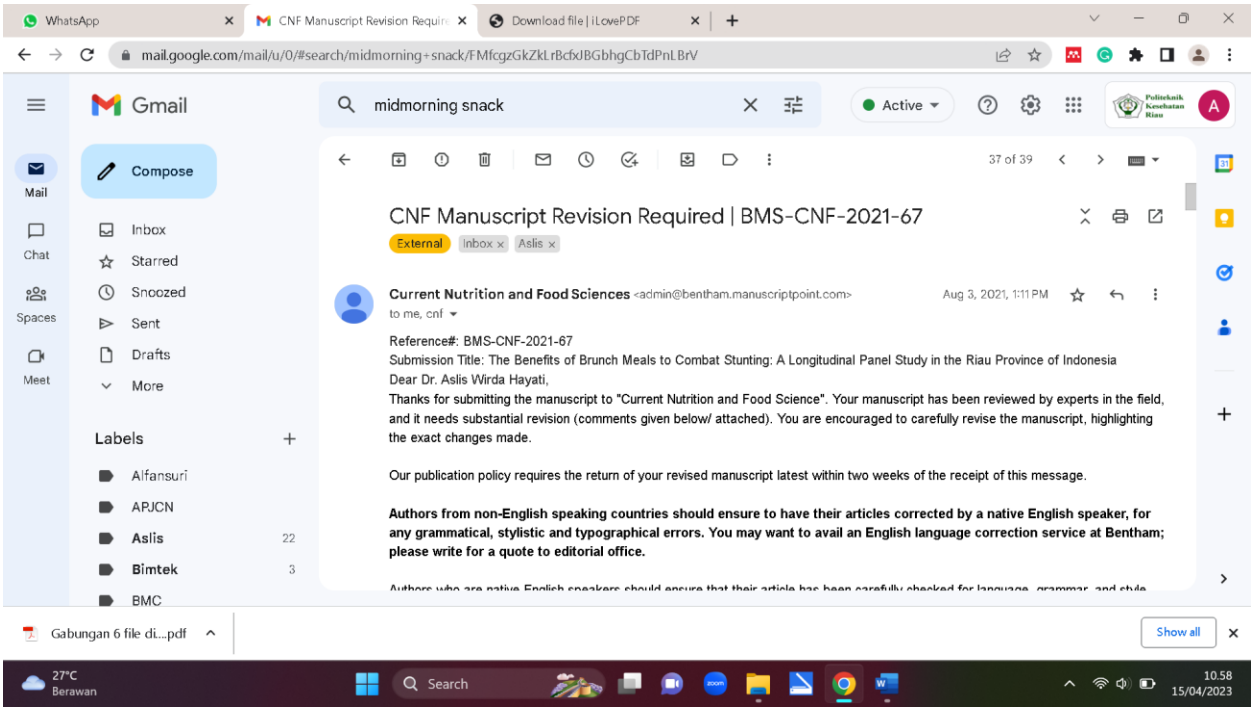
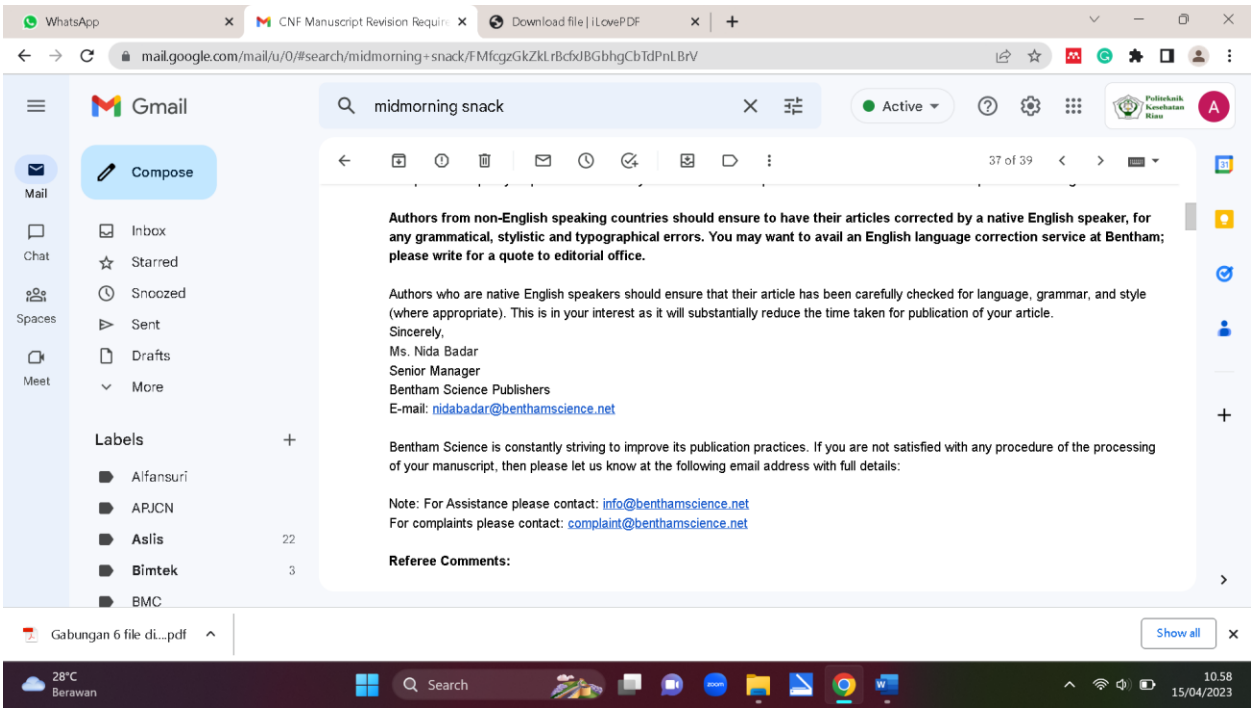
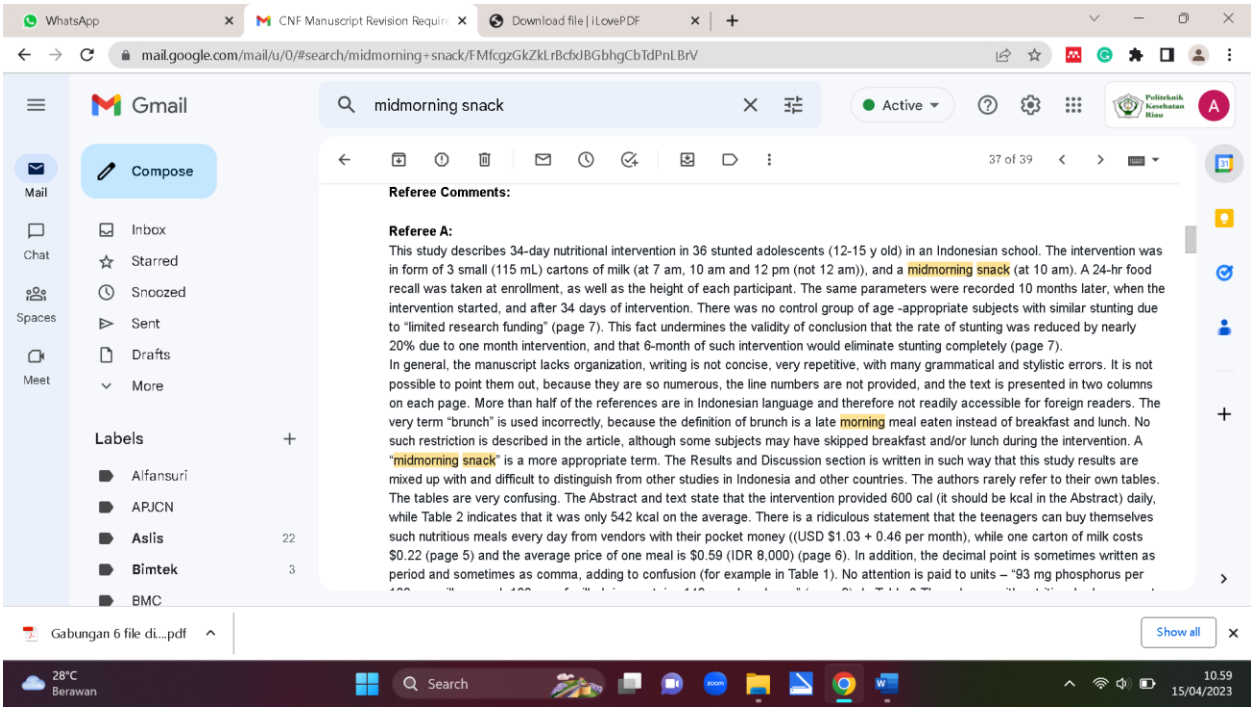
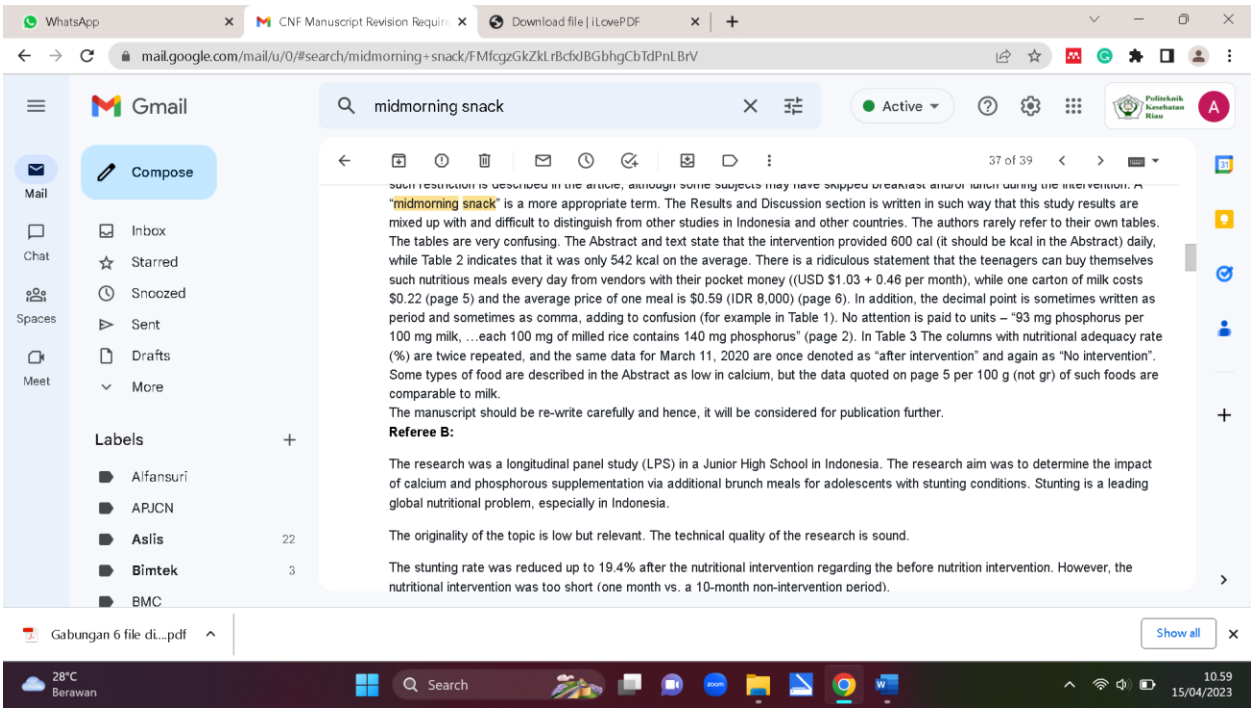
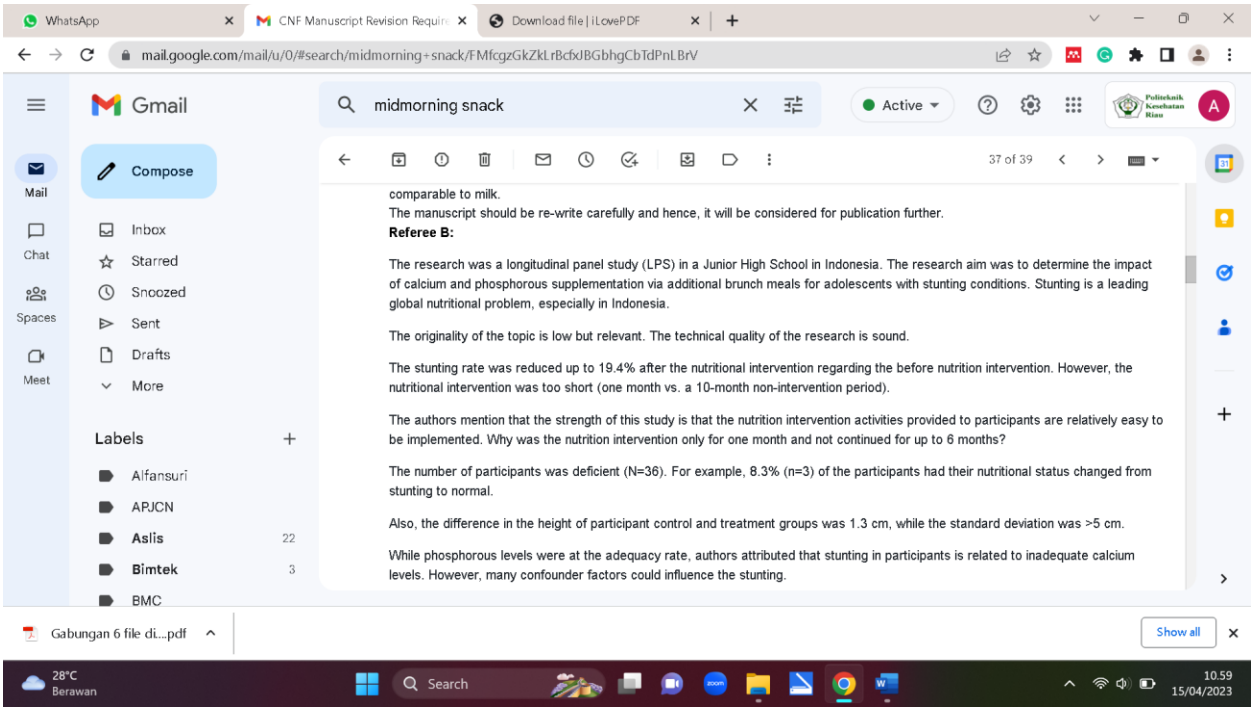
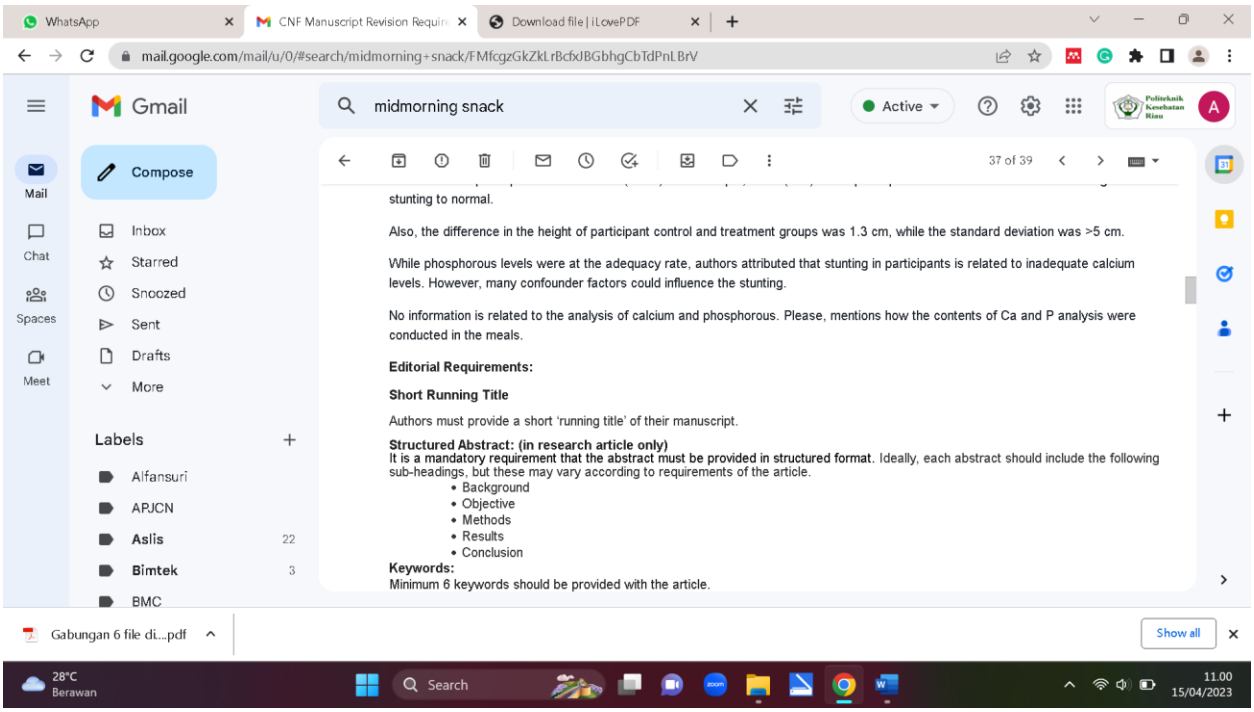

WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
CNF Manuscript Revision Required | BMS-CNF-2021-67
External
Inbox ×
Aslis ×
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Aug 3, 2021, 1:11 PM
to me, cnf
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Aslis Wirda Hayati,
Thanks for submitting the manuscript to "Current Nutrition and Food Science". Your manuscript has been reviewed by experts in the field, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made.
Our publication policy requires the return of your revised manuscript latest within two weeks of the receipt of this message.
Authors from non-English speaking countries should ensure to have their articles corrected by a native English speaker, for any grammatical, stylistic and typographical errors. You may want to avail an English language correction service at Bentham; please write for a quote to editorial office.
Gabungan 6 file di...pdf
Show all
27°C
Berawan
Search
10.58
15/04/2023

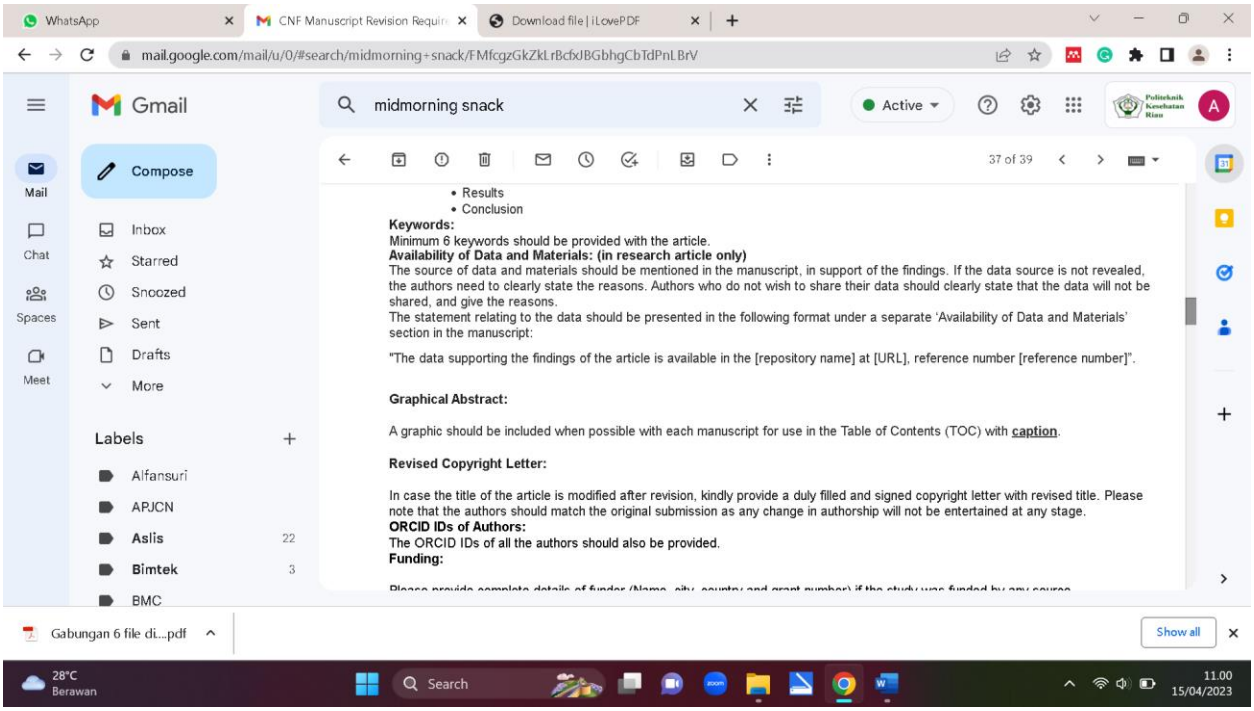

WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
Authors from non-English speaking countries should ensure to have their articles corrected by a native English speaker, for any grammatical, stylistic and typographical errors. You may want to avail an English language correction service at Bentham; please write for a quote to editorial office.
Authors who are native English speakers should ensure that their article has been carefully checked for language, grammar, and style (where appropriate). This is in your interest as it will substantially reduce the time taken for publication of your article.
Sincerely,
Ms. Nida Badar
Senior Manager
Bentham Science Publishers
E-mail: nidabadar@benthamscience.net
Bentham Science is constantly striving to improve its publication practices. If you are not satisfied with any procedure of the processing of your manuscript, then please let us know at the following email address with full details:
Note: For Assistance please contact: info@benthamscience.net
For complaints please contact: complaint@benthamscience.net
Referee Comments:
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
10.58
15/04/2023

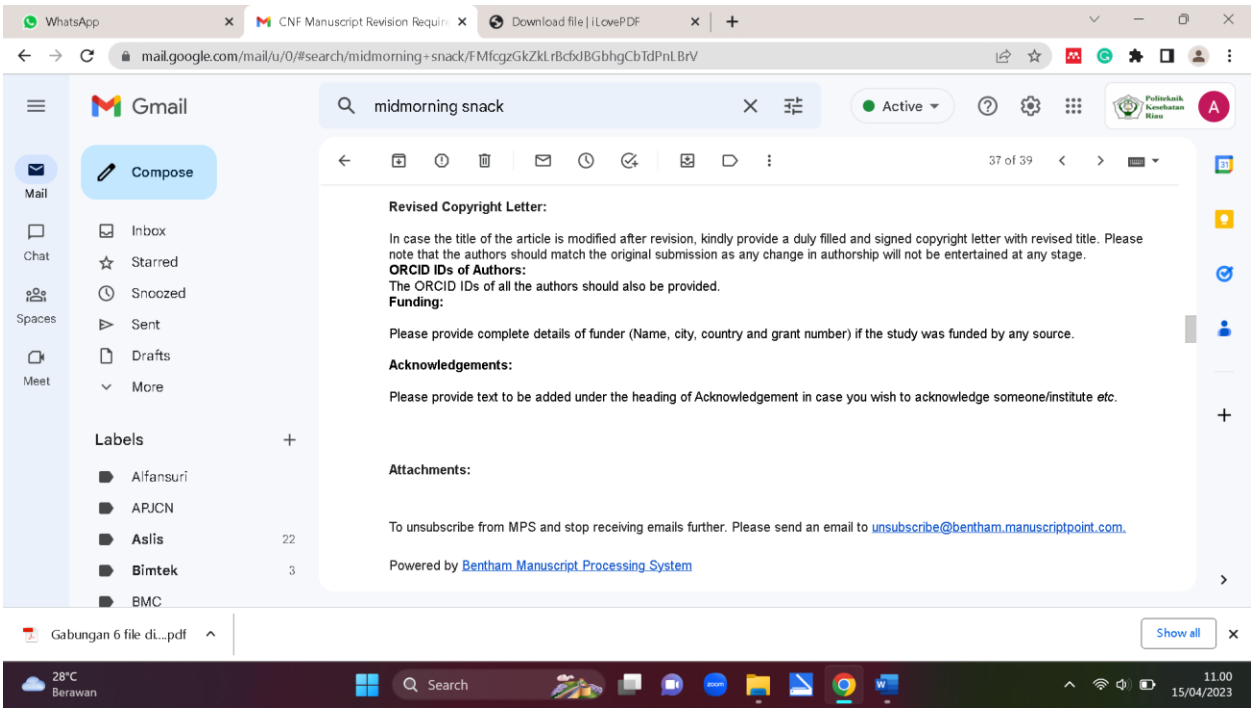

WhatsApp
CNF Manuscript Revision Require
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
Referee Comments:
Referee A:
This study describes 34-day nutritional intervention in 36 stunted adolescents (12-15 y old) in an Indonesian school. The intervention was in form of 3 small (115 mL) cartons of milk (at 7 am, 10 am and 12 pm (not 12 am)), and a midmorning snack (at 10 am). A 24-hr food recall was taken at enrollment, as well as the height of each participant. The same parameters were recorded 10 months later, when the intervention started, and after 34 days of intervention. There was no control group of age -appropriate subjects with similar stunting due to "limited research funding" (page 7). This fact undermines the validity of conclusion that the rate of stunting was reduced by nearly 20% due to one month intervention, and that 6-month of such intervention would eliminate stunting completely (page 7).
In general, the manuscript lacks organization, writing is not concise, very repetitive, with many grammatical and stylistic errors. It is not possible to point them out, because they are so numerous, the line numbers are not provided, and the text is presented in two columns on each page. More than half of the references are in Indonesian language and therefore not readily accessible for foreign readers. The very term "brunch" is used incorrectly, because the definition of brunch is a late morning meal eaten instead of breakfast and lunch. No such restriction is described in the article, although some subjects may have skipped breakfast and/or lunch during the intervention. A "midmorning snack" is a more appropriate term. The Results and Discussion section is written in such way that this study results are mixed up with and difficult to distinguish from other studies in Indonesia and other countries. The authors rarely refer to their own tables. The tables are very confusing. The Abstract and text state that the intervention provided 600 cal (it should be kcal in the Abstract) daily, while Table 2 indicates that it was only 542 kcal on the average. There is a ridiculous statement that the teenagers can buy themselves such nutritious meals every day from vendors with their pocket money ((USD $1.03 + 0.46 per month), while one carton of milk costs $0.22 (page 5) and the average price of one meal is $0.59 (IDR 8,000) (page 6). In addition, the decimal point is sometimes written as period and sometimes as comma, adding to confusion (for example in Table 1). No attention is paid to units – "93 mg phosphorus per
Gabungan 6 file di...pdf
Show all
28°C Berawan
Search
10.59 15/04/2023

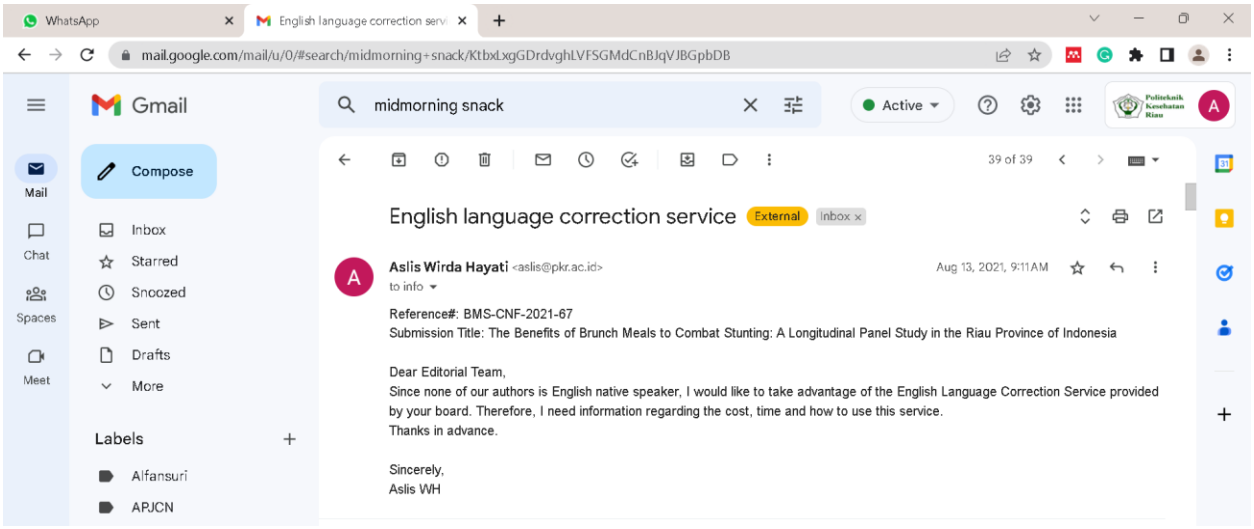

WhatsApp
CNF Manuscript Revision Require
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
such restriction is described in the article, although some subjects may have skipped breakfast and/or lunch during the intervention. A "midmorning snack" is a more appropriate term. The Results and Discussion section is written in such way that this study results are mixed up with and difficult to distinguish from other studies in Indonesia and other countries. The authors rarely refer to their own tables. The tables are very confusing. The Abstract and text state that the intervention provided 600 cal (it should be kcal in the Abstract) daily, while Table 2 indicates that it was only 542 kcal on the average. There is a ridiculous statement that the teenagers can buy themselves such nutritious meals every day from vendors with their pocket money ((USD $1.03 + 0.46 per month), while one carton of milk costs $0.22 (page 5) and the average price of one meal is $0.59 (IDR 8,000) (page 6). In addition, the decimal point is sometimes written as period and sometimes as comma, adding to confusion (for example in Table 1). No attention is paid to units – "93 mg phosphorus per 100 mg milk, …each 100 mg of milled rice contains 140 mg phosphorus" (page 2). In Table 3 The columns with nutritional adequacy rate (%) are twice repeated, and the same data for March 11, 2020 are once denoted as "after intervention" and again as "No intervention". Some types of food are described in the Abstract as low in calcium, but the data quoted on page 5 per 100 g (not gr) of such foods are comparable to milk.
The manuscript should be re-write carefully and hence, it will be considered for publication further.
Referee B:
The research was a longitudinal panel study (LPS) in a Junior High School in Indonesia. The research aim was to determine the impact of calcium and phosphorous supplementation via additional brunch meals for adolescents with stunting conditions. Stunting is a leading global nutritional problem, especially in Indonesia.
The originality of the topic is low but relevant. The technical quality of the research is sound.
The stunting rate was reduced up to 19.4% after the nutritional intervention regarding the before nutrition intervention. However, the nutritional intervention was too short (one month vs. a 10-month non-intervention period).
Gabungan 6 file di...pdf
Show all
28°C Berawan
Search
10.59 15/04/2023

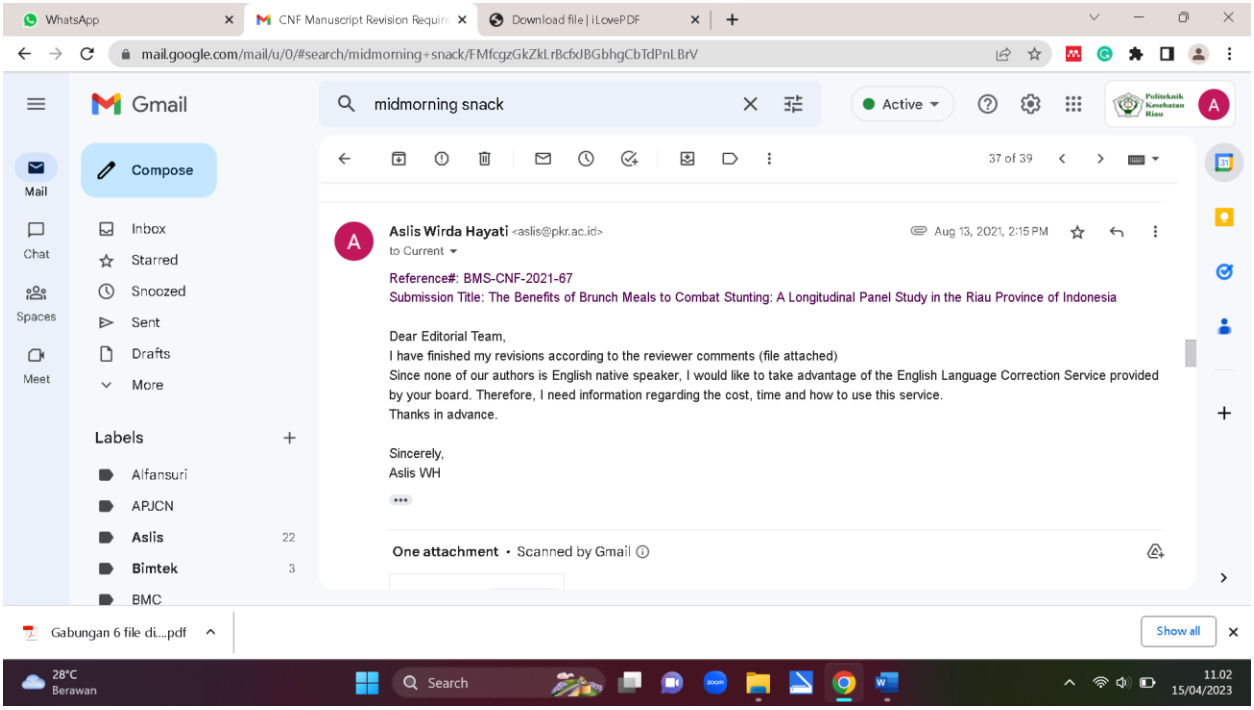

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
37 of 39
comparable to milk.
The manuscript should be re-write carefully and hence, it will be considered for publication further.
Referee B:
The research was a longitudinal panel study (LPS) in a Junior High School in Indonesia. The research aim was to determine the impact of calcium and phosphorous supplementation via additional brunch meals for adolescents with stunting conditions. Stunting is a leading global nutritional problem, especially in Indonesia.
The originality of the topic is low but relevant. The technical quality of the research is sound.
The stunting rate was reduced up to 19.4% after the nutritional intervention regarding the before nutrition intervention. However, the nutritional intervention was too short (one month vs. a 10-month non-intervention period).
The authors mention that the strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented. Why was the nutrition intervention only for one month and not continued for up to 6 months?
The number of participants was deficient (N=36). For example, 8.3% (n=3) of the participants had their nutritional status changed from stunting to normal.
Also, the difference in the height of participant control and treatment groups was 1.3 cm, while the standard deviation was >5 cm.
While phosphorous levels were at the adequacy rate, authors attributed that stunting in participants is related to inadequate calcium levels. However, many confounder factors could influence the stunting.
Gabungan 6 file di...pdf
Show all
Search
10.59
15/04/2023

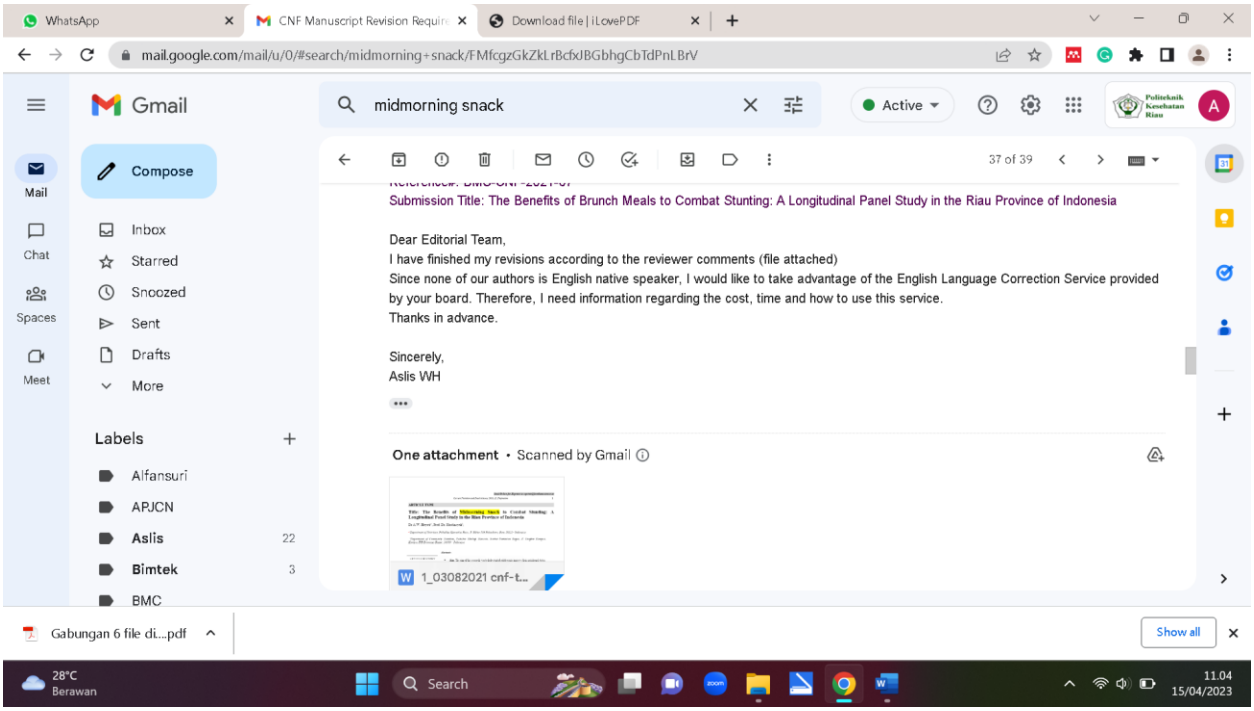

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
37 of 39
stunting to normal.
Also, the difference in the height of participant control and treatment groups was 1.3 cm, while the standard deviation was >5 cm.
While phosphorous levels were at the adequacy rate, authors attributed that stunting in participants is related to inadequate calcium levels. However, many confounder factors could influence the stunting.
No information is related to the analysis of calcium and phosphorous. Please, mentions how the contents of Ca and P analysis were conducted in the meals.
Editorial Requirements:
Short Running Title
Authors must provide a short 'running title' of their manuscript.
Structured Abstract: (in research article only)
It is a mandatory requirement that the abstract must be provided in structured format. Ideally, each abstract should include the following sub-headings, but these may vary according to requirements of the article.
Background
Objective
Methods
Results
Conclusion
Keywords:
Minimum 6 keywords should be provided with the article.
Gabungan 6 file di...pdf
Show all
Search
11.00
15/04/2023

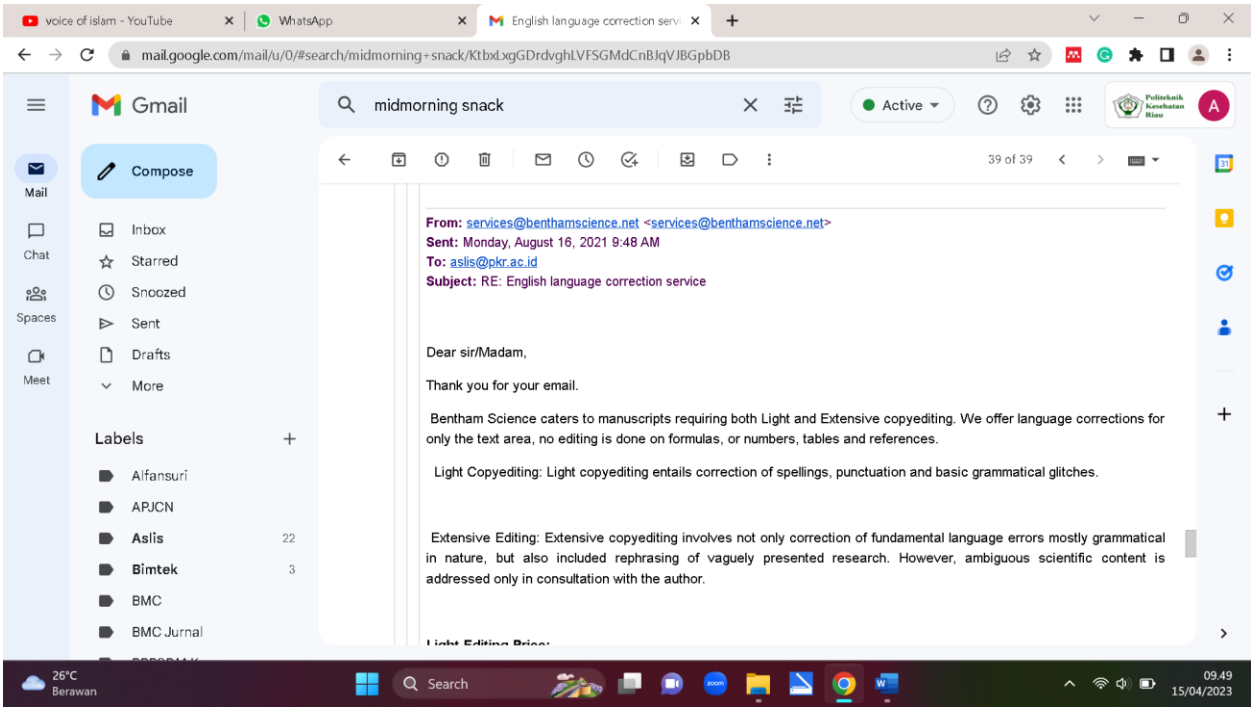

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
37 of 39
• Results
• Conclusion
Keywords:
Minimum 6 keywords should be provided with the article.
Availability of Data and Materials: (in research article only)
The source of data and materials should be mentioned in the manuscript, in support of the findings. If the data source is not revealed, the authors need to clearly state the reasons. Authors who do not wish to share their data should clearly state that the data will not be shared, and give the reasons.
The statement relating to the data should be presented in the following format under a separate 'Availability of Data and Materials' section in the manuscript:
"The data supporting the findings of the article is available in the [repository name] at [URL], reference number [reference number]".
Graphical Abstract:
A graphic should be included when possible with each manuscript for use in the Table of Contents (TOC) with caption.
Revised Copyright Letter:
In case the title of the article is modified after revision, kindly provide a duly filled and signed copyright letter with revised title. Please note that the authors should match the original submission as any change in authorship will not be entertained at any stage.
ORCID IDs of Authors:
The ORCID IDs of all the authors should also be provided.
Funding:
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.00
15/04/2023

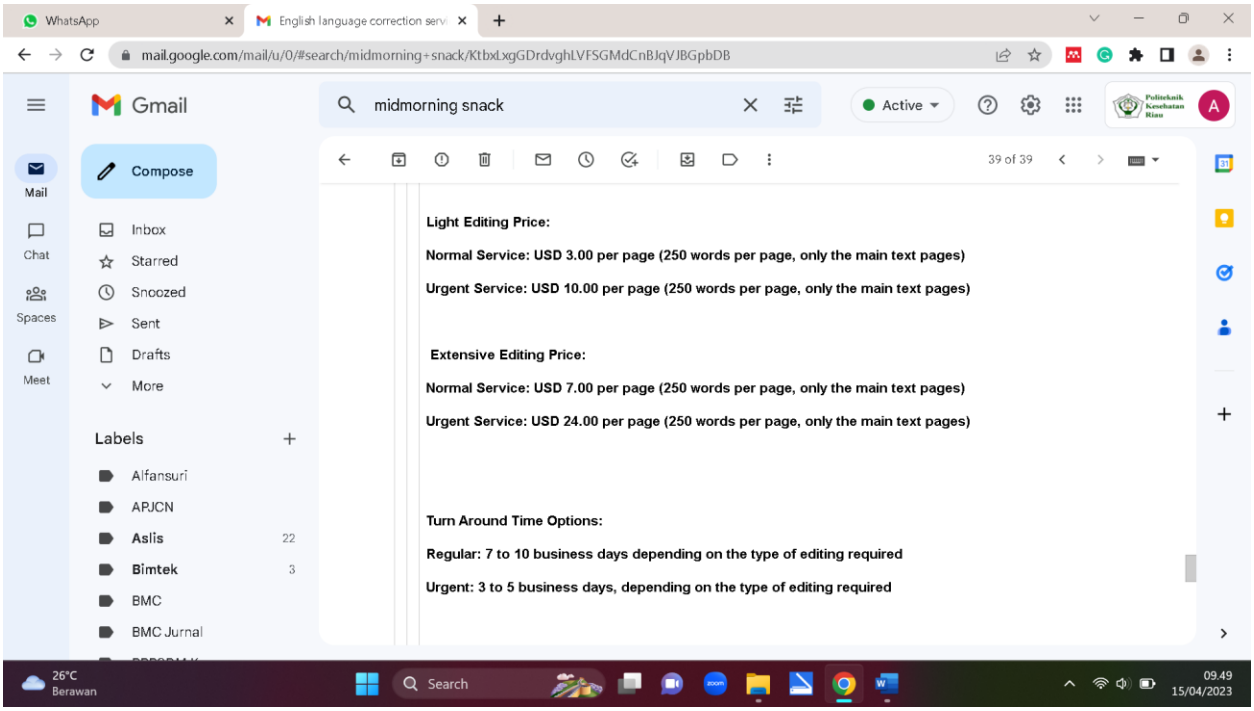

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
37 of 39
Revised Copyright Letter:
In case the title of the article is modified after revision, kindly provide a duly filled and signed copyright letter with revised title. Please note that the authors should match the original submission as any change in authorship will not be entertained at any stage.
ORCID IDs of Authors:
The ORCID IDs of all the authors should also be provided.
Funding:
Please provide complete details of funder (Name, city, country and grant number) if the study was funded by any source.
Acknowledgements:
Please provide text to be added under the heading of Acknowledgement in case you wish to acknowledge someone/institute etc.
Attachments:
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.00
15/04/2023

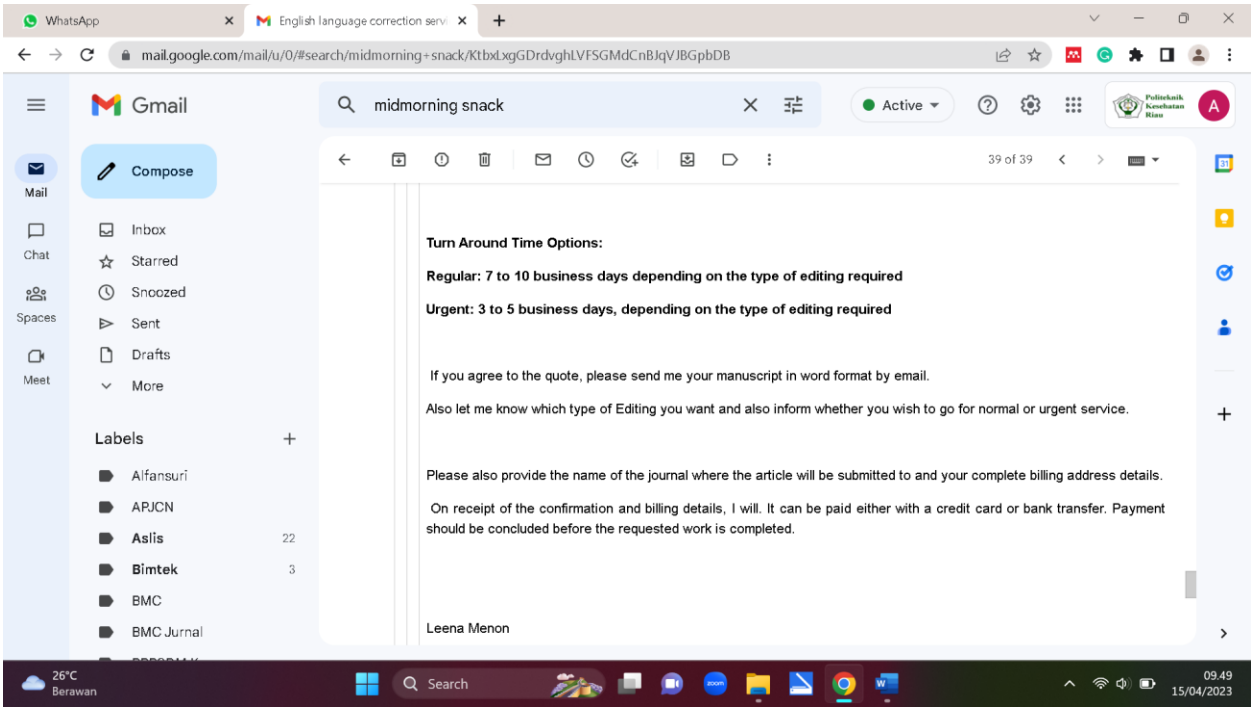

WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
39 of 39
English language correction service
External
Inbox ×
Aslis Wirda Hayati <aslis@pkr.ac.id>
to info
Aug 13, 2021, 9:11 AM
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Editorial Team,
Since none of our authors is English native speaker, I would like to take advantage of the English Language Correction Service provided by your board. Therefore, I need information regarding the cost, time and how to use this service.
Thanks in advance.
Sincerely,
Aslis WH

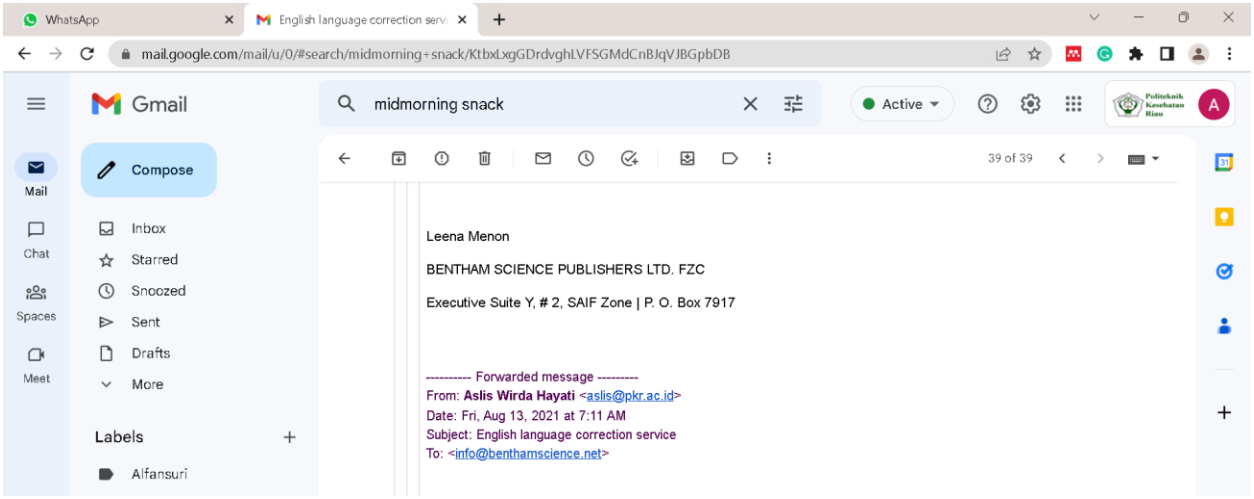

WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Aug 13, 2021, 2:15 PM
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Editorial Team,
I have finished my revisions according to the reviewer comments (file attached)
Since none of our authors is English native speaker, I would like to take advantage of the English Language Correction Service provided by your board. Therefore, I need information regarding the cost, time and how to use this service.
Thanks in advance.
Sincerely,
Aslis WH
One attachment • Scanned by Gmail
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.02
15/04/2023

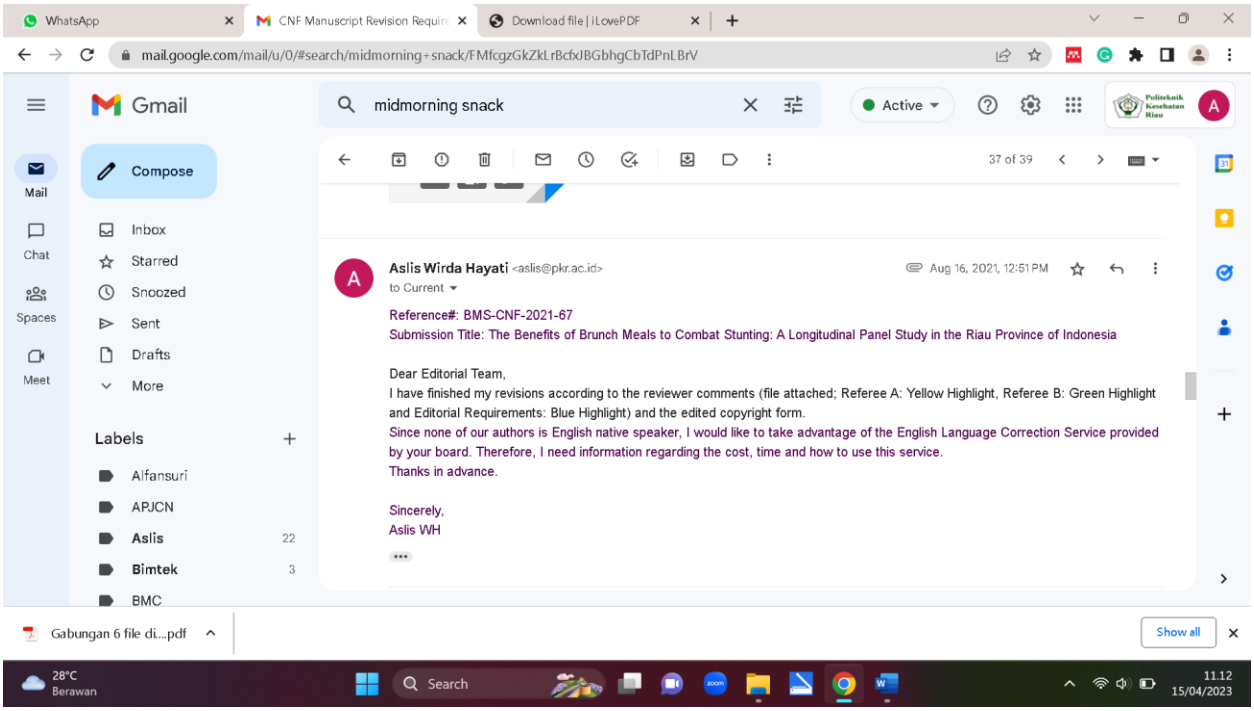

WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Editorial Team,
I have finished my revisions according to the reviewer comments (file attached)
Since none of our authors is English native speaker, I would like to take advantage of the English Language Correction Service provided by your board. Therefore, I need information regarding the cost, time and how to use this service.
Thanks in advance.
Sincerely,
Aslis WH
One attachment • Scanned by Gmail
1_03082021 cnf-t...
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.04
15/04/2023

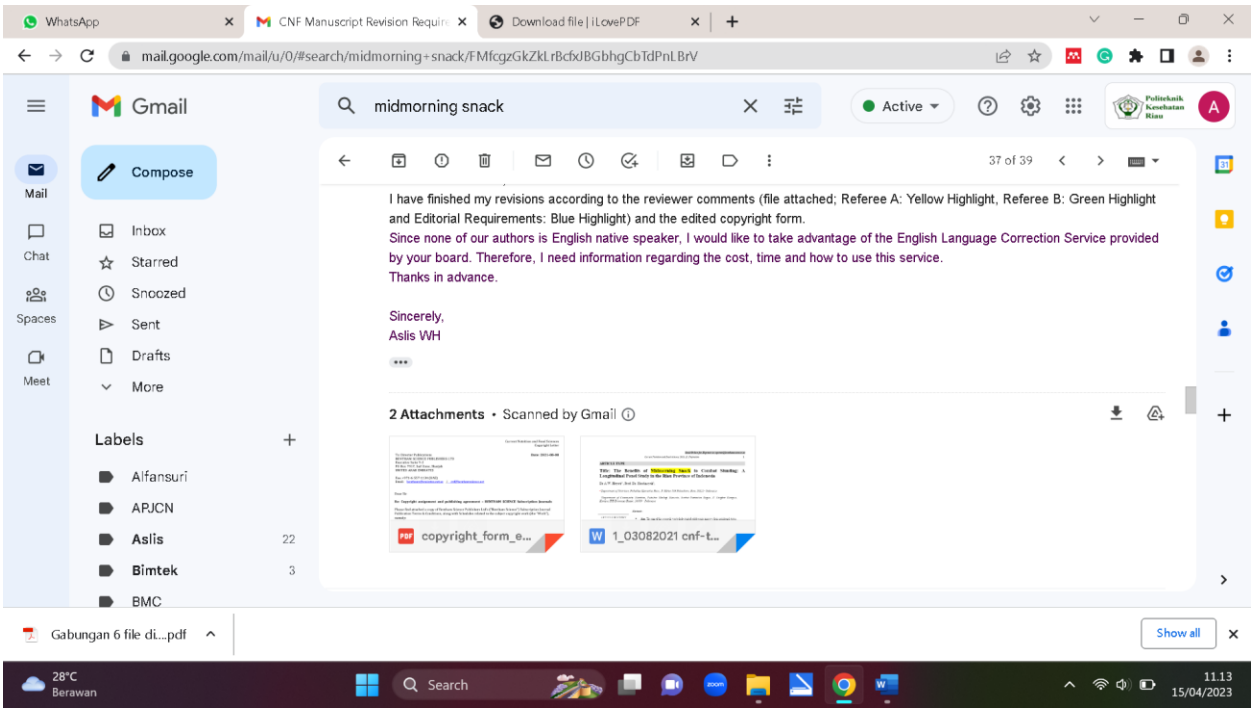

voice of islam - YouTube
WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
From: services@benthamscience.net <services@benthamscience.net>
Sent: Monday, August 16, 2021 9:48 AM
To: aslis@pkr.ac.id
Subject: RE: English language correction service
Dear sir/Madam,
Thank you for your email.
Bentham Science caters to manuscripts requiring both Light and Extensive copyediting. We offer language corrections for only the text area, no editing is done on formulas, or numbers, tables and references.
Light Copyediting: Light copyediting entails correction of spellings, punctuation and basic grammatical glitches.
Extensive Editing: Extensive copyediting involves not only correction of fundamental language errors mostly grammatical in nature, but also included rephrasing of vaguely presented research. However, ambiguous scientific content is addressed only in consultation with the author.
26°C Berawan
Search
09.49 15/04/2023


WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Light Editing Price:
Normal Service: USD 3.00 per page (250 words per page, only the main text pages)
Urgent Service: USD 10.00 per page (250 words per page, only the main text pages)
Extensive Editing Price:
Normal Service: USD 7.00 per page (250 words per page, only the main text pages)
Urgent Service: USD 24.00 per page (250 words per page, only the main text pages)
Turn Around Time Options:
Regular: 7 to 10 business days depending on the type of editing required
Urgent: 3 to 5 business days, depending on the type of editing required
26°C Berawan
Search
09.49 15/04/2023


WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Turn Around Time Options:
Regular: 7 to 10 business days depending on the type of editing required
Urgent: 3 to 5 business days, depending on the type of editing required
If you agree to the quote, please send me your manuscript in word format by email.
Also let me know which type of Editing you want and also inform whether you wish to go for normal or urgent service.
Please also provide the name of the journal where the article will be submitted to and your complete billing address details.
On receipt of the confirmation and billing details, I will. It can be paid either with a credit card or bank transfer. Payment should be concluded before the requested work is completed.
Leena Menon
26°C
Berawan
Search
09.49
15/04/2023


WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
39 of 39
Leena Menon
BENTHAM SCIENCE PUBLISHERS LTD. FZC
Executive Suite Y, # 2, SAIF Zone | P. O. Box 7917
---------- Forwarded message ---------
From: Aslis Wirda Hayati <aslis@pkr.ac.id>
Date: Fri, Aug 13, 2021 at 7:11 AM
Subject: English language correction service
To: <info@benthamscience.net>


WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
Aug 16, 2021, 12:51 PM
to Current
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Editorial Team,
I have finished my revisions according to the reviewer comments (file attached; Referee A: Yellow Highlight, Referee B: Green Highlight and Editorial Requirements: Blue Highlight) and the edited copyright form.
Since none of our authors is English native speaker, I would like to take advantage of the English Language Correction Service provided by your board. Therefore, I need information regarding the cost, time and how to use this service.
Thanks in advance.
Sincerely,
Aslis WH
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.12
15/04/2023


WhatsApp
CNF Manuscript Revision Requir
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
37 of 39
I have finished my revisions according to the reviewer comments (file attached; Referee A: Yellow Highlight, Referee B: Green Highlight and Editorial Requirements: Blue Highlight) and the edited copyright form.
Since none of our authors is English native speaker, I would like to take advantage of the English Language Correction Service provided by your board. Therefore, I need information regarding the cost, time and how to use this service.
Thanks in advance.
Sincerely,
Aslis WH
2 Attachments • Scanned by Gmail
copyright_form_e...
1_03082021 cnf-t...
Gabungan 6 file di...pdf
Show all
28°C
Berawan
Search
11.13
15/04/2023

To: Director Publications
BENTHAM SCIENCE PUBLISHERS LTD
Executive Suite Y-2
PO Box 7917, Saif Zone, Sharjah
UNITED ARAB EMIRATES

Date: 2021-08-08

Fax: +971-6-557-1134 (UAE)
Email: benthams@emirates.net.ae / cnf@benthamscience.net

Dear Sir

Re: Copyright assignment and publishing agreement – BENTHAM SCIENCE Subscription Journals

Please find attached a copy of Bentham Science Publishers Ltd's ("Bentham Science") Subscription Journal Publication Terms & Conditions, along with Schedules related to the subject copyright work (the "Work"), namely:

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

I am the Principal / Corresponding Author of the Work, and my contact details are found in the signature block below. In order to submit the Work for publication with Bentham Science, I understand that:

- it is necessary to complete and submit this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules;
- this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules, together comprise the copyright assignment and publishing agreement between myself and Bentham Science relating to the Work; and
- while primarily contemplating publication in Bentham Science subscription journal/s, this documentation also allows me to select an option ("Open Access Plus") and pay an associated fee to have the Work published on an open access basis.

Name: Aslis Wirda Hayati

Principal / Corresponding Author of the Work ("Assignor")

Affiliation: Poltekkes Kemenkes Riau, Nutrition

Address: Jl. Melur 103

Telephone: +62818106440

Fax: ---

Email: aslis@pkr.ac.id

BACKGROUND

1.1. The "Work" is the research article, review article, letter, clinical trial study, report, article, or other copyright work, as identified in the Copyright Letter and further detailed in Schedule 1: Details of the Work (including such form of the copyright work submitted to Bentham Science for publication pursuant to clause 4, below), but excluding (except where context otherwise requires) any diagrams, figures or illustration specifically identified to Bentham Science pursuant to clause 3.2, below.
1.2. Bentham Science and the Assignor agree that these Subscription Journal Publication Terms & Conditions, along with the details set-out in the Copyright Letter and in the Schedules, comprise the agreement between the parties relating to Work (the "Agreement").

2. AUTHORS

2.1. The individual/s identified in Schedule 2: Authors are the authors of the Work ("Author/s"). The Assignor represents and warrants that he or she has full right and power to enter into this Agreement, and (where the Assignor is not the sole author) that the Author/s of the Work consent and agree to the terms of this Agreement and have irrevocably granted all rights in the Work to the Assignor for assignment to Bentham Science in accordance with the terms of this Agreement. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science.
2.2. The Assignor represents and warrants that the Author/s have, to the fullest extent permitted by applicable law, waived or undertaken to refrain from enforcing against Bentham Science, their moral rights in the Work. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science

3. COPYRIGHT ASSIGNMENT

3.1. Subject to clause 3.2, in consideration of the mutual undertakings contained herein, the Assignor hereby assigns to Bentham Science absolutely with full title guarantee the following rights throughout the world:
(a) the entire copyright and all other rights in the nature of copyright subsisting in the Work and in all preliminary drafts or earlier versions of the Work;
(b) all other rights in the Work of whatever nature (but, for the avoidance of doubt, excluding any intellectual property rights in any theory, apparatus or invention expressed in the Work), whether now known or created in the future, to which the Assignor is now, or at any time after the date of this Agreement may be, entitled by virtue of the laws in force in any part of the world; and
(c) all rights in and to all physical and digital materials of any kind which embody the Work in whole or in part;

together with all related rights and powers arising or accrued, including the right to bring, make, oppose, defend, appeal and obtain relief (and to retain any damages recovered) in respect of any infringement, or any other cause of action arising from ownership, of any of these assigned rights, whether occurring before, on, or after the date of this Agreement.
3.2. To the extent that copyright in any of the diagrams, illustrations or figures incorporated into the Work does not belong to the Assignor, the Assignor undertakes to specifically identify such diagrams, illustrations or figures to Bentham Science, and to procure (and warrants that it has procured) for Bentham Science such rights as will enable Bentham Science to use (without limitation) such diagrams, illustrations and figures, without restriction, in the course of publishing the Work. Where context requires, references to "Work" in this Agreement shall include references to such diagrams, illustrations or figures.
3.3. Bentham Science may charge, assign and/or license the benefit of this Agreement in whole or in part, including (without limitation) any and all rights assigned to Bentham Science hereunder, and the benefit of any representations, warranties, indemnities and undertakings of the Assignor, to any third party.

4. DELIVERY AND PUBLISHING

4.1. Bentham Science offers publishing via a variety of methods. The parties agree that, at a minimum, and subject to the terms of this Agreement, the Work shall be published in the subscription journal specified, in Schedule 3: Publishing. Additionally, if so specified in the space provided in Schedule 3: Publishing in respect of "Open Access Plus", and subject to the commercial terms specified therein and the other terms of this Agreement, the Work shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: https://creativecommons.org/licenses/by/4.0/legalcode
4.2. The Assignor may, if so specified in the space provided in Schedule 1: Details of the Work, opt to have Bentham Science, or its third party contractor, provide a short animated video summarising the salient aspects of the Work, on the basis that all rights, title and interest in such short animated video shall become part of the Work for the purposes of this Agreement. The provision of such service by Bentham Science or its third party contractor shall be subject to the prevailing terms and rates relating to such service. Such animated video shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY-NC-ND 4.0), a copy of which is available at https://creativecommons.org/licenses/by-nc-nd/4.0/, and Bentham Science shall retain all rights to exploit the video commercially.
4.3. The Assignor undertakes to provide to Bentham Science, by the deadline specified in Schedule 1: Details of the Work (the "Submission Deadline"), an electronic copy of the Work in a high-quality, professionally prepared, production-ready format. The Assignor undertakes to ensure that all pages of the Work so submitted have been proof-read carefully, and that all diagrams, illustrations, figures and captions, are of excellent quality, with regard to both substance and form.

4.4. The Assignor represents and warrants that the Work has been prepared in accordance with the relevant Guidelines, and checked for all possible linguistic inconsistencies and errors, including grammar, style and typography, by someone with a high command of the English language and familiarity with academic writing in the English language. ("Guidelines" means the Instructions to Authors available on the Bentham Science website, as well as the Aims & Scope applicable to the relevant Bentham Science publication). Bentham Science's nominated service provider, Eureka Science, offers English language support services which Assignor may elect to utilise in respect of the Work by completing the applicable box in Schedule 1: Details of the Work. The provision of such services by Eureka Science shall be subject to Eureka Science's prevailing terms and rates relating to such type of optional support.

4.5. In the space provided in Schedule 1: Details of the Work, the Assignor shall disclose whether or not the Work reports experiments involving humans or animals.

4.6. Bentham Science shall be entitled to carry-out such minor amendments or adjustments to the Work as it considers necessary in order to ensure conformity with Bentham Science's production and presentation requirements. If Bentham Science notifies the Assignor that the Work requires amendments or adjustments beyond what Bentham Science considers to be minor, then the Assignor may opt to either: i. address such issues directly (within a reasonable timeframe specified by Bentham Science), or ii. instruct Bentham Science to address such issues. If the Assignor instructs Bentham Science to address the issues, Bentham Science's terms and rates relating to this type of optional support shall apply, and Bentham Science shall confirm the likely costs to the Assignor before commencing any such work.

4.7. For quality monitoring purposes, Bentham Science will seek a review of the Work by specialists familiar with the subject matter. The Assignor acknowledges and agrees that acceptance of the Work by Bentham Science and publication of the same shall be subject to positive peer review by independent referees. Bentham Science may consult such referees as it considers appropriate, including referees identified by reference to publication records, recommendations of editorial board members, or otherwise.

4.8. Nothing in this Agreement shall restrict Bentham Science, as assignee of the copyright in the Work, from publishing and marketing the Work in any manner (including via third parties such as third party aggregators). Bentham Science reserves the right to refrain from publishing the Work, or to withdraw the Work from circulation following publication, at its own discretion. Without limitation, Bentham Science may exercise this right if it determines that the Work contains language errors that exceed 5% or more of the total Work (based on total word count), if the work fails to conform with Bentham Science's production and presentation requirements, if the work attracts undesirable or negative publicity that Bentham considers may impact on the reputations of the Author/s or Bentham Science, and/or for its own commercial reasons.

5. SELF-ARCHIVING POLICIES

By signing the Copyright Letter the authors retain the rights of self-archiving. Following are the important features of self-archiving policy of Bentham Science journals:

(a) Authors can deposit the first draft of a submitted article on their personal websites, their institution's repositories or any non-commercial repository for personal use, internal institutional use or for permitted scholarly posting only.

(b) Authors may deposit the ACCEPTED VERSION of the peer-reviewed article on their personal websites, their institution's repository or any non-commercial repository such as PMC, arXiv after 12 MONTHS of publication on the journal website. In addition, an acknowledgement must be given to the original source of publication and a link should be inserted to the published article on the journal's/publisher's website.

(c) If the research is funded by NIH, Wellcome Trust or any other Open Access Mandate, authors are allowed the archiving of published version of manuscripts in an institutional repository after the mandatory embargo period. Authors should first contact the Editorial Office of the journal for information about depositing a copy of the manuscript to a repository. Consistent with the copyright agreement, Bentham Science does not allow archiving of FINAL PUBLISHED VERSION of manuscripts unless under an open access mandate as above.

(d) The link to the original source of publication should be provided by inserting the DOI number of the article in the following sentence: "The published manuscript is available at EurekaSelect via http://www.eurekaselect.com/[insert DOI]."

(e) There is no embargo on the archiving of articles published under the OPEN ACCESS PLUS category. Authors are allowed deposition of such articles on institutional, non-commercial repositories and personal websites immediately after publication on the journal website.

6. CONFLICTS

The Assignor shall disclose, in Schedule 1: Details of the Work, details relating to all actual or potential conflicts of interest relating to the Work, and all financial contributions relevant to the Work and its publication pursuant to this Agreement. If requested by Bentham Science, the Assignor shall provide Bentham Science with any further information it may request in respect of such matters.

7. WARRANTIES

The Assignor warrants and undertakes that, as at the date of this Agreement:
a) the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. Bentham Science Publishers uses the iThenticate software to detect instances of overlapping and similar text in submitted manuscripts. iThenticate software checks content against a database of periodicals, the Internet, and a comprehensive article database.
b) the Assignor is the sole legal and beneficial owner of the rights purported to be assigned pursuant to this Agreement, and (if applicable) the Assignor has obtained any and all necessary assignments or other permissions from co-authors and/or employers to ensure that the Assignor is able to comply with its obligations and to assign the rights purported to be assigned pursuant to this Agreement
c) the Assignor is exclusively entitled to give all warranties, indemnities, assurances, confirmations, waivers and agreements set out in this Agreement
d) the Work has not been published by any third party, or submitted to any third party for consideration for publication, and will not be published by any third party or submitted to any third party for consideration by or on behalf of the Assignor or any of the Author/s;
e) once the Work has been submitted to Bentham Science for publication in accordance with clause 4, the Assignor will not attempt to withdraw the Work from publication;
f) the Assignor has not assigned or granted to any third party any of the rights assigned or granted pursuant to this Agreement;
g) the exploitation of the rights assigned or granted by this Agreement will not infringe the rights of any third party, including without limitation, any third party intellectual property rights and any rights to register the same;
h) the Assignor is unaware of any infringement, or likely infringement, of any of the rights assigned or granted pursuant to this Agreement;
i) the rights assigned by this Agreement are free from any security interest, option, mortgage, charge or lien;
j) the Work is factually accurate and contains no matter which is scandalous, libellous, unlawful, or otherwise actionable;
k) there are no actual or potential conflicts of interest, except as specified in Schedule 1: Details of the Work;
l) there has been no financial contribution to the Work, except as specified in Schedule 1: Details of the Work; and
m) there have been no experiments involving humans or animals, except as specified in Schedule 1: Details of the Work.

8. INDEMNITIES

8.1. The Assignor shall indemnify Bentham Science against all liabilities, costs, expenses, damages and losses (including any direct, indirect or consequential losses, loss of profit, loss of reputation and all interest, penalties and legal costs (calculated on a full indemnity basis) and all other professional costs and expenses) suffered or incurred by Bentham Science arising out of or in connection with:
(a) any breach by the Assignor of any of the warranties contained in clause 7; and
(b) the enforcement of this Agreement.
8.2. At the request of Bentham Science, and at the Assignor's own expense, the Assignor shall provide all reasonable assistance to enable Bentham Science to resist any claim, action or proceedings brought against Bentham Science as a consequence of any breach by the Assignor of the warranties contained in clause 7. This indemnity shall apply whether or not Bentham Science has been negligent or at fault.

9. FURTHER ASSURANCE

9.1. At its own expense the Assignor shall, and shall use all reasonable endeavours to procure that any necessary third party shall, promptly execute such documents and perform such acts as may reasonably be required for the purpose of giving full effect to this Agreement, including assisting Bentham Science in perfecting title, defending and enforcing the copyright or any other rights granted to Bentham Science pursuant to this Agreement, and assisting with any other proceedings which may be brought by or against Bentham Science against or by any third party relating to the rights assigned by this Agreement.
9.2. The Assignor irrevocably appoints Bentham Science to be its attorney in its name and on its behalf to execute documents, use the Assignor’s name and do all things which are necessary or desirable for Bentham Science to obtain for itself or its nominee the full benefit of this Agreement. This power of attorney is irrevocable as long as any of the Assignor's obligations under this Agreement remain undischarged. The attorney may, in any way it thinks fit and in the name and on behalf of the Assignor:
(a) take any action that this Agreement requires the Assignor to take;
(b) exercise any rights which this Agreement gives to the Assignor; and
(c) appoint and remove one or more substitute attorneys with full power as the Assignor's attorney on terms that the attorney thinks fit.

The Assignor must ratify and confirm everything that the attorney and any substitute attorney does or arranges using the powers granted under this clause.

10. BENTHAM SCIENCE - PRIVACY POLICY

Bentham Science Publishers Ltd. is committed to respecting your privacy. Please visit our privacy policy at https://benthamscience.com/privacy-policy.php.We describe how we collect and use your information, and the rights you have in relation to such information. We are the data controller of the personal data you provide to us for processing in accordance with this privacy notice.

11. GENERAL TERMS

11.1. **Entire agreement:** This Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter. Each party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that are not set out in this Agreement. Each party agrees that it shall have no claim for innocent or negligent misrepresentation or negligent misstatement based on any statement in this Agreement.

11.2. **Confidentiality:** Each party undertakes that it will not at any time hereafter use, divulge or communicate to any person, except to its professional representatives or advisers or as may be required by law or any legal or regulatory authority, any confidential information concerning the business or affairs of the other party which may have or may in future come to its knowledge and each of the parties shall use its reasonable endeavours to prevent the publication or disclosure of any confidential information concerning such matters.

11.3. **Waiver:** No failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict the further exercise of that or any other right or remedy. No single or partial exercise of such right or remedy shall prevent or restrict the further exercise of that or any other right or remedy.

11.4. **Variation:** No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives).

11.5. **Severance:** If any provision or part-provision of this Agreement is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this clause shall not affect the validity and enforceability of the rest of this Agreement. If any provision or part-provision of this Agreement is invalid, illegal or unenforceable, the parties shall negotiate in good faith to amend such provision so that, as amended, it is legal, valid and enforceable, and, to the greatest extent possible, achieves the intended commercial result of the original provision.

11.6. **Governing law and jurisdiction:** This Agreement and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the law of the Dubai International Financial Centre. Each party irrevocably agrees that the courts of the Dubai International Financial Centre shall have non-exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this Agreement or its subject matter or formation (including non-contractual disputes or claims).

I (Aslis Wirda Hayati , Poltekkes Kemenkes Riau, Nutrition , Jl. Melur 103 , +62818106440 , aslis@pkr.ac.id) agreed to the terms and conditions laid down in copyright letter.

SCHEDULE 1: DETAILS OF THE WORK

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

TYPE OF WORK:

Research Article

DESCRIPTION OF WORK:

The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to socialize about the importance of consuming high calcium midmorning snack to teenagers. The activity of consuming high-calcium midmorning snack by adolescents can be continued independently. So far, teenagers don't use pocket money to buy midmorning snack that are high incalcium, but they buy other types of snacks that are low in calcium, consisting of soto (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Is the Work likely to be of particular interest to pharmaceutical or biotechnology companies?

NO

If Yes, provide details of the company that you believe will be interested in your submission, together with a brief summary of why you think this will be of interest.

DECLARATION OF COMPLIANCE WITH APPLICABLE STANDARDS:

1. Does the Work report experiments involving human subjects?

NO

•If Yes, were the reported experiments in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the *Helsinki Declaration* of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931)?

NO

(If Yes, the Assignor must submit a copy of the approval and consent-to-disclose form to Bentham Science Publishers by fax or email.) Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.

(If No, the Assignor must mention an institutional or regional guideline.)

---

2. Does the Work report experiments involving animals?

NO

• If Yes, were the reported experiments in accordance with the standards set forth in **one of below national guidelines and regulations:**

◦ The US National Research Council's "Guide for the Care and Use of Laboratory Animals,"
◦ The US Public Health Service's "Policy on Humane Care and Use of Laboratory Animals," and "Guide for the Care and Use of Laboratory Animals."
◦ UK : the Animals (Scientific Procedures) Act 1986 Amendment Regulations (SI 2012/3039).

NO

(If Yes, the Assignor must submit a copy of the approval to Bentham Science Publishers by fax or email and please also state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.)

(If No, the Assignor must mention an institutional or regional guideline.

CONFLICTS OF INTEREST

Conflicts of interest arise when authors, reviewers, or editors have interests (such as financial or personal interests) that are not made clear and that may influence their judgment on the content of their work. Authors and editors who submit work for publication with Bentham Science are required to disclose and acknowledge all forms of financial support relating to the work to be published, all commercial or financial involvement that might present an appearance of a conflict of interest in respect of the work, and all agreements relating to sponsorship of any research upon which the work is based.

Are there any actual, or potential, conflicts of interest?

NO

If Yes, details of the actual or potential conflicts of interest must be set-out in the spaces provided below.

DISCLOSURE REGARDING ACTUAL OR POTENTIAL CONFLICTS OF INTEREST:

DISCLOSURE REGARDING THIRD PARTY FINANCIAL CONTRIBUTIONS:

LANGUAGE AND EDITING:

Does Assignor require assistance in having the English grammar and style of the Work checked and improved by Bentham Science?

NO

If Yes, Bentham Science will provide a quote for this.

US GOVERNMENT EMPLOYEES / CONTRACTORS:

1. Was any Author a US government employee when the Work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

2. Was Author an independent contractor to the US government when the work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

SCHEDULE 2: ALL AUTHORS (include Principal/Corresponding Author details; add spaces for additional authors if required)

NAME: Aslis Wirda Hayati

AFFILIATION: Poltekkes Kemenkes Riau, Nutrition

EMAIL: aslis@pkr.ac.id

AUTHOR CONTRIBUTION: Study Concept or Design

ORCID: 0000-0003-3672-5356

We agree to the terms as set out in the Agreement.

Signed by:_____

NAME: Hardinsyah Hardinsyah

AFFILIATION: IPB University, Community Nutrition, Faculty of Human Ecology

EMAIL: hardinsyah_ridwan@yahoo.com

AUTHOR CONTRIBUTION: Data Analysis or Interpretation

ORCID: 0000-0002-0748-4373

We agree to the terms as set out in the Agreement.

Signed by:_____

SCHEDULE 3: PUBLISHING

TITLE OF SUBSCRIPTION JOURNAL(S):	Current Nutrition and Food Sciences
"**Open Access Plus**" Option	If the Assignor also wishes to have the Work made available on an open access basis, the Work shall be made available on an open access basis, by Bentham Science, under the terms of the Creative Commons Attribution 4.0 International Public License CC-BY 4.0, subject to the payment of a one-off Fee of [825 USD]. Does the Assignor also require such "open access" publication, and agree to pay the applicable Fee in accordance with the terms below? *YES*

ANIMATED VIDEO:	**Animated Abstract Option:**
	The Animated Abstract Fee, payable in respect of the publication by Bentham Science of the Work in the above stated journal is in accordance with the terms below.
	The Assignor may elect (subject to the payment of a one-off fee of **US$ 1190** for English language, and **US$ 1690** for Foreign language articles and provided that Bentham Science shall remain exclusively entitled to exploit the Work on a commercial basis as Bentham Science deems fit, acting in its sole discretion) to require Bentham Science to make the Work available on an "open access" basis via e-journal publication for all to view and download in accordance with the terms of Creative Commons License CC BY-NC-ND 4.0 - Attribution-NonCommercial-NoDerivatives 4.0 International.
	Assignor hereby requests such "open access" publication of the Animated abstract and agrees to pay the applicable Fee in accordance with the terms below:

	YES The Fee shall be paid initially with a **US$ 700** advance payment on giving the Publisher the instruction to start work on the Animated Abstract, and **US$ 490** (English language edition) or **US$ 990** (Foreign language edition) on completion of the Animated Abstract.

PAYMENT TERMS:	Bentham Science shall invoice the Assignor in respect of the Fee. The Assignor shall pay the Fee to Bentham Science within 15 days of the dateof invoice by means of cheque made payable to “Bentham Science Publishers Ltd”, or by credit card payment or by bank wire transfer. On making bank payments, please ensure that reference is made to our invoice number to avoid your payment not being traced. The Fee shall be paid in full without any deduction or withholding other than as required by law and the Assignor shall not be entitled to assert any credit, set-off, deduction, counterclaim or abatement of any nature whatsoever against Bentham Science in order to justify withholding payment of any such amount in whole or in part. If the Assignor is required, pursuant to any applicable present or future law, rule or regulation of any competent governmental or other administrative body, to make any deduction or withholding from any amount payable to Bentham Science pursuant to this Agreement, the Assignor shall pay to Bentham Science an additional amount as will, after the deduction or withholding has been made, leave Bentham Science with the same amount as it would have been entitled to receive in the absence of any such requirement to make a deduction or withholding; promptly pay to the relevant authority the amount of such deduction or withholding; and provide evidence of the same to Bentham Science on request.

Send Orders for Reprints to reprints@benthamscience.ae

Current Nutrition and Food Science, **2019**, *15, Pagination*

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Poltekkes Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

ARTICLE HISTORY

Received:
Revised:
Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: To determine the impact of calcium and phosphorous supplementation via additional midmorning snack for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snack. The midmorning snack menu was daily varied, and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth) and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 calories (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA) and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.
- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2: -2.0) and -2.3 ± 0.4 (-3.2: -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below of the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorous intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5: 100.0) % so that the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4: 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9: 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased the calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to socialize about the importance of consuming high calcium midmorning snack to teenagers. The activity of consuming high-calcium midmorning snack by adolescents can be continued independently. So far, teenagers don't use pocket money to buy midmorning snack that are high in calcium, but they buy other types of snacks that are low in calcium, consisting of *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

1573-4013/19 $58.00+.00

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorous

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. According to the World Health Organization (WHO), the overall prevalence of stunting among children aged 13 to 15 years is 35.1 %. [1]. The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 12–23 years in Indonesia was 34.2 percent and 40.0 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) [2] . The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 %, and serious when the prevalence of stunting is greater than 40 % [3]. Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. [4]. Stunting is a common public health problem among adolescents around the world (up to 27–65 %) [5]. Stunting among adolescents is often disregarded as a nutritional deficiency problem [6]. Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy new-born are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development [6]. During this period, more than 20% of total height growth and up to 50% of body bone mass is attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and amount and the risk of stunting in children aged 24 months (OR =4.1, $p < 0.05$). The average amount of milk consumed by stunted children (17 days per week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) [7]. Milk contains calcium, which is necessary for bone and height growth [8]. In addition, fish and seafood have more calcium than beef or chicken. [9]. Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight [10,11].

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorous deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorous. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency would stifle growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below of the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA but the rate of phosphorous intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snack as well as milk. As a result, the goal of the research was to see how additional midmorning snack affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table 1). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 [18], and parent's willingness to participate in the study and sign the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria. [19].

The Lwanga and Lameshow formula was used to calculate the number of samples [20]. A value of α =5% (1.964) and a value of β =20% (0.842) were utilized in formula [21]. Previous research statistical parameters (e.g. mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that $\mu 1 - \mu 2 = 0.4$ cm (the increase of study participant body length), and a standard deviation of $\sigma = 1.6$ cm, based on which the minimum sample of this research was 21 participants. Following screening, 36 study participants were eligible for participating as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 [22]. Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snack [23] and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020. The nutrition intervention only for one month and not continued for up to 6 months because the corona virus that causes Covid-19 has infected Indonesia since March 2, 2020 which was conveyed by the President of the Republic of Indonesia; Furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020 all face-to-face learning activities in schools were stopped and turned into online learning.

The midmorning snack menu was daily varied, and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth) and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snack consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snack are foods sold by vendors near the school compound. Division of meal time per day is divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner and evening snack. Energy provision during breakfast provides around 20% of RDA, lunch is around 30% and dinner is around 20% of RDA; midmorning, afternoon, and evening snacks are approximately 10% of the RDA each [24]. The total amount of energy of the meals and milk was 541.8 calories (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA) and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m. and 12:00 p.m. given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The researcher observed the participants both during meal and milk consumption. The research team and 2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed were recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. Similar process was repeated between at 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there was any leftovers.

Requirement calculation of (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorous, iron, and zinc) was based on the recommended dietary allowance (RDA) per age [25]. Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table [26]. Based on nutritional intake data, the participants obtained the nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people [27]. This means a sufficient nutritional level necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines used the term Recommended Energy and Nutrient Intake (RENI), in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy is categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy is categorized as low when recorded at <80 and and sufficient if ≥80% of RDA; the vitamin and mineral adequacy is categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

Nutritional quality of the food intake is calculated based on Hardinsyah's formula [28]. It is categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{(\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number nutrition that nutritional quality food (energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorous: i=14; iron: i=15; zinc: i=16).

The study also involved the teachers and parent's questionnaire regarding details for participant eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSIONS

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8:152.2) cm, their age was 13.5 ± 0.9 (12.0:15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2: -2.0).

At the beginning of the study, calcium and phosphorous adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorous =0.406*) (Table 2). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3:100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and considered inadequate if <50% of the NAR [29].

Moreover, at the same time, calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively. Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with this study's findings [29].

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml) which could decrease stunting events within 2 months (p =0.01) [29]. Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children (p <0.05) [9]. Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to 240 ml) containing more than 270 mg of calcium— almost a third of the daily calcium needs; therefore, the milk consumption is very good for school age children [30]. Regularly consuming milk is highly recommended to meet calcium needs [31]. Milk consumption can improve bone growth, which ultimately influences height, and helps reducing the risk of bone mass loss [32].

Milk is considered as a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth [8]. Proteins in cow milk—such as casein, whey, and amino acids—can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix [32]. Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue [30]. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix [33].

Calcium forms a complex bond with phosphate that can provide strength to bones [34]. Poor calcium intake in adolescents will cause growth and peak bone mass to be disrupted [35]. Optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. A total of 51% of peak bone mass accumulates during puberty growth and reaches 37% of the adult bone mineral density [36]. In adolescence, the increase in bone mass occurs between 40–60% of the total bone mass [37].

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, that are in the period of formation. Calcium deficiency not only affects both bone and tooth growth, but affects the immune system, nervous system resistance, and impaired heart muscle contraction power as well [33]. Long-term calcium consumption deficiency will negatively affect bone structure; moreover, during growth, it can induce growth disorders [38]. Calcium deficiency can affect linear growth should bone calcium content be less than 50% [39]. Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body [40]. During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium [41].

The need for calcium and phosphor increases in adolescence as height growth and bone mass formation

rapidly take place [14]. Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth [42].

Before this study was conducted, the primary sources of daily calcium intake were soup noodle, 298 mg (*soto*); pastel, 296 mg; chicken noodles, 262 mg; tofu, 223 mg; fritters, 204 mg; *pao* meat, 194 mg; tempeh, 155 mg; rice cake, 147 mg; and eclairs, 105 mg per 100 g of edible food. Calcium consumption from non-dairy sources hardly constituted the total daily calcium intake. The calcium content of the food is high per 100 g of edible food but the respondents consume it in small quantities so that it is not sufficient in accordance with the recommended diatary allowance (RDA). For example, one bowl of soto is consumed by all family members so that the respondent only consumes a few tablespoons. Foods that are good sources of calcium such as tofu, tempeh, beans, and green vegetables contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods [1]. Milk is the best source of calcium and is the largest contributor to daily calcium consumption [43]. Both the amount and frequency of milk consumption shows a noticeable relationship with the height of the child [16].

Moreover, both the amount and frequency of milk consumption in adolescents aged 16–17 years are related to height [8,16]. The prevalence of stunting is lower in children who consume milk. Children aged 1–12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) [34]. No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% like it at room temperature.

The monthly allowance received by the study participant on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Full Cream 115 mL milk pack is 30% with the suggestion of serving two packages per day. The price of milk per box is IDR 2,350 (USD$ 0,16). A total of 16.4% of the participants had been accustomed to buying milk since before this research was conducted. The types of consumed milk were UHT milk (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%) and Milo (2.7). A portion of 100 g of milk contains about 143 mg which were digestible in the body. Apart from milk, ice cream also contains calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg. Family income was related to the incidence of stunting in infants ($p = 0.048$). Low family income is at risk of getting stunting[44]. The type of purchased food depends on the family income level [45]. The grocery purchasing capability of the family correlates with its income level; a high family income allows for the fulfilment of the nutritional needs of the whole family; however, low family incomes correlate with a low purchasing power for household food and potentially affect stunting events in children.

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried egg, and 33.3% liked omelet. Egg consumption provides nutrition that facilitates increased growth and contributes to reduce stunting ($p < 0.05$) [14]. Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% [13]. The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46].

The toddlers' frequency of egg consumption which fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46]. However, the frequent category information is missing from journal articles [46]. Egg consumption is 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years is 5 times / week [47].

Within the first ten months, participants had not received midmorning snack. When participants had not received midmorning snack, some participants consumed snacks. The types of snacks that participants consumed were soup noodles, pastel, chicken noodles, tofu, fritters, *pao* meat, tempeh, rice cake, and eclairs. However, the consumption of the various snacks did not improve the participant's nutritional status. On the 11th month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack— along with high calcium milk. The meals were purchased from shops near the participant's area. The price of one meal was approximately IDR 8,000 which is considered very affordable. Therefore, the participants will be able to purchase the meals even after the completion of the study.

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers are able to provide their own. The first reason is that midmorning snack are sold around them. The second reason is the price of the low-priced midmorning snack. The students can use snack money to buy midmorning snack. Therefore, the participants will be able to purchase the meals even after the completion of the study. Researchers have informed stunting teens during midmorning snack that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

After the intervention, the height of the participants increased (Table **3**). The control group was formed before

being given midmorning snack. In the first ten months of the study, all participants were not given midmorning snack. The nutritional status of all participants in the first ten months is still stunting. The treatment group, who had been given midmorning snack for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming midmorning snack for 34 days. The height of participant control group is 143.6 ± 5.2 while the treatment group is 144.9 ± 5.1 cm ($p < 0.00$). The average tendency (mean) increase in participant height after treatment is 1.3 cm (Table **4**– output paired t-test).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snack and drinking milk increase calcium intake, but it also increased intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4:86.3) to 84.8 ± 20.3 (30.9:100.0) (Table 3). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

A total of 55.86% of elementary school children always have breakfast and have a normal nutritional status [47]. Breakfast has a long-term effect on nutritional status [48]. In Norway, the nutritional status of senior high school students improved after being given an intervention in the form of breakfast [49]. On the other hand, in developing countries, skipping breakfast is highly prevalent in the United States and Europe (10% to 30%) in Children and Adolescents [50].

Children who do not eat breakfast are deficient in micronutrients, resulting in poor physical health. [51]. Calcium, vitamin D, phosphorus and protein are essential nutrients in bone formation [52]. Children who have long-lasting deficiency of protein intake even though their energy intake is sufficient will experience stunted growth in height [53]. At school, children who do not have breakfast are prone to sickness, often skip, cannot concentrate on learning, and drop out of school [54].

Delaying breakfast can lead to morning malnutrition and increase the risk of general malnutrition [55]. Delaying breakfast can result in excessive food consumption during other mealtimes—especially dinner—resulting in obesity [56]. Skipping breakfast can put a person at risk of weight gain, as it will trigger excessive food consumption during the day [57].

Breakfast can affect the nutritional status of the child; children who usually skip breakfast are at a threefold risk of unhealthy eating habits as well as a difficulty controlling appetite, thus impacting the incidence of obesity [48]. It is part of a balanced nutritional fulfilment and can affect a person's daily mind-set and activity, especially in children during their-in-growth period namely children 0-5 years (children under five years) and adolescents [58].

It is recommended to incorporate balanced nutrition in breakfast, and meet 20%–25% of the total energy needs in before school study [59]. Breakfast should be able to meet 15–30% of the daily nutritional needs of adolescents [60]. Breakfast can also help balance metabolism, thus maintaining an ideal weight [7].

Breakfast is a morning activity that assists in meeting the body's energy needs to optimally perform daily activities; this is important for schoolchildren, as it can support the growth and development period as well as various school activities [61]. Breakfast promotes the prevention of hypoglycemia, stabilizes blood glucose levels, and prevents dehydration after sleep-related fasting [62]. Meeting the nutritional needs of schoolchildren is important to support their growth [63]. Breakfast constitutes food and beverage, lasting up to 9 AM [60].

The benefits of breakfast for schoolchildren include improving memory, concentration, reading ability, counting, improved stamina, and rare sickness [64]. Schoolchildren who skip breakfast can have impaired learning concentration and drowsiness [65]. Schoolchildren who skip breakfast will see an increase in blood sugar levels and either a decrease in physical condition or mental decline [66]. Snacking and rushing to school results in teenagers choosing not to spend enough time eating breakfast and even skipping breakfast [67] .

Breakfast can trigger the short-term metabolism of fasting conditions (empty stomach time between dinner and the next meal) to supply nutrients to the central nervous system to perform cognitive functions. Long-term breakfast habits can affect the cognitive system [68].

Breakfast as an initial energy supplier, especially as a source of glucose energy for the brain, is highly recommended for everyone. Glucose is very involved in a person's cognitive memory (memory) mechanism. Glucose is a form of carbohydrate that is in the bloodstream to provide fuel for the brain. Neurons cannot store glucose so the brain depends on blood flow for energy [69].

Hawker food is the first digested food item for children who are not used to having breakfast; therefore, snacks become important. Consuming snacks maintains energy levels before main meal time [70]. The habit of school-snacking occurs because 3–4 hours after breakfast the individual will feel hungry again [71]. Consumed snacks and energy contribution to the recommended adequacy are positively correlated [72]. Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or public places [73].

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature and quality of their snacking. Between-

meal eating contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished [74]. Many children do not have breakfast, as they choose snacking [75].

The nutritional value of hawker meals does not always satisfy the body's nutritional requirements [76]. Children who regularly have breakfast tend to present improved nutritional status than children who skip breakfast [77]. Consistent breakfast intake can improve nutritional status, regulate weight gain, and increase height in the long run [78]. Adolescents who consume breakfast regularly have a higher intake of carbohydrates, protein, and fiber and lower fat intake than those who do not [50]. Women with good breakfast quality have a relatively higher intake of micro nutrition [60]. While those who do not have breakfast can present Vitamin A, Vitamin B6, Calcium, Copper, Iron, Magnesium, and Zinc deficiencies [79].

During the 10-month non-intervention period, 8.3% (n =3) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% participant statuses from stunting to normal.

Therefore, it is predicted that, if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month the intervention could reduce by 19.4%, so if the intervention was extended to 6 months therefore 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snack and milk are sold around them and the price is affordable by the pocket money given by their parents. The time before this research was conducted they did not know about the types of food they should consume, how much and when to consume them. Time after the research was conducted they became aware of this and were able to meet their nutritional needs.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, the design became pre-nutrition intervention and after nutrition intervention was given in the same school.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat *pao*, tempeh, rice cake and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snack and calcium-fortified milk were supplied. The breakfast menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snack and high calcium milk must be eaten; however, it can be consumed at any time of day.

Providing intervention, such as midmorning snack and milk, may be an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

The participants' parents signed an informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia for their permission to conduct the study; PT Indolakto, Jakarta, Indonesia for providing milk for this study.

REFERENCES

1. Organization WH. Improving Child Growth. Geneva; 2001.
2. Health M of. Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.
3. World Health Organization. Child growth indicators and their interpretation. World Health Organization,. Geneva; 2010.
4. Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.
5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.
6. Mahmud MK, Zulfianto NA. Tabel Komposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. STATUS GIZI, ASUPAN MAKAN REMAJA AKHIR YANG BERPROFESI SEBAGAI MODEL. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma Mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.
12. Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.
13. Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) Dalam Dua Varietas Kubis (Brassica oleracea) Di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan Konsumsi Susu Dan Kalsium Dengan Densitas Tulang Dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.
17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.
18. World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/
19. Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.
20. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.
21. Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.
24. Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. GIZI WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.
26. Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.
27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.
28. Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan Kebiasaan Konsumsi Susu dengan Kejadian Stunting pada Siswa Kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah

Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.
31. Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.
32. Tirtasaputra E, Puspasari G, Lucretia T. Milk Consumption Correlates with Body Height in Children. J Med Heal. 2019;2(3):878–84.
33. Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama; 2015.
34. Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.
35. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
36. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The HELENA study. Horm Res Paediatr. 2010;74(5):339–50.
37. Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
38. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.
39. Prentice A, Bates CJ. An Appraisal of the Adequacy of Dietary Mineral Intakes in Developing Countries for Bone Growth and Development in Children. Nutr Res Rev. 1993;6(1):51–69.
40. Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.
41. Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.
42. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.
43. Mann J, Truswell AS. Essentials of Human Nutrition. 2nd Edi. Oxford University Press, Inc; 2002.
44. Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
45. Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.
46. Wulandari, Budiasturtik I, Alamsyah D. Hubungan Karakteristik Sosial Ekonomi dan Pola Asuh Pemberian Makan Terhadap Kejadian Stunting pada Balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
47. Annisa PA. Densitas Energi Konsumsi, Status Gizi, Dan Daya Ingat Sesaat Anak Usia Sekolah Dasar. J Gizi dan Pangan. 2015;9(3):187–94.
48. Kral TVE, Whiteford LM, Heo M, Faith MS. Effects of eating breakfast compared with skipping breakfast on ratings of appetite and intake at subsequent meals in 8- To 10-y-old children. Am J Clin Nutr. 2011;93(2):284–91.
49. Ask AS, Hernes S, Aarek I, Johannessen G, Haugen M. Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast - A pilot study. Nutr J. 2006;5(1):4–9.
50. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 2005;105(5):743–60.
51. Perdana F, Hardinsyah H. Analisis Jenis, Jumlah, Dan Mutu Gizi Konsumsi Sarapan Anak Indonesia. J Gizi dan Pangan. 2013;8(1):39.
52. Matali VJ, Wungouw HIS, Sapulete I. Pengaruh Asupan Susu terhadap Tinggi Badan dan Berat Badan Anak Sekolah Dasar. J e-Biomedik. 2017;5(2).
53. Sundari E, Nuryanto N. Hubungan Asupan Protein, Seng, Zat Besi, Dan Riwayat Penyakit Infeksi Dengan Z-Score Tb/U Pada Balita. J Nutr Coll. 2016;5(4):520–9.
54. Afriana R. HUBUNGAN POLA KONSUMSI MAKAN TERHADAP STATUS GIZI ANAK KELAS 6 DI SDN PB KELAPA DUA TANGERANG TAHUN AJARAN 2010-2011. Universitas Pembangunan Nasional; 2011.
55. Kleinman RE, Hall S, Green H, Korzec-Ramirez D, Patton K, Pagano ME, et al. Diet, breakfast, and academic performance in children. Ann Nutr Metab. 2002;46(SUPPL. 1):24–30.
56. Martin A, Normand S, Sothier M, Peyrat J, Louche-Pelissier C, Laville M. Is advice for breakfast consumption justified? Results from a short-term dietary and metabolic experiment in young healthy men. Br J Nutr. 2000;84(3):337–44.
57. Millimet DL, Tchernis R, Husain M. School nutrition programs and the incidence of childhood obesity. J Hum Resour. 2010;45(3):640–54.
58. Khomsan A. Pangan dan Gizi untuk Kesehatan. Edisi Kedu. PT. Raja Grafindo Persada; 2005.
59. Khomsan A. Pangan dan Gizi untuk Kesehatan. Jakarta: PT. Raja Grafindo Persada; 2003.
60. Hardinsyah H, Aries M. Jenis Pangan Sarapan Dan Perannya Dalam Asupan Gizi Harian Anak Usia 6—12 Tahun Di Indonesia. J Gizi dan Pangan. 2016;7(2):89.
61. Wiarto G. Budaya Hidup Sehat. Cetakan 1. Yogyakarta: Yogyakarta Gosyen Publishing; 2013. 236 p.
62. Gibson SA, Gunn P. What's for breakfast? Nutritional implications of breakfast habits: Insights from the NDNS dietary records. Nutr Bull. 2011;36(1):78–86.
63. Hardinsyah H. Ilmu Gizi dan Aplikasi: Gizi Bayi dan Balita. Jakarta: EGC Penerbit Buku Kedokteran;

2017.
64. Brown JL, Beardslee WH, Prothrow-Stith D. Impact Of School Breakfast On Children's Health And Learning. Comm by Sodexo Found [Internet]. 2008;1–20. Available from: www.sodexoUSA.com
65. Dianida Erlyningrum. HUBUNGAN ANTARA KEBIASAAN SARAPAN PAGI DENGAN PRESTASI BELAJAR PADA SISWA SEKOLAH DASAR NEGERI DUREN KECAMATAN BANDUNGAN KABUPATEN SEMARANG [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632
66. Hartoyo E, SHOLIHAH, QOMARIYATUS and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.
67. Octavia ZF. Frekuensi Dan Kontribusi Energi Dari Sarapan Meningkatkan Status Gizi Remaja Putri. J Ris Gizi. 2020;8(1):32–6.
68. Valadares CT, Fukuda MTH, Françolin-Silva AL, Hernandes AS, Almeida SS. Effects of postnatal protein malnutrition on learning and memory procedures. Nutr Neurosci. 2010;13(6):274–82.
69. Khalida E, Fadlyana E, Somasetia DH. Hubungan Kebiasaan Sarapan dengan Prestasi Belajar dan Fungsi Kognitif pada Anak Sekolah Dasar. Sari Pediatr. 2016;17(2):89.
70. Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009.
71. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).
72. Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional "Jajanan Cilok dan Penganan Gorengan." Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.
73. Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.
74. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
75. Masrikhiyah R, Octora M iqbal. Pengaruh Kebiasaan Sarapan Dan Status Gizi Remaja Terhadap Prestasi Belajar. J Ilm Gizi dan Kesehat. 2020;2(01):23–7.
76. Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.
77. Al-Oboudi LM. Impact of Breakfast Eating Pattern on Nutritional Status, Glucose Level, Iron Status in Blood and Test Grades among Upper Primary School Girls in Riyadh City, Saudi Arabia. Pakistan J Nutr. 2010;9(2):106–11.
78. Gibney MJ, Margetts BM, Kearney JM, Arab L. Gizi Kesehatan Masyarakat. Jakarta: Penerbit Buku Kedokteran EGC; 2009. 467 p.
79. Ruxton CHS, Kirk TR. Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. Br J Nutr. 1997;78(2):199–213.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48** (Stunting)	19.4 (7)
	48 – 55.6 (Normal)	75.0 (27)
	≥ 55,6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)
Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0: 175.0)***	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)
Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)		
Age	Measurement Date	Body Height	Z-score		Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6:137.9)	-2.6±0.3 (-2.90:-2.65)		11/03/2020	136.4±2.5 (134.7:139.3)	-2.6±0.3 (-2.90:-2.25)
13	11/02/2020	141.5±4.8 (135.4:151.7)	-2.5±0.6 (-3.24:-1.36)		11/03/2020	143.2±5.0 (135.8:153.5)	-2.3±0.6 (-3.15:-1.19)
14	11/02/2020	144.9±3.8 (138.1:150.9)	-2.4±0.5 (-3.34:-1.97)		11/03/2020	146.4±3.7 (140.4:153.6)	-2.3±0.5 (-3.10:-1.68)
15	11/02/2020	147.5±3.8 (143.5:154.9)	-2.4±0.3 (-2.87:-1.91)		11/03/2020	148.1±3.7 (144.2:155.2)	-2.3±0.3 (-2.75:-1.85)
	Average	143.6±5.2 (133.6:154.9)	-2.5±0.4 (-3.30:-1.40)		Average	144.9±5.1 (134.7:155.2)	-2.3±0.4 (-3.15:-1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Pair T-Test and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate							Paired Sample T-Test of Nutritional Adequacy Rate		
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate			Nutritional Adequacy Rate (%)		Paired Sample
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)		No Intervention (April 29th, 2019)	After Intervention (March 11th, 2020)	(p value)
1	Energy	70.7±18.5 (39.6:100.0)	0.118	0.495	66.9±20.3 (30.2:86.6)	-0.037	0.832		70.7±18.5 (39.6:100.0)	66.9±20.3 (30.2:86.6)	0.143
2	Protein	77.3±20.0 (44.5:100.0)	0.078	0.650	87.3±18.0 (50.9:100.0)	0.069	0.687		77.3±20.0 (44.5:100.0)	87.3±18.0 (50.9:100.0)	0.147
3	Fats	73.2±25.9 (20.8:100.0)	0.048	0.781	76.6±24.5 (42.3:100.0)	0.051	0.769		73.2±25.9 (20.8:100.0)	76.6±24.5 (42.3:100.0)	0.309
4	Carbohydrates	61.2±18.0 (24.5:100.0)	0.104	0.547	49.5±19.8 (18.4:100.0)	0.009	0.959		61.2±18.0 (24.5:100.0)	49.5±19.8 (18.4:100.0)	0.004**
5	Vitamin A	75.1±35.4 (5.0:100.0)	0.202	0.238	77.9±20.6 (35.4:100.0)	0.028	0.873		75.1±35.4 (5.0:100.0)	77.9±20.6 (35.4:100.0)	0.676
6	Vitamin E	21.3±13.4 (0.0:58.2)	0.142	0.408	54.6±26.8 (7.3:100.0)	0.000	0.999		21.3±13.4 (0.0:58.2)	54.6±26.8 (7.3:100.0)	0.000**
7	Vitamin B-1	35.6±21.2 (9.1:100.0)	0.277	0.101	63.0±21.4 (25.0:100.0)	-0.048	0.781		35.6±21.2 (9.1:100.0)	63.0±21.4 (25.0:100.0)	0.000**
8	Vitamin B-2	62.2±24.6 (20.0:100.0)	0.209	0.222	97.9±5.8 (76.9:100.0)	-0.025	0.884		62.2±24.6 (20.0:100.0)	97.9±5.8 (76.9:100.0)	0.000**
9	Vitamin B-6	61.9±22.7	0.166	0.333	78.2±20.5	0.145	0.400		61.9±22.7	78.2±20.5	0.002**

		(25.0:100.0)			(38.5:100.0)				(25.0:100.0)	(38.5:100.0)	
10	Vitamin C	17.2±24.2 (0.0:85.8)	0.169	0.324	30.4±33.4 (5.4:100.0)	0.029	0.866		17.2±24.2 (0.0:85.8)	30.4±33.4 (5.4:100.0)	0.048*
11	Sodium	17.0±11.9 (2.0:55.7)	0.291	0.086	76.0±26.2 (18.6:100.0)	0.058	0.738		17.0±11.9 (2.0:55.7)	76.0±26.2 (18.6:100.0)	0.000**
12	Calcium	27.3±27.8 (3.3:100.0)**	0.433	0.008	59.1±19.0 (15.5:100.0)	0.071	0.680		27.3±27.8 (3.3:100.0)	59.1±19.0 (15.5:100.0)	0.000**
13	Magnesium	73.1±21.1 (35.7:100.0)	0.100	0.561	92.8±14.3 (42.8:100.0)	0.133	0.440		73.1±21.1 (35.7:100.0)	92.8±14.3 (42.8:100.0)	0.000**
14	Phosphorous	55.9±21.2 (25.4:100.0)*	0.406	0.014	87.8±17.0 (45.4:100.0)	0.123	0.476		55.9±21.2 (25.4:100.0)	87.8±17.0 (45.4:100.0)	0.000**
15	Iron	52.8±29.0 (14.0:100.0)	0.110	0.524	75.5±24.3 (26.4:100.0)	0.093	0.590		52.8±29.0 (14.0:100.0)	75.5±24.3 (26.4:100.0)	0.001**
16	Zinc	61.2±22.0 (33.3:100.0)	0.208	0.233	84.8±20.3 (30.9:100.0)	0.062	0.719		61.2±22.0 (33.3:100.0)	84.8±20.3 (30.9:100.0)	0.001**
Nutritional quality of food		52.7±15.5 (28.4: 86.3)*	0.281	0.027	84.8±20.3 (30.9: 100.0)	0.062	0.720		52.7±15.5 (28.4: 86.3)	84.8±20.3 (30.9: 100.0)	0.001**

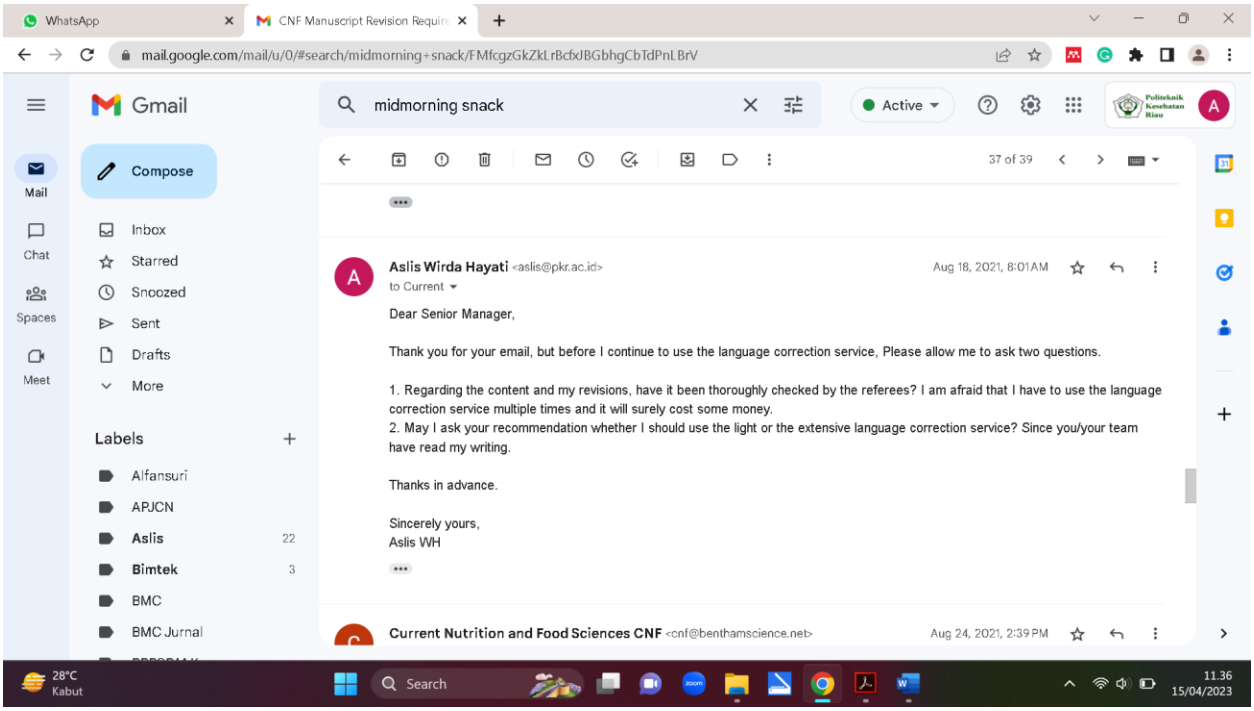
DAY	TIME		
	07:00 a.m.	**10:00 a.m.**	**12:00 p.m.**
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk
WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

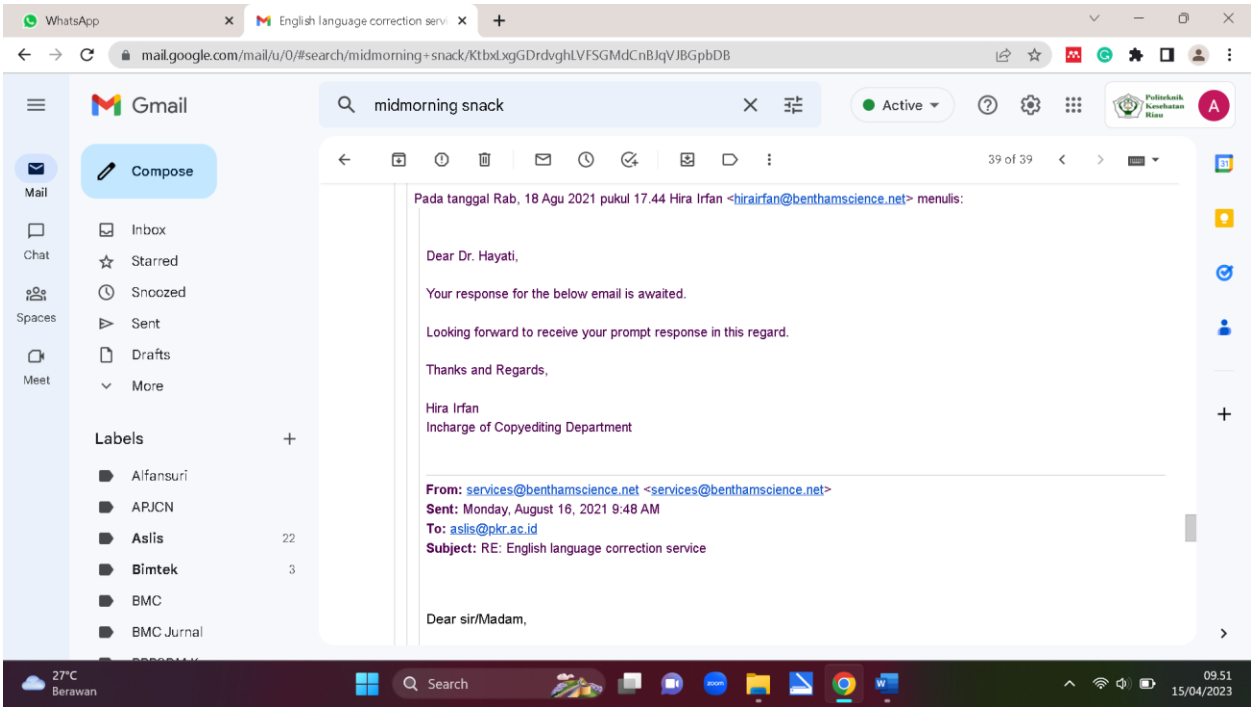
1573-4013/19 $58.00+.00

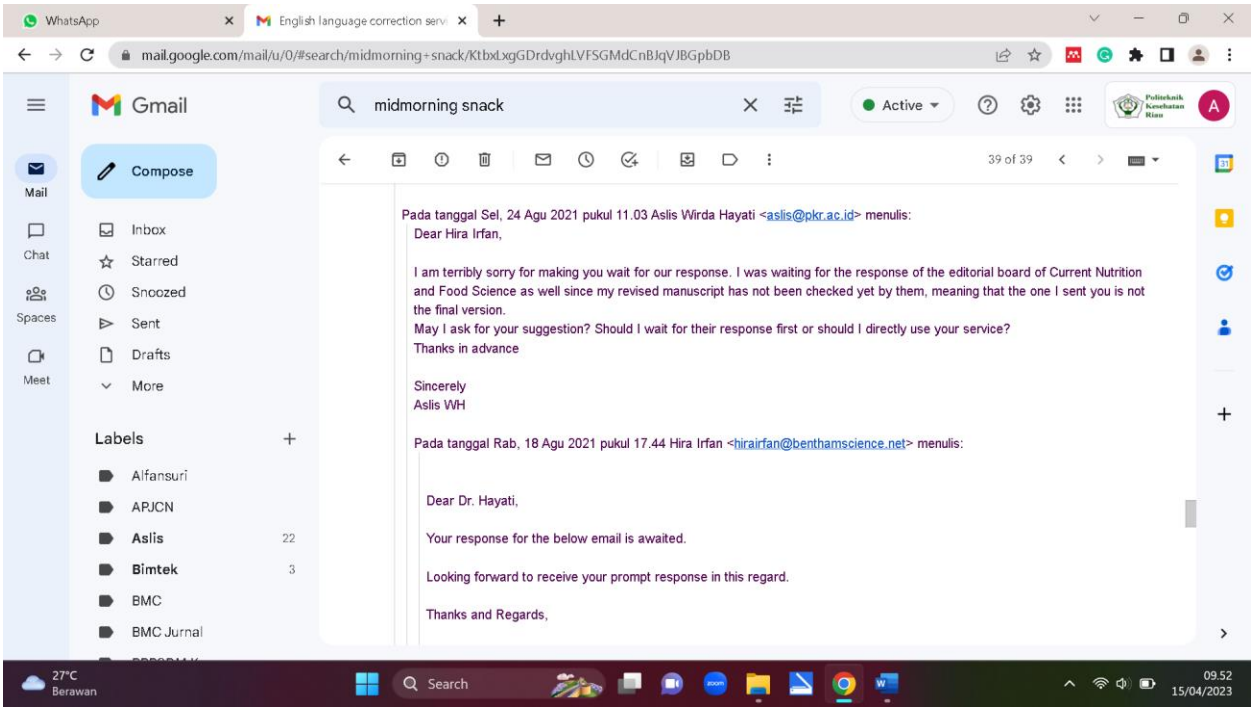
THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk
FRIDAY		 	
	Milk	Sandwich + Milk	Milk
SATURDAY		 	
	Milk	Chicken Porridge + Milk	Milk

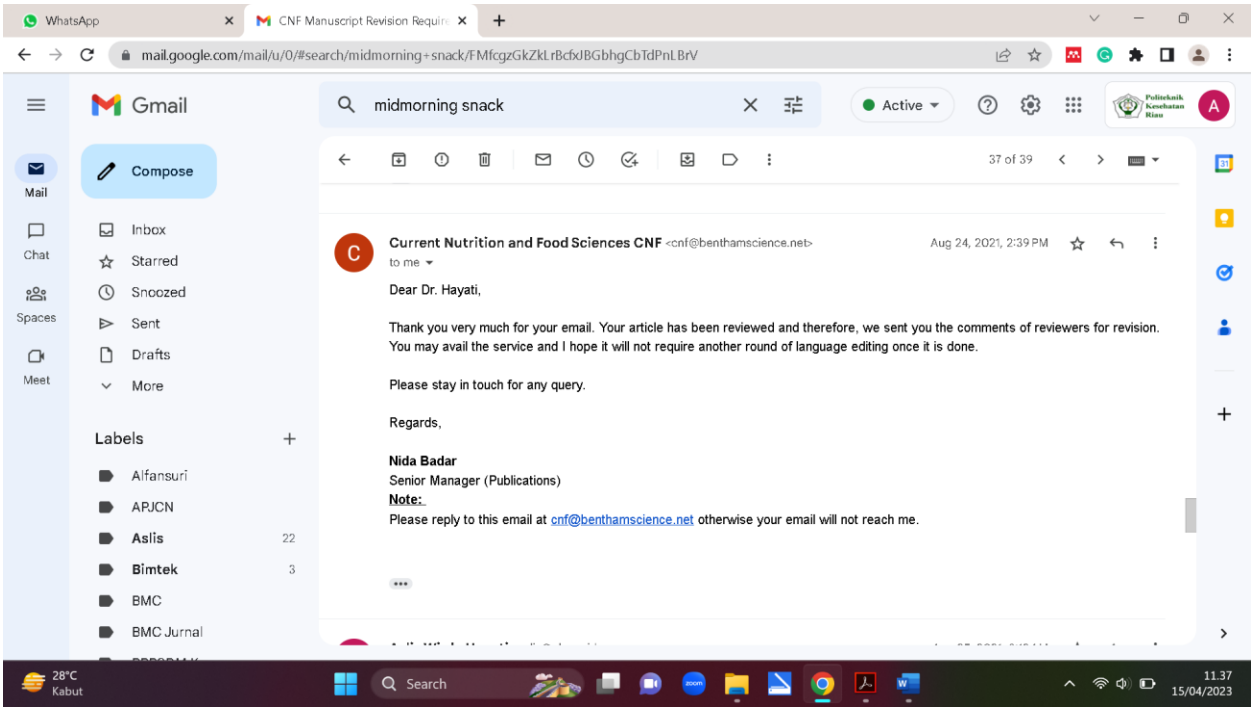
SUNDAY			 
	Milk	Fried Rice Teri + Milk	Milk

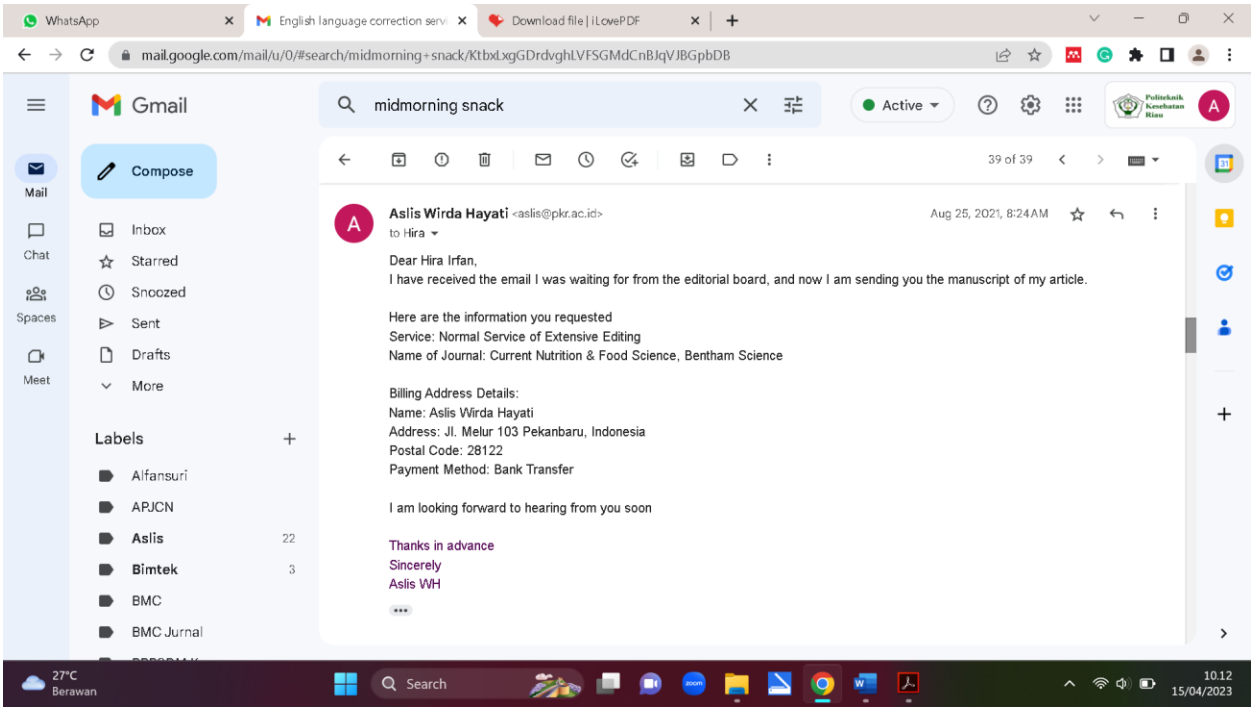
Picture **1.** The midmorning snack

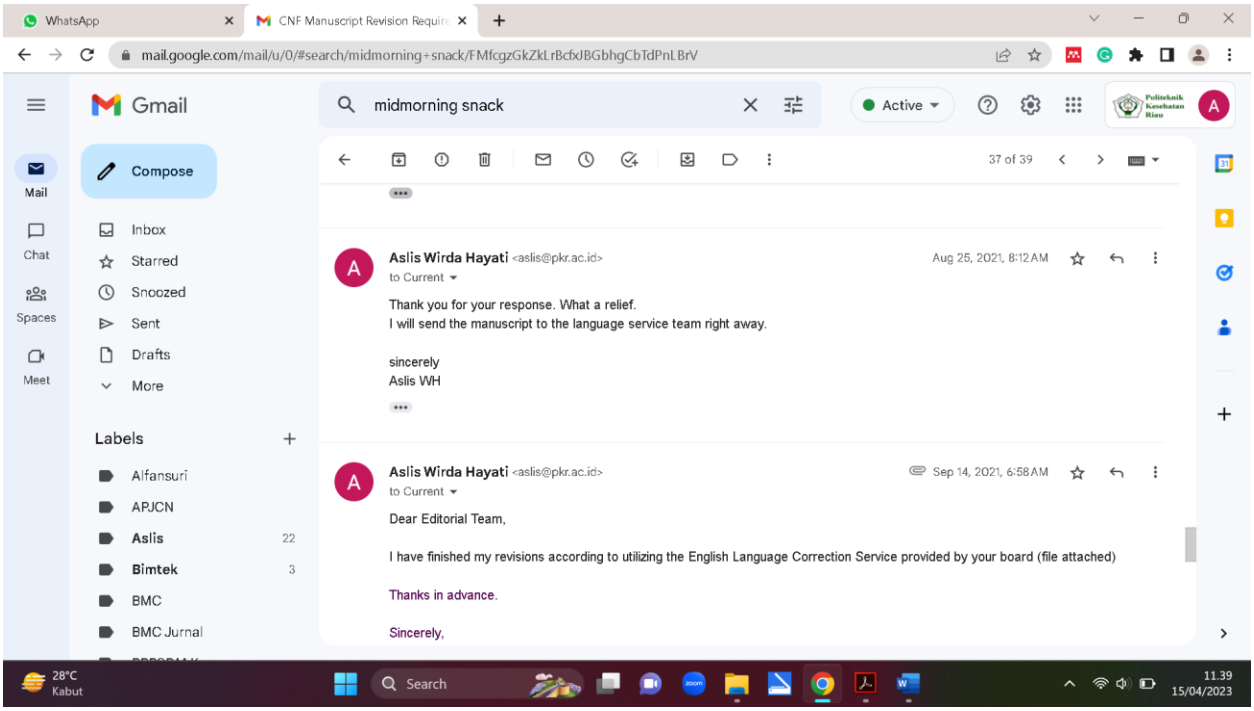

WhatsApp
CNF Manuscript Revision Requir
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
37 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Aug 18, 2021, 8:01 AM
Dear Senior Manager,
Thank you for your email, but before I continue to use the language correction service, Please allow me to ask two questions.
1. Regarding the content and my revisions, have it been thoroughly checked by the referees? I am afraid that I have to use the language correction service multiple times and it will surely cost some money.
2. May I ask your recommendation whether I should use the light or the extensive language correction service? Since you/your team have read my writing.
Thanks in advance.
Sincerely yours,
Aslis WH
Current Nutrition and Food Sciences CNF <cnf@benthamscience.net>
Aug 24, 2021, 2:39 PM
28°C
Kabut
Search
11.36
15/04/2023

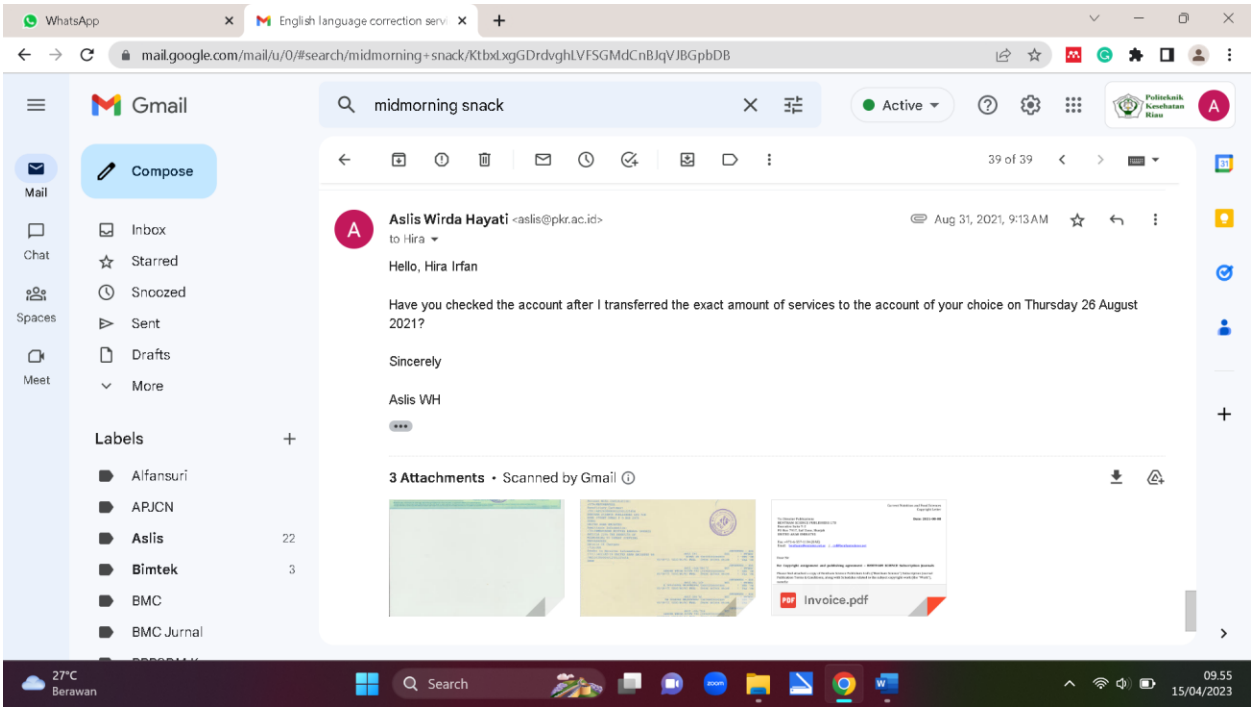

WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Pada tanggal Rab, 18 Agu 2021 pukul 17.44 Hira Irfan <hirairfan@benthamscience.net> menulis:
Dear Dr. Hayati,
Your response for the below email is awaited.
Looking forward to receive your prompt response in this regard.
Thanks and Regards,
Hira Irfan
Incharge of Copyediting Department
From: services@benthamscience.net <services@benthamscience.net>
Sent: Monday, August 16, 2021 9:48 AM
To: aslis@pkr.ac.id
Subject: RE: English language correction service
Dear sir/Madam,
27°C
Berawan
Search
09.51
15/04/2023


WhatsApp
English language correction servi
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Pada tanggal Sel, 24 Agu 2021 pukul 11.03 Aslis Wirda Hayati <aslis@pkr.ac.id> menulis:
Dear Hira Irfan,
I am terribly sorry for making you wait for our response. I was waiting for the response of the editorial board of Current Nutrition and Food Science as well since my revised manuscript has not been checked yet by them, meaning that the one I sent you is not the final version.
May I ask for your suggestion? Should I wait for their response first or should I directly use your service?
Thanks in advance
Sincerely
Aslis WH
Pada tanggal Rab, 18 Agu 2021 pukul 17.44 Hira Irfan <hirairfan@benthamscience.net> menulis:
Dear Dr. Hayati,
Your response for the below email is awaited.
Looking forward to receive your prompt response in this regard.
Thanks and Regards,
27°C Berawan
Search
09.52 15/04/2023


WhatsApp
CNF Manuscript Revision Requir
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
37 of 39
Current Nutrition and Food Sciences CNF <cnf@benthamscience.net>
to me
Aug 24, 2021, 2:39 PM
Dear Dr. Hayati,
Thank you very much for your email. Your article has been reviewed and therefore, we sent you the comments of reviewers for revision. You may avail the service and I hope it will not require another round of language editing once it is done.
Please stay in touch for any query.
Regards,
Nida Badar
Senior Manager (Publications)
Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.
28°C Kabut
Search
11.37 15/04/2023


WhatsApp
English language correction servi
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Hira
Aug 25, 2021, 8:24 AM
Dear Hira Irfan,
I have received the email I was waiting for from the editorial board, and now I am sending you the manuscript of my article.
Here are the information you requested
Service: Normal Service of Extensive Editing
Name of Journal: Current Nutrition & Food Science, Bentham Science
Billing Address Details:
Name: Aslis Wirda Hayati
Address: Jl. Melur 103 Pekanbaru, Indonesia
Postal Code: 28122
Payment Method: Bank Transfer
I am looking forward to hearing from you soon
Thanks in advance
Sincerely
Aslis WH
27°C
Berawan
Search
10.12
15/04/2023


WhatsApp
CNF Manuscript Revision Requir
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
37 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Aug 25, 2021, 8:12 AM
Thank you for your response. What a relief.
I will send the manuscript to the language service team right away.
sincerely
Aslis WH
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Sep 14, 2021, 6:58 AM
Dear Editorial Team,
I have finished my revisions according to utilizing the English Language Correction Service provided by your board (file attached)
Thanks in advance.
Sincerely,
28°C
Kabut
Search
11.39
15/04/2023


WhatsApp
English language correction serv
mail.google.com/mail/u/0/#search/midmorning+snack/KtbxLxgGDrdvghLVFSGMdCnBJqVJBGpbDB
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
39 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Hira
Aug 31, 2021, 9:13 AM
Hello, Hira Irfan
Have you checked the account after I transferred the exact amount of services to the account of your choice on Thursday 26 August 2021?
Sincerely
Aslis WH
3 Attachments • Scanned by Gmail
Invoice.pdf
27°C
Berawan
Search
09.55
15/04/2023

BNI

Validasi :

Tanggal/ *Date* : 26 Agustus 2021

Formulir Kiriman Uang

Remittance Application

Penerima/*Beneficiary* ☐ Penduduk/*Resident* ☐ Bukan Penduduk/*Non Resident*

☐ Perorangan/*Personal* ☐ Perusahaan/*Company*

☐ Pemerintah/*Government* ☐ *Remittance*

Nama/*Name* : Bentham Science Publishers LTD.(FZE)

Alamat/*Address* :

Telepon/*Phone* :

Kota/*City* : Negara/*Country* :

Bank Penerima/*Beneficiary Bank* : National Bank of Fujairah PJSC

Kota/*City* : Negara/*Country* :

No. Rek./*Acc. No.* : 0120012254 54

Pengirim/*Remitter* ☐ Penduduk/*Resident* ☐ Bukan Penduduk/*Non Resident*

☐ Perorangan/*Personal* ☐ Perusahaan/*Company*

☐ Pemerintah/*Government* ☐ *Remittance*

Nama/*Name* : ASLIS WIRDA HAYATI

Nama Alias/*Alias Name* :

No. ID : 0301934417

KTP/SIM/*Passport*/KITAS

Alamat/*Address* :

Telepon/*Phone* : 081810644O

Kota/*City* : Negara/*Country* :

Jenis Pengiriman/*Type of Transfer* ☐ LLG/*Clearing* ☐ RTGS ☐ Draft ☐ SWIFT ☑ NBFUAEA FDXB

Sumber Dana/ *Source of fund*

☐ Tunai/*Cash* ☐ Cek/*BG No.*

☑ Debit Rek./*Debit Acc. No.* 0301934417

Mata Uang/*Currency* : ☐ IDR ☐ USD ☐

Jumlah Dana yang dikirim/*Amount Transfer* :

Jumlah/*Amount*	Kurs/*Rate*	Nilai/*Total Amount*
US$ 161.00		

Biaya/*Charge*	Valas/*Amount in Foreign Exchange*	Kurs/ *Amount*	Nilai/ *Total Amount*
Komisi/*Commision*			
Pengiriman/*Handling*			
Bank Koresponden/*Correspondent Bank*			
Jumlah Biaya/*Amount Charge* :			
Total yang dibayarkan/*Total Amount* :			

Terbilang/*Amount in Words* : seratus enam puluh satu dolar amerika

Tujuan Transaksi (*Transaction Purpose*) : pembayaran editing bahasa in

Berita (*Message*) : Article 2155 : The Benefits of Midmorning Snack to Combat Stunting.

Biaya dari Bank koresponden dibebankan ke rekening/
Correspondent bank charges are for account of :

☐ Penerima/*Beneficiary* ☐ Pengirim/*Remitter* ☐ *Sharing*

PT BANK NEGARA INDONESIA (PERSERO) TBK KANTOR CAPEM TANGERANG

Saya menyetujui sepenuhnya syarat-syarat yang tercantum pada halaman belakang formulir ini / *I unconditionally accept all the terms and conditions on the reverse form.*

Pejabat Bank/*Bank Official* Teller Pemohon/*Applicant*

Sah jika ada cetakan data komputer atau tanda tangan yang berwenang/*The applicant form will be valid if there is a computerized validation or the authorized signature.*

- Transaksi oleh Walk In Customer (WIC) di atas Rp 100 juta atau nilai yang setara dengan itu wajib mengisi form PMN (KYC)/*Transaction by Walk In Customer amounting exceeds Rp 100,000,000 (one hundred million rupiahs) or equivalent value must fill in the PMN (KYC) Form.*
- Transaksi oleh bukan penduduk di atas USD 10.000 atau ekuivalen wajib mengisi Form LLD1/*Transactional by non-resident amounting over US $ 10,000 or its equivalent must fill in LLD1 Form.*

Lembar 3 : Nasabah

PT. BANK NEGARA INDONESIA (Persero), Tbk
CABANG : PEKANBARU

IBOC - Maintenance (S10)

Teller ID : 84768
Date : 26/08/2021
Time : 11:54:10

Sender's Reference:
:20:S10PBR00088321
Bank Operation Code:
:23B:CRED
Value Date/Currency/Interbank Settled Amount:
:32A:210826USD161,
Ordering Customer:
:50K:/0000000301934417
ASLIS WIRDA HAYATI
JL BANGUN KARYA NO 79 A
PEKANBARU
INDONESIA
Ordering Institution:
:52A:BNINIDJAXXX
Account With Institution:
:57A:NBFUAEAFXXX
Beneficiary Customer:
:59:/AE520380000012001225454
BENTHAM SCIENCE PUBLISHERS LTD FZE
BANK STREET DUBAI P O BOX 2979
DUBAI
UNITED ARAB EMIRATES
Remittance Information:
:70:PEMBAYARAN EDITING BAHASA INGGRIS
ARTICLE 2155 THE BENEFITS OF
MIDMORNING TO COMBAT STUNTING
NBFUAEAFXXX
Details Of Charges:
:71A:OUR
Sender to Receiver Information:
:72://ACC/AT/YR UNITED ARAB EMIRATES BR
/AE520380000012001225454
IBAN

PT. BANK NEGARA INDONESIA (PERSERO) TBK
KANTOR CAPEM TANGKERANG
BNI

008 - PEKANBARU
JUMLAH : USD 161 1568
NO. REK. : 0088402001010O1 KU YAKIR
NO. TRX. : 84768 93619S 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 2,348,990- 1568
NO. REK. : 0000003019344I7 Ibu ASLIS WIRDA HAYATI
NO. TRX. : 84768 93619S 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 437,700 1568
NO. REK. : 0083604820100O1 Pendapatan Restitusi B
NO. TRX. : 84768 93619S 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 35,000 1568
NO. REK. : 0083604208010O1 PENDAPATAN PROPISI KU
NO. TRX. : 84768 93619S 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 472,700- 1568
NO. REK. : 0000003019344I7 Ibu ASLIS WIRDA HAYATI
NO. TRX. : 84768 93619S 96962 TRAN 26/08/2021 11:45:59

REFERENCE : S10PBR00088321

To: Director Publications
BENTHAM SCIENCE PUBLISHERS LTD
Executive Suite Y-2
PO Box 7917, Saif Zone, Sharjah
UNITED ARAB EMIRATES

Date: 2021-08-08

Fax: +971-6-557-1134 (UAE)
Email: benthams@emirates.net.ae / cnf@benthamscience.net

Dear Sir

Re: Copyright assignment and publishing agreement – BENTHAM SCIENCE Subscription Journals

Please find attached a copy of Bentham Science Publishers Ltd's ("Bentham Science") Subscription Journal Publication Terms & Conditions, along with Schedules related to the subject copyright work (the "Work"), namely:

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

I am the Principal / Corresponding Author of the Work, and my contact details are found in the signature block below. In order to submit the Work for publication with Bentham Science, I understand that:

- it is necessary to complete and submit this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules;
- this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules, together comprise the copyright assignment and publishing agreement between myself and Bentham Science relating to the Work; and
- while primarily contemplating publication in Bentham Science subscription journal/s, this documentation also allows me to select an option ("Open Access Plus") and pay an associated fee to have the Work published on an open access basis.

Name: Aslis Wirda Hayati

Principal / Corresponding Author of the Work ("Assignor")

Affiliation: Poltekkes Kemenkes Riau, Nutrition

Address: Jl. Melur 103

Telephone: +62818106440

Fax: ---

Email: aslis@pkr.ac.id

BACKGROUND

1.1. The "Work" is the research article, review article, letter, clinical trial study, report, article, or other copyright work, as identified in the Copyright Letter and further detailed in Schedule 1: Details of the Work (including such form of the copyright work submitted to Bentham Science for publication pursuant to clause 4, below), but excluding (except where context otherwise requires) any diagrams, figures or illustration specifically identified to Bentham Science pursuant to clause 3.2, below.
1.2. Bentham Science and the Assignor agree that these Subscription Journal Publication Terms & Conditions, along with the details set-out in the Copyright Letter and in the Schedules, comprise the agreement between the parties relating to Work (the "Agreement").

2. AUTHORS

2.1. The individual/s identified in Schedule 2: Authors are the authors of the Work ("Author/s"). The Assignor represents and warrants that he or she has full right and power to enter into this Agreement, and (where the Assignor is not the sole author) that the Author/s of the Work consent and agree to the terms of this Agreement and have irrevocably granted all rights in the Work to the Assignor for assignment to Bentham Science in accordance with the terms of this Agreement. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science.
2.2. The Assignor represents and warrants that the Author/s have, to the fullest extent permitted by applicable law, waived or undertaken to refrain from enforcing against Bentham Science, their moral rights in the Work. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science

3. COPYRIGHT ASSIGNMENT

3.1. Subject to clause 3.2, in consideration of the mutual undertakings contained herein, the Assignor hereby assigns to Bentham Science absolutely with full title guarantee the following rights throughout the world:
(a) the entire copyright and all other rights in the nature of copyright subsisting in the Work and in all preliminary drafts or earlier versions of the Work;
(b) all other rights in the Work of whatever nature (but, for the avoidance of doubt, excluding any intellectual property rights in any theory, apparatus or invention expressed in the Work), whether now known or created in the future, to which the Assignor is now, or at any time after the date of this Agreement may be, entitled by virtue of the laws in force in any part of the world; and
(c) all rights in and to all physical and digital materials of any kind which embody the Work in whole or in part;

together with all related rights and powers arising or accrued, including the right to bring, make, oppose, defend, appeal and obtain relief (and to retain any damages recovered) in respect of any infringement, or any other cause of action arising from ownership, of any of these assigned rights, whether occurring before, on, or after the date of this Agreement.
3.2. To the extent that copyright in any of the diagrams, illustrations or figures incorporated into the Work does not belong to the Assignor, the Assignor undertakes to specifically identify such diagrams, illustrations or figures to Bentham Science, and to procure (and warrants that it has procured) for Bentham Science such rights as will enable Bentham Science to use (without limitation) such diagrams, illustrations and figures, without restriction, in the course of publishing the Work. Where context requires, references to "Work" in this Agreement shall include references to such diagrams, illustrations or figures.
3.3. Bentham Science may charge, assign and/or license the benefit of this Agreement in whole or in part, including (without limitation) any and all rights assigned to Bentham Science hereunder, and the benefit of any representations, warranties, indemnities and undertakings of the Assignor, to any third party.

4. DELIVERY AND PUBLISHING

4.1. Bentham Science offers publishing via a variety of methods. The parties agree that, at a minimum, and subject to the terms of this Agreement, the Work shall be published in the subscription journal specified, in Schedule 3: Publishing. Additionally, if so specified in the space provided in Schedule 3: Publishing in respect of "Open Access Plus", and subject to the commercial terms specified therein and the other terms of this Agreement, the Work shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: https://creativecommons.org/licenses/by/4.0/legalcode
4.2. The Assignor may, if so specified in the space provided in Schedule 1: Details of the Work, opt to have Bentham Science, or its third party contractor, provide a short animated video summarising the salient aspects of the Work, on the basis that all rights, title and interest in such short animated video shall become part of the Work for the purposes of this Agreement. The provision of such service by Bentham Science or its third party contractor shall be subject to the prevailing terms and rates relating to such service. Such animated video shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY-NC-ND 4.0), a copy of which is available at https://creativecommons.org/licenses/by-nc-nd/4.0/, and Bentham Science shall retain all rights to exploit the video commercially.
4.3. The Assignor undertakes to provide to Bentham Science, by the deadline specified in Schedule 1: Details of the Work (the "Submission Deadline"), an electronic copy of the Work in a high-quality, professionally prepared, production-ready format. The Assignor undertakes to ensure that all pages of the Work so submitted have been proof-read carefully, and that all diagrams, illustrations, figures and captions, are of excellent quality, with regard to both substance and form.

4.4. The Assignor represents and warrants that the Work has been prepared in accordance with the relevant Guidelines, and checked for all possible linguistic inconsistencies and errors, including grammar, style and typography, by someone with a high command of the English language and familiarity with academic writing in the English language. ("Guidelines" means the Instructions to Authors available on the Bentham Science website, as well as the Aims & Scope applicable to the relevant Bentham Science publication). Bentham Science's nominated service provider, Eureka Science, offers English language support services which Assignor may elect to utilise in respect of the Work by completing the applicable box in Schedule 1: Details of the Work. The provision of such services by Eureka Science shall be subject to Eureka Science's prevailing terms and rates relating to such type of optional support.

4.5. In the space provided in Schedule 1: Details of the Work, the Assignor shall disclose whether or not the Work reports experiments involving humans or animals.

4.6. Bentham Science shall be entitled to carry-out such minor amendments or adjustments to the Work as it considers necessary in order to ensure conformity with Bentham Science's production and presentation requirements. If Bentham Science notifies the Assignor that the Work requires amendments or adjustments beyond what Bentham Science considers to be minor, then the Assignor may opt to either: i. address such issues directly (within a reasonable timeframe specified by Bentham Science), or ii. instruct Bentham Science to address such issues. If the Assignor instructs Bentham Science to address the issues, Bentham Science's terms and rates relating to this type of optional support shall apply, and Bentham Science shall confirm the likely costs to the Assignor before commencing any such work.

4.7. For quality monitoring purposes, Bentham Science will seek a review of the Work by specialists familiar with the subject matter. The Assignor acknowledges and agrees that acceptance of the Work by Bentham Science and publication of the same shall be subject to positive peer review by independent referees. Bentham Science may consult such referees as it considers appropriate, including referees identified by reference to publication records, recommendations of editorial board members, or otherwise.

4.8. Nothing in this Agreement shall restrict Bentham Science, as assignee of the copyright in the Work, from publishing and marketing the Work in any manner (including via third parties such as third party aggregators). Bentham Science reserves the right to refrain from publishing the Work, or to withdraw the Work from circulation following publication, at its own discretion. Without limitation, Bentham Science may exercise this right if it determines that the Work contains language errors that exceed 5% or more of the total Work (based on total word count), if the work fails to conform with Bentham Science's production and presentation requirements, if the work attracts undesirable or negative publicity that Bentham considers may impact on the reputations of the Author/s or Bentham Science, and/or for its own commercial reasons.

5. SELF-ARCHIVING POLICIES

By signing the Copyright Letter the authors retain the rights of self-archiving. Following are the important features of self-archiving policy of Bentham Science journals:

(a) Authors can deposit the first draft of a submitted article on their personal websites, their institution's repositories or any non-commercial repository for personal use, internal institutional use or for permitted scholarly posting only.

(b) Authors may deposit the ACCEPTED VERSION of the peer-reviewed article on their personal websites, their institution's repository or any non-commercial repository such as PMC, arXiv after 12 MONTHS of publication on the journal website. In addition, an acknowledgement must be given to the original source of publication and a link should be inserted to the published article on the journal's/publisher's website.

(c) If the research is funded by NIH, Wellcome Trust or any other Open Access Mandate, authors are allowed the archiving of published version of manuscripts in an institutional repository after the mandatory embargo period. Authors should first contact the Editorial Office of the journal for information about depositing a copy of the manuscript to a repository. Consistent with the copyright agreement, Bentham Science does not allow archiving of FINAL PUBLISHED VERSION of manuscripts unless under an open access mandate as above.

(d) The link to the original source of publication should be provided by inserting the DOI number of the article in the following sentence: "The published manuscript is available at EurekaSelect via http://www.eurekaselect.com/[insert DOI]."

(e) There is no embargo on the archiving of articles published under the OPEN ACCESS PLUS category. Authors are allowed deposition of such articles on institutional, non-commercial repositories and personal websites immediately after publication on the journal website.

6. CONFLICTS

The Assignor shall disclose, in Schedule 1: Details of the Work, details relating to all actual or potential conflicts of interest relating to the Work, and all financial contributions relevant to the Work and its publication pursuant to this Agreement. If requested by Bentham Science, the Assignor shall provide Bentham Science with any further information it may request in respect of such matters.

7. WARRANTIES

The Assignor warrants and undertakes that, as at the date of this Agreement:
a) the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. Bentham Science Publishers uses the iThenticate software to detect instances of overlapping and similar text in submitted manuscripts. iThenticate software checks content against a database of periodicals, the Internet, and a comprehensive article database.
b) the Assignor is the sole legal and beneficial owner of the rights purported to be assigned pursuant to this Agreement, and (if applicable) the Assignor has obtained any and all necessary assignments or other permissions from co-authors and/or employers to ensure that the Assignor is able to comply with its obligations and to assign the rights purported to be assigned pursuant to this Agreement
c) the Assignor is exclusively entitled to give all warranties, indemnities, assurances, confirmations, waivers and agreements set out in this Agreement
d) the Work has not been published by any third party, or submitted to any third party for consideration for publication, and will not be published by any third party or submitted to any third party for consideration by or on behalf of the Assignor or any of the Author/s;
e) once the Work has been submitted to Bentham Science for publication in accordance with clause 4, the Assignor will not attempt to withdraw the Work from publication;
f) the Assignor has not assigned or granted to any third party any of the rights assigned or granted pursuant to this Agreement;
g) the exploitation of the rights assigned or granted by this Agreement will not infringe the rights of any third party, including without limitation, any third party intellectual property rights and any rights to register the same;
h) the Assignor is unaware of any infringement, or likely infringement, of any of the rights assigned or granted pursuant to this Agreement;
i) the rights assigned by this Agreement are free from any security interest, option, mortgage, charge or lien;
j) the Work is factually accurate and contains no matter which is scandalous, libellous, unlawful, or otherwise actionable;
k) there are no actual or potential conflicts of interest, except as specified in Schedule 1: Details of the Work;
l) there has been no financial contribution to the Work, except as specified in Schedule 1: Details of the Work; and
m) there have been no experiments involving humans or animals, except as specified in Schedule 1: Details of the Work.

8. INDEMNITIES

8.1. The Assignor shall indemnify Bentham Science against all liabilities, costs, expenses, damages and losses (including any direct, indirect or consequential losses, loss of profit, loss of reputation and all interest, penalties and legal costs (calculated on a full indemnity basis) and all other professional costs and expenses) suffered or incurred by Bentham Science arising out of or in connection with:
(a) any breach by the Assignor of any of the warranties contained in clause 7; and
(b) the enforcement of this Agreement.
8.2. At the request of Bentham Science, and at the Assignor's own expense, the Assignor shall provide all reasonable assistance to enable Bentham Science to resist any claim, action or proceedings brought against Bentham Science as a consequence of any breach by the Assignor of the warranties contained in clause 7. This indemnity shall apply whether or not Bentham Science has been negligent or at fault.

9. FURTHER ASSURANCE

9.1. At its own expense the Assignor shall, and shall use all reasonable endeavours to procure that any necessary third party shall, promptly execute such documents and perform such acts as may reasonably be required for the purpose of giving full effect to this Agreement, including assisting Bentham Science in perfecting title, defending and enforcing the copyright or any other rights granted to Bentham Science pursuant to this Agreement, and assisting with any other proceedings which may be brought by or against Bentham Science against or by any third party relating to the rights assigned by this Agreement.
9.2. The Assignor irrevocably appoints Bentham Science to be its attorney in its name and on its behalf to execute documents, use the Assignor’s name and do all things which are necessary or desirable for Bentham Science to obtain for itself or its nominee the full benefit of this Agreement. This power of attorney is irrevocable as long as any of the Assignor's obligations under this Agreement remain undischarged. The attorney may, in any way it thinks fit and in the name and on behalf of the Assignor:
(a) take any action that this Agreement requires the Assignor to take;
(b) exercise any rights which this Agreement gives to the Assignor; and
(c) appoint and remove one or more substitute attorneys with full power as the Assignor's attorney on terms that the attorney thinks fit.

The Assignor must ratify and confirm everything that the attorney and any substitute attorney does or arranges using the powers granted under this clause.

10. BENTHAM SCIENCE - PRIVACY POLICY

Bentham Science Publishers Ltd. is committed to respecting your privacy. Please visit our privacy policy at https://benthamscience.com/privacy-policy.php.We describe how we collect and use your information, and the rights you have in relation to such information. We are the data controller of the personal data you provide to us for processing in accordance with this privacy notice.

11. GENERAL TERMS

11.1. **Entire agreement:** This Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter. Each party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that are not set out in this Agreement. Each party agrees that it shall have no claim for innocent or negligent misrepresentation or negligent misstatement based on any statement in this Agreement.

11.2. **Confidentiality:** Each party undertakes that it will not at any time hereafter use, divulge or communicate to any person, except to its professional representatives or advisers or as may be required by law or any legal or regulatory authority, any confidential information concerning the business or affairs of the other party which may have or may in future come to its knowledge and each of the parties shall use its reasonable endeavours to prevent the publication or disclosure of any confidential information concerning such matters.

11.3. **Waiver:** No failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict the further exercise of that or any other right or remedy. No single or partial exercise of such right or remedy shall prevent or restrict the further exercise of that or any other right or remedy.

11.4. **Variation:** No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives).

11.5. **Severance:** If any provision or part-provision of this Agreement is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this clause shall not affect the validity and enforceability of the rest of this Agreement. If any provision or part-provision of this Agreement is invalid, illegal or unenforceable, the parties shall negotiate in good faith to amend such provision so that, as amended, it is legal, valid and enforceable, and, to the greatest extent possible, achieves the intended commercial result of the original provision.

11.6. **Governing law and jurisdiction:** This Agreement and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the law of the Dubai International Financial Centre. Each party irrevocably agrees that the courts of the Dubai International Financial Centre shall have non-exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this Agreement or its subject matter or formation (including non-contractual disputes or claims).

I (Aslis Wirda Hayati , Poltekkes Kemenkes Riau, Nutrition , Jl. Melur 103 , +62818106440 , aslis@pkr.ac.id) agreed to the terms and conditions laid down in copyright letter.

SCHEDULE 1: DETAILS OF THE WORK

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

TYPE OF WORK:

Research Article

DESCRIPTION OF WORK:

The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to socialize about the importance of consuming high calcium midmorning snack to teenagers. The activity of consuming high-calcium midmorning snack by adolescents can be continued independently. So far, teenagers don't use pocket money to buy midmorning snack that are high incalcium, but they buy other types of snacks that are low in calcium, consisting of soto (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Is the Work likely to be of particular interest to pharmaceutical or biotechnology companies?

NO

If Yes, provide details of the company that you believe will be interested in your submission, together with a brief summary of why you think this will be of interest.

DECLARATION OF COMPLIANCE WITH APPLICABLE STANDARDS:

1. Does the Work report experiments involving human subjects?

NO

•If Yes, were the reported experiments in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the *Helsinki Declaration* of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931)?

NO

(If Yes, the Assignor must submit a copy of the approval and consent-to-disclose form to Bentham Science Publishers by fax or email.) Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.

(If No, the Assignor must mention an institutional or regional guideline.)

---

2. Does the Work report experiments involving animals?

NO

• If Yes, were the reported experiments in accordance with the standards set forth in **one of below national guidelines and regulations:**

◦ The US National Research Council's "Guide for the Care and Use of Laboratory Animals,"
◦ The US Public Health Service's "Policy on Humane Care and Use of Laboratory Animals," and "Guide for the Care and Use of Laboratory Animals."
◦ UK : the Animals (Scientific Procedures) Act 1986 Amendment Regulations (SI 2012/3039).

NO

(If Yes, the Assignor must submit a copy of the approval to Bentham Science Publishers by fax or email and please also state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.)

(If No, the Assignor must mention an institutional or regional guideline.

CONFLICTS OF INTEREST

Conflicts of interest arise when authors, reviewers, or editors have interests (such as financial or personal interests) that are not made clear and that may influence their judgment on the content of their work. Authors and editors who submit work for publication with Bentham Science are required to disclose and acknowledge all forms of financial support relating to the work to be published, all commercial or financial involvement that might present an appearance of a conflict of interest in respect of the work, and all agreements relating to sponsorship of any research upon which the work is based.

Are there any actual, or potential, conflicts of interest?

NO

If Yes, details of the actual or potential conflicts of interest must be set-out in the spaces provided below.

DISCLOSURE REGARDING ACTUAL OR POTENTIAL CONFLICTS OF INTEREST:

DISCLOSURE REGARDING THIRD PARTY FINANCIAL CONTRIBUTIONS:

LANGUAGE AND EDITING:

Does Assignor require assistance in having the English grammar and style of the Work checked and improved by Bentham Science?

NO

If Yes, Bentham Science will provide a quote for this.

US GOVERNMENT EMPLOYEES / CONTRACTORS:

1. Was any Author a US government employee when the Work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

2. Was Author an independent contractor to the US government when the work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

SCHEDULE 2: ALL AUTHORS (include Principal/Corresponding Author details; add spaces for additional authors if required)

NAME: Aslis Wirda Hayati

AFFILIATION: Poltekkes Kemenkes Riau, Nutrition

EMAIL: aslis@pkr.ac.id

AUTHOR CONTRIBUTION: Study Concept or Design

ORCID: 0000-0003-3672-5356

We agree to the terms as set out in the Agreement.

Signed by:_____

NAME: Hardinsyah Hardinsyah

AFFILIATION: IPB University, Community Nutrition, Faculty of Human Ecology

EMAIL: hardinsyah_ridwan@yahoo.com

AUTHOR CONTRIBUTION: Data Analysis or Interpretation

ORCID: 0000-0002-0748-4373

We agree to the terms as set out in the Agreement.

Signed by:_____

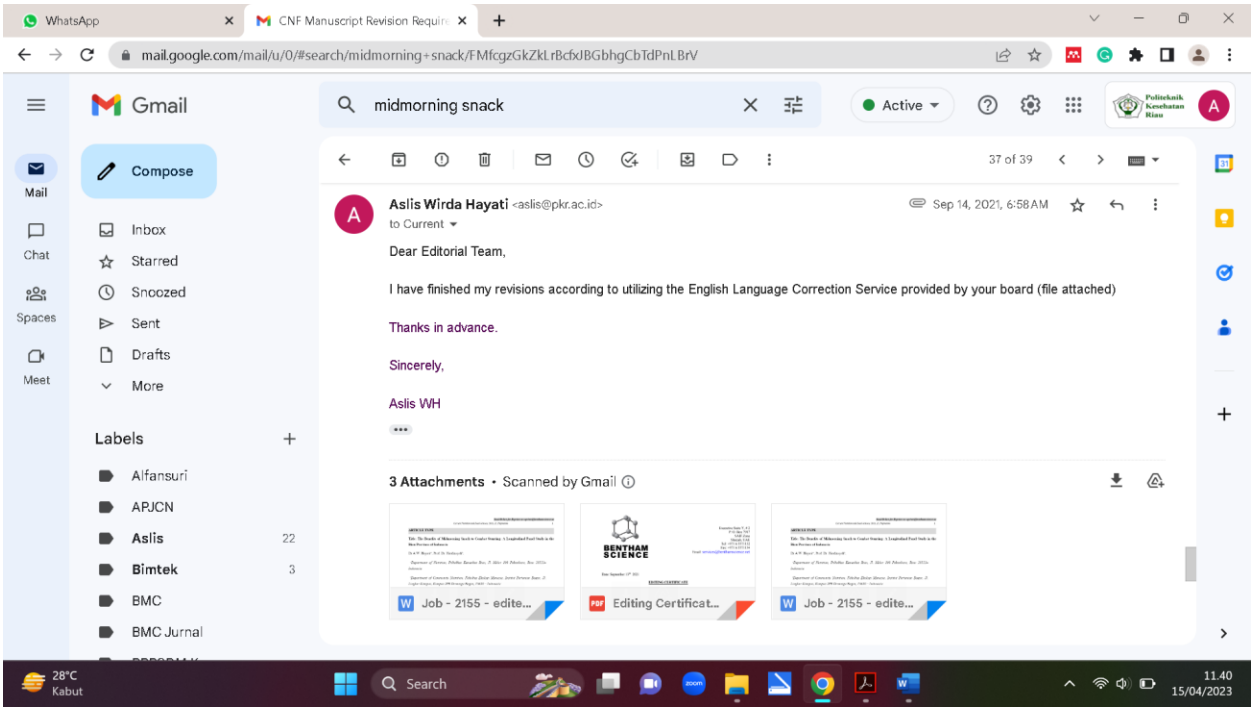
SCHEDULE 3: PUBLISHING

TITLE OF SUBSCRIPTION JOURNAL(S):	Current Nutrition and Food Sciences
"**Open Access Plus**" Option	If the Assignor also wishes to have the Work made available on an open access basis, the Work shall be made available on an open access basis, by Bentham Science, under the terms of the Creative Commons Attribution 4.0 International Public License CC-BY 4.0, subject to the payment of a one-off Fee of [825 USD]. Does the Assignor also require such "open access" publication, and agree to pay the applicable Fee in accordance with the terms below? *YES*

ANIMATED VIDEO:	**Animated Abstract Option:**
	The Animated Abstract Fee, payable in respect of the publication by Bentham Science of the Work in the above stated journal is in accordance with the terms below.
	The Assignor may elect (subject to the payment of a one-off fee of **US$ 1190** for English language, and **US$ 1690** for Foreign language articles and provided that Bentham Science shall remain exclusively entitled to exploit the Work on a commercial basis as Bentham Science deems fit, acting in its sole discretion) to require Bentham Science to make the Work available on an "open access" basis via e-journal publication for all to view and download in accordance with the terms of Creative Commons License CC BY-NC-ND 4.0 - Attribution-NonCommercial-NoDerivatives 4.0 International.
	Assignor hereby requests such "open access" publication of the Animated abstract and agrees to pay the applicable Fee in accordance with the terms below:

	YES The Fee shall be paid initially with a **US$ 700** advance payment on giving the Publisher the instruction to start work on the Animated Abstract, and **US$ 490** (English language edition) or **US$ 990** (Foreign language edition) on completion of the Animated Abstract.

PAYMENT TERMS:	Bentham Science shall invoice the Assignor in respect of the Fee. The Assignor shall pay the Fee to Bentham Science within 15 days of the dateof invoice by means of cheque made payable to “Bentham Science Publishers Ltd”, or by credit card payment or by bank wire transfer. On making bank payments, please ensure that reference is made to our invoice number to avoid your payment not being traced. The Fee shall be paid in full without any deduction or withholding other than as required by law and the Assignor shall not be entitled to assert any credit, set-off, deduction, counterclaim or abatement of any nature whatsoever against Bentham Science in order to justify withholding payment of any such amount in whole or in part. If the Assignor is required, pursuant to any applicable present or future law, rule or regulation of any competent governmental or other administrative body, to make any deduction or withholding from any amount payable to Bentham Science pursuant to this Agreement, the Assignor shall pay to Bentham Science an additional amount as will, after the deduction or withholding has been made, leave Bentham Science with the same amount as it would have been entitled to receive in the absence of any such requirement to make a deduction or withholding; promptly pay to the relevant authority the amount of such deduction or withholding; and provide evidence of the same to Bentham Science on request.


WhatsApp
CNF Manuscript Revision Requir
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGkZkLrBcfxJBGbhgCbTdPnLBrV
Gmail
midmorning snack
Active
Politeknik Kesehatan Riau
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
37 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Sep 14, 2021, 6:58 AM
Dear Editorial Team,
I have finished my revisions according to utilizing the English Language Correction Service provided by your board (file attached)
Thanks in advance.
Sincerely,
Aslis WH
3 Attachments • Scanned by Gmail
Job - 2155 - edite...
Editing Certificat...
Job - 2155 - edite...
28°C Kabut
Search
11.40 15/04/2023

Send Orders for Reprints to reprints@benthamscience.ae

Current Nutrition and Food Science, **2019,** *15, Pagination*

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Poltekkes Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

ARTICLE HISTORY

Received:

Revised:

Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: The objective of this study was to determine the impact of calcium and phosphorous supplementation via additional midmorning snacks for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snacks. The midmorning snack menu was daily varied, and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

1573-4013/19 $58.00+.00

egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 calories (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.

- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2: -2.0) and -2.3 ± 0.4 (-3.2: -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below ~~of~~ the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorous intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5: 100.0) % due to which ~~so that~~ the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4: 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9: 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased ~~the~~ calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to create awareness ~~socialize~~ about the importance of consuming high calcium midmorning snacks to teenagers. The activity of consuming high-calcium midmorning snacks by adolescents can be continued independently. So far, teenagers do not use pocket money to buy midmorning snacks that are high in calcium, but they buy other types of

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

snacks that are low in calcium, consisting of *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake, and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorous

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. According to the World Health Organization (WHO), the overall prevalence of stunting among children aged 13 to 15 years is 35.1 %. [1]. The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 12–23 years in Indonesia was 34.2 percent and 40.0 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) [2]-. The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 %~~,~~ and serious when the prevalence of stunting is greater than 40 % [3]. Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. [4]. Stunting is a common public health problem among adolescents around the world (up to 27–65 %) [5]. Stunting among adolescents is often disregarded as a nutritional deficiency problem [6]. Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy new-born, are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development [6]. During this period, more than 20% of total height growth and up to 50% of body bone mass ~~is~~ are attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and the amount and ~~the~~ risk of stunting in children aged 24 months (OR =4.1, $p < 0.05$). The average amount of milk consumed by stunted children (17 times ~~days per~~ a week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) [7]. Milk contains calcium, which is necessary for bone and height growth [8]. In addition, fish and seafood have more calcium than beef or chicken. [9]. Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight [10,11].

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorous deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorous. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency ~~would~~ stifles growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below ~~of~~ the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorous intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snacks as well as milk. As a result, the goal of the research was to see how additional midmorning snacks affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table 1). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 [18]. ~~and p~~Parent~~'~~s' willingness to participate in the study was obtained and they signed the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria. [19].

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

The Lwanga and Lameeshow formula was used to calculate the number of samples [20]. A value of α =5% (1.964) and a value of β =20% (0.842) were utilized in the formula [21]. Previous research statistical parameters (e.g., mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that μ1–μ2 = 0.4 cm (the increase of study participant body length), and a standard deviation of σ = 1.6 cm, based on which the minimum sample of this research was 21 participants. Following the screening, 36 study participants were eligible for participating, as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 [22]. Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snacks [23] and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020. The nutrition intervention underwent only for one month and did not continued for up to 6 months because the corona virus that causes Covid-19 has infected Indonesia since March 2, 2020 as which was conveyed by the President of the Republic of Indonesia; Furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which all face-to-face learning activities in schools were stopped and turned into online learning was administered.

The midmorning snack menu was daily varied, and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snacks consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snacks are foods sold by vendors near the school compound. Division of meal time per day is Meals per day were divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner, and evening snack. Energy provision during breakfast provideds around 20% of RDA, lunch is around 30%, and dinner is around 20% of RDA; midmorning,

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

afternoon, and evening snacks were ~~are~~ approximately 10% of the RDA each [24]. The total amount of energy of the meals and milk was 541.8 calories (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m., and 12:00 p.m., given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The researcher observed the participants both during meal and milk consumption. The research team and 2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed ~~were~~ was recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. ~~Similar~~ A similar process was repeated between ~~at~~ 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there ~~was~~ were any leftovers.

Requirement calculation ~~of~~ (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorous, iron, and zinc) was based on the recommended dietary allowance (RDA) per age [25]. Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table [26]. Based on nutritional intake data, the participants obtained ~~the~~ nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people [27]. This means that a sufficient nutritional level is necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A, and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size, and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada, NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines ~~used~~ the term Recommended Energy and Nutrient Intake (RENI) is used~~,~~ and in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy was ~~is~~

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy was ~~is~~ categorized as low when recorded at <80 and ~~and~~ sufficient if ≥80% of RDA; the vitamin and mineral adequacy was ~~is~~ categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

~~Nutritional~~ The nutritional quality of the food intake was ~~is~~ calculated based on Hardinsyah's formula [28]. It was ~~is~~ categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{\sum (\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number of nutrition~~s~~ and ~~the that~~ nutritional quality of food
(energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorous: i=14; iron: i=15; zinc: i=16).

The study also involved ~~the~~ teacher's and parent's questionnaire regarding details of ~~for~~ participants' eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSION~~S~~

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8:152.2) cm, their age was 13.5 ± 0.9 (12.0:15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2: -2.0).

At the beginning of the study, calcium and phosphorous adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorous =0.406*) (Table 2). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3:100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and is considered inadequate if <50% of the NAR [29].

Moreover, at the same time, the calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively. Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with our ~~this~~ study's findings [29].

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Font: 10 pt
Formatted: Line spacing: single
Formatted: Highlight
Formatted: Font: 10 pt
Formatted: Line spacing: single
Formatted: Font: 10 pt, Highlight
Formatted: Font: 10 pt
Formatted: Font: 10 pt, Highlight
Formatted: Font: 10 pt
Formatted: Font: 10 pt, Highlight
Formatted: Font: 10 pt
Formatted: Font: 10 pt, Highlight
Formatted: Font: 10 pt
Formatted: Font: 10 pt, Highlight
Formatted: Font: 10 pt
Formatted: Indent: Left: 0 cm, Space After: 0 pt, Line spacing: single
Formatted: Highlight
Formatted: Highlight

Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml), which could decrease stunting events within 2 months (p =0.01) [29]. Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children (p <0.05) [9]. Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to 240 ml) containing more than 270 mg of calcium—almost one a third of the daily calcium needs; therefore, the milk consumption is very beneficial good for school aged children [30]. Regularly consuming milk is highly recommended to meet calcium needs [31]. Milk consumption can improve bone growth, which ultimately influences height, and helps reducing the risk of bone mass loss [32].

Milk is considered as a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth [8]. Proteins in cow milk—such as casein, whey, and amino acids —can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix [32]. Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue [30]. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix [33].

Calcium forms a complex bond with phosphate that can provide strength to bones [34]. Poor calcium intake in adolescents can will cause disrupt growth and peak bone mass to be disrupted [35]. Optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. A total of 51% of peak bone mass accumulates during puberty growth and reaches 37% of the adult bone mineral density [36]. In adolescence, the increase in bone mass occurs between 40–60% of the total bone mass [37].

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, that which are in the period of formation. Calcium deficiency not only affects both bone and tooth growth, but affects the immune system, nervous system resistance, and impairsed heart muscle contraction power as well [33]. Long-term calcium consumption deficiency will negatively affect bone

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

structure; moreover, during growth, it can induce growth disorders [38]. Calcium deficiency can affect linear growth should bone calcium content be less than 50% [39]. Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body [40]. During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium [41].

The need for calcium and phosphor increases in adolescence as height growth and bone mass formation rapidly take place [14]. Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth [42].

Before this study was conducted, the primary sources of daily calcium intake were soup noodle, 298 mg (*soto*); pastel, 296 mg; chicken noodles, 262 mg; tofu, 223 mg; fritters, 204 mg; *pao* meat, 194 mg; tempeh, 155 mg; rice cake, 147 mg; and eclairs, 105 mg per 100 g of edible food. Calcium consumption from non-dairy sources hardly constituted the total daily calcium intake. The calcium content of the food was ~~is~~ high per 100 g of edible food, but the respondents consumed it in small quantities, due to which ~~so that~~ it was ~~is~~ not sufficient and in accordance with the recommended die~~a~~tary allowance (RDA). For example, one bowl of soto is consumed by all family members so that the respondent only consumes a few tablespoons. Foods that are good sources of calcium, such as tofu, tempeh, beans, and green vegetables, contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods [1]. Milk is the best source of calcium and is the largest contributor to daily calcium consumption [43]. Both the amount and frequency of milk consumption show~~s~~ a noticeable relationship with the height of the child [16].

Moreover, both the amount and frequency of milk consumption in adolescents aged 16–17 years are related to height [8,16]. The prevalence of stunting is lower in children who consume milk. Children aged 1–12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) [34]. No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% liked it at room temperature.

The monthly allowance received by the study participant~~s~~ on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Full Cream 115 mL milk pack was ~~is~~ 30% with the suggestion of serving two packages per day. The price of milk per box was ~~is~~

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Commented [CN1]: Author's assistance required.
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

IDR 2,350 (USD$ 0,16). A total of 16.4% of the participants had been accustomed to buying milk even ~~since~~ before this research was conducted. The types of consumed milk were UHT milk (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%), and Milo (2.7). A portion of 100 g of milk contains about 143 mg of calcium ~~which were~~that was ~~-~~digestible in the body. Apart from milk, ice cream also contains calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg. Family income was related to the incidence of stunting in infants (p = 0.048). Low family income is at risk of getting stunting[44]. The type of purchased food depends on the family's income level [45]. The grocery purchasing capability of the family correlates with its income level; a high family income allows ~~for~~ the fulfilment of the nutritional needs of the whole family; however, low family income~~s~~ correlate~~s~~ with a low purchasing power for household food and potentially affect stunting events in children.

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried eggs, and 33.3% liked omelets. Egg consumption provides nutrition that facilitates increased growth and contributes to ~~reduce~~ reducing stunting (p <0.05) [14]. Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% [13]. The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46].

~~The toddlers' frequency of egg consumption which fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46].~~ However, the frequent category information was ~~is~~ missing in ~~from~~ journal articles [46]. Egg consumption was ~~is~~ 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years was ~~is~~ 5 times / week [47].

Within the first ten months, participants had not received midmorning snacks. When participants had not received midmorning snacks, some participants consumed snacks themselves. The types of snacks that participants consumed were soup noodles, pastel, chicken noodles, tofu, fritters, *pao* meat, tempeh, rice cake, and eclairs. However, the consumption of these ~~various~~ snacks did not improve the participant's nutritional status. On the 11th month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack— along with high calcium milk. The meals were purchased from shops near the participant~~'~~s' area. The price of one meal was approximately IDR 8,000, which is considered very affordable. Therefore, the participants will be able to purchase the meals even after the completion of the study.

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Not Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers ~~are able to~~can provide for their own. The first reason is that midmorning snacks are sold around them. The second reason is the price of the ~~low priced~~ midmorning snacks. The students can use snack money to buy midmorning snacks. ~~Therefore, the participants will be able to purchase the meals even after the completion of the study.~~ Researchers have informed stunting teens during midmorning snacks that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

After the intervention, the height of the participants increased (Table **3**). The control group was formed before being given a midmorning snack. In the first ten months of the study, all participants were not given midmorning snacks. The nutritional status of all participants in the first ten months is still stunting. The treatment group, ~~who~~ which had been given midmorning snacks for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming midmorning snacks for 34 days. The height of the participants of the control group was ~~is~~ 143.6 ± 5.2 while of the treatment group was ~~is~~ 144.9 ± 5.1 cm ($p < 0.00$). The average increase tendency (mean) ~~increase~~ in participant height after treatment is 1.3 cm (Table **4**– output paired t-test).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snacks and drinking milk increased calcium intake, but it also increased the intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4:86.3) to 84.8 ± 20.3 (30.9:100.0) (Table 3). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

A total of 55.86% of elementary school children always have breakfast and have a normal nutritional status [47]. Breakfast has a long-term effect on nutritional status [48]. In Norway, the nutritional status of senior high school students improved after being given ~~an~~ intervention in the form of breakfast [49]. On the other hand, in developing countries, skipping breakfast is highly prevalent in the United States and Europe (10% to 30%) in Children and Adolescents [50].

Children who do not eat breakfast are deficient in micronutrients, resulting in poor physical health. [51]. Calcium, vitamin D, phosphorus, and protein are essential nutrients in bone formation [52]. Children who have a long-lasting deficiency of protein intake, even though their energy intake is sufficient, will experience stunted growth in height [53]. At school, children who do not have breakfast

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight

are prone to sickness, often skip, cannot concentrate on learning, and drop out of school [54].

Delaying breakfast can lead to morning malnutrition and increase the risk of general malnutrition [55]. Delaying breakfast can result in excessive food consumption during other mealtimes—especially dinner—resulting in obesity [56]. Skipping breakfast can put a person at risk of weight gain, as it will trigger excessive food consumption during the day [57].

Breakfast can affect the nutritional status of the child; children who usually skip breakfast are at a threefold risk of unhealthy eating habits as well as ~~a~~ difficulty controlling appetite, thus impacting the incidence of obesity [48]. It is part of a balanced nutritional fulfilment and can affect a person's daily mind-set and activity, especially in children during their-in-growth period, namely children 0-5 years (children under five years) and adolescents [58].

It is recommended to incorporate balanced nutrition in breakfast~~,~~ and meet 20%–25% of the total energy needs ~~in before school study~~ [59]. Breakfast should be able to meet 15–30% of the daily nutritional needs of adolescents [60]. Breakfast can also help balance metabolism, thus maintaining an ideal weight [7].

Breakfast is a morning activity that assists in meeting the body's energy needs to optimally perform daily activities; this is important for schoolchildren, as it can support the growth and development period as well as various school activities [61]. Breakfast promotes the prevention of hypoglycemia, stabilizes blood glucose levels, and prevents dehydration after sleep-related fasting [62]. Meeting the nutritional needs of schoolchildren is important to support their growth [63]. Breakfast constitutes food and beverage, lasting up to 9 AM [60].

The benefits of breakfast for schoolchildren include improving memory, concentration, reading ability, counting, improved stamina, and rare sickness [64]. Schoolchildren who skip breakfast can have impaired learning concentration and drowsiness [65]. Schoolchildren who skip breakfast will see an increase in blood sugar levels and either a decrease in physical condition or mental decline [66]. Snacking and rushing to school results in teenagers choosing not to spend enough time eating breakfast and even skipping breakfast [67]~~-~~.

Breakfast can trigger the short-term metabolism of fasting conditions (empty stomach time between dinner and the next meal) to supply nutrients to the central nervous system for ~~to~~ performing cognitive functions. Long-term breakfast habits can affect the cognitive system [68].

Breakfast as an initial energy supplier, especially as a source of glucose energy for the brain, is highly recommended for everyone. Glucose is very involved in a person's cognitive memory (memory) mechanism. Glucose is a form

Formatted: Highlight

Formatted: Highlight

of carbohydrate that is in the bloodstream to provide fuel for the brain. Neurons cannot store glucose, so the brain depends on blood flow for energy [69].

Hawker food is the first digested food item for children who are not used to having breakfast; therefore, snacks become important. Consuming snacks maintains energy levels before main meal time [70]. The habit of school-snacking occurs because 3–4 hours after breakfast, the individual ~~will~~ feels hungry again [71]. Consumed snacks and energy contribution to the recommended adequacy are positively correlated [72]. Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or in public places [73].

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature, and quality of their snacking. Between-meal eating contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished [74]. Many children do not have breakfast, as they choose snacking [75].

The nutritional value of hawker meals does not always satisfy the body's nutritional requirements [76]. Children who regularly have breakfast tend to present improved nutritional status than children who skip breakfast [77]. Consistent breakfast intake can improve nutritional status, regulate weight gain, and increase height in the long run [78]. Adolescents who consume breakfast regularly have a higher intake of carbohydrates, protein, and fiber and a lower fat intake than those who do not [50]. Women with good breakfast quality have a relatively higher intake of micro nutrition [60]. ~~While~~ In contrast, those who do not have breakfast can present Vitamin A, Vitamin B6, Calcium, Copper, Iron, Magnesium, and Zinc deficiencies [79].

During the 10-month non-intervention period, 8.3% (n =3) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% of participant statuses from stunting to normal.

Therefore, it is predicted that, if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month, the intervention could reduce by 19.4%, so if the

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

intervention was extended to 6 months, ~~therefore~~ 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snacks and milk are sold around them, and the price is affordable and can be purchased ~~by~~ with the pocket money given by their parents. The time before this research was conducted, they did not know about the types of food they should consume, how much, and when to consume them. Time after the research was conducted, they became aware of this and were able to meet their nutritional needs.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, ~~the design became~~ pre-nutrition intervention and post ~~after~~ nutrition intervention were ~~was~~ given in the same school.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat *pao*, tempeh, rice cake, and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snacks and calcium-fortified milk were supplied. The breakfast menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snacks and high calcium milk must be eaten; however, ~~it~~ they can be consumed at any time of day.

Providing intervention, such as midmorning snacks and milk, may ~~be~~ be an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Highlight
Formatted: Not Highlight
Formatted: Not Highlight

The participants' parents signed ~~an~~ informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia, for their permission to conduct the study; and PT Indolakto, Jakarta, Indonesia, for providing milk for this study.

REFERENCES

1. Organization WH. Improving Child Growth. Geneva; 2001.
2. Health M of. Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.
3. World Health Organization. Child growth indicators and their interpretation. World Health Organization,. Geneva; 2010.
4. Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.
5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.
6. Mahmud MK, Zulfianto NA. Tabel Komposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. STATUS GIZI, ASUPAN MAKAN REMAJA AKHIR YANG BERPROFESI SEBAGAI MODEL. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma Mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The

Formatted: Highlight

effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.

12. Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.
13. Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) Dalam Dua Varietas Kubis (Brassica oleracea) Di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan Konsumsi Susu Dan Kalsium Dengan Densitas Tulang Dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.
17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.
18. World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/
19. Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.
20. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.
21. Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.
24. Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. GIZI WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.
26. Kementerian Kesehatan Republik

Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.

27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.
28. Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan Kebiasaan Konsumsi Susu dengan Kejadian Stunting pada Siswa Kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.
31. Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.
32. Tirtasaputra E, Puspasari G, Lucretia T. Milk Consumption Correlates with Body Height in Children. J Med Heal. 2019;2(3):878–84.
33. Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama; 2015.
34. Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.
35. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
36. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The HELENA study. Horm Res Paediatr. 2010;74(5):339–50.
37. Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
38. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.
39. Prentice A, Bates CJ. An Appraisal of the Adequacy of Dietary Mineral Intakes in Developing Countries for Bone Growth and Development in Children. Nutr Res Rev. 1993;6(1):51–69.
40. Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.
41. Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.
42. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and

calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.

43. Mann J, Truswell AS. Essentials of Human Nutrition. 2nd Edi. Oxford University Press, Inc; 2002.
44. Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
45. Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.
46. Wulandari, Budiasturtik I, Alamsyah D. Hubungan Karakteristik Sosial Ekonomi dan Pola Asuh Pemberian Makan Terhadap Kejadian Stunting pada Balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
47. Annisa PA. Densitas Energi Konsumsi, Status Gizi, Dan Daya Ingat Sesaat Anak Usia Sekolah Dasar. J Gizi dan Pangan. 2015;9(3):187–94.
48. Kral TVE, Whiteford LM, Heo M, Faith MS. Effects of eating breakfast compared with skipping breakfast on ratings of appetite and intake at subsequent meals in 8- To 10-y-old children. Am J Clin Nutr. 2011;93(2):284–91.
49. Ask AS, Hernes S, Aarek I, Johannessen G, Haugen M. Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast - A pilot study. Nutr J. 2006;5(1):4–9.
50. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 2005;105(5):743–60.
51. Perdana F, Hardinsyah H. Analisis Jenis, Jumlah, Dan Mutu Gizi Konsumsi Sarapan Anak Indonesia. J Gizi dan Pangan. 2013;8(1):39.
52. Matali VJ, Wungouw HIS, Sapulete I. Pengaruh Asupan Susu terhadap Tinggi Badan dan Berat Badan Anak Sekolah Dasar. J e-Biomedik. 2017;5(2).
53. Sundari E, Nuryanto N. Hubungan Asupan Protein, Seng, Zat Besi, Dan Riwayat Penyakit Infeksi Dengan Z-Score Tb/U Pada Balita. J Nutr Coll. 2016;5(4):520–9.
54. Afriana R. HUBUNGAN POLA KONSUMSI MAKAN TERHADAP STATUS GIZI ANAK KELAS 6 DI SDN PB KELAPA DUA TANGERANG TAHUN AJARAN 2010-2011. Universitas Pembangunan Nasional; 2011.
55. Kleinman RE, Hall S, Green H, Korzec-Ramirez D, Patton K, Pagano ME, et al. Diet, breakfast, and academic performance in children. Ann Nutr Metab.

2002;46(SUPPL. 1):24–30.

56. Martin A, Normand S, Sothier M, Peyrat J, Louche-Pelissier C, Laville M. Is advice for breakfast consumption justified? Results from a short-term dietary and metabolic experiment in young healthy men. Br J Nutr. 2000;84(3):337–44.
57. Millimet DL, Tchernis R, Husain M. School nutrition programs and the incidence of childhood obesity. J Hum Resour. 2010;45(3):640–54.
58. Khomsan A. Pangan dan Gizi untuk Kesehatan. Edisi Kedu. PT. Raja Grafindo Persada; 2005.
59. Khomsan A. Pangan dan Gizi untuk Kesehatan. Jakarta: PT. Raja Grafindo Persada; 2003.
60. Hardinsyah H, Aries M. Jenis Pangan Sarapan Dan Perannya Dalam Asupan Gizi Harian Anak Usia 6—12 Tahun Di Indonesia. J Gizi dan Pangan. 2016;7(2):89.
61. Wiarto G. Budaya Hidup Sehat. Cetakan 1. Yogyakarta: Yogyakarta Gosyen Publishing; 2013. 236 p.
62. Gibson SA, Gunn P. What's for breakfast? Nutritional implications of breakfast habits: Insights from the NDNS dietary records. Nutr Bull. 2011;36(1):78–86.
63. Hardinsyah H. Ilmu Gizi dan Aplikasi: Gizi Bayi dan Balita. Jakarta: EGC Penerbit Buku Kedokteran; 2017.
64. Brown JL, Beardslee WH, Prothrow-Stith D. Impact Of School Breakfast On Children's Health And Learning. Comm by Sodexo Found [Internet]. 2008;1–20. Available from: www.sodexoUSA.com
65. Dianida Erlyningrum. HUBUNGAN ANTARA KEBIASAAN SARAPAN PAGI DENGAN PRESTASI BELAJAR PADA SISWA SEKOLAH DASAR NEGERI DUREN KECAMATAN BANDUNGAN KABUPATEN SEMARANG [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632
66. Hartoyo E, SHOLIHAH, QOMARIYATUS and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.
67. Octavia ZF. Frekuensi Dan Kontribusi Energi Dari Sarapan Meningkatkan Status Gizi Remaja Putri. J Ris Gizi. 2020;8(1):32–6.
68. Valadares CT, Fukuda MTH, Françolin-Silva AL, Hernandes AS, Almeida SS. Effects of postnatal protein malnutrition on learning and memory procedures. Nutr Neurosci. 2010;13(6):274–82.
69. Khalida E, Fadlyana E, Somasetia DH. Hubungan Kebiasaan Sarapan dengan Prestasi Belajar dan Fungsi Kognitif pada Anak Sekolah Dasar. Sari Pediatr. 2016;17(2):89.

70. Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009.
71. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).
72. Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional "Jajanan Cilok dan Penganan Gorengan." Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.
73. Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.
74. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
75. Masrikhiyah R, Octora M iqbal. Pengaruh Kebiasaan Sarapan Dan Status Gizi Remaja Terhadap Prestasi Belajar. J Ilm Gizi dan Kesehat. 2020;2(01):23–7.
76. Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.
77. Al-Oboudi LM. Impact of Breakfast Eating Pattern on Nutritional Status, Glucose Level, Iron Status in Blood and Test Grades among Upper Primary School Girls in Riyadh City, Saudi Arabia. Pakistan J Nutr. 2010;9(2):106–11.
78. Gibney MJ, Margetts BM, Kearney JM, Arab L. Gizi Kesehatan Masyarakat. Jakarta: Penerbit Buku Kedokteran EGC; 2009. 467 p.
79. Ruxton CHS, Kirk TR. Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. Br J Nutr. 1997;78(2):199–213.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48** (Stunting)	19.4 (7)
	48 – 55.6 (Normal)	75.0 (27)
	≥ 55,6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)

1573-4013/19 $58.00+.00

Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0: 175.0)***	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)

Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)		
Age	Measurement Date	Body Height	Z-score		Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6:137.9)	-2.6±0.3 (-2.90:-2.65)		11/03/2020	136.4±2.5 (134.7:139.3)	-2.6±0.3 (-2.90:-2.25)
13	11/02/2020	141.5±4.8 (135.4:151.7)	-2.5±0.6 (-3.24:-1.36)		11/03/2020	143.2±5.0 (135.8:153.5)	-2.3±0.6 (-3.15:-1.19)
14	11/02/2020	144.9±3.8 (138.1:150.9)	-2.4±0.5 (-3.34:-1.97)		11/03/2020	146.4±3.7 (140.4:153.6)	-2.3±0.5 (-3.10:-1.68)
15	11/02/2020	147.5±3.8	-2.4±0.3		11/03/2020	148.1±3.7	-2.3±0.3

		(143.5:154.9)	(-2.87:-1.91)			(144.2:155.2)	(-2.75:-1.85)
	Average	143.6±5.2 (133.6:154.9)	-2.5±0.4 (-3.30:-1.40)		Average	144.9±5.1 (134.7:155.2)	-2.3±0.4 (-3.15:-1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Pair T-Test and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate							Paired Sample T-Test of Nutritional Adequacy Rate		
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate			Nutritional Adequacy Rate (%)		Paired Sample
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)		No Intervention (April 29th, 2019)	After Intervention (March 11th, 2020)	(p value)
1	Energy	70.7±18.5 (39.6:100.0)	0.118	0.495	66.9±20.3 (30.2:86.6)	-0.037	0.832		70.7±18.5 (39.6:100.0)	66.9±20.3 (30.2:86.6)	0.143
2	Protein	77.3±20.0 (44.5:100.0)	0.078	0.650	87.3±18.0 (50.9:100.0)	0.069	0.687		77.3±20.0 (44.5:100.0)	87.3±18.0 (50.9:100.0)	0.147
3	Fats	73.2±25.9 (20.8:100.0)	0.048	0.781	76.6±24.5 (42.3:100.0)	0.051	0.769		73.2±25.9 (20.8:100.0)	76.6±24.5 (42.3:100.0)	0.309

4	Carbohydrates	61.2±18.0 (24.5:100.0)	0.104	0.547	49.5±19.8 (18.4:100.0)	0.009	0.959		61.2±18.0 (24.5:100.0)	49.5±19.8 (18.4:100.0)	0.004 **
5	Vitamin A	75.1±35.4 (5.0:100.0)	0.202	0.238	77.9±20.6 (35.4:100.0)	0.028	0.873		75.1±35.4 (5.0:100.0)	77.9±20.6 (35.4:100.0)	0.676
6	Vitamin E	21.3±13.4 (0.0:58.2)	0.142	0.408	54.6±26.8 (7.3:100.0)	0.000	0.999		21.3±13.4 (0.0:58.2)	54.6±26.8 (7.3:100.0)	0.000 **
7	Vitamin B-1	35.6±21.2 (9.1:100.0)	0.277	0.101	63.0±21.4 (25.0:100.0)	-0.048	0.781		35.6±21.2 (9.1:100.0)	63.0±21.4 (25.0:100.0)	0.000 **
8	Vitamin B-2	62.2±24.6 (20.0:100.0)	0.209	0.222	97.9±5.8 (76.9:100.0)	-0.025	0.884		62.2±24.6 (20.0:100.0)	97.9±5.8 (76.9:100.0)	0.000 **
9	Vitamin B-6	61.9±22.7 (25.0:100.0)	0.166	0.333	78.2±20.5 (38.5:100.0)	0.145	0.400		61.9±22.7 (25.0:100.0)	78.2±20.5 (38.5:100.0)	0.002 **
10	Vitamin C	17.2±24.2 (0.0:85.8)	0.169	0.324	30.4±33.4 (5.4:100.0)	0.029	0.866		17.2±24.2 (0.0:85.8)	30.4±33.4 (5.4:100.0)	0.048 *
11	Sodium	17.0±11.9 (2.0:55.7)	0.291	0.086	76.0±26.2 (18.6:100.0)	0.058	0.738		17.0±11.9 (2.0:55.7)	76.0±26.2 (18.6:100.0)	0.000 **
12	Calcium	27.3±27.8 (3.3:100.0) **	0.433	0.008	59.1±19.0 (15.5:100.0)	0.071	0.680		27.3±27.8 (3.3:100.0)	59.1±19.0 (15.5:100.0)	0.000 **
13	Magnesium	73.1±21.1 (35.7:100.0)	0.100	0.561	92.8±14.3 (42.8:100.0)	0.133	0.440		73.1±21.1 (35.7:100.0)	92.8±14.3 (42.8:100.0)	0.000 **

14	Phosphorous	55.9±21.2 (25.4:100.0)*	0.406	0.014	87.8±17.0 (45.4:100.0)	0.123	0.476		55.9±21.2 (25.4:100.0)	87.8±17.0 (45.4:100.0)	0.000**
15	Iron	52.8±29.0 (14.0:100.0)	0.110	0.524	75.5±24.3 (26.4:100.0)	0.093	0.590		52.8±29.0 (14.0:100.0)	75.5±24.3 (26.4:100.0)	0.001**
16	Zinc	61.2±22.0 (33.3:100.0)	0.208	0.233	84.8±20.3 (30.9:100.0)	0.062	0.719		61.2±22.0 (33.3:100.0)	84.8±20.3 (30.9:100.0)	0.001**
Nutritional quality of food		52.7±15.5 (28.4: 86.3)*	0.281	0.027	84.8±20.3 (30.9: 100.0)	0.062	0.720		52.7±15.5 (28.4: 86.3)	84.8±20.3 (30.9: 100.0)	0.001**

DAY	TIME		
	07:00 a.m.	**10:00 a.m.**	**12:00 p.m.**
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk

1573-4013/19 $58.00+.00

WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk

FRIDAY		 	
	Milk	Sandwich + Milk	Milk
SATURDAY		 	
	Milk	Chicken Porridge + Milk	Milk

SUNDAY		 	
	Milk	Fried Rice Teri + Milk	Milk

Picture **1.** The midmorning snack

Executive Suite Y, # 2
P. O. Box 7917
SAIF Zone
Sharjah, UAE
Tel: +971 6 5571132
Fax: +971 6 5571134
Email: services@benthamscience.net

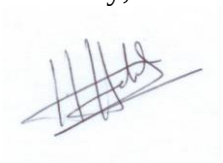
Date: September 13th 2021

EDITING CERTIFICATE

This is to acknowledge that the article titled "**The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia**" had been submitted to Bentham Science Publishing Services for addressing the language inconsistencies existing in the document.

The document was duly subjected to a thorough assessment of any sort of typographical and grammatical errors, and is now in a refined form, ready for submission for publication as and when desired.

Sincerely,



Leena Menon
Corporate Manager

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Poltekkes Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

A R T I C L E H I S T O R Y

Received:

Revised:

Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: The objective of this study was to determine the impact of calcium and phosphorous supplementation via additional midmorning snacks for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snacks. The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled

1573-4013/19 $58.00+.00

egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 calories (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.

- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2: -2.0) and -2.3 ± 0.4 (-3.2: -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorous intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5: 100.0) % due to which the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4: 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9: 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to create awareness about the importance of consuming high calcium midmorning snacks to teenagers. The activity of consuming high-calcium midmorning snacks by adolescents can be continued independently. So far, teenagers do not use pocket money to buy midmorning snacks that are high in calcium, but they buy other types of snacks that are low in

calcium, consisting of *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake, and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorous

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. According to the World Health Organization (WHO), the overall prevalence of stunting among children aged 13 to 15 years is 35.1 %. [1]. The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 12–23 years in Indonesia was 34.2 percent and 40.0 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) [2]. The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 % and serious when the prevalence of stunting is greater than 40 % [3]. Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. [4]. Stunting is a common public health problem among adolescents around the world (up to 27–65 %) [5]. Stunting among adolescents is often disregarded as a nutritional deficiency problem [6]. Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy newborn, are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development [6]. During this period, more than 20% of total height growth and up to 50% of body bone mass are attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and the amount and risk of stunting in children aged 24 months (OR =4.1, $p < 0.05$). The average amount of milk consumed by stunted children (17 times a week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) [7]. Milk contains calcium, which is necessary for bone and height growth [8]. In addition, fish and seafood have more calcium than beef or chicken. [9]. Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight [10,11].

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorous deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorous. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency stifles growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorous intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snacks as well as milk. As a result, the goal of the research was to see how additional midmorning snacks affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table 1). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 [18]. Parents' willingness to participate in the study was obtained and they signed the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria. [19].

The Lwanga and Lameshow formula was used to calculate the number of samples [20]. A value of α =5% (1.964) and a value of β =20% (0.842) were utilized in the formula [21]. Previous research statistical parameters (e.g., mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that μ1–μ2 = 0.4 cm (the increase of study participant body length), and a standard deviation of σ = 1.6 cm, based on which the minimum sample of this research was 21 participants. Following the screening, 36 study participants were eligible for participating, as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 [22]. Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snacks [23] and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020. The nutrition intervention underwent only for one month and did not continue for up to 6 months because the coronavirus that causes Covid-19 has infected Indonesia since March 2, 2020 as was conveyed by the President of the Republic of Indonesia; Furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which learning activities in schools were stopped and online learning was administered.

The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snacks consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snacks are foods sold by vendors near the school. Meals per day were divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner, and evening snack. Energy provision during breakfast provided around 20% of RDA, lunch around 30%, and dinner around 20% of RDA; midmorning, afternoon, and evening snacks were approximately 10% of the RDA each [24]. The total amount of

energy of the meals and milk was 541.8 calories (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m., and 12:00 p.m., given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The researcher observed the participants both during meal and milk consumption. The research team and 2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed was recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. A similar process was repeated between 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there were any leftovers.

Requirement calculation (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorous, iron, and zinc) was based on the recommended dietary allowance (RDA) per age [25]. Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table [26]. Based on nutritional intake data, the participants obtained nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people [27]. This means that a sufficient nutritional level is necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A, and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size, and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada, NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines the term Recommended Energy and Nutrient Intake (RENI) is used and in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy was categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy was categorized as low when recorded at <80 and sufficient if ≥80% of

RDA; the vitamin and mineral adequacy was categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

The nutritional quality of the food intake was calculated based on Hardinsyah's formula [28]. It was categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{(\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number of nutritions and the nutritional quality of food (energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorous: i=14; iron: i=15; zinc: i=16).

The study also involved teacher's and parent's questionnaire regarding details of participants' eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSION

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8:152.2) cm, their age was 13.5 ± 0.9 (12.0:15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2: -2.0).

At the beginning of the study, calcium and phosphorous adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorous =0.406*) (Table 2). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3:100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and is considered inadequate if <50% of the NAR [29].

Moreover, at the same time, the calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively. Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with our study's findings [29].

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml), which could decrease stunting events within 2 months (p =0.01) [29]. Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children (p <0.05) [9]. Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to

240 ml) containing more than 270 mg of calcium—almost one third of the daily calcium needs; therefore, milk consumption is very beneficial for school aged children [30]. Regularly consuming milk is highly recommended to meet calcium needs [31]. Milk consumption can improve bone growth, which ultimately influences height and helps reducing the risk of bone mass loss [32].

Milk is considered a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth [8]. Proteins in cow milk—such as casein, whey, and amino acids can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix [32]. Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue [30]. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix [33].

Calcium forms a complex bond with phosphate that can provide strength to bones [34]. Poor calcium intake in adolescents can disrupt growth and peak bone mass [35]. Optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. A total of 51% of peak bone mass accumulates during puberty and reaches 37% of the adult bone mineral density [36]. In adolescence, the increase in bone mass occurs between 40–60% of the total bone mass [37].

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, which are in the period of formation. Calcium deficiency not only affects both bone and tooth growth but affects the immune system, nervous system resistance, and impairs heart muscle contraction power as well [33]. Long-term calcium consumption deficiency will negatively affect bone structure; moreover, during growth, it can induce growth disorders [38]. Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body [40]. During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium [41].

The need for calcium and phosphor increases in adolescence as height growth and bone mass formation rapidly take place [14]. Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth [42].

Before this study was conducted, the primary sources of daily calcium intake were soup noodle, 298 mg (*soto*); pastel, 296 mg; chicken noodles, 262 mg; tofu, 223 mg; fritters, 204 mg; *pao* meat, 194 mg; tempeh, 155 mg; rice cake, 147 mg; and eclairs, 105 mg per 100 g of edible food. Calcium consumption from non-dairy sources hardly constituted the total daily calcium intake. The calcium content of the food was high per 100 g of edible food, but the respondents consumed it in small quantities, due to which it was not sufficient and in accordance with the recommended dietary allowance (RDA). For example, one bowl of soto is consumed by all family members so that the respondent only consumes a few tablespoons. Foods that are good sources of calcium, such as tofu, tempeh, beans, and green vegetables, contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods [1]. Milk is the best source of calcium and is the largest contributor to daily calcium consumption [43]. Both the amount and frequency of milk consumption show a noticeable relationship with the height of the child [16].

Moreover, both the amount and frequency of milk consumption in adolescents aged 16–17 years are related to height [8,16]. The prevalence of stunting is lower in children who consume milk. Children aged 1–12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) [34]. No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% liked it at room temperature.

The monthly allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Full Cream 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,350 (USD$ 0,16). A total of 16.4% of the participants had been accustomed to buying milk even before this research was conducted. The types of consumed milk were UHT milk (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%), and Milo (2.7). A portion of 100 g of milk contains about 143 mg of calcium that was digestible in the body. Apart from milk, ice cream also contains calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg. Family income was related to the incidence of stunting in infants ($p = 0.048$). Low family income is at risk of getting stunting[44]. The

type of purchased food depends on the family's income level [45]. The grocery purchasing capability of the family correlates with its income level; a high family income allows the fulfilment of the nutritional needs of the whole family; however, low family income correlates with a low purchasing power for household food and potentially affect stunting events in children.

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried eggs, and 33.3% liked omelets. Egg consumption provides nutrition that facilitates increased growth and contributes to reducing stunting ($p < 0.05$) [14]. Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% [13]. The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46].

However, the frequent category information was missing in journal articles [46]. Egg consumption was 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years was 5 times / week [47].

Within the first ten months, participants had not received midmorning snacks. When participants had not received midmorning snacks, some participants consumed snacks themselves. The types of snacks that participants consumed were soup noodles, pastel, chicken noodles, tofu, fritters, *pao* meat, tempeh, rice cake, and eclairs. However, the consumption of thesesnacks did not improve the participant's nutritional status. On the 11th month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack— along with high calcium milk. The meals were purchased from shops near the participants' area. The price of one meal was approximately IDR 8,000, which is considered very affordable. Therefore, the participants will be able to purchase the meals even after the completion of the study.

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers can provide for their own. The first reason is that midmorning snacks are sold around them. The second reason is the price of the midmorning snacks. The students can use snack money to buy midmorning snacks. Researchers have informed stunting teens during midmorning snacks that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

After the intervention, the height of the participants increased (Table **3**). The control group was formed before being given a midmorning snack. In the first ten months of the study, all participants were not given midmorning snacks.

The nutritional status of all participants in the first ten months is still stunting. The treatment group, which had been given midmorning snacks for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming midmorning snacks for 34 days. The height of the participants of the control group was 143.6 ± 5.2 while of the treatment group was 144.9 ± 5.1 cm ($p < 0.00$). The average increase tendency (mean) in participant height after treatment is 1.3 cm (Table **4**– output paired t-test).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snacks and drinking milk increased calcium intake, but it also increased the intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4:86.3) to 84.8 ± 20.3 (30.9:100.0) (Table 3). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

A total of 55.86% of elementary school children always have breakfast and have a normal nutritional status [47]. Breakfast has a long-term effect on nutritional status [48]. In Norway, the nutritional status of senior high school students improved after being given intervention in the form of breakfast [49]. On the other hand, in developing countries, skipping breakfast is highly prevalent in the United States and Europe (10% to 30%) in Children and Adolescents [50].

Children who do not eat breakfast are deficient in micronutrients, resulting in poor physical health. [51]. Calcium, vitamin D, phosphorus, and protein are essential nutrients in bone formation [52]. Children who have a long-lasting deficiency of protein intake, even though their energy intake is sufficient, will experience stunted growth in height [53]. At school, children who do not have breakfast are prone to sickness, often skip, cannot concentrate on learning, and drop out of school [54].

Delaying breakfast can lead to morning malnutrition and increase the risk of general malnutrition [55]. Delaying breakfast can result in excessive food consumption during other mealtimes—especially dinner—resulting in obesity [56]. Skipping breakfast can put a person at risk of weight gain, as it will trigger excessive food consumption during the day [57].

Breakfast can affect the nutritional status of the child; children who usually skip breakfast are at a threefold risk of unhealthy eating habits as well as difficulty controlling appetite, thus impacting the incidence of obesity [48]. It is part of a balanced nutritional fulfilment and can affect a person's daily mind-set and activity, especially in children during their-in-growth period, namely children 0-5 years (children under five years) and adolescents [58].

It is recommended to incorporate balanced nutrition in breakfast and meet 20%–25% of the total energy needs [59]. Breakfast should be able to meet 15–30% of the daily nutritional needs of adolescents [60]. Breakfast can also help balance metabolism, thus maintaining an ideal weight [7].

Breakfast is a morning activity that assists in meeting the body's energy needs to optimally perform daily activities; this is important for schoolchildren, as it can support the growth and development period as well as various school activities [61]. Breakfast promotes the prevention of hypoglycemia, stabilizes blood glucose levels, and prevents dehydration after sleep-related fasting [62]. Meeting the nutritional needs of schoolchildren is important to support their growth [63]. Breakfast constitutes food and beverage, lasting up to 9 AM [60].

The benefits of breakfast for schoolchildren include improving memory, concentration, reading ability, counting, improved stamina, and rare sickness [64]. Schoolchildren who skip breakfast can have impaired learning concentration and drowsiness [65]. Schoolchildren who skip breakfast will see an increase in blood sugar levels and either a decrease in physical condition or mental decline [66]. Snacking and rushing to school results in teenagers choosing not to spend enough time eating breakfast and even skipping breakfast [67].

Breakfast can trigger the short-term metabolism of fasting conditions (empty stomach time between dinner and the next meal) to supply nutrients to the central nervous system for performing cognitive functions. Long-term breakfast habits can affect the cognitive system [68].

Breakfast as an initial energy supplier, especially as a source of glucose energy for the brain, is highly recommended for everyone. Glucose is very involved in a person's cognitive memory (memory) mechanism. Glucose is a form of carbohydrate that is in the bloodstream to provide fuel for the brain. Neurons cannot store glucose, so the brain depends on blood flow for energy [69].

Hawker food is the first digested food item for children who are not used to having breakfast; therefore, snacks become important. Consuming snacks maintains energy levels before main meal time [70]. The habit of school-snacking occurs because 3–4 hours after breakfast, the individual feels hungry again [71]. Consumed snacks and energy contribution to the recommended adequacy are positively correlated [72]. Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or in public places [73].

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature, and quality of their snacking. Between-meal eating

contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished [74]. Many children do not have breakfast, as they choose snacking [75].

The nutritional value of hawker meals does not always satisfy the body's nutritional requirements [76]. Children who regularly have breakfast tend to present improved nutritional status than children who skip breakfast [77]. Consistent breakfast intake can improve nutritional status, regulate weight gain, and increase height in the long run [78]. Adolescents who consume breakfast regularly have a higher intake of carbohydrates, protein, and fiber and a lower fat intake than those who do not [50]. Women with good breakfast quality have a relatively higher intake of micro nutrition [60]. In contrast, those who do not have breakfast can present Vitamin A, Vitamin B6, Calcium, Copper, Iron, Magnesium, and Zinc deficiencies [79].

During the 10-month non-intervention period, 8.3% (n =3) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% of participant statuses from stunting to normal.

Therefore, it is predicted that if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month, the intervention could reduce by 19.4%, so if the intervention was extended to 6 months, 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snacks and milk are sold around them, and the price is affordable and can be purchased with the pocket money given by their parents. The time before this research was conducted, they did not know about the types of food they should consume, how much, and when to consume them. Time after the research was conducted, they became aware of this and were able to meet their nutritional needs.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, pre-nutrition intervention and post nutrition intervention were given in the same school.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat *pao*, tempeh, rice cake, and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snacks and calcium-fortified milk were supplied. The breakfast menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snacks and high calcium milk must be eaten; however, they can be consumed at any time of day.

Providing intervention, such as midmorning snacks and milk, maybe an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

The participants' parents signed informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia, for their permission to conduct the study; and PT Indolakto, Jakarta, Indonesia, for providing milk for this study.

REFERENCES

1. Organization WH. Improving Child Growth. Geneva; 2001.
2. Health M of. Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.
3. World Health Organization. Child growth indicators and their interpretation. World Health Organization,. Geneva; 2010.
4. Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.
5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.
6. Mahmud MK, Zulfianto NA. Tabel Komposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. STATUS GIZI, ASUPAN MAKAN REMAJA AKHIR YANG BERPROFESI SEBAGAI MODEL. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma Mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.
12. Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.
13. Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) Dalam Dua Varietas Kubis (Brassica oleracea) Di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan Konsumsi Susu Dan Kalsium

Dengan Densitas Tulang Dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.

17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.
18. World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/
19. Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.
20. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.
21. Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.
24. Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. GIZI WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.
26. Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.
27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.
28. Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan Kebiasaan Konsumsi Susu dengan Kejadian Stunting pada Siswa Kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.

31. Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.
32. Tirtasaputra E, Puspasari G, Lucretia T. Milk Consumption Correlates with Body Height in Children. J Med Heal. 2019;2(3):878–84.
33. Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama; 2015.
34. Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.
35. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
36. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The HELENA study. Horm Res Paediatr. 2010;74(5):339–50.
37. Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
38. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.
39. Prentice A, Bates CJ. An Appraisal of the Adequacy of Dietary Mineral Intakes in Developing Countries for Bone Growth and Development in Children. Nutr Res Rev. 1993;6(1):51–69.
40. Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.
41. Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.
42. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.
43. Mann J, Truswell AS. Essentials of Human Nutrition. 2nd Edi. Oxford University Press, Inc; 2002.
44. Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
45. Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.
46. Wulandari, Budiasturtik I, Alamsyah D. Hubungan Karakteristik Sosial Ekonomi dan Pola Asuh Pemberian Makan Terhadap Kejadian Stunting pada Balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
47. Annisa PA. Densitas Energi Konsumsi, Status Gizi, Dan Daya Ingat Sesaat Anak

Usia Sekolah Dasar. J Gizi dan Pangan. 2015;9(3):187–94.

48. Kral TVE, Whiteford LM, Heo M, Faith MS. Effects of eating breakfast compared with skipping breakfast on ratings of appetite and intake at subsequent meals in 8- To 10-y-old children. Am J Clin Nutr. 2011;93(2):284–91.
49. Ask AS, Hernes S, Aarek I, Johannessen G, Haugen M. Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast - A pilot study. Nutr J. 2006;5(1):4–9.
50. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 2005;105(5):743–60.
51. Perdana F, Hardinsyah H. Analisis Jenis, Jumlah, Dan Mutu Gizi Konsumsi Sarapan Anak Indonesia. J Gizi dan Pangan. 2013;8(1):39.
52. Matali VJ, Wungouw HIS, Sapulete I. Pengaruh Asupan Susu terhadap Tinggi Badan dan Berat Badan Anak Sekolah Dasar. J e-Biomedik. 2017;5(2).
53. Sundari E, Nuryanto N. Hubungan Asupan Protein, Seng, Zat Besi, Dan Riwayat Penyakit Infeksi Dengan Z-Score Tb/U Pada Balita. J Nutr Coll. 2016;5(4):520–9.
54. Afriana R. HUBUNGAN POLA KONSUMSI MAKAN TERHADAP STATUS GIZI ANAK KELAS 6 DI SDN PB KELAPA DUA TANGERANG TAHUN AJARAN 2010-2011. Universitas Pembangunan Nasional; 2011.
55. Kleinman RE, Hall S, Green H, Korzec-Ramirez D, Patton K, Pagano ME, et al. Diet, breakfast, and academic performance in children. Ann Nutr Metab. 2002;46(SUPPL. 1):24–30.
56. Martin A, Normand S, Sothier M, Peyrat J, Louche-Pelissier C, Laville M. Is advice for breakfast consumption justified? Results from a short-term dietary and metabolic experiment in young healthy men. Br J Nutr. 2000;84(3):337–44.
57. Millimet DL, Tchernis R, Husain M. School nutrition programs and the incidence of childhood obesity. J Hum Resour. 2010;45(3):640–54.
58. Khomsan A. Pangan dan Gizi untuk Kesehatan. Edisi Kedu. PT. Raja Grafindo Persada; 2005.
59. Khomsan A. Pangan dan Gizi untuk Kesehatan. Jakarta: PT. Raja Grafindo Persada; 2003.
60. Hardinsyah H, Aries M. Jenis Pangan Sarapan Dan Perannya Dalam Asupan Gizi Harian Anak Usia 6—12 Tahun Di Indonesia. J Gizi dan Pangan. 2016;7(2):89.
61. Wiarto G. Budaya Hidup Sehat. Cetakan 1. Yogyakarta: Yogyakarta Gosyen

Publishing; 2013. 236 p.

62. Gibson SA, Gunn P. What's for breakfast? Nutritional implications of breakfast habits: Insights from the NDNS dietary records. Nutr Bull. 2011;36(1):78–86.
63. Hardinsyah H. Ilmu Gizi dan Aplikasi: Gizi Bayi dan Balita. Jakarta: EGC Penerbit Buku Kedokteran; 2017.
64. Brown JL, Beardslee WH, Prothrow-Stith D. Impact Of School Breakfast On Children's Health And Learning. Comm by Sodexo Found [Internet]. 2008;1–20. Available from: www.sodexoUSA.com
65. Dianida Erlyningrum. HUBUNGAN ANTARA KEBIASAAN SARAPAN PAGI DENGAN PRESTASI BELAJAR PADA SISWA SEKOLAH DASAR NEGERI DUREN KECAMATAN BANDUNGAN KABUPATEN SEMARANG [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632
66. Hartoyo E, SHOLIHAH, QOMARIYATUS and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.
67. Octavia ZF. Frekuensi Dan Kontribusi Energi Dari Sarapan Meningkatkan Status Gizi Remaja Putri. J Ris Gizi. 2020;8(1):32–6.
68. Valadares CT, Fukuda MTH, Françolin-Silva AL, Hernandes AS, Almeida SS. Effects of postnatal protein malnutrition on learning and memory procedures. Nutr Neurosci. 2010;13(6):274–82.
69. Khalida E, Fadlyana E, Somasetia DH. Hubungan Kebiasaan Sarapan dengan Prestasi Belajar dan Fungsi Kognitif pada Anak Sekolah Dasar. Sari Pediatr. 2016;17(2):89.
70. Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009.
71. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).
72. Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional "Jajanan Cilok dan Penganan Gorengan." Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.
73. Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.
74. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
75. Masrikhiyah R, Octora M iqbal. Pengaruh Kebiasaan Sarapan Dan Status Gizi Remaja Terhadap Prestasi Belajar. J Ilm Gizi dan Kesehat. 2020;2(01):23–7.
76. Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.
77. Al-Oboudi LM. Impact of Breakfast Eating

Pattern on Nutritional Status, Glucose Level, Iron Status in Blood and Test Grades among Upper Primary School Girls in Riyadh City, Saudi Arabia. Pakistan J Nutr. 2010;9(2):106–11.

78. Gibney MJ, Margetts BM, Kearney JM, Arab L. Gizi Kesehatan Masyarakat. Jakarta: Penerbit Buku Kedokteran EGC; 2009. 467 p.

79. Ruxton CHS, Kirk TR. Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. Br J Nutr. 1997;78(2):199–213.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48** (Stunting)	19.4 (7)
	48 – 55.6 (Normal)	75.0 (27)
	≥ 55,6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)
Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0: 175.0)***	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)
Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)		
Age	Measurement Date	Body Height	Z-score		Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6:137.9)	-2.6±0.3 (-2.90:-2.65)		11/03/2020	136.4±2.5 (134.7:139.3)	-2.6±0.3 (-2.90:-2.25)
13	11/02/2020	141.5±4.8 (135.4:151.7)	-2.5±0.6 (-3.24:-1.36)		11/03/2020	143.2±5.0 (135.8:153.5)	-2.3±0.6 (-3.15:-1.19)
14	11/02/2020	144.9±3.8 (138.1:150.9)	-2.4±0.5 (-3.34:-1.97)		11/03/2020	146.4±3.7 (140.4:153.6)	-2.3±0.5 (-3.10:-1.68)
15	11/02/2020	147.5±3.8 (143.5:154.9)	-2.4±0.3 (-2.87:-1.91)		11/03/2020	148.1±3.7 (144.2:155.2)	-2.3±0.3 (-2.75:-1.85)
	Average	143.6±5.2 (133.6:154.9)	-2.5±0.4 (-3.30:-1.40)		Average	144.9±5.1 (134.7:155.2)	-2.3±0.4 (-3.15:-1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Pair T-Test and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate							Paired Sample T-Test of Nutritional Adequacy Rate		
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate			Nutritional Adequacy Rate (%)		Paired Sample
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)		No Intervention (April 29th, 2019)	After Intervention (March 11th, 2020)	(p value)
1	Energy	70.7±18.5 (39.6:100.0)	0.118	0.495	66.9±20.3 (30.2:86.6)	-0.037	0.832		70.7±18.5 (39.6:100.0)	66.9±20.3 (30.2:86.6)	0.143
2	Protein	77.3±20.0 (44.5:100.0)	0.078	0.650	87.3±18.0 (50.9:100.0)	0.069	0.687		77.3±20.0 (44.5:100.0)	87.3±18.0 (50.9:100.0)	0.147
3	Fats	73.2±25.9 (20.8:100.0)	0.048	0.781	76.6±24.5 (42.3:100.0)	0.051	0.769		73.2±25.9 (20.8:100.0)	76.6±24.5 (42.3:100.0)	0.309
4	Carbohydrates	61.2±18.0 (24.5:100.0)	0.104	0.547	49.5±19.8 (18.4:100.0)	0.009	0.959		61.2±18.0 (24.5:100.0)	49.5±19.8 (18.4:100.0)	0.004**
5	Vitamin A	75.1±35.4 (5.0:100.0)	0.202	0.238	77.9±20.6 (35.4:100.0)	0.028	0.873		75.1±35.4 (5.0:100.0)	77.9±20.6 (35.4:100.0)	0.676
6	Vitamin E	21.3±13.4 (0.0:58.2)	0.142	0.408	54.6±26.8 (7.3:100.0)	0.000	0.999		21.3±13.4 (0.0:58.2)	54.6±26.8 (7.3:100.0)	0.000**

7	Vitamin B-1	35.6±21.2 (9.1:100.0)	0.277	0.101	63.0±21.4 (25.0:100.0)	-0.048	0.781		35.6±21.2 (9.1:100.0)	63.0±21.4 (25.0:100.0)	0.000**
8	Vitamin B-2	62.2±24.6 (20.0:100.0)	0.209	0.222	97.9±5.8 (76.9:100.0)	-0.025	0.884		62.2±24.6 (20.0:100.0)	97.9±5.8 (76.9:100.0)	0.000**
9	Vitamin B-6	61.9±22.7 (25.0:100.0)	0.166	0.333	78.2±20.5 (38.5:100.0)	0.145	0.400		61.9±22.7 (25.0:100.0)	78.2±20.5 (38.5:100.0)	0.002**
10	Vitamin C	17.2±24.2 (0.0:85.8)	0.169	0.324	30.4±33.4 (5.4:100.0)	0.029	0.866		17.2±24.2 (0.0:85.8)	30.4±33.4 (5.4:100.0)	0.048*
11	Sodium	17.0±11.9 (2.0:55.7)	0.291	0.086	76.0±26.2 (18.6:100.0)	0.058	0.738		17.0±11.9 (2.0:55.7)	76.0±26.2 (18.6:100.0)	0.000**
12	Calcium	27.3±27.8 (3.3:100.0)**	0.433	0.008	59.1±19.0 (15.5:100.0)	0.071	0.680		27.3±27.8 (3.3:100.0)	59.1±19.0 (15.5:100.0)	0.000**
13	Magnesium	73.1±21.1 (35.7:100.0)	0.100	0.561	92.8±14.3 (42.8:100.0)	0.133	0.440		73.1±21.1 (35.7:100.0)	92.8±14.3 (42.8:100.0)	0.000**
14	Phosphorous	55.9±21.2 (25.4:100.0)*	0.406	0.014	87.8±17.0 (45.4:100.0)	0.123	0.476		55.9±21.2 (25.4:100.0)	87.8±17.0 (45.4:100.0)	0.000**
15	Iron	52.8±29.0 (14.0:100.0)	0.110	0.524	75.5±24.3 (26.4:100.0)	0.093	0.590		52.8±29.0 (14.0:100.0)	75.5±24.3 (26.4:100.0)	0.001**
16	Zinc	61.2±22.0 (33.3:100.0)	0.208	0.233	84.8±20.3 (30.9:100.0)	0.062	0.719		61.2±22.0 (33.3:100.0)	84.8±20.3 (30.9:100.0)	0.001**
Nutritional quality of food		52.7±15.5 (28.4: 86.3)*	0.281	0.027	84.8±20.3 (30.9: 100.0)	0.062	0.720		52.7±15.5 (28.4: 86.3)	84.8±20.3 (30.9: 100.0)	0.001**

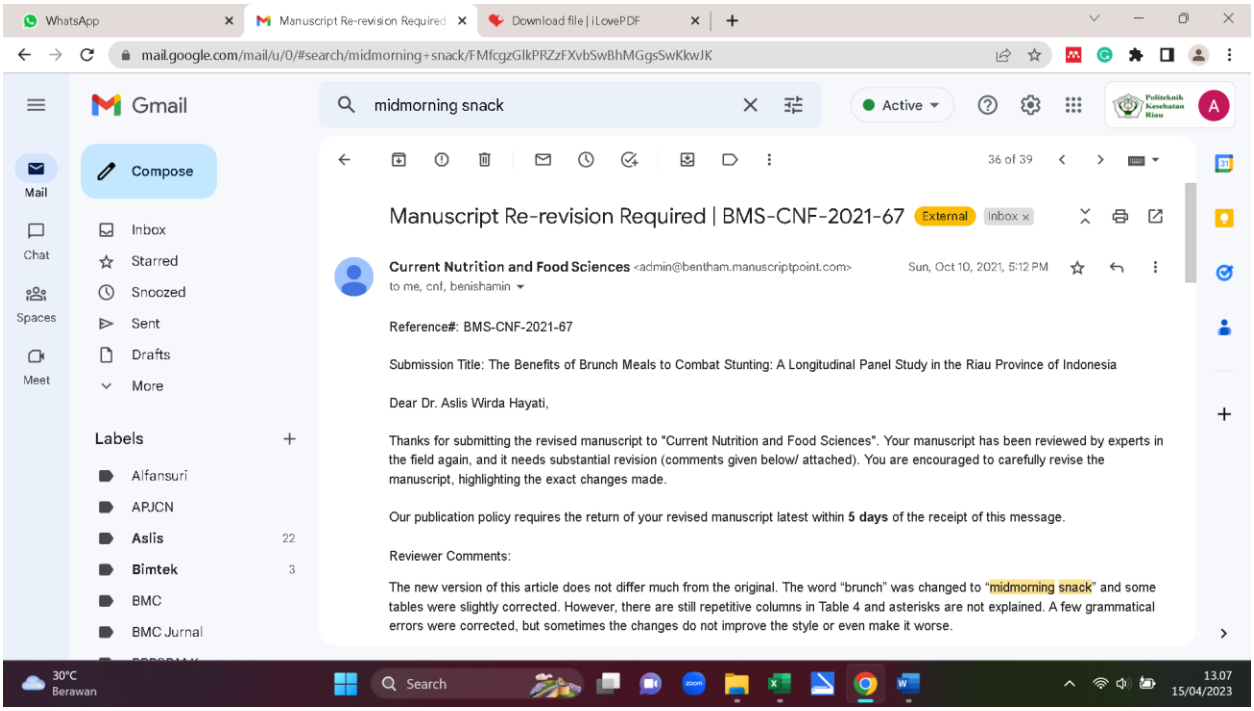
DAY	TIME		
	07:00 a.m.	10:00 a.m.	12:00 p.m.
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk
WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

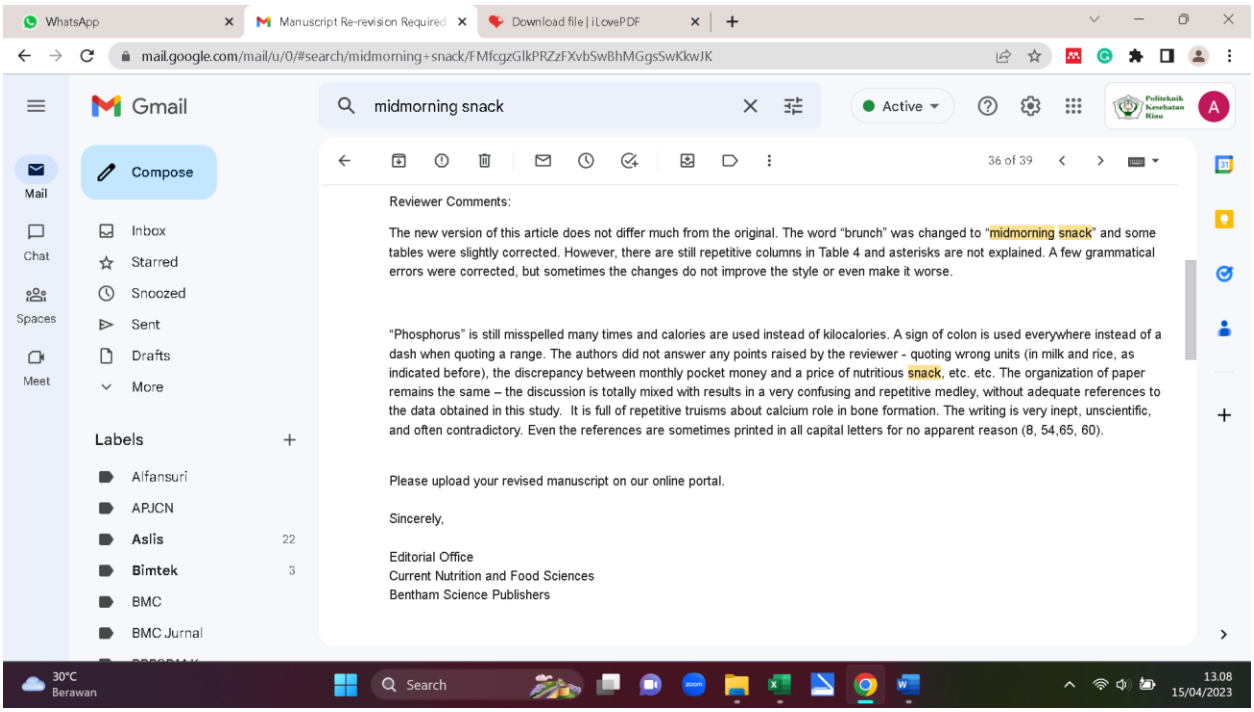
1573-4013/19 $58.00+.00

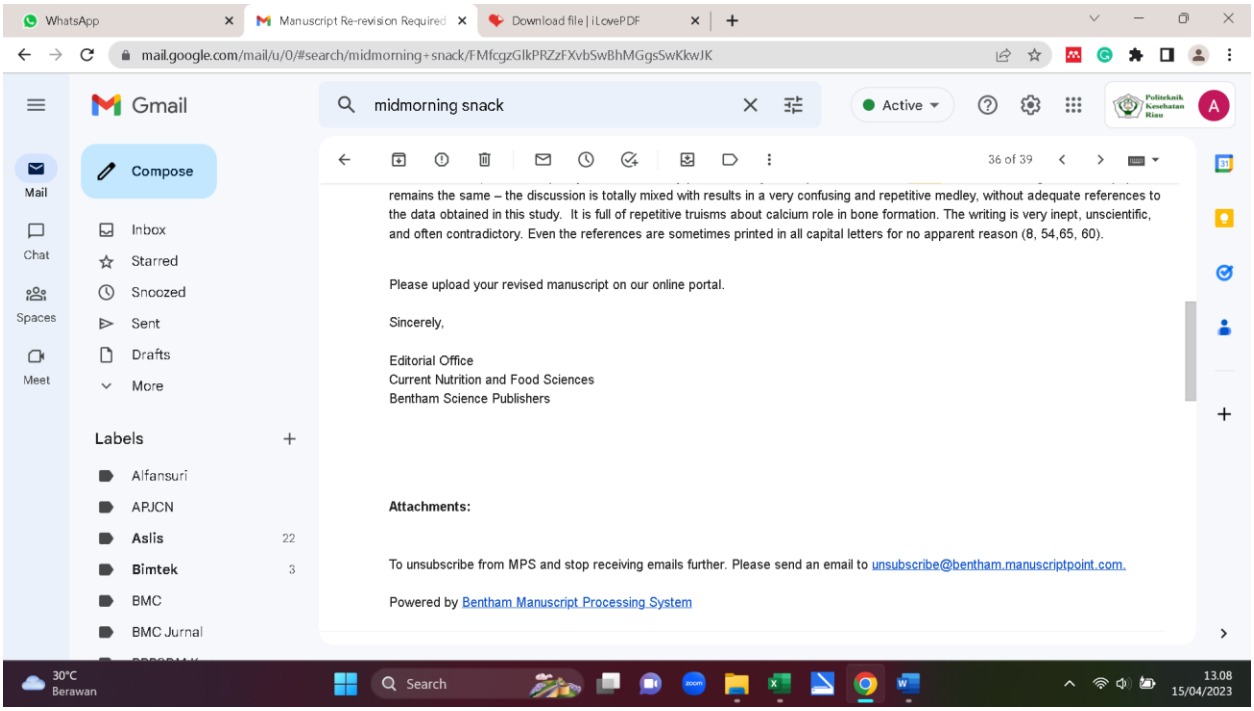
THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk
FRIDAY		 	
	Milk	Sandwich + Milk	Milk

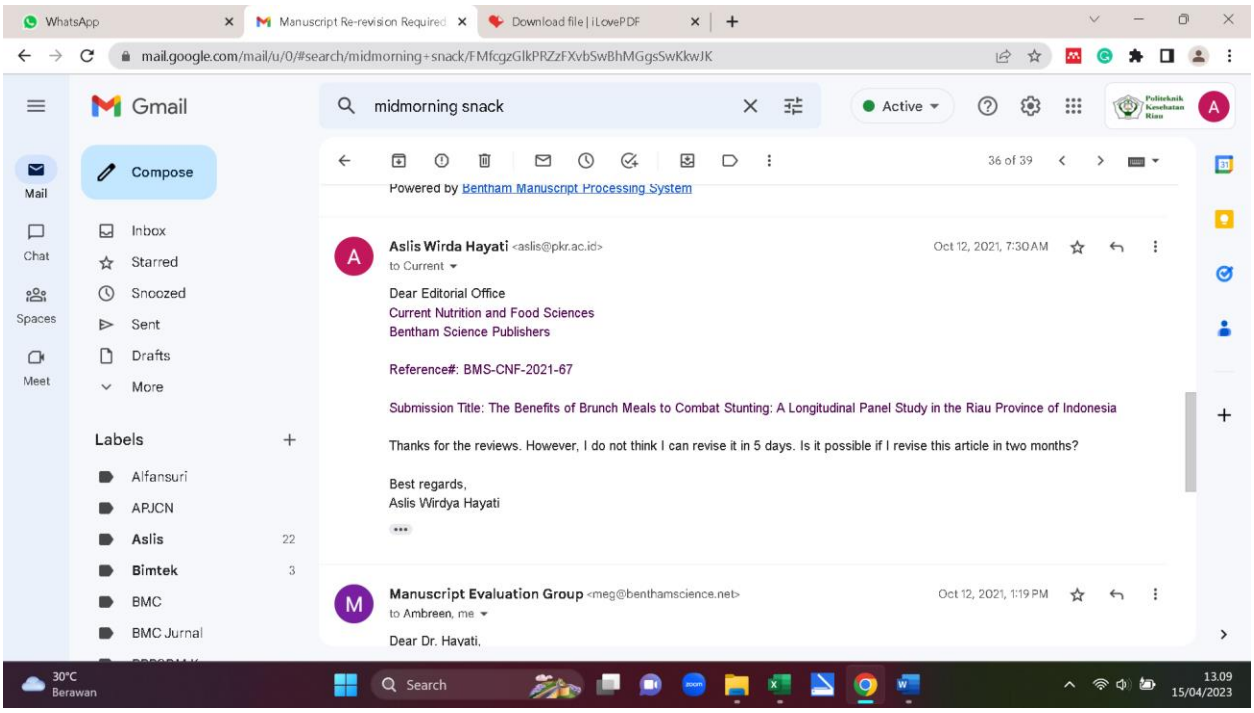
SATURDAY			
	Milk	Chicken Porridge + Milk	Milk
SUNDAY			
	Milk	Fried Rice Teri + Milk	Milk

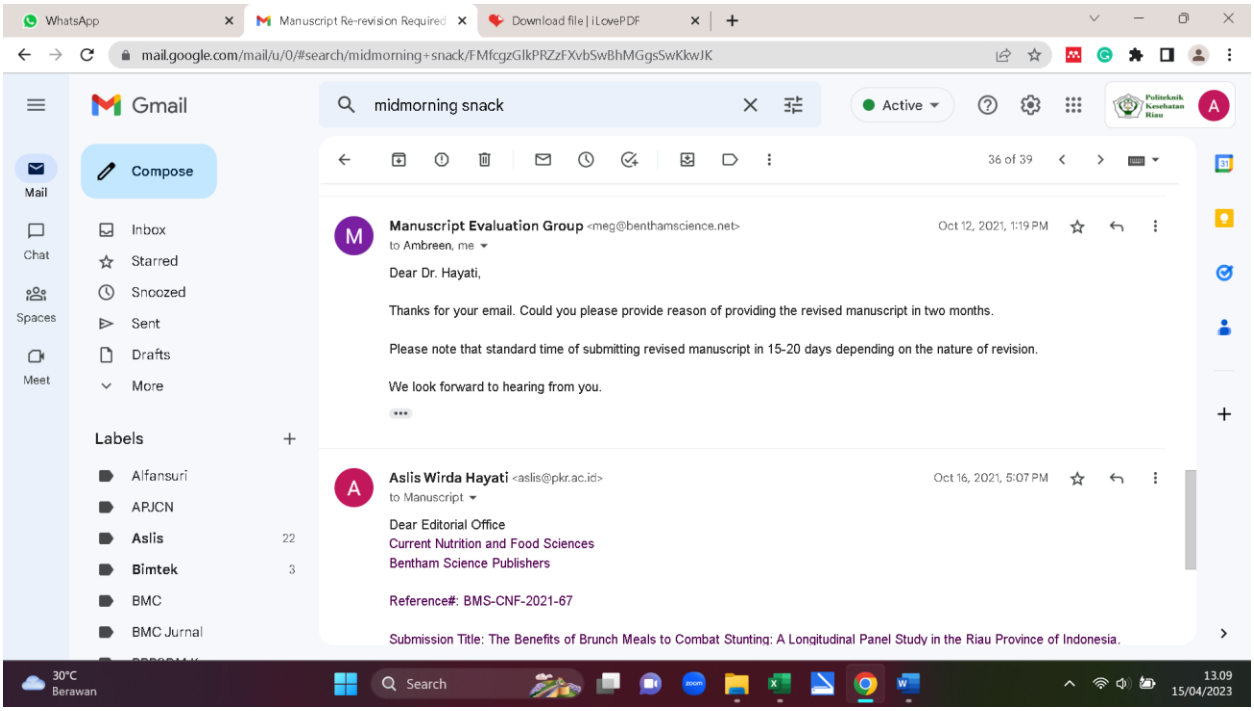
Picture **1.** The midmorning snack

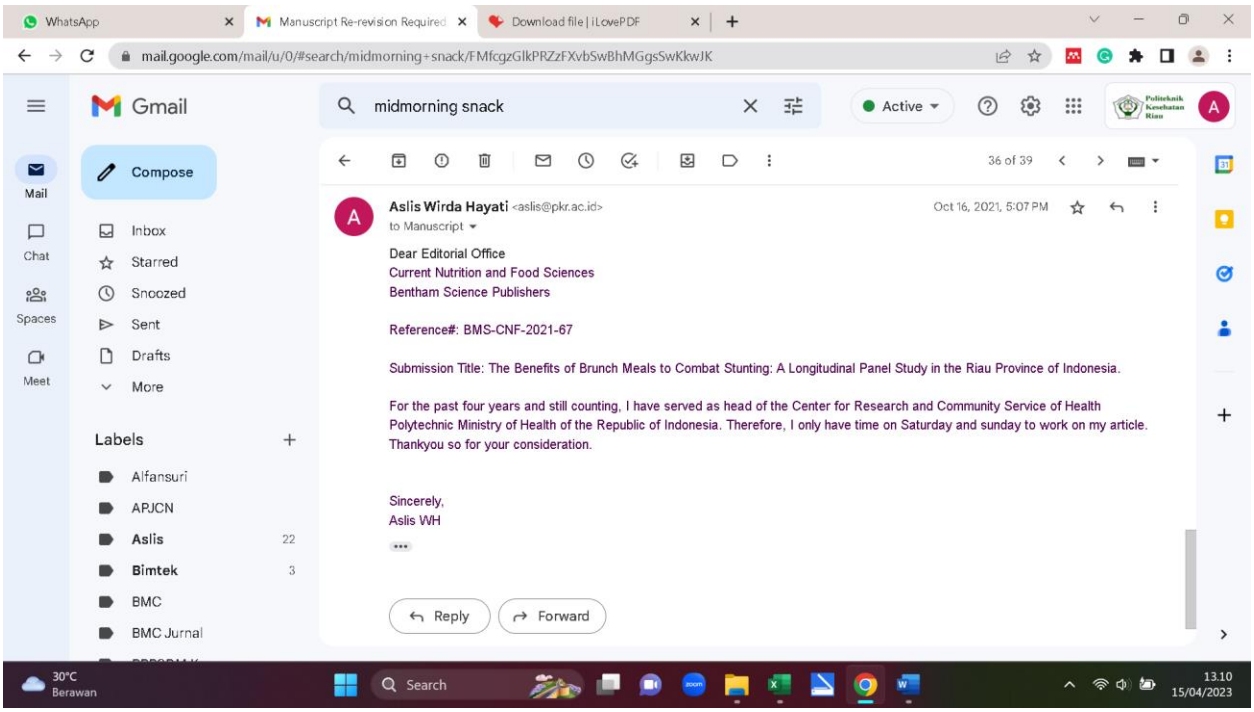

WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
Manuscript Re-revision Required | BMS-CNF-2021-67
External
Inbox ×
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Sun, Oct 10, 2021, 5:12 PM
to me, cnf, benishamin
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Aslis Wirda Hayati,
Thanks for submitting the revised manuscript to "Current Nutrition and Food Sciences". Your manuscript has been reviewed by experts in the field again, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made.
Our publication policy requires the return of your revised manuscript latest within 5 days of the receipt of this message.
Reviewer Comments:
The new version of this article does not differ much from the original. The word "brunch" was changed to "midmorning snack" and some tables were slightly corrected. However, there are still repetitive columns in Table 4 and asterisks are not explained. A few grammatical errors were corrected, but sometimes the changes do not improve the style or even make it worse.
30°C
Berawan
Search
13.07
15/04/2023

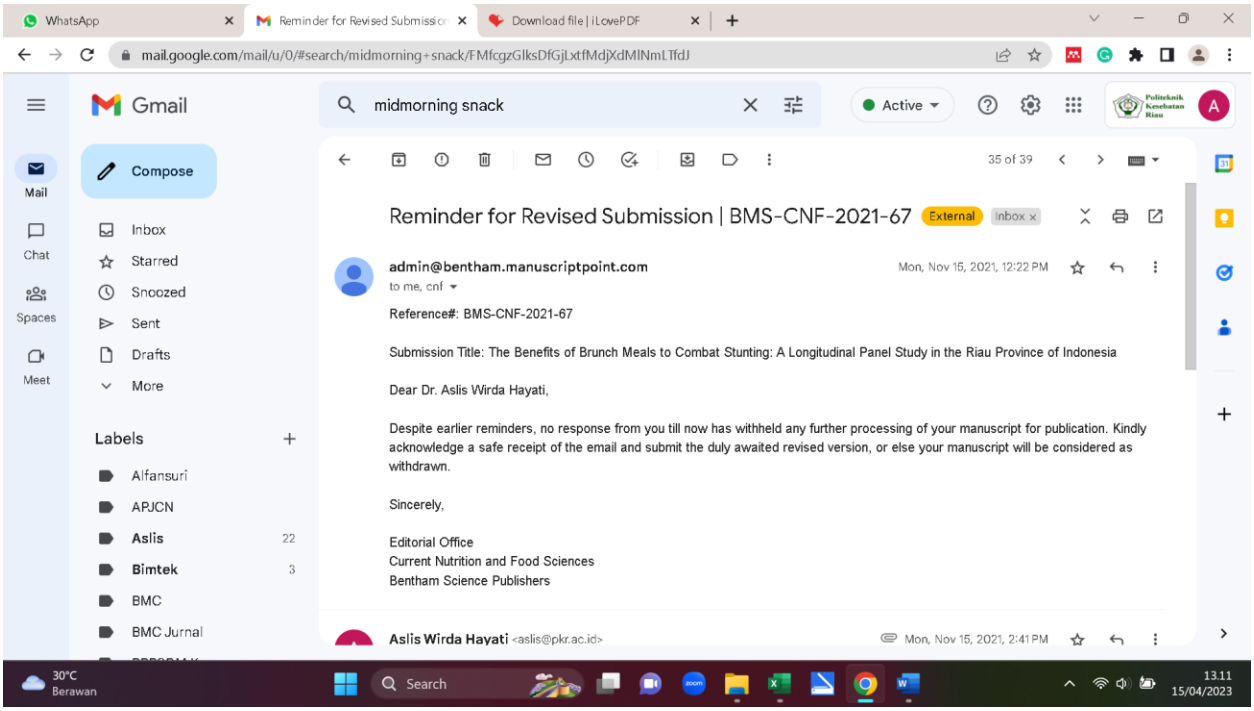

WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
Reviewer Comments:
The new version of this article does not differ much from the original. The word "brunch" was changed to "midmorning snack" and some tables were slightly corrected. However, there are still repetitive columns in Table 4 and asterisks are not explained. A few grammatical errors were corrected, but sometimes the changes do not improve the style or even make it worse.
"Phosphorus" is still misspelled many times and calories are used instead of kilocalories. A sign of colon is used everywhere instead of a dash when quoting a range. The authors did not answer any points raised by the reviewer - quoting wrong units (in milk and rice, as indicated before), the discrepancy between monthly pocket money and a price of nutritious snack, etc. etc. The organization of paper remains the same – the discussion is totally mixed with results in a very confusing and repetitive medley, without adequate references to the data obtained in this study. It is full of repetitive truisms about calcium role in bone formation. The writing is very inept, unscientific, and often contradictory. Even the references are sometimes printed in all capital letters for no apparent reason (8, 54,65, 60).
Please upload your revised manuscript on our online portal.
Sincerely,
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
30°C
Berawan
Search
13.08
15/04/2023

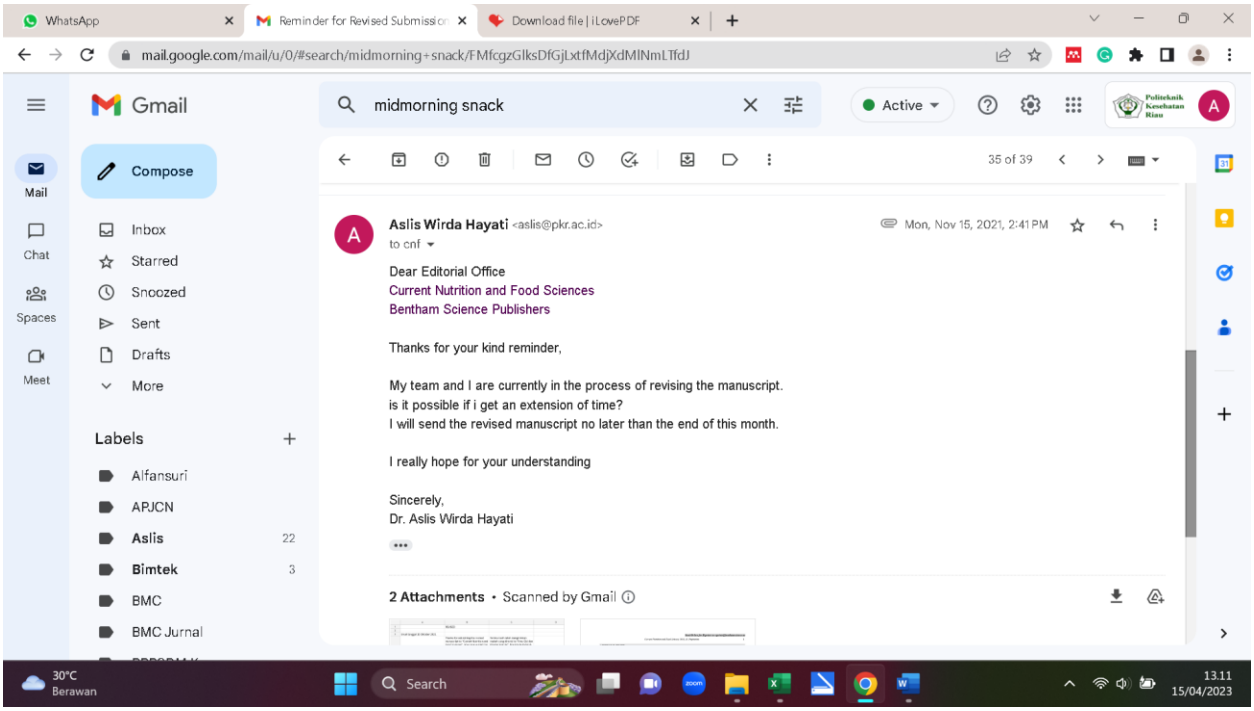

WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
remains the same – the discussion is totally mixed with results in a very confusing and repetitive medley, without adequate references to the data obtained in this study. It is full of repetitive truisms about calcium role in bone formation. The writing is very inept, unscientific, and often contradictory. Even the references are sometimes printed in all capital letters for no apparent reason (8, 54,65, 60).
Please upload your revised manuscript on our online portal.
Sincerely,
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Attachments:
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
30°C
Berawan
Search
13.08
15/04/2023

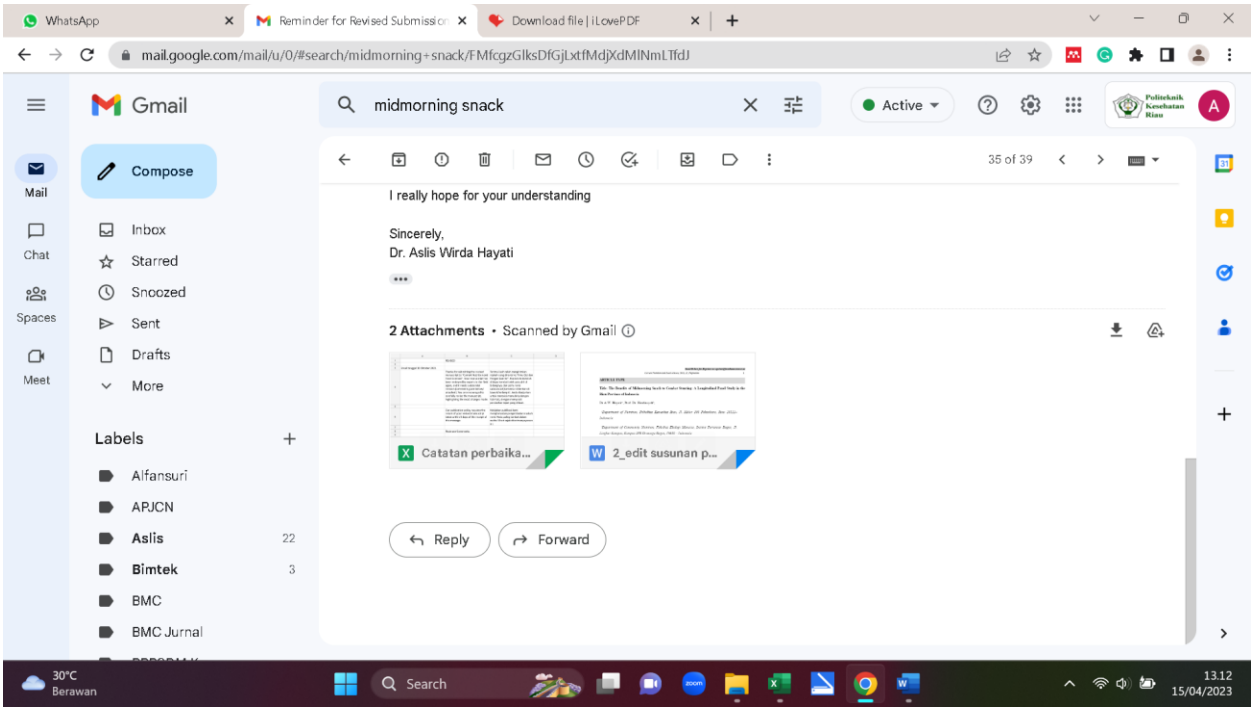

WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
Powered by Bentham Manuscript Processing System
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Oct 12, 2021, 7:30 AM
Dear Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Thanks for the reviews. However, I do not think I can revise it in 5 days. Is it possible if I revise this article in two months?
Best regards,
Aslis Wirdya Hayati
Manuscript Evaluation Group <meg@benthamscience.net>
to Ambreen, me
Oct 12, 2021, 1:19 PM
Dear Dr. Hayati,
30°C
Berawan
Search
13.09
15/04/2023


WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
Manuscript Evaluation Group <meg@benthamscience.net>
to Ambreen, me
Oct 12, 2021, 1:19 PM
Dear Dr. Hayati,
Thanks for your email. Could you please provide reason of providing the revised manuscript in two months.
Please note that standard time of submitting revised manuscript in 15-20 days depending on the nature of revision.
We look forward to hearing from you.
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Manuscript
Oct 16, 2021, 5:07 PM
Dear Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia.
30°C
Berawan
Search
13.09
15/04/2023


WhatsApp
Manuscript Re-revision Required
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkPRZzFXvbSwBhMGgsSwKkwJK
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
36 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Manuscript
Oct 16, 2021, 5:07 PM
Dear Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia.
For the past four years and still counting, I have served as head of the Center for Research and Community Service of Health Polytechnic Ministry of Health of the Republic of Indonesia. Therefore, I only have time on Saturday and sunday to work on my article. Thankyou so for your consideration.
Sincerely,
Aslis WH
Reply
Forward
30°C
Berawan
Search
13.10
15/04/2023


WhatsApp
Reminder for Revised Submissi
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlksDfGjLxtfMdjXdMlNmLTfdJ
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
35 of 39
Reminder for Revised Submission | BMS-CNF-2021-67
External
Inbox
admin@bentham.manuscriptpoint.com
to me, cnf
Mon, Nov 15, 2021, 12:22 PM
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Aslis Wirda Hayati,
Despite earlier reminders, no response from you till now has withheld any further processing of your manuscript for publication. Kindly acknowledge a safe receipt of the email and submit the duly awaited revised version, or else your manuscript will be considered as withdrawn.
Sincerely,
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Aslis Wirda Hayati <aslis@pkr.ac.id>
Mon, Nov 15, 2021, 2:41 PM
30°C
Berawan
Search
13.11
15/04/2023


WhatsApp
Reminder for Revised Submissi
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlksDfGjLxtfMdjXdMlNmLTfdJ
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
35 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to cnf
Mon, Nov 15, 2021, 2:41 PM
Dear Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Thanks for your kind reminder,
My team and I are currently in the process of revising the manuscript.
is it possible if i get an extension of time?
I will send the revised manuscript no later than the end of this month.
I really hope for your understanding
Sincerely,
Dr. Aslis Wirda Hayati
2 Attachments • Scanned by Gmail
30°C
Berawan
Search
13.11
15/04/2023


midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
BMC Jurnal
I really hope for your understanding
Sincerely,
Dr. Aslis Wirda Hayati
2 Attachments • Scanned by Gmail
Catatan perbaika...
2_edit susunan p...
Reply
Forward
35 of 39
Active
Search
30°C
Berawan
13.12
15/04/2023

REVISED

Email tanggal 10 Oktober 2021

Thanks for submitting the revised manuscript to "Current Nutrition and Food Sciences". Your manuscript has been reviewed by experts in the field again, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made.	Terima kasih telah mengirimkan naskah yang direvisi ke "Ilmu Gizi dan Pangan Saat Ini". Naskah Anda telah ditinjau kembali oleh para ahli di bidangnya, dan perlu revisi substansial (komentar diberikan di bawah/terlampir). Anda dianjurkan untuk merevisi manuskrip dengan hati-hati, dengan menyoroti perubahan tepat yang dibuat.
Our publication policy requires the return of your revised manuscript latest within 5 days of the receipt of this message.	Kebijakan publikasi kami mengharuskan pengembalian naskah revisi Anda paling lambat dalam waktu 5 hari sejak diterimanya pesan ini.
Reviewer Comments:	
The new version of this article does not differ much from the original. The word “brunch” was changed to “midmorning snack” and some tables were slightly corrected. However, there are still repetitive columns in Table 4 and asterisks are not explained. A few grammatical errors were corrected, but sometimes the changes do not improve the style or even make it worse.	Versi baru artikel ini tidak jauh berbeda dengan aslinya. Kata “brunch” diubah menjadi “midmorning snack” dan beberapa meja sedikit dikoreksi. Namun, masih ada kolom berulang pada Tabel 4 dan tanda bintang tidak dijelaskan. Beberapa kesalahan tata bahasa telah diperbaiki, tetapi terkadang perubahan tidak memperbaiki gaya atau bahkan memperburuknya.

There are still repetitive columns in Table 4.	Repetitive columns in Table 4 sudah dirubah dengan menghapus sebagian columns. Penghapusan columns tidak menyebabkan perubahan pada kesimpulan artikel.

		Asterisks are not explained.	Ditambahkan penjelasan di bawah Table 4 tentang asterisks sebagai berikut ini: ** = p value <0.01; * = p value <0.05
			Ditambah penjelasan tentang calcium and phosphorous di narasi artikel sebagai berikut ini: Setelah pemberian the midmorning snack and milk kepada participant's selama satu bulan maka terjadi peningkatan calcium adequacy rate participant's dari 27.3 menjadi 59.1%; juga meningkatkan phosphorous adequacy rate participant's dari 55.9 menjadi 87.8%.
"Phosphorus" is still misspelled many times and calories are used instead of kilocalories. A sign of colon is used everywhere instead of a dash when quoting a range. The authors did not answer any points raised by the reviewer - quoting wrong units (in milk and rice, as indicated before), the discrepancy between monthly pocket money and a price of nutritious snack, etc. etc.	Fosfor masih salah eja berkali-kali dan kalori digunakan sebagai pengganti kilokalori. Tanda titik dua digunakan di mana-mana alih-alih tanda hubung saat mengutip rentang. Penulis tidak menjawab poin apa pun yang dikemukakan oleh reviewer - salah mengutip unit (dalam susu dan beras, seperti yang ditunjukkan sebelumnya), perbedaan antara uang saku bulanan dan harga makanan ringan bergizi, dll.		
		"Phosphorus" is still misspelled many times.	"Phosphorus" sudah direvisi semua sesuai dengan yang disarankan.
		Calories are used instead of kilocalories.	"Kilocalories" sudah direvisi semua sesuai dengan yang disarankan.

		A sign of colon is used everywhere instead of a dash when quoting a range.	"Dash" sudah direvisi semua sesuai dengan yang disarankan.
		The authors did not answer any points raised by the reviewer - quoting wrong units (in milk and rice, as indicated before), the discrepancy between monthly pocket money and a price of nutritious snack, etc. etc.	Sedang dikerjakan (on prosessing)
The organization of paper remains the same – the discussion is totally mixed with results in a very confusing and repetitive medley, without adequate references to the data obtained in this study. It is full of repetitive truisms about calcium role in bone formation. The writing is very inept, unscientific, and often contradictory. Even the references are sometimes printed in all capital letters for no apparent reason (8, 54,65, 60).	Susunan kertas tetap sama – diskusi benar-benar tercampur dengan hasil dalam gaya ganti yang sangat membingungkan dan berulang, tanpa referensi yang memadai untuk data yang diperoleh dalam penelitian ini. Ini penuh dengan kebenaran yang berulang-ulang tentang peran kalsium dalam pembentukan tulang. Tulisannya sangat tidak layak, tidak ilmiah, dan sering kontradiktif. Bahkan referensi terkadang dicetak dengan huruf kapital semua tanpa alasan yang jelas (8, 54,65, 60).		
		Even the references are sometimes printed in all capital letters for no apparent reason (8, 54,65, 60).	The references sudah direvisi semua sesuai dengan yang disarankan. "8 "Semula: Haq AB, Murbawani EA. STATUS GIZI, ASUPAN MAKAN REMAJA AKHIR YANG BERPROFESI SEBAGAI MODEL. J Nutr Coll. 2014;3(4):489–94. Menjadi:

Haq AB, Murbawani EA. Status gizi, asupan makan remaja akhir yang berprofesi sebagai model. J Nutr Coll. 2014;3(4):489–94.

"54" Semula
Afriana R. HUBUNGAN POLA
Menjadi
Afriana R. Hubungan Pola Konsumsi

"60" Tidak direvisi karena sudah benar.

"65" Semula:
Dianida Erlyningrum. HUBUNGAN ANTARA KEBIASAAN SARAPAN PAGI DENGAN PRESTASI BELAJAR PADA SISWA SEKOLAH DASAR NEGERI DUREN KECAMATAN BANDUNGAN KABUPATEN SEMARANG [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632

Menjadi:
Dianida Erlyningrum. Hubungan antara Kebiasaan Sarapan Pagi dengan Prestasi Belajar pada Siswa Sekolah Dasar Negeri Duren Kecamatan Bandungan Kabupaten Semarang [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632.

"66" Semula:

Hartoyo E, SHOLIHAH, QOMARIYATUS and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.

Menjadi:
Hartoyo E, Sholihah, Qomariyatus and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.

Eamil dari admin 2 Nopember 2021

With reference to the revision requested in your manuscript for possible publication in "Current Nutrition and Food Sciences". Unfortunately, we have not yet received a response from you.	Dengan mengacu pada revisi yang diminta dalam naskah Anda untuk kemungkinan publikasi di "Ilmu Gizi dan Pangan Saat Ini". Sayangnya, kami belum menerima tanggapan dari Anda.
Kindly revise the manuscript according to the suggestions of the reviewers and submit the revised manuscript along with the rebuttal letter for final editorial decision.	Mohon merevisi naskah sesuai dengan saran dari reviewer dan menyerahkan naskah yang direvisi bersama dengan surat sanggahan untuk keputusan editorial akhir.

Eamil dari admin 11 Nopember 2021

Thankyou for kindly reminding me regarding the manuscript revision	Terima kasih telah mengingatkan saya tentang revisi naskah

Email dari Senior Manager Ms. Nida Badar	Thanks for submitting the manuscript to "Current Nutrition and Food Science". Your manuscript has been reviewed by experts in the field, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made.	Terima kasih telah mengirimkan naskah ke "Ilmu Gizi dan Pangan Saat Ini". Naskah Anda telah ditinjau oleh para ahli di bidangnya, dan perlu revisi substansial (komentar diberikan di bawah/terlampir). Anda dianjurkan untuk merevisi manuskrip dengan hati-hati, dengan menyoroti perubahan tepat yang dibuat.
Referee Comments:		
Referee A:		
	This study describes 34-day nutritional intervention in 36 stunted adolescents (12-15 y old) in an Indonesian school. The intervention was in form of 3 small (115 mL) cartons of milk (at 7 am, 10 am and 12 pm (not 12 am)), and a midmorning snack (at 10 am). A 24-hr food recall was taken at enrollment, as well as the height of each participant. The same parameters were recorded 10 months later, when the intervention started, and after 34 days of intervention. There was no control group of age -appropriate subjects with similar stunting due to “limited research funding” (page 7). This fact undermines the validity of conclusion that the rate of stunting was reduced by nearly 20% due to one month intervention, and that 6-month of such intervention would eliminate stunting completely (page 7).	Penelitian ini mendeskripsikan intervensi gizi 34 hari pada 36 remaja stunting (12-15 tahun) di sebuah sekolah di Indonesia. Intervensi berupa 3 dus kecil (115 mL) susu (pukul 07.00, 10.00, dan 12.00 (bukan jam 12)), dan snack siang (pukul 10.00). Recall makanan 24 jam dilakukan pada saat pendaftaran, serta tinggi badan masing-masing peserta. Parameter yang sama dicatat 10 bulan kemudian, saat intervensi dimulai, dan setelah 34 hari intervensi. Tidak ada kelompok kontrol subyek sesuai usia dengan pengerdilan serupa karena "pendanaan penelitian terbatas" (halaman 7). Fakta ini melemahkan validitas kesimpulan bahwa tingkat pengerdilan berkurang hampir 20% karena intervensi satu bulan, dan bahwa 6 bulan intervensi tersebut akan menghilangkan pengerdilan sepenuhnya (halaman 7).

Selengkapnya tentang teks sumber iniDiperlukan teks sumber untuk mendapatkan informasi terjemahan tambahan
Kirim masukan
Panel samping

There was no control group of age - appropriate subjects with similar stunting due to “limited research funding” (page 7). This fact undermines the validity of conclusion that the rate of stunting was reduced by nearly 20% due to one month intervention, and that 6-month of such intervention would eliminate stunting completely (page 7).

"Due to limited research funding" dihilangkan dalam kalimat tersebut.

Before
This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, pre-nutrition intervention and post nutrition intervention were given in the same school.
After:
This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, pre-nutrition intervention and post nutrition intervention were given in the same school.

In general, the manuscript lacks organization, writing is not concise, very repetitive, with many grammatical and stylistic errors. It is not possible to point them out, because they are so numerous, the line numbers are not provided, and the text is presented in two columns on each page.

Secara umum, naskah kurang terorganisir, penulisan tidak ringkas, sangat berulang, dengan banyak kesalahan tata bahasa dan gaya bahasa. Tidak mungkin untuk menunjukkannya, karena jumlahnya sangat banyak, nomor baris tidak disediakan, dan teks disajikan dalam dua kolom pada setiap halaman.

In general, the manuscript lacks organization, writing is not concise, very repetitive, with many grammatical and stylistic errors.

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Poltekkes Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

ARTICLE HISTORY

Received:

Revised:

Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: The objective of this study was to determine the impact of calcium and phosphorus supplementation via additional midmorning snacks for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snacks. The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled

1573-4013/19 $58.00+.00

egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 kilocalories (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.

- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2 — -2.0) and -2.3 ± 0.4 (-3.2 — -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorus intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5 —100.0) % due to which the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4 — 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9 — 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to create awareness about the importance of consuming high calcium midmorning snacks to teenagers. The activity of consuming high-calcium midmorning snacks by adolescents can be continued independently. So far, teenagers do not use pocket money to buy midmorning snacks that are high in calcium, but they buy other types of snacks that are low in

calcium, consisting of *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake, and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorus

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. According to the World Health Organization (WHO), the overall prevalence of stunting among children aged 13 to 15 years is 35.1 %. [1]. The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 12–23 years in Indonesia was 34.2 percent and 40.0 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) [2]. The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 % and serious when the prevalence of stunting is greater than 40 % [3]. Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. [4]. Stunting is a common public health problem among adolescents around the world (up to 27–65 %) [5]. Stunting among adolescents is often disregarded as a nutritional deficiency problem [6]. Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy newborn, are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development [6]. During this period, more than 20% of total height growth and up to 50% of body bone mass are attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and the amount and risk of stunting in children aged 24 months (OR =4.1, $p < 0.05$). The average amount of milk consumed by stunted children (17 times a week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) [7]. Milk contains calcium, which is necessary for bone and height growth [8]. In addition, fish and seafood have more calcium than beef or chicken. [9]. Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight [10,11].

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorus deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorus. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency stifles growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorus intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snacks as well as milk. As a result, the goal of the research was to see how additional midmorning snacks affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table **1**). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 [18]. Parents' willingness to participate in the study was obtained and they signed the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria [19].

The Lwanga and Lameshow formula was used to calculate the number of samples [20]. A value of α =5% (1.964) and a value of β =20% (0.842) were utilized in the formula [21]. Previous research statistical parameters (e.g., mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that μ1–μ2 = 0.4 cm (the increase of study participant body length), and a standard deviation of σ = 1.6 cm, based on which the minimum sample of this research was 21 participants. Following the screening, 36 study participants were eligible for participating, as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 [22]. Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snacks [23] and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020. The nutrition intervention underwent only for one month and did not continue for up to 6 months because the coronavirus that causes Covid-19 has infected Indonesia since March 2, 2020 as was conveyed by the President of the Republic of Indonesia; furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which learning activities in schools were stopped and online learning was administered.

The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snacks consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snacks are foods sold by vendors near the school. Meals per day were divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner, and evening snack. Energy provision during breakfast provided around 20% of RDA, lunch around 30%, and dinner around 20% of RDA; midmorning, afternoon, and evening snacks were approximately 10% of the RDA each [24]. The total amount of

energy of the meals and milk was 541.8 kilocalories (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m., and 12:00 p.m., given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The researcher observed the participants both during meal and milk consumption. The research team and 2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed was recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. A similar process was repeated between 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there were any leftovers.

Requirement calculation (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorus, iron, and zinc) was based on the recommended dietary allowance (RDA) per age [25]. Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table [26]. Based on nutritional intake data, the participants obtained nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people [27]. This means that a sufficient nutritional level is necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A, and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size, and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada, NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines the term Recommended Energy and Nutrient Intake (RENI) is used and in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy was categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy was categorized as low when recorded at <80 and sufficient if ≥80% of

RDA; the vitamin and mineral adequacy was categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

The nutritional quality of the food intake was calculated based on Hardinsyah's formula [28]. It was categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{(\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number of nutritions and the nutritional quality of food (energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorus: i=14; iron: i=15; zinc: i=16).

The study also involved teacher's and parent's questionnaire regarding details of participants' eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSION

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8 — 152.2) cm, their age was 13.5 ± 0.9 (12.0 — 15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2 — -2.0).

At the beginning of the study, calcium and phosphorus adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorus =0.406**) (Table **4**). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3 — 100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and is considered inadequate if <50% of the NAR [29].

Moreover, at the same time, the calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively.

Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with our study's findings [29].

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml), which could decrease stunting events within 2 months (p =0.01) [29]. Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children (p <0.05) [9].

Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to 240 ml) containing more than 270 mg of calcium— almost one third of the daily calcium needs; therefore, milk consumption is very beneficial for school aged children [30].

Regularly consuming milk is highly recommended to meet calcium needs [31]. Milk consumption can improve bone growth, which ultimately influences height and helps reducing the risk of bone mass loss [32].

Milk is considered a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth [8]. Proteins in cow milk—such as casein, whey, and amino acids can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix [32]. Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue [30]. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. Literatur yang lain menyampaikan bahwa optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix [33].

Calcium forms a complex bond with phosphate that can provide strength to bones [34]. Poor calcium intake in adolescents can disrupt growth and peak bone mass [35]. A total of 51% of peak bone mass accumulates during puberty and reaches 37% of the adult bone mineral density [36]. Literatur yang lain menyebutkan bahwa in adolescence, the increase in bone mass occurs between 40–60% of the total bone mass [37].

The need for calcium and phosphorus increases in adolescence as height growth and bone mass formation rapidly take place [14]. Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth [42].

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, which are in the period of formation. Calcium deficiency not only affects both bone and tooth growth but

affects the immune system, nervous system resistance, and impairs heart muscle contraction power as well [33]. Long-term calcium consumption deficiency will negatively affect bone structure; moreover, during growth, it can induce growth disorders [38]. Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body [40]. During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium [41].

Before this study was conducted, the primary sources of daily calcium intake were soup noodle, 298 mg (*soto*); pastel, 296 mg; chicken noodles, 262 mg; tofu, 223 mg; fritters, 204 mg; *pao* meat, 194 mg; tempeh, 155 mg; rice cake, 147 mg; and eclairs, 105 mg per 100 g of edible food. Calcium consumption from non-dairy sources hardly constituted the total daily calcium intake. The calcium content of the food was high per 100 g of edible food, but the respondents consumed it in small quantities, due to which it was not sufficient and in accordance with the recommended dietary allowance (RDA). For example, one bowl of soto is consumed by all family members so that the respondent only consumes a few tablespoons. Foods that are good sources of calcium, such as tofu, tempeh, beans, and green vegetables, contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods [1]. Milk is the best source of calcium and is the largest contributor to daily calcium consumption [43]. Both the amount and frequency of milk consumption show a noticeable relationship with the height of the child [16].

Moreover, both the amount and frequency of milk consumption in adolescents aged 16–17 years are related to height [8,16]. The prevalence of stunting is lower in children who consume milk. Children aged 1–12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) [34]. No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% liked it at room temperature.

The monthly allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Chocolate 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,350 (USD$ 0,16). A total of 16.4% of the participants had been accustomed to buying milk even before this research was conducted. The types of consumed milk were UHT milk (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%), and Milo (2.7). A portion of 100 g of milk contains about 143 mg of calcium that was digestible in the body. Apart from milk, ice cream also contains

calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg. Family income was related to the incidence of stunting in infants (p = 0.048). Low family income is at risk of getting stunting[44]. The type of purchased food depends on the family's income level [45]. The grocery purchasing capability of the family correlates with its income level; a high family income allows the fulfilment of the nutritional needs of the whole family; however, low family income correlates with a low purchasing power for household food and potentially affect stunting events in children.

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried eggs, and 33.3% liked omelets. Egg consumption provides nutrition that facilitates increased growth and contributes to reducing stunting (p <0.05) [14]. Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% [13]. The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category [46].

However, the frequent category information was missing in journal articles [46]. Egg consumption was 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years was 5 times / week [47].

Within the first ten months, participants had not received midmorning snacks. When participants had not received midmorning snacks, some participants consumed snacks themselves. The types of snacks that participants consumed were soup noodles, pastel, chicken noodles, tofu, fritters, *pao* meat, tempeh, rice cake, and eclairs. However, the consumption of theses nacks did not improve the participant's nutritional status. On the 11th month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack— along with high calcium milk. The meals were purchased from shops near the participants' area. The price of one meal was approximately IDR 8,000, which is considered very affordable. Therefore, the participants will be able to purchase the meals even after the completion of the study.

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers can provide for their own. The first reason is that midmorning snacks are sold around them. The second reason is the price of the midmorning snacks. The students can use snack money to buy midmorning snacks. Researchers have informed stunting teens during midmorning snacks that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

After the intervention, the height of the participants increased (Table **3**). The control group was formed before being given a midmorning snack. In the first ten months of the study, all participants were not given midmorning snacks. The nutritional status of all participants in the first ten months is still stunting. The treatment group, which had been given midmorning snacks for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming midmorning snacks for 34 days. The height of the participants of the control group was 143.6 ± 5.2 while of the treatment group was 144.9 ± 5.1 cm ($p < 0.00$). The average increase tendency (mean) in participant height after treatment is 1.3 cm (Table **4**– output paired t-test).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snacks and drinking milk increased calcium intake, but it also increased the intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4 — 86.3) to 84.8 ± 20.3 (30.9 — 100.0) (Table **4**). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

A total of 55.86% of elementary school children always have breakfast and have a normal nutritional status [47]. Breakfast has a long-term effect on nutritional status [48]. In Norway, the nutritional status of senior high school students improved after being given intervention in the form of breakfast [49]. On the other hand, in developing countries, skipping breakfast is highly prevalent in the United States and Europe (10% to 30%) in Children and Adolescents [50].

Children who do not eat breakfast are deficient in micronutrients, resulting in poor physical health. [51]. Calcium, vitamin D, phosphorus, and protein are essential nutrients in bone formation [52]. Children who have a long-lasting deficiency of protein intake, even though their energy intake is sufficient, will experience stunted growth in height [53]. At school, children who do not have breakfast are prone to sickness, often skip, cannot concentrate on learning, and drop out of school [54].

Delaying breakfast can lead to morning malnutrition and increase the risk of general malnutrition [55]. Delaying breakfast can result in excessive food consumption during other mealtimes—especially dinner—resulting in obesity [56]. Skipping breakfast can put a person at risk of weight gain, as it will trigger excessive food consumption during the day [57].

Breakfast can affect the nutritional status of the child; children who usually skip breakfast are at a threefold risk of unhealthy eating habits as well as difficulty controlling appetite, thus impacting the incidence of obesity [48]. It is part of a balanced nutritional fulfilment and can affect a person's daily

mind-set and activity, especially in children during their-in-growth period, namely children 0-5 years (children under five years) and adolescents [58].

It is recommended to incorporate balanced nutrition in breakfast and meet 20%–25% of the total energy needs [59]. Breakfast should be able to meet 15–30% of the daily nutritional needs of adolescents [60]. Breakfast can also help balance metabolism, thus maintaining an ideal weight [7].

Breakfast is a morning activity that assists in meeting the body's energy needs to optimally perform daily activities; this is important for schoolchildren, as it can support the growth and development period as well as various school activities [61]. Breakfast promotes the prevention of hypoglycemia, stabilizes blood glucose levels, and prevents dehydration after sleep-related fasting [62]. Meeting the nutritional needs of schoolchildren is important to support their growth [63]. Breakfast constitutes food and beverage, lasting up to 9 a.m. [60].

The benefits of breakfast for schoolchildren include improving memory, concentration, reading ability, counting, improved stamina, and rare sickness [64]. Schoolchildren who skip breakfast can have impaired learning concentration and drowsiness [65]. Schoolchildren who skip breakfast will see an increase in blood sugar levels and either a decrease in physical condition or mental decline [66]. Snacking and rushing to school results in teenagers choosing not to spend enough time eating breakfast and even skipping breakfast [67].

Breakfast can trigger the short-term metabolism of fasting conditions (empty stomach time between dinner and the next meal) to supply nutrients to the central nervous system for performing cognitive functions. Long-term breakfast habits can affect the cognitive system [68].

Breakfast as an initial energy supplier, especially as a source of glucose energy for the brain, is highly recommended for everyone. Glucose is very involved in a person's cognitive memory (memory) mechanism. Glucose is a form of carbohydrate that is in the bloodstream to provide fuel for the brain. Neurons cannot store glucose, so the brain depends on blood flow for energy [69].

Hawker food is the first digested food item for children who are not used to having breakfast; therefore, snacks become important. Consuming snacks maintains energy levels before main meal time [70]. The habit of school-snacking occurs because 3–4 hours after breakfast, the individual feels hungry again [71]. Consumed snacks and energy contribution to the recommended adequacy are positively correlated [72]. Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or in public places [73].

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature, and quality of their snacking. Between-meal eating contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished [74]. Many children do not have breakfast, as they choose snacking [75].

The nutritional value of hawker meals does not always satisfy the body's nutritional requirements [76]. Children who regularly have breakfast tend to present improved nutritional status than children who skip breakfast [77]. Consistent breakfast intake can improve nutritional status, regulate weight gain, and increase height in the long run [78]. Adolescents who consume breakfast regularly have a higher intake of carbohydrates, protein, and fiber and a lower fat intake than those who do not [50]. Women with good breakfast quality have a relatively higher intake of micro nutrition [60]. In contrast, those who do not have breakfast can present Vitamin A, Vitamin B6, Calcium, Copper, Iron, Magnesium, and Zinc deficiencies [79].

During the 10-month non-intervention period, 8.3% (n =3) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% of participant statuses from stunting to normal.

Therefore, it is predicted that if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month, the intervention could reduce by 19.4%, so if the intervention was extended to 6 months, 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snacks and milk are sold around them, and the price is affordable and can be purchased with the pocket money given by their parents. The time before this research was conducted, they did not know about the types of food they should consume, how much, and when to consume them. Time after the research was conducted, they became aware of this and were able to meet their nutritional needs.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, pre-

nutrition intervention and post nutrition intervention were given in the same school.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were *soto* (soup noodle), pastel, chicken noodles, tofu, fritters, meat *pao*, tempeh, rice cake, and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snacks and calcium-fortified milk were supplied. The breakfast menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snacks and high calcium milk must be eaten; however, they can be consumed at any time of day.

Providing intervention, such as midmorning snacks and milk, maybe an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

The participants' parents signed informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia, for their permission to conduct the study; and PT Indolakto, Jakarta, Indonesia, for providing milk for this study.

REFERENCES

1. Organization WH. Improving Child Growth. Geneva; 2001.
2. Health M of Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.
3. World Health Organization. Child growth indicators and their interpretation. World Health Organization,. Geneva; 2010.
4. Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.
5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.
6. Mahmud MK, Zulfianto NA. Tabel Komposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. Status gizi, asupan makan remaja akhir yang berprofesi sebagai model. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stunting dan tidak stunting usia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.
12. Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.
13. Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) dalam dua varietas kubis (Brassica oleracea) di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan konsumsi susu dan Kalsium

dengan Densitas Tulang dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.

17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.
18. World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/
19. Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.
20. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.
21. Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.
24. Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. GIZI WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.
26. Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.
27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.
28. Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan kebiasaan konsumsi susu dengan kejadian stunting pada siswa kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.

31. Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.
32. Tirtasaputra E, Puspasari G, Lucretia T. Milk consumption correlates with body height in children. J Med Heal. 2019;2(3):878–84.
33. Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama; 2015.
34. Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.
35. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
36. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The Helena study. Horm Res Paediatr. 2010;74(5):339–50.
37. Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
38. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.
39. Prentice A, Bates CJ. An appraisal of the adequacy of dietary mineral intakes in developing countries for bone growth and development in children. Nutr Res Rev. 1993;6(1):51–69.
40. Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.
41. Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.
42. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.
43. Mann J, Truswell AS. Essentials of Human Nutrition. 2nd Edi. Oxford University Press, Inc; 2002.
44. Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
45. Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.
46. Wulandari, Budiasturtik I, Alamsyah D. Hubungan karakteristik sosial ekonomi dan pola asuh pemberian makan terhadap kejadian stunting pada balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
47. Annisa PA. Densitas energi konsumsi, status gizi, dan daya ingat sesaat anak usia

sekolah dasar. J Gizi dan Pangan. 2015;9(3):187–94.

48. Kral TVE, Whiteford LM, Heo M, Faith MS. Effects of eating breakfast compared with skipping breakfast on ratings of appetite and intake at subsequent meals in 8- To 10-y-old children. Am J Clin Nutr. 2011;93(2):284–91.
49. Ask AS, Hernes S, Aarek I, Johannessen G, Haugen M. Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast - A pilot study. Nutr J. 2006;5(1):4–9.
50. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 2005;105(5):743–60.
51. Perdana F, Hardinsyah H. Analisis jenis, jumlah, dan mutu gizi konsumsi sarapan anak Indonesia. J Gizi dan Pangan. 2013;8(1):39.
52. Matali VJ, Wungouw HIS, Sapulete I. Pengaruh asupan susu terhadap tinggi badan dan berat badan anak sekolah dasar. J e-Biomedik. 2017;5(2).
53. Sundari E, Nuryanto N. Hubungan asupan protein, seng, zat besi, dan riwayat penyakit infeksi dengan Z-Score TB/U pada Balita. J Nutr Coll. 2016;5(4):520–9.
54. Afriana R. Hubungan Pola Konsumsi Makan dengan Status Gizi Anak Kelas 6 di Sekolah Dasar Negeri Kelapa Dua Tangerang Tahun Ajaran 2010-2011. Universitas Pembangunan Nasional; 2011.
55. Kleinman RE, Hall S, Green H, Korzec-Ramirez D, Patton K, Pagano ME, et al. Diet, breakfast, and academic performance in children. Ann Nutr Metab. 2002;46(SUPPL. 1):24–30.
56. Martin A, Normand S, Sothier M, Peyrat J, Louche-Pelissier C, Laville M. Is advice for breakfast consumption justified? Results from a short-term dietary and metabolic experiment in young healthy men. Br J Nutr. 2000;84(3):337–44.
57. Millimet DL, Tchernis R, Husain M. School nutrition programs and the incidence of childhood obesity. J Hum Resour. 2010;45(3):640–54.
58. Khomsan A. Pangan dan Gizi untuk Kesehatan. Edisi Kedu. PT. Raja Grafindo Persada; 2005.
59. Khomsan A. Pangan dan Gizi untuk Kesehatan. Jakarta: PT. Raja Grafindo Persada; 2003.
60. Hardinsyah H, Aries M. Jenis pangan sarapan dan perannya dalam asupan gizi harian anak usia 6—12 tahun di Indonesia. J Gizi dan Pangan. 2016;7(2):89.
61. Wiarto G. Budaya Hidup Sehat. Cetakan 1. Yogyakarta: Yogyakarta Gosyen Publishing; 2013. 236 p.

62. Gibson SA, Gunn P. What's for breakfast? Nutritional implications of breakfast habits: Insights from the NDNS dietary records. Nutr Bull. 2011;36(1):78–86.
63. Hardinsyah H. Ilmu Gizi dan Aplikasi: Gizi Bayi dan Balita. Jakarta: EGC Penerbit Buku Kedokteran; 2017.
64. Brown JL, Beardslee WH, Prothrow-Stith D. Impact Of School Breakfast On Children's Health And Learning. Comm by Sodexo Found [Internet]. 2008;1–20. Available from: www.sodexoUSA.com
65. Dianida Erlyningrum. Hubungan antara Kebiasaan Sarapan Pagi dengan Prestasi Belajar pada Siswa Sekolah Dasar Negeri Duren Kecamatan Bandungan Kabupaten Semarang [Internet]. Poltekkes Kemenkes Semarang; 2019. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=18632.
66. Hartoyo E, Sholihah, Qomariyatus and Fauzia R, Nur Rachmah D. Sarapan Pagi dan Produktivitas. Malang: UB Press: Universitas Brawijaya Malang; 2019.
67. Octavia ZF. Frekuensi Dan Kontribusi Energi Dari Sarapan Meningkatkan Status Gizi Remaja Putri. J Ris Gizi. 2020;8(1):32–6.
68. Valadares CT, Fukuda MTH, Françolin-Silva AL, Hernandes AS, Almeida SS. Effects of postnatal protein malnutrition on learning and memory procedures. Nutr Neurosci. 2010;13(6):274–82.
69. Khalida E, Fadlyana E, Somasetia DH. Hubungan kebiasaan sarapan dengan prestasi belajar dan fungsi kognitif pada anak sekolah dasar. Sari Pediatr. 2016;17(2):89.
70. Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009.
71. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).
72. Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional "Jajanan Cilok dan Penganan Gorengan." Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.
73. Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.
74. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
75. Masrikhiyah R, Octora M iqbal. Pengaruh Kebiasaan Sarapan Dan Status Gizi Remaja Terhadap Prestasi Belajar. J Ilm Gizi dan Kesehat. 2020;2(01):23–7.
76. Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.
77. Al-Oboudi LM. Impact of breakfast eating pattern on nutritional status, glucose level, iron status in blood and test grades among

upper primary school girls in Riyadh City, Saudi Arabia. Pakistan J Nutr. 2010;9(2):106–11.

78. Gibney MJ, Margetts BM, Kearney JM, Arab L. Gizi Kesehatan Masyarakat. Jakarta: Penerbit Buku Kedokteran EGC; 2009. 467 p.

79. Ruxton CHS, Kirk TR. Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. Br J Nutr. 1997;78(2):199–213.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48** (Stunting)	19.4 (7)
	48 – 55.6 (Normal)	75.0 (27)
	≥ 55,6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)
Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0: 175.0)***	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)
Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)	
Age	Measurement Date	Body Height	Z-score	Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6 — 137.9)	-2.6±0.3 (-2.90 — -2.65)	11/03/2020	136.4±2.5 (134.7 — 139.3)	-2.6±0.3 (-2.90 — -2.25)
13	11/02/2020	141.5±4.8 (135.4 — 151.7)	-2.5±0.6 (-3.24 — -1.36)	11/03/2020	143.2±5.0 (135.8 — 153.5)	-2.3±0.6 (-3.15 — -1.19)
14	11/02/2020	144.9±3.8 (138.1 — 150.9)	-2.4±0.5 (-3.34 — -1.97)	11/03/2020	146.4±3.7 (140.4 — 153.6)	-2.3±0.5 (-3.10 — -1.68)
15	11/02/2020	147.5±3.8 (143.5 — 154.9)	-2.4±0.3 (-2.87 — -1.91)	11/03/2020	148.1±3.7 (144.2 — 155.2)	-2.3±0.3 (-2.75 — -1.85)
	Average	143.6±5.2 (133.6 — 154.9)	-2.5±0.4 (-3.30 — -1.40)	Average	144.9±5.1 (134.7 — 155.2)	-2.3±0.4 (-3.15 — -1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate					
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate	
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)
1	Energy	70.7±18.5 (39.6 — 100.0)	0.118	0.495	66.9±20.3 (30.2 — 86.6)	-0.037	0.832
2	Protein	77.3±20.0 (44.5 — 100.0)	0.078	0.650	87.3±18.0 (50.9 — 100.0)	0.069	0.687
3	Fats	73.2±25.9 (20.8 — 100.0)	0.048	0.781	76.6±24.5 (42.3 — 100.0)	0.051	0.769
4	Carbohydrates	61.2±18.0 (24.5 — 100.0)	0.104	0.547	49.5±19.8 (18.4 — 100.0)	0.009	0.959
5	Vitamin A	75.1±35.4 (5.0 — 100.0)	0.202	0.238	77.9±20.6 (35.4 — 100.0)	0.028	0.873
6	Vitamin E	21.3±13.4	0.142	0.408	54.6±26.8	0.000	0.999

		(0.0 — 58.2)			(7.3 — 100.0)		
7	Vitamin B-1	35.6±21.2 (9.1 — 100.0)	0.277	0.101	63.0±21.4 (25.0 — 100.0)	-0.048	0.781
8	Vitamin B-2	62.2±24.6 (20.0 — 100.0)	0.209	0.222	97.9±5.8 (76.9 — 100.0)	-0.025	0.884
9	Vitamin B-6	61.9±22.7 (25.0 — 100.0)	0.166	0.333	78.2±20.5 (38.5 — 100.0)	0.145	0.400
10	Vitamin C	17.2±24.2 (0.0 — 85.8)	0.169	0.324	30.4±33.4 (5.4 — 100.0)	0.029	0.866
11	Sodium	17.0±11.9 (2.0 — 55.7)	0.291	0.086	76.0±26.2 (18.6 — 100.0)	0.058	0.738
12	Calcium	27.3±27.8 (3.3 — 100.0)**	0.433	0.008	59.1±19.0 (15.5 —100.0)	0.071	0.680
13	Magnesium	73.1±21.1 (35.7 — 100.0)	0.100	0.561	92.8±14.3 (42.8 — 100.0)	0.133	0.440
14	Phosphorus	55.9±21.2 (25.4 — 100.0)**	0.406	0.014	87.8±17.0 (45.4 — 100.0)	0.123	0.476
15	Iron	52.8±29.0 (14.0 — 100.0)	0.110	0.524	75.5±24.3 (26.4 — 100.0)	0.093	0.590
16	Zinc	61.2±22.0 (33.3 — 100.0)	0.208	0.233	84.8±20.3 (30.9 — 100.0)	0.062	0.719
Nutritional quality of food		52.7±15.5 (28.4 — 86.3)*	0.281	0.027	84.8±20.3 (30.9 — 100.0)	0.062	0.720

** = p value <0.01; * = p value <0.05

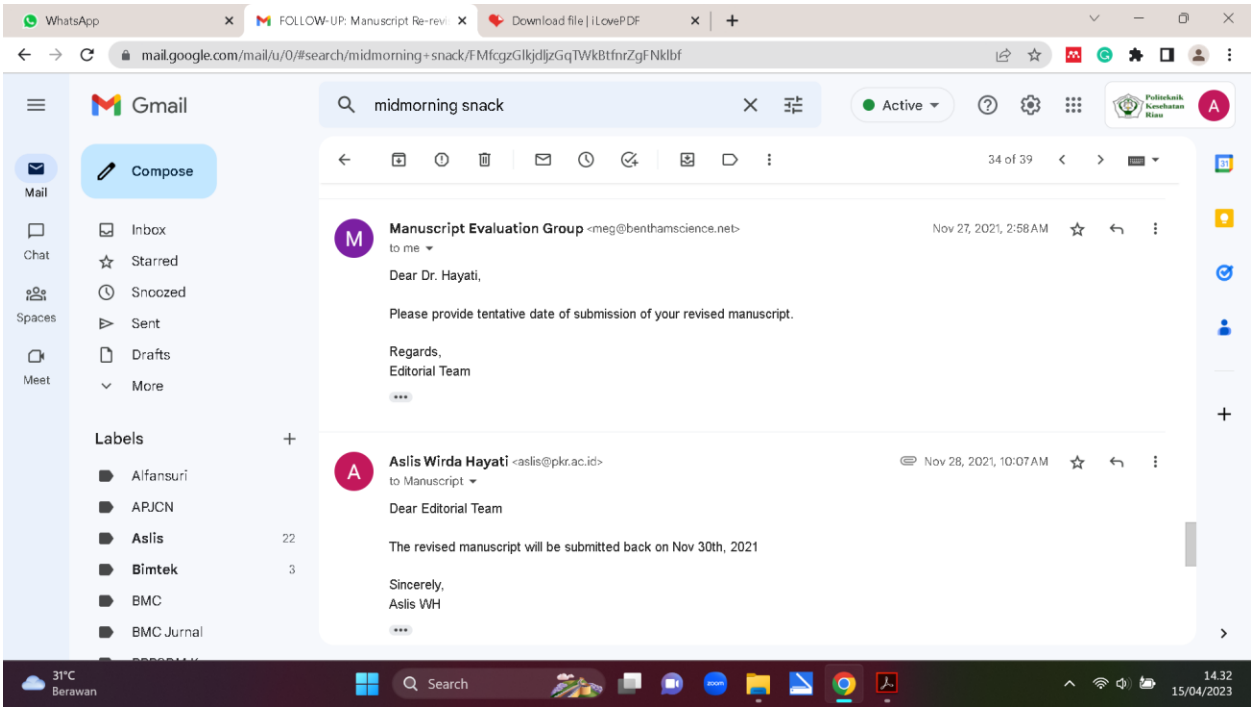
DAY	TIME		
	07:00 a.m.	10:00 a.m.	12:00 p.m.
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk
WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

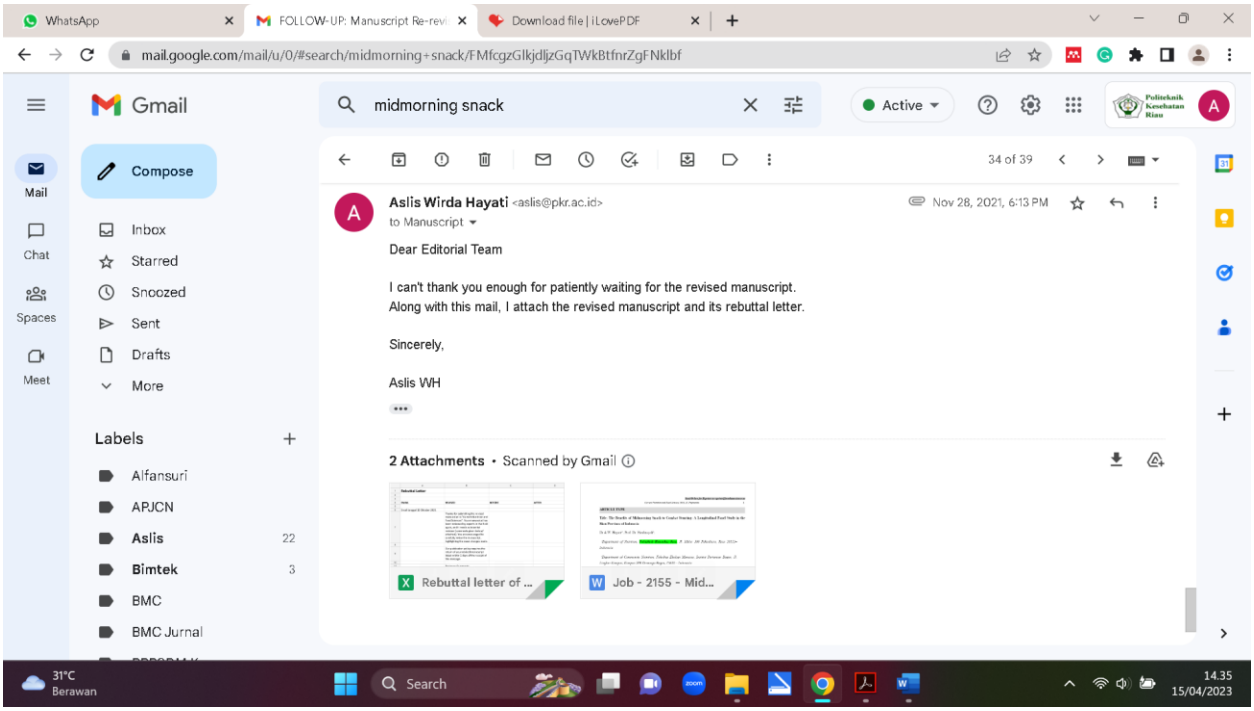
1573-4013/19 $58.00+.00

THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk
FRIDAY		 	
	Milk	Sandwich + Milk	Milk
SATURDAY		 	
	Milk	Chicken Porridge + Milk	Milk

SUNDAY			
	Milk	Fried Rice Teri + Milk	Milk

Picture **1.** The midmorning snack


WhatsApp
FOLLOW-UP: Manuscript Re-revi
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkjdljzGqTWkBtfnrZgFNklbf
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
34 of 39
Manuscript Evaluation Group <meg@benthamscience.net>
to me
Nov 27, 2021, 2:58 AM
Dear Dr. Hayati,
Please provide tentative date of submission of your revised manuscript.
Regards,
Editorial Team
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Manuscript
Nov 28, 2021, 10:07 AM
Dear Editorial Team
The revised manuscript will be submitted back on Nov 30th, 2021
Sincerely,
Aslis WH
31°C
Berawan
Search
14.32
15/04/2023


WhatsApp
FOLLOW-UP: Manuscript Re-revi
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGlkjdljzGqTWkBtfnrZgFNklbf
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
34 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Manuscript
Nov 28, 2021, 6:13 PM
Dear Editorial Team
I can't thank you enough for patiently waiting for the revised manuscript.
Along with this mail, I attach the revised manuscript and its rebuttal letter.
Sincerely,
Aslis WH
2 Attachments • Scanned by Gmail
Rebuttal letter of ...
Job - 2155 - Mid...
31°C
Berawan
Search
14.35
15/04/2023

Rebuttal Letter

EMAIL	REVISED	BEFORE	AFTER
Email tanggal 10 Oktober 2021	Thanks for submitting the revised manuscript to "Current Nutrition and Food Sciences". Your manuscript has been reviewed by experts in the field again, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made. Our publication policy requires the return of your revised manuscript latest within 5 days of the receipt of this message. Reviewer Comments: The new version of this article does not differ much from the original. The word “brunch” was changed to “midmorning snack” and some tables were slightly corrected. However, there are still repetitive columns in Table 4 and asterisks are not explained. A few grammatical errors were corrected, but sometimes the changes do not improve the style or even make it worse.		

	There are still repetitive columns in Table 4.	The repetitive columns in Table 4 have been changed by deleting some of the columns. Deleting columns does not change the conclusion of the article.
	Asterisks are not explained.	Added an explanation under Table 4 about asterisks as follows: ** = p value <0.01; * = p value <0.05
		an explanation is added about calcium and phosphorus in the article narration as follows: After giving the midmorning snack and milk to participants for one month, there was an increase in the participant's calcium adequacy rate from 27.3 to 59.1%; also increased the participant's phosphorus adequacy rate from 55.9 to 87.8%.
“Phosphorus” is still misspelled many times and calories are used instead of kilocalories. A sign of colon is used everywhere instead of a dash when quoting a range. The authors did not answer any points raised by the reviewer - quoting wrong units (in milk and rice, as indicated before), the discrepancy between monthly pocket money and a price of nutritious snack, etc. etc.		
	“Phosphorus” is still misspelled many times.	“Phosphorus” has been revised all as suggested.
	Calories are used instead of kilocalories.	Kilocalories (kcal) has been revised all according to the recommended.

	A sign of colon is used everywhere instead of a dash when quoting a range.	Dash has been revised all as suggested.	
	The authors did not answer any points raised by the reviewer - quoting wrong units (in milk and rice, as indicated before), the discrepancy between monthly pocket money and a price of nutritious snack, etc. etc.		The answers are below
The organization of paper remains the same – the discussion is totally mixed with results in a very confusing and repetitive medley, without adequate references to the data obtained in this study. It is full of repetitive truisms about calcium role in bone formation. The writing is very inept, unscientific, and often contradictory. Even the references are sometimes printed in all capital letters for no apparent reason (8, 54,65, 60).			
	Even the references are sometimes printed in all capital letters for no apparent reason (8).	The references have all been revised as suggested. 8 Originally: Haq AB, Murbawani EA. STATUS GIZI, ASUPAN MAKAN REMAJA AKHIR YANG BERPROFESI SEBAGAI MODEL. J Nutr Coll. 2014;3(4):489–94. Become:	

Haq AB, Murbawani EA. Status gizi, asupan makan remaja akhir yang berprofesi sebagai model. J Nutr Coll. 2014;3(4):489–94.

Eamil dari admin 2 Nopember 2021

With reference to the revision requested in your manuscript for possible publication in "Current Nutrition and Food Sciences". Unfortunately, we have not yet received a response from you.

Kindly revise the manuscript according to the suggestions of the reviewers and submit the revised manuscript along with the rebuttal letter for final editorial decision.

Eamil dari admin 11 Nopember 2021

Thankyou for kindly reminding me regarding the manuscript revision

Email dari Senior Manager Ms. Nida Badar

Thanks for submitting the manuscript to "Current Nutrition and Food Science". Your manuscript has been reviewed by experts in the field, and it needs substantial revision (comments given below/ attached). You are encouraged to carefully revise the manuscript, highlighting the exact changes made.

Editorial			Changes I made regarding Editorial suggestions are shaded in green in the article.
	Authors from non-English speaking countries should ensure to have their articles corrected by a native English speaker, for any grammatical, stylistic and typographical errors. You may want to avail an English language correction service at Bentham; please write for a quote to editorial office.	I come from a non-English speaking country. This article has been corrected by a native English speaker. Changes in the article are marked with a green highlight.	
	Authors must provide a short 'running title' of their manuscript.		The Benefits of Midmorning Snack to Combat Stunting
	It is a mandatory requirement that the abstract must be provided in structured format. Ideally, each abstract should include the following sub-headings, but these may vary according to requirements of the article. · Background · Objective · Methods · Results · Conclusion		It is in accordance with the guidelines for journal writing.
	Minimum 6 keywords should be provided with the article.		Already appropriate.

	The source of data and materials should be mentioned in the manuscript, in support of the findings. If the data source is not revealed, the authors need to clearly state the reasons. Authors who do not wish to share their data should clearly state that the data will not be shared, and give the reasons.		Already appropriate.
	"The data supporting the findings of the article is available in the [repository name] at [URL], reference number [reference number]".		Already appropriate.
Referee A			The changes I made regarding Referee A's suggestions are shaded in yellow in the article.
	This study describes 34-day nutritional intervention in 36 stunted adolescents (12-15 y old) in an Indonesian school. The intervention was in form of 3 small (115 mL) cartons of milk (at 7 am, 10 am and 12 pm (not 12 am)), and a midmorning snack (at 10 am).	12 pm (not 12 am)	Fixed to 12 pm (page 6, page 20)
	A 24-hr food recall was taken at enrollment, as well as the height of each participant.		
	The same parameters were recorded 10 months later, when the intervention started, and after 34 days of intervention.		

There was no control group of age - appropriate subjects with similar stunting due to “limited research funding” (page 7).	Information was added "As a suggestion, future research could be undertaken by having a control group of age-appropriate individuals with similar stunting for six months."
This research should be conducted simu	This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, the design became pre-nutrition intervention and post nutrition intervention were given in the same school. Future research could be undertaken by having a control group of age-appropriate individuals with similar stunting for six months.
In general, the manuscript lacks organization, writing is not concise, very repetitive, with many grammatical and stylistic errors. It is not possible to point them out, because they are so numerous, the line numbers are not provided, and the text is presented in two columns on each page.	The results and discussion sections have been added with subtitles so that the article is organized. The repetitive content of the article has been removed. Parts of the article that are not closely related to the conclusion have been removed. The wrong punctuation has been fixed. The grammar has been edited by native speakers.
More than half of the references are in Indonesian language and therefore not readily accessible for foreign readers.	I have reduced some references in Indonesian.

The very term “brunch” is used incorrectly, because the definition of brunch is a late morning meal eaten instead of breakfast and lunch. No such restriction is described in the article, although some subjects may have skipped breakfast and/or lunch during the intervention.	
A “midmorning snack” is a more appropriate term.	I've replaced the term "brunch" with "mid morning snack" in the article.
The Results and Discussion section is written in such way that this study results are mixed up with and difficult to distinguish from other studies in Indonesia and other countries.	The Results and Discussion section has been compiled and given subtitles.
The authors rarely refer to their own tables.	Fixed it so it has referenced the table itself.
The tables are very confusing.	Tables have been removed, double sections and confusing markings have been fixed.
The Abstract and text state that the intervention provided 600 cal (it should be kcal in the Abstract) daily, while Table 2 indicates that it was only 542 kcal on the average.	It has been changed to 541.8 kcal

There is a ridiculous statement that the teenagers can buy themselves such nutritious meals every day from vendors with their pocket money ((USD $1.03 + 0.46 per month), while one carton of milk costs $0.22 (page 5) and the average price of one meal is $0.59 (IDR 8,000) (page 6).

"The lowest price of milk in the canteen around the school is IDR 1,000 (USD$ 0.07) and the highest is IDR 3,200 (USD$ 0.22) per box, this brand of milk is different from the intervention milk" is added in the paragraph.

The daily allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Chocolate 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,200 (USD$ 0.15).

The daily allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Chocolate 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,200 (USD$ 0.15). The lowest price of milk in the canteen around the school is IDR 1,000 (USD$ 0.07) and the highest is IDR 3,200 (USD$ 0.22) per box, this brand of milk is different from the intervention milk.

"The lowest price of one meal is IDR 5,000 (USD$ 0.35) and the highest price is IDR 10,000 (USD$ 0.70)" is added in the paragraph.

	The price of one meal was approximately IDR 8,000 (USD$ 0.56), which is considered very affordable. Therefore, the participants will be able to purchase the meals even after the completion of the study.	The price of one meal was approximately IDR 8,000 (USD$ 0.56), which is considered very affordable. The lowest price of one meal is IDR 5,000 (USD$ 0.35) and the highest price is IDR 10,000 (USD$ 0.70). Therefore, the participants will be able to purchase the meals even after the completion of the study.
	2.200 8.000 12.200	14.417 6.429 7.988
In addition, the decimal point is sometimes written as period and sometimes as comma, adding to confusion (for example in Table 1).		Revised
No attention is paid to units – “93 mg phosphorus per 100 mg milk, …each 100 mg of milled rice contains 140 mg phosphorus” (page 2).		It has been stated in this background that phosphorus is not a problem for teenagers because the level of phosphorus adequacy is already good, which is ≥ 50% RDA.

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorus deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorus. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency stifles growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorus intake among the participants was sufficient.

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorus deficiency, growth may be disrupted [12]. High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium [13]. Phosphorus is also found in milk, which is why it is so important (93 mg per 100 mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorus. During periods of growth, the body's need for calcium increases [14]. Calcium deficiency stifles growth [15]. Height can be utilized as an indicator of the quality of growth and bone formation [16,17]. In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorus intake among the participants was sufficient.

In Table 3 The columns with nutritional adequacy rate (%) are twice repeated, and the same data for March 11, 2020 are once denoted as “after intervention” and again as “No intervention”.

The part that was repeated twice has been removed.

	Some types of food are described in the Abstract as low in calcium, but the data quoted on page 5 per 100 g (not gr) of such foods are comparable to milk.	This section has been removed because it biased the understanding of this article. Although the calcium content is high like milk, but because it comes from plants, its bioavailability is low so it is one of the causes of stunting.
	The manuscript should be re-write carefully and hence, it will be considered for publication further.	It's been written with care. Hopefully pass for publication.
Referee B		The changes I made regarding Referee A's suggestions are shaded in blue in the article.
	The research was a longitudinal panel study (LPS) in a Junior High School in Indonesia. The research aim was to determine the impact of calcium and phosphorous supplementation via additional brunch meals for adolescents with stunting conditions. Stunting is a leading global nutritional problem, especially in Indonesia. The originality of the topic is low but relevant. The technical quality of the research is sound.	

The stunting rate was reduced up to 19.4% after the nutritional intervention regarding the before nutrition intervention.

However, the nutritional intervention was too short (one month vs. a 10-month non-intervention period).

The authors mention that the strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented.
Why was the nutrition intervention only for one month and not continued for up to 6 months?

An explanation has been added to the article that the intervention can only be carried out for one month related to the COVID-19 pandemic so that students study at home.

"The nutrition intervention underwent only for one month and did not continue for up to 6 months because the coronavirus that causes Covid-19 has infected Indonesia since March 2, 2020 as was conveyed by the President of the Republic of Indonesia; furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which learning activities in schools were stopped and online learning was administered."

The number of participants was deficient (N=36). For example, 8.3% (n=3) of the participants had their nutritional status changed from stunting to normal.		It's been fixed to the following:
	During the 10-month non-intervention period, 8.3% (n =3) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting.	During the 10-month non-intervention period, 8.3% (n =36) of the participants had their nutritional status changed from stunting to normal, meaning that without any intervention, about 90% of the participants would still be in stunting.
Also, the difference in the height of participant control and treatment groups was 1.3 cm, while the standard deviation was >5 cm.		I also thought the same thing. Therefore, since 2014 until now, I have conducted research related to the biomarker of stunting, namely urine pyridinium crosslink. One of my publications is "Pyridinium Crosslinks (Pyd) in the Urine is Associated with Stunting in Neonates" in https://www.journalajrimps.com/index.php/AJRIMPS/article/view/30113.
While phosphorous levels were at the adequacy rate, authors attributed that stunting in participants is related to inadequate calcium levels. However, many confounder factors could influence the stunting.		I agree with the statement "many confounder factors could influence the stunting". In this article, I look at stunting from a nutrition point of view.
No information is related to the analysis of calcium and phosphorous. Please, mentions how the contents of Ca and P analysis were conducted in the meals.	It has been written in the article as follows:	

Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table [26].

26. Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Politeknik Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

A R T I C L E H I S T O R Y

Received:

Revised:

Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: The objective of this study was to determine the impact of calcium and phosphorus supplementation via additional midmorning snacks for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snacks. The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled

1573-4013/19 $58.00+.00

egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 kcal (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.

- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2 — -2.0) and -2.3 ± 0.4 (-3.2 — -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorus intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5 —100.0) % due to which the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4 — 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9 — 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to create awareness about the importance of consuming high calcium midmorning snacks to teenagers. The activity of consuming high-calcium midmorning snacks by adolescents can be continued independently. So far, teenagers do not use pocket money to buy midmorning snacks that are high in calcium, but they buy other types of snacks that are low in

calcium, consisting of pastel, noodles, tofu, fritters, pao, tempeh, rice cake, and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorus

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. According to the World Health Organization (WHO), the overall prevalence of stunting among children aged 13 to 15 years is 35.1 %. (1). The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 12–23 years in Indonesia was 34.2 percent and 40.0 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) (2). The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 % and serious when the prevalence of stunting is greater than 40 % (3). Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. (4). Stunting is a common public health problem among adolescents around the world (up to 27–65 %) (5). Stunting among adolescents is often disregarded as a nutritional deficiency problem (6). Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy newborn, are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development (6). During this period, more than 20% of total height growth and up to 50% of body bone mass are attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and the

amount and risk of stunting in children aged 24 months (OR =4.1, $p < 0.05$). The average amount of milk consumed by stunted children (17 times a week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) (7). Milk contains calcium, which is necessary for bone and height growth (8). In addition, fish and seafood have more calcium than beef or chicken. (9). Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight (10,11).

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorus deficiency, growth may be disrupted (12). High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium (13). Phosphorus is also found in milk, which is why it is so important (93 mg mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorus. During periods of growth, the body's need for calcium increases (14). Calcium deficiency stifles growth (15). Height can be utilized as an indicator of the quality of growth and bone formation (16,17). In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorus intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snacks as well as milk. As a result, the goal of the research was to see how additional midmorning snacks affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table **1**). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 (18). Parents' willingness to participate in the study was obtained and they signed the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria (19).

The Lwanga and Lameshow formula was used to calculate the number of samples (20). A value of α =5% (1.964) and a value of β =20% (0.842) were utilized in the formula (21). Previous research

statistical parameters (e.g., mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that $\mu 1 - \mu 2 = 0.4$ cm (the increase of study participant body length), and a standard deviation of $\sigma = 1.6$ cm, based on which the minimum sample of this research was 21 participants. Following the screening, 36 study participants were eligible for participating, as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 (22). Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snacks (23) and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020.

The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snacks consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snacks are foods sold by vendors near the school. Meals per day were divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner, and evening snack. Energy provision during breakfast provided around 20% of RDA, lunch around 30%, and dinner around 20% of RDA; midmorning, afternoon, and evening snacks were approximately 10% of the RDA each (24). The total amount of energy of the meals and milk was 541.8 kcal (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m., and 12:00 p.m., given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The researcher observed the participants both during meal and milk consumption. The research team and

2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed was recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. A similar process was repeated between 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there were any leftovers.

Requirement calculation (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorus, iron, and zinc) was based on the recommended dietary allowance (RDA) per age (25). Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table (26). Based on nutritional intake data, the participants obtained nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people (27). This means that a sufficient nutritional level is necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A, and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size, and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada, NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines the term Recommended Energy and Nutrient Intake (RENI) is used and in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy was categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy was categorized as low when recorded at <80 and sufficient if ≥80% of RDA; the vitamin and mineral adequacy was categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

The nutritional quality of the food intake was calculated based on Hardinsyah's formula (28). It was categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{(\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number of nutritions and the nutritional quality of food (energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorus: i=14; iron: i=15; zinc: i=16).

The study also involved teacher's and parent's questionnaire regarding details of participants' eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSION

Height and Calcium Intake

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8 — 152.2) cm, their age was 13.5 ± 0.9 (12.0 — 15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2 — -2.0) (Table **1**).

At the beginning of the study, calcium and phosphorus adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorus =0.406**) (Table **4**). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3 — 100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and is considered inadequate if <50% of the NAR (29).

Moreover, at the same time, the calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively.

Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with our study's findings (29).

Calcium Intake form Milk

No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% liked it at room temperature.

A total of 16.4% of the participants had been accustomed to buying milk even before this research was conducted. The types of consumed milk were UHT Kids Chocolate (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%), and Milo (2.7). A portion of 100 g of milk contains about 143 mg of calcium that was digestible in the body. Apart from milk, ice cream also contains calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg.

The prevalence of stunting is lower in children who consume milk. Both the amount and frequency of milk consumption in adolescents aged 16–17 years are related to height (8,16). Children aged 1–

12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) (30).

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml), which could decrease stunting events within 2 months ($p = 0.01$) (29). Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children ($p < 0.05$) (9).

Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to 240 ml) containing more than 270 mg of calcium— almost one third of the daily calcium needs; therefore, milk consumption is very beneficial for school aged children (31).

Regularly consuming milk is highly recommended to meet calcium needs (32). Milk consumption can improve bone growth, which ultimately influences height and helps reducing the risk of bone mass loss (33).

Milk is considered a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth (8). Moreover, milk is the best source of calcium and is the largest contributor to daily calcium consumption (34).

Proteins in cow milk—such as casein, whey, and amino acids can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix (33). Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue [30]. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. Optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix (35).

Calcium forms a complex bond with phosphate that can provide strength to bones (30). Poor calcium intake in adolescents can disrupt growth and peak bone mass (36). A total of 51% of peak bone mass accumulates during puberty and reaches 37% of the adult bone mineral density (37). In

adolescence, the increase in bone mass occurs between 40–60% of the total bone mass (38).

The need for calcium and phosphorus increases in adolescence as height growth and bone mass formation rapidly take place (14). Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth (39).

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, which are in the period of formation. Calcium deficiency not only affects both bone and tooth growth but affects the immune system, nervous system resistance, and impairs heart muscle contraction power as well (35). Long-term calcium consumption deficiency will negatively affect bone structure; moreover, during growth, it can induce growth disorders (40). Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body (41). During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium (42).

Non-dairy calcium intake for stunting prevention

Before this study was conducted, participants had consumed non-dairy calcium sources. The amount of that food they consume is very small. So it is not sufficient as much as the recommended dietary adequacy. Tofu, tempeh, beans, and green vegetables, contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods (1).

The Price of Milk

The daily allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Chocolate 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,200 (USD$ 0.15). The lowest price of milk in the canteen around the school is IDR 1,000 (USD$ 0.07) and the highest is IDR 3,200 (USD$ 0.22) per box. However, the brand of milks are different from the intervention milk.

Family income was related to the incidence of stunting in infants ($p = 0.048$). Low family income is at risk of getting stunting (43). The type of purchased food depends on the family's income level (44). The grocery purchasing capability of the family correlates with its income level; a high family income allows the fulfilment of the

nutritional needs of the whole family; however, low family income correlates with a low purchasing power for household food and potentially affect stunting events in children.

Egg Consumption

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried eggs, and 33.3% liked omelets. Except for chicken porridge and fried rice, the midmorning snacks contain eggs. Egg consumption provides nutrition that facilitates increased growth and contributes to reducing stunting ($p < 0.05$) (14). Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% (13). The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category (45).

Egg consumption was 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years was 5 times / week (46).

The Midmorning Snacks

Within the first ten months, participants had not received the midmorning snacks. When participants had not received the midmorning snacks, some participants consumed snacks themselves. The types of snacks that participants consumed were pastel, noodles, tofu, fritters, *pao*, tempeh, rice cake, and eclairs. However, the consumption of theses nacks did not improve the participant's nutritional status. On the 11th month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack—along with high calcium milk. The meals were purchased from shops near the participants' area. The price of one meal was approximately IDR 8,000 (USD$ 0.56), which is considered very affordable. The lowest price of one meal is IDR 5,000 (USD$ 0.35) and the highest price is IDR 10,000 (USD$ 0.70). Therefore, the participants will be able to purchase the meals even after the completion of the study.

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers can provide for their own. The first reason is that midmorning snacks are sold around them. The second reason is the price of the midmorning snacks. The students can use snack money to buy midmorning snacks. Researchers have informed stunting teens during midmorning snacks that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

The Height after Nutrition Intervenstion

After the intervention, the height of the participants increased (Table **3**). The control group was formed before being given a midmorning snack. In the first ten months of the study, all participants were not given the midmorning snacks. The nutritional status of all participants in the first ten months is still stunting. The treatment group, which had been given the midmorning snacks for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming the midmorning snacks for 34 days. The height of the participants of the control group was 143.6 ± 5.2 while of the treatment group was 144.9 ± 5.1 cm ($p < 0.00$). The average increase tendency (mean) in participant height after treatment is 1.3 cm (Table **3**).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snacks and drinking milk increased calcium intake, but it also increased the intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4 — 86.3) to 84.8 ± 20.3 (30.9 — 100.0) (Table **4**). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

Habit of Consuming Snack

Consuming snacks maintains energy levels before main meal time (47). The habit of school-snacking occurs because 3–4 hours after breakfast, the individual feels hungry again (48). Consumed snacks and energy contribution to the recommended adequacy are positively correlated (49). Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or in public places (50).

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature, and quality of their snacking. Between-meal eating contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished (51). The nutritional value of hawker meals does not always satisfy the body's nutritional requirements (52).

Benefits of Midmorning Snacks and Milk to Height

During the 10-month non-intervention period, 8.3% (n =36) of the participants had their nutritional status changed from stunting to normal, meaning

that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% of participant statuses from stunting to normal.

Therefore, it is predicted that if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month, the intervention could reduce by 19.4%, so if the intervention was extended to 6 months, 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snacks and milk are sold around them, and the price is affordable and can be purchased with the pocket money given by their parents. The time before this research was conducted, they did not know about the types of food they should consume, how much, and when to consume them. Time after the research was conducted, they became aware of this and were able to meet their nutritional needs.

The nutrition intervention underwent only for one month and did not continue for up to 6 months because the coronavirus that causes Covid-19 has infected Indonesia since March 2, 2020 as was conveyed by the President of the Republic of Indonesia; furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which learning activities in schools were stopped and online learning was administered.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, the design became pre-nutrition intervention and post nutrition intervention were given in the same school. As a suggestion, future research could be undertaken by having a control group of age-appropriate individuals with similar stunting for six months.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were pastel, noodles, tofu, fritters, *pao*, tempeh, rice cake, and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snacks and calcium-fortified milk were supplied. The midmorning snack menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake

increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snacks and high calcium milk must be eaten.

Providing intervention, such as midmorning snacks and milk, maybe an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

The participants' parents signed informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia, for their permission to conduct the study; and PT Indolakto, Jakarta, Indonesia, for providing milk for this study.

REFERENCES

1. Organization WH. Improving Child Growth. Geneva; 2001.
2. Health M of. Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.
3. World Health Organization. Child growth indicators and their interpretation. World Health Organization,. Geneva; 2010.
4. Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.
5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination

Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.

6. Mahmud MK, Zulfianto NA. Tabel Komposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. Status Gizi, Asupan Makan Remaja Akhir yang Berprofesi sebagai Model. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma Mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.
12. Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.
13. Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) Dalam Dua Varietas Kubis (Brassica oleracea) Di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan Konsumsi Susu Dan Kalsium Dengan Densitas Tulang Dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.
17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.
18. World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/
19. Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.
20. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A

Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.

21. Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.
24. Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. Gizi WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.
26. Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.
27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.
28. Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan Kebiasaan Konsumsi Susu dengan Kejadian Stunting pada Siswa Kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.
31. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.
32. Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.
33. Tirtasaputra E, Puspasari G, Lucretia T. Milk Consumption Correlates with Body Height in Children. J Med Heal. 2019;2(3):878–84.
34. Mann J, Truswell AS. Essentials of Human Nutrition. 2nd Edi. Oxford University Press, Inc; 2002.
35. Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama;

2015.

36. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
37. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The Helena study. Horm Res Paediatr. 2010;74(5):339–50.
38. Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
39. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.
40. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.
41. Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.
42. Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.
43. Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
44. Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.
45. Wulandari, Budiasturtik I, Alamsyah D. Hubungan Karakteristik Sosial Ekonomi dan Pola Asuh Pemberian Makan Terhadap Kejadian Stunting pada Balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
46. Annisa PA. Densitas Energi Konsumsi, Status Gizi, dan Daya Ingat Sesaat Anak Usia Sekolah Dasar. J Gizi dan Pangan. 2015;9(3):187–94.
47. Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009.
48. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).
49. Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional "Jajanan Cilok dan Penganan Gorengan." Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.
50. Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.
51. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
52. Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48 (Stunting)	19.4 (7)
	48 — 55.6 (Normal)	75.0 (27)
	≥ 55.6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)
Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0 — 175.0)	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

1573-4013/19 $58.00+.00

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)
Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)	
Age	Measurement Date	Body Height	Z-score	Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6 — 137.9)	-2.6±0.3 (-2.90 — -2.65)	11/03/2020	136.4±2.5 (134.7 — 139.3)	-2.6±0.3 (-2.90 — -2.25)
13	11/02/2020	141.5±4.8 (135.4 — 151.7)	-2.5±0.6 (-3.24 — -1.36)	11/03/2020	143.2±5.0 (135.8 — 153.5)	-2.3±0.6 (-3.15 — -1.19)
14	11/02/2020	144.9±3.8 (138.1 — 150.9)	-2.4±0.5 (-3.34 — -1.97)	11/03/2020	146.4±3.7 (140.4 — 153.6)	-2.3±0.5 (-3.10 — -1.68)
15	11/02/2020	147.5±3.8 (143.5 — 154.9)	-2.4±0.3 (-2.87 — -1.91)	11/03/2020	148.1±3.7 (144.2 — 155.2)	-2.3±0.3 (-2.75 — -1.85)
	Average	143.6±5.2 (133.6 — 154.9)	-2.5±0.4 (-3.30 — -1.40)	Average	144.9±5.1 (134.7 — 155.2)	-2.3±0.4 (-3.15 — -1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate					
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate	
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)
1	Energy	70.7±18.5 (39.6 — 100.0)	0.118	0.495	66.9±20.3 (30.2 — 86.6)	-0.037	0.832
2	Protein	77.3±20.0 (44.5 — 100.0)	0.078	0.650	87.3±18.0 (50.9 — 100.0)	0.069	0.687
3	Fats	73.2±25.9 (20.8 — 100.0)	0.048	0.781	76.6±24.5 (42.3 — 100.0)	0.051	0.769
4	Carbohydrates	61.2±18.0 (24.5 — 100.0)	0.104	0.547	49.5±19.8 (18.4 — 100.0)	0.009	0.959
5	Vitamin A	75.1±35.4 (5.0 — 100.0)	0.202	0.238	77.9±20.6 (35.4 — 100.0)	0.028	0.873
6	Vitamin E	21.3±13.4 (0.0 — 58.2)	0.142	0.408	54.6±26.8 (7.3 — 100.0)	0.000	0.999
7	Vitamin B-1	35.6±21.2 (9.1 — 100.0)	0.277	0.101	63.0±21.4 (25.0 — 100.0)	-0.048	0.781
8	Vitamin B-2	62.2±24.6 (20.0 — 100.0)	0.209	0.222	97.9±5.8 (76.9 — 100.0)	-0.025	0.884
9	Vitamin B-6	61.9±22.7 (25.0 — 100.0)	0.166	0.333	78.2±20.5 (38.5 — 100.0)	0.145	0.400
10	Vitamin C	17.2±24.2 (0.0 — 85.8)	0.169	0.324	30.4±33.4 (5.4 — 100.0)	0.029	0.866
11	Sodium	17.0±11.9 (2.0 — 55.7)	0.291	0.086	76.0±26.2 (18.6 — 100.0)	0.058	0.738
12	Calcium	27.3±27.8 (3.3 — 100.0)**	0.433	0.008	59.1±19.0 (15.5 —100.0)	0.071	0.680
13	Magnesium	73.1±21.1 (35.7 — 100.0)	0.100	0.561	92.8±14.3 (42.8 — 100.0)	0.133	0.440
14	Phosphorus	55.9±21.2 (25.4 — 100.0)**	0.406	0.014	87.8±17.0 (45.4 — 100.0)	0.123	0.476
15	Iron	52.8±29.0 (14.0 — 100.0)	0.110	0.524	75.5±24.3 (26.4 — 100.0)	0.093	0.590
16	Zinc	61.2±22.0 (33.3 — 100.0)	0.208	0.233	84.8±20.3 (30.9 — 100.0)	0.062	0.719
Nutritional quality of food		52.7±15.5 (28.4 — 86.3)*	0.281	0.027	84.8±20.3 (30.9 — 100.0)	0.062	0.720

** = p value <0.01; * = p value <0.05

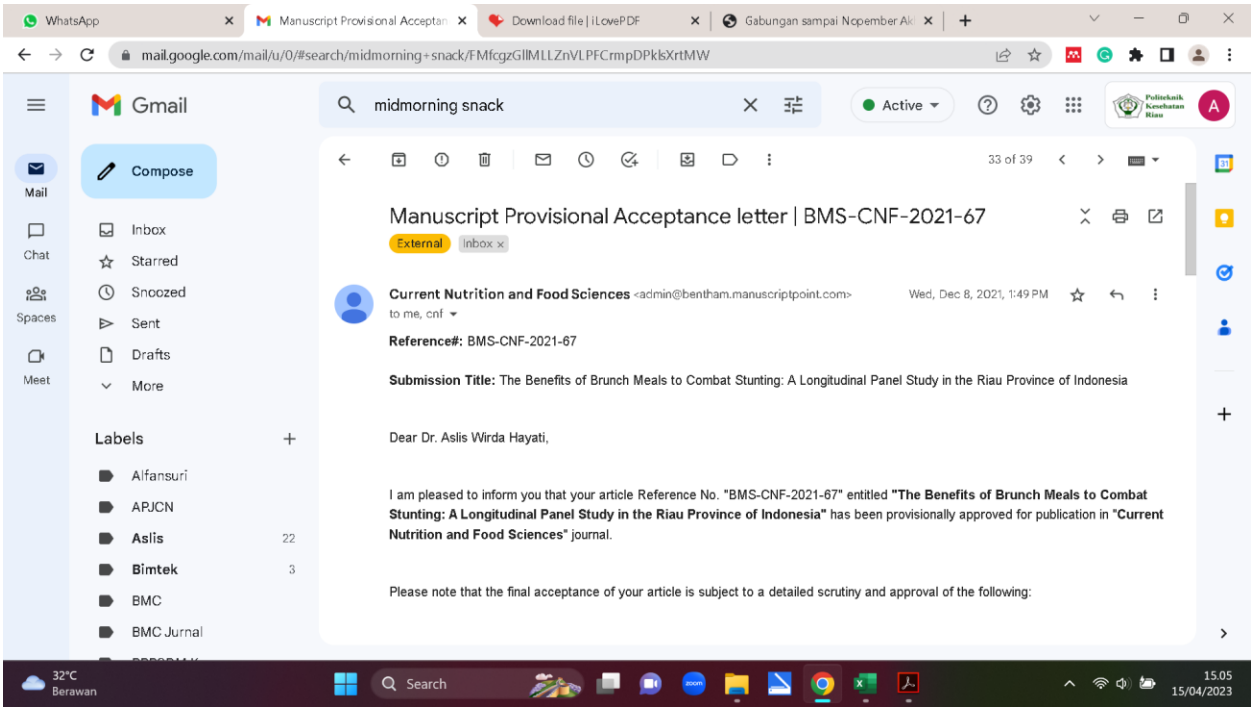
DAY	TIME		
	07:00 a.m.	10:00 a.m.	12:00 p.m.
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk
WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

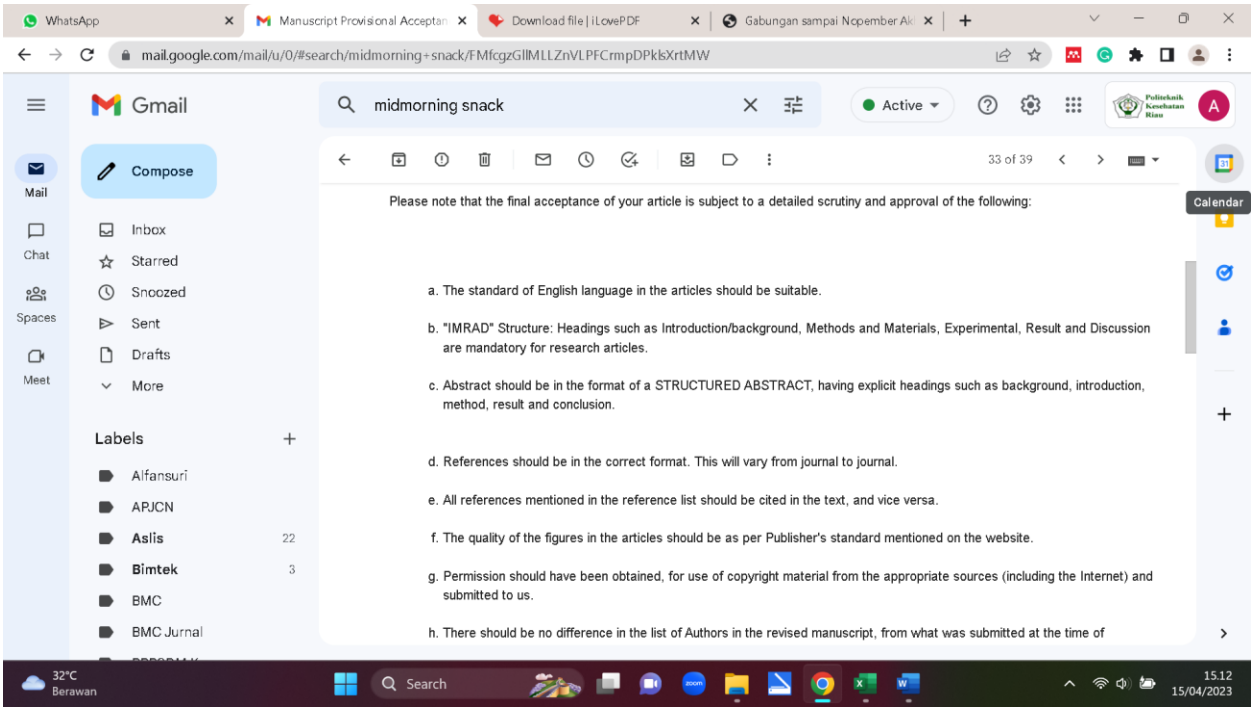
1573-4013/19 $58.00+.00

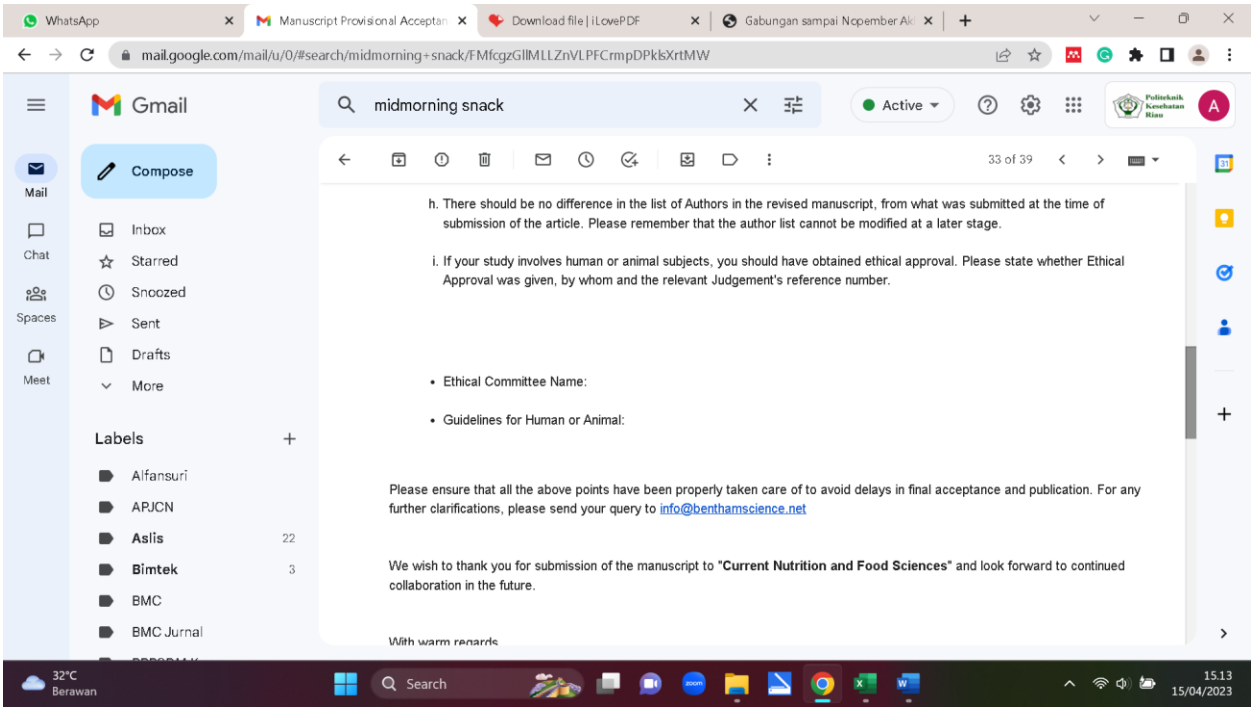
THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk
FRIDAY		 	
	Milk	Sandwich + Milk	Milk
SATURDAY		 	
	Milk	Chicken Porridge + Milk	Milk

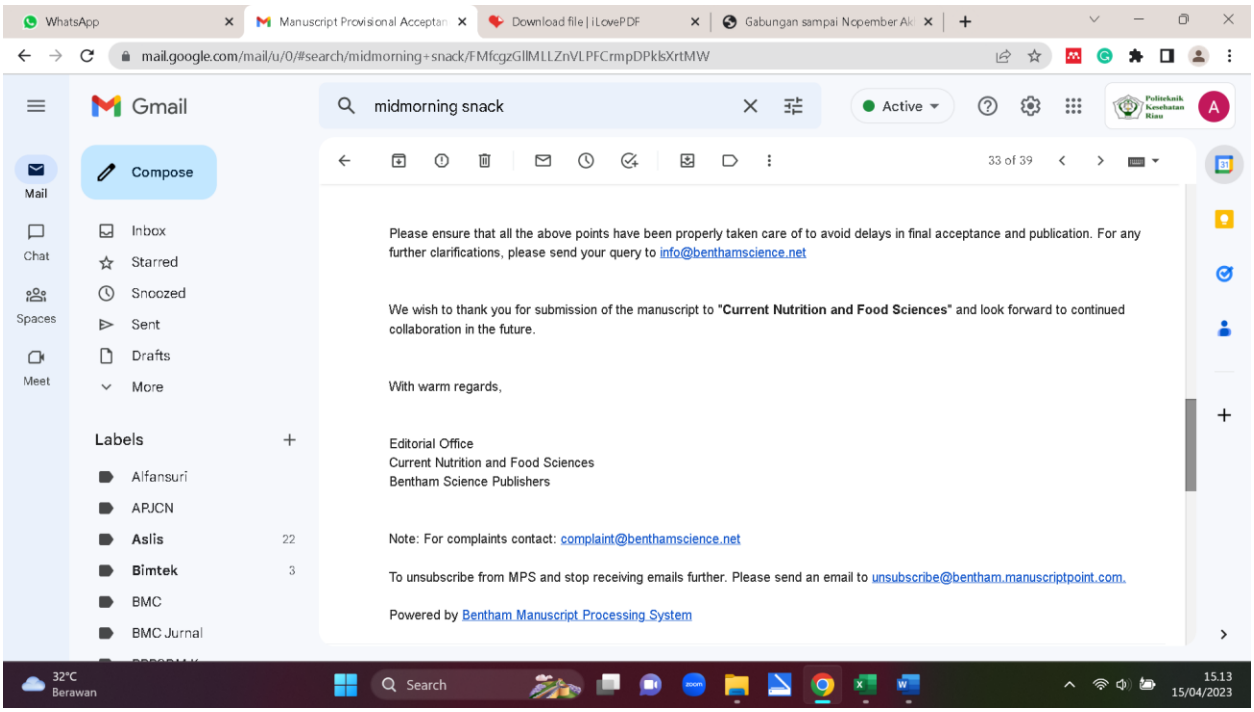
SUNDAY			
	Milk	Fried Rice Teri + Milk	Milk

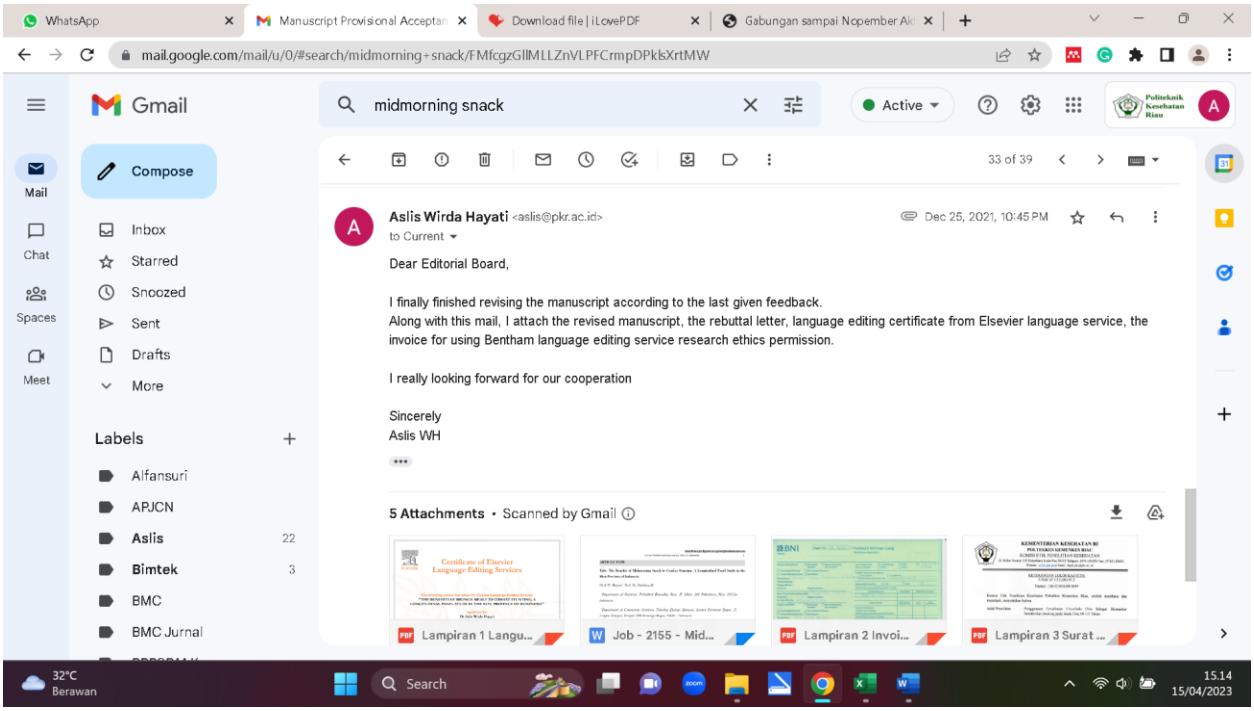
Picture **1.** The midmorning snack


midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
33 of 39
Manuscript Provisional Acceptance letter | BMS-CNF-2021-67
External
Inbox
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Wed, Dec 8, 2021, 1:49 PM
to me, cnf
Reference#: BMS-CNF-2021-67
Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Aslis Wirda Hayati,
I am pleased to inform you that your article Reference No. "BMS-CNF-2021-67" entitled "The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia" has been provisionally approved for publication in "Current Nutrition and Food Sciences" journal.
Please note that the final acceptance of your article is subject to a detailed scrutiny and approval of the following:
32°C
Berawan
Search
15.05
15/04/2023


midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
33 of 39
Calendar
Please note that the final acceptance of your article is subject to a detailed scrutiny and approval of the following:
a. The standard of English language in the articles should be suitable.
b. "IMRAD" Structure: Headings such as Introduction/background, Methods and Materials, Experimental, Result and Discussion are mandatory for research articles.
c. Abstract should be in the format of a STRUCTURED ABSTRACT, having explicit headings such as background, introduction, method, result and conclusion.
d. References should be in the correct format. This will vary from journal to journal.
e. All references mentioned in the reference list should be cited in the text, and vice versa.
f. The quality of the figures in the articles should be as per Publisher's standard mentioned on the website.
g. Permission should have been obtained, for use of copyright material from the appropriate sources (including the Internet) and submitted to us.
h. There should be no difference in the list of Authors in the revised manuscript, from what was submitted at the time of
32°C
Berawan
Search
15.12
15/04/2023


WhatsApp
Manuscript Provisional Acceptan
Download file | iLovePDF
Gabungan sampai Nopember Ak
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGllMLLZnVLPFCrmpDPklsXrtMW
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
33 of 39
h. There should be no difference in the list of Authors in the revised manuscript, from what was submitted at the time of submission of the article. Please remember that the author list cannot be modified at a later stage.
i. If your study involves human or animal subjects, you should have obtained ethical approval. Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.
• Ethical Committee Name:
• Guidelines for Human or Animal:
Please ensure that all the above points have been properly taken care of to avoid delays in final acceptance and publication. For any further clarifications, please send your query to info@benthamscience.net
We wish to thank you for submission of the manuscript to "Current Nutrition and Food Sciences" and look forward to continued collaboration in the future.
With warm regards
32°C
Berawan
Search
15.13
15/04/2023


WhatsApp
Manuscript Provisional Acceptan
Download file | iLovePDF
Gabungan sampai Nopember Ak
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGllMLLZnVLPFCrmpDPklsXrtMW
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
33 of 39
Please ensure that all the above points have been properly taken care of to avoid delays in final acceptance and publication. For any further clarifications, please send your query to info@benthamscience.net
We wish to thank you for submission of the manuscript to "Current Nutrition and Food Sciences" and look forward to continued collaboration in the future.
With warm regards,
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Note: For complaints contact: complaint@benthamscience.net
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
32°C
Berawan
Search
15.13
15/04/2023


WhatsApp
Manuscript Provisional Acceptan
Download file | iLovePDF
Gabungan sampai Nopember Ak
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGllMLLZnVLPFCrmpDPklsXrtMW
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
33 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Current
Dec 25, 2021, 10:45 PM
Dear Editorial Board,
I finally finished revising the manuscript according to the last given feedback.
Along with this mail, I attach the revised manuscript, the rebuttal letter, language editing certificate from Elsevier language service, the invoice for using Bentham language editing service research ethics permission.
I really looking forward for our cooperation
Sincerely
Aslis WH
5 Attachments • Scanned by Gmail
Lampiran 1 Langu...
Job - 2155 - Mid...
Lampiran 2 Invoi...
Lampiran 3 Surat ...
32°C
Berawan
Search
15.14
15/04/2023

ELSEVIER

Certificate of Elsevier Language Editing Services

The following article was edited by Elsevier Language Editing Services:

"THE BENEFITS OF BRUNCH MEALS TO COMBAT STUNTING; A LONGITUDINAL PANEL STUDY IN THE RIAU PROVINCE OF INDONESIA"

Authored by:

Dr Aslis Wirda Hayati

Date: 05-Nov-2020

Serial number: LE-199586-D51DD47F3197

ARTICLE TYPE

Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

Dr A.W. Hayati[a*], Prof. Dr. Hardinsyah[b],

[a]*Department of Nutrition, Politeknik Kemenkes Riau, Jl. Melur 103 Pekanbaru, Riau 28122– Indonesia*

[b]*Department of Community Nutrition, Fakultas Ekologi Manusia, Institut Pertanian Bogor, Jl. Lingkar Kampus, Kampus IPB Dramaga Bogor, 16680 – Indonesia*

A R T I C L E H I S T O R Y

Received:

Revised:

Accepted:

DOI:

Abstract:

- **Aim**: The aim of this research was to help stunted adolescents improve their nutritional status.
- **Background**: Stunting is a leading global nutritional problem, especially in developing countries such as Indonesia. This was a longitudinal panel study in the SMP Negeri 3 Pekanbaru Riau Province Junior High School, Indonesia.
- **Objective**: The objective of this study was to determine the impact of calcium and phosphorus supplementation via additional midmorning snacks for adolescents with stunting conditions.
- **Methods**: We included 36 participants, aged 12–15 years with a height-for-age Z-score of <-2 Standard Deviation. They underwent a one-month nutritional intervention during which selected snacks and high-calcium milk were given for midmorning snacks. The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled

1573-4013/19 $58.00+.00

egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce). The total amount of energy of the meals and milk was 541.8 kcal (30% of RDA-Recommended Dietary Allowance), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total. Data analysis and food intake consumption were conducted using the Pearson Product moments test.

- **Results**: The participants' mean height-for-age Z-score before and after the nutritional intervention was -2.5 ± 0.4 (-3.2 — -2.0) and -2.3 ± 0.4 (-3.2 — -1.2), respectively. After the intervention, the rate of stunting was reduced up to 19.4%; the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance—27.3 ± 27.8 (3.3:100.0) %; the rate of phosphorus intake among the participants was sufficient. The rate of calcium intake after the nutritional intervention was 59.1 ± 19.0 (15.5 —100.0) % due to which the nutritional quality of food before the intervention was still lacking, namely 52.7 ± 15.5 (28.4 — 86.3) after the nutrition intervention increased to 84.8 ± 20.3 (30.9 — 100.0); (r value = 0.43; p value = 0.01).
- **Conclusion**: The nutritional intervention increased calcium intake. The outcome of the nutritional intervention led to the improvement of nutritional status from stunting to the normal category.
- **Other**: The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to create awareness about the importance of consuming high calcium midmorning snacks to teenagers. The activity of consuming high-calcium midmorning snacks by adolescents can be continued independently. So far, teenagers do not use pocket money to buy midmorning snacks that are high in calcium, but they buy other types of snacks that are low in

calcium, consisting of pastel, noodles, tofu, fritters, pao, tempeh, rice cake, and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Keywords: Adolescent, midmorning snack, calcium, egg, milk, nutritional quality of food, stunting, phosphorus

1. INTRODUCTION

Stunting is a major nutritional issue worldwide, particularly in developing countries like Indonesia. Stunting in girls aged 15–19 is 52% in Guatemala and 44% in Bangladesh (1). The Ministry of Health, Republic of Indonesia (MOH RI) reported in 2007 that the prevalence of stunting among children aged 6–12 years and adolescents aged 13–15 years in Indonesia was 35.6 percent and 35.2 percent, respectively, based on data from the National Basic Health Research (RISKESDAS) (2). The MOH RI found in 2010 that the prevalence of stunting among teenagers aged 13–15 in Indonesia was 35.2 percent based on national statistics. In the province of Riau, the prevalence was 36.6 percent. According to the WHO, these public health issues are considered extreme when the prevalence of stunting is between 30 and 39 % and serious when the prevalence of stunting is greater than 40 % (3). Stunting is thus a consistent problem among the adolescent age group in Riau province of Indonesia

Adolescence is a time of transition from childhood to adulthood, characterized by anatomical, physiological, and psychological changes. The three stages of adolescence are as follows: (a) physical preparation period, 11–15 years old; (b) preparatory period, 15–18 years old; and (c) adult preparatory period, 18–21 years old. (4). Stunting is a common public health problem among adolescents around the world (up to 27–65 %) (5). Stunting among adolescents is often disregarded as a nutritional deficiency problem (6). Decreased cognitive learning ability, reduced productivity, and an increased risk of adolescent pregnancy, which leads to an unhealthy newborn, are all possible negative consequences. In comparison to other postpartum times, the teenage years, along with the first year of life, have the second-fastest body and height development (6). During this period, more than 20% of total height growth and up to 50% of body bone mass are attained. As a result, adequate nutrition is essential during adolescence.

Calcium and phosphorus are required for body growth. Milk and dairy products are the main sources of these micronutrients. There is a link between milk consumption frequency and the amount and risk of stunting in children aged 24

months (OR =4.1, p < 0.05). The average amount of milk consumed by stunted children (17 times a week) is lower than that consumed by healthy children (24 times a week). Stunted children drink less milk (337.63 mL per day) than healthy children (468.13 mL per day) (7). Milk contains calcium, which is necessary for bone and height growth (8). In addition, fish and seafood have more calcium than beef or chicken (9). Bone mineralization is extremely important during growth. Low calcium intake can affect the function of osteoblasts by causing a lack of mineralization of the new bone deposit matrix. Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight (10,11).

Calcium forms complex bone-strengthening bonds with phosphates. Upon phosphorus deficiency, growth may be disrupted (12). High-protein foods, such as meat, poultry, fish, eggs, and grains, are the primary sources of phosphorus. Phosphorus is abundant in foods that are rich in both protein and calcium (13). Phosphorus is also found in milk, which is why it is so important (93 mg mg milk). Furthermore, each 100 mg of milled rice contains 140 mg of phosphorus. During periods of growth, the body's need for calcium increases (14). Calcium deficiency stifles growth (15). Height can be utilized as an indicator of the quality of growth and bone formation (16,17). In this study, the rate of calcium intake before the nutritional intervention was 50% below the recommended dietary allowance (RDA)—27.3 ± 27.8 (3.3:100.0) %RDA, but the rate of phosphorus intake among the participants was sufficient.

In this study, the participants were provided a variety of locally available midmorning snacks as well as milk. As a result, the goal of the research was to see how additional midmorning snacks affected the potential improvement of stunting in adolescents.

2. MATERIALS AND METHOD

The study complied with the World Medical Association Declaration of Helsinki–Ethical Principles for Medical Research involving human subjects and ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019). SMP Negeri 3 Pekanbaru, Riau Province, Indonesia, was the site of this longitudinal panel study. Students in their first, second, and third years took part in this study (Table **1**). By the middle of April 2019, the participants would be between the ages of 12 and 15, with a height-for-age Z-score (HAZ) of < -2 (18). Parents' willingness to participate in the study was obtained and they signed the informed consent form on behalf of their children. Diagnosed chronic illnesses, born twins, mental health disorders, a history of low birth weight, and concurrent participation in a similar study were all exclusion criteria (19).

The Lwanga and Lameshow formula was used to calculate the number of samples (20). A value of

α =5% (1.964) and a value of β =20% (0.842) were utilized in the formula (21). Previous research statistical parameters (e.g., mean and standard deviation) were used to determine the number of samples representing population characteristics. The study showed that μ1–μ2 = 0.4 cm (the increase of study participant body length), and a standard deviation of σ = 1.6 cm, based on which the minimum sample of this research was 21 participants. Following the screening, 36 study participants were eligible for participating, as presented in Table **1**.

On April 29th, 2019, records of the participants' height and food recall 1 x 24 hours were taken, which was the food consumed the day before. The measurement was retaken 10 months later (February 11th, 2020). No nutritional intervention was administered during the first ten months. The count was implemented by Bhandari et al. in 2001 (22). Between February 11th and March 11th, 2020, the study participants underwent a dietary intervention in the form of midmorning snacks (23) and high calcium milk. Records of the participants' height and food recall 1 x 24 hours were retaken on March 11th, 2020.

The midmorning snack menu was daily varied and included *gado-gado* (rice, boiled egg, potato, tempeh, tofu, long beans, cabbage & peanut sauce), fried vermicelli (vermicelli, omelet, cucumber & prawn crackers), *batagor* (tofu, cassava flour crackers, boiled egg & peanut sauce), *lontong medan* (rice, boiled egg, vermicelli, french fries, fried anchovy, green bean & carrots curry), sandwich (plain toast, omelet, cucumber, lettuce, tomato & chili sauce), chicken porridge (rice porridge, fried bread, shredded chicken, shredded chicken & chicken broth), and fried rice *teri* (rice, anchovy, prawn crackers, cucumber, chili sauce & soy sauce) as displayed in Picture **1** and Table **2**.

The midmorning snacks consist of snacks with energy contents of 30% (recommended dietary allowance) RDA. The midmorning snacks are foods sold by vendors near the school. Meals per day were divided into six; breakfast, midmorning snacks, lunch, afternoon snacks, dinner, and evening snack. Energy provision during breakfast provided around 20% of RDA, lunch around 30%, and dinner around 20% of RDA; midmorning, afternoon, and evening snacks were approximately 10% of the RDA each (24). The total amount of energy of the meals and milk was 541.8 kcal (30% of RDA), 25 g of protein (50% of RDA), 90 g of carbohydrate (30% of RDA), and 600 mg of calcium (35% of RDA). Meal and milk administration lasted 34 days in total.

The participants entered the research area at around 7.00 a.m. The participants consumed three cartons of milk at 8:00 a.m., 10:00 a.m., and 12:00 p.m., given by the research team members. The midmorning snack was served at 10 a.m. and consumed right after. Both the meals and milk were consumed at school during school days. The

researcher observed the participants both during meal and milk consumption. The research team and 2 members of the health school team members observed the meals consumed by the participants.

Once the milk was consumed, the participants left the research site. The amount consumed was recorded. The remaining unconsumed food was weighed and counted, since it will affect the amount of nutritional intake consumed. A similar process was repeated between 10:00 a.m. and 12:00 p.m. On the other hand, during school breaks, the meals and milk were directly distributed to the students' residence by the research team member. The research team observed the consumption of the meals and recorded their intake in case there were any leftovers.

Requirement calculation (including energy, protein, fats, carbohydrates, vitamin A, vitamin E, vitamin B-1, vitamin B-2, vitamin B-6, vitamin C, sodium, calcium, magnesium, phosphorus, iron, and zinc) was based on the recommended dietary allowance (RDA) per age (25). Analysis of the various nutrients was carried out using the Food-Beverage Nutrient Composition Database from the Indonesian Food Composition Table (26). Based on nutritional intake data, the participants obtained nutritional adequacy. Nutritional adequacy (NA) is the level of nutrient intake that can meet the nutritional needs of almost all healthy people (27). This means that a sufficient nutritional level is necessary to prevent diseases due to malnutrition, such as disorders due to iodium deficiency for iodium, xeroftalmia and night blindness for vitamin A, and beriberi for thiamin. NA is the daily adequacy of nutrients according to age group, gender, body size, and activity to prevent the occurrence of malnutrition or excess nutrition.

Internationally, various terms are used such as in the United States and Canada, NA is also known as Dietary Reference Intakes (DRIs), and in the European Union called Population Reference Intakes, in Japan called Nutrients-Based Dietary Reference Intakes (NBDRIs), WHO uses the term Recommended Intake (RNI), in the Philippines the term Recommended Energy and Nutrient Intake (RENI) is used and in Australia and New Zealand the term Nuterient Reference Values (NRVs). Moreover, the energy adequacy was categorized as low when recorded at <70 and sufficient if ≥70% of RDA; the protein adequacy was categorized as low when recorded at <80 and sufficient if ≥80% of RDA; the vitamin and mineral adequacy was categorized as low when recorded at <50% and sufficient if ≥50% of RDA.

$$\text{Nutritional Adequacy Rate (NAR)} = \frac{\text{Nutritional Intake}}{\text{Recommended dietary allowance (RDA)}} \times 100\%$$

The nutritional quality of the food intake was calculated based on Hardinsyah's formula (28). It was categorized low if at <70% and sufficient at ≥70% of RDA.

$$\text{Nutritional quality of food (\%)} = \frac{(\text{NARi})}{n}$$

NARi = Nutritional Adequacy Rate (truncated at 100)
n = The number of nutritions and the nutritional quality of food (energy: i=1; protein: i=2; fats: i=3; carbohydrates: i=4; vitamin A: i=5; vitamin E: i=6; vitamin B1: i=7; vitamin B2: i=8; vitamin B6: i=9; vitamin C: i=10, sodium: i=11; calcium: i=12; magnesium: i=13; phosphorus: i=14; iron: i=15; zinc: i=16).

The study also involved teacher's and parent's questionnaire regarding details of participants' eligibility. This instrument also explored information regarding both the parental and socio-economic status of the study participants, such as household income per month. Data analysis and food intake consumption were conducted using the Pearson Product moments test with the SPSS version 16 for Windows.

3. RESULTS AND DISCUSSION

Height and Calcium Intake

Before the intervention, all participants experienced stunting. The mean height of the participants was 141.0 ± 5.2 (128.8 — 152.2) cm, their age was 13.5 ± 0.9 (12.0 — 15.0) years, and the HAZ was -2.5 ± 0.4 (-3.2 — -2.0) (Table **1**).

At the beginning of the study, calcium and phosphorus adequacy rates positively correlated with the study participant's height (r calcium =0.433**, r phosphorus =0.406**) (Table **4**). The level of calcium adequacy rate among all participants was low (27.3 ± 27.8, 3.3 — 100.0%). The sufficient adequacy rate of calcium is about ≥50% of the Nutritional Adequacy Rate (NAR) and is considered inadequate if <50% of the NAR (29).

Moreover, at the same time, the calcium intake of participants aged 10–12 years, both male and female, was 244.5 mg and 223.5 mg, respectively. For those aged 13–15 years, the calcium intake of boys and girls was 315.2 and 362.9 mg, respectively.

Calcium intake among adolescent girls—based on a Bangladeshi study— was 248.80 ± 212 mg, in line with our study's findings (29).

Calcium Intake form Milk

No study participants had dairy allergies. A total of 89% of the study participants liked cold milk, while 11% liked it at room temperature.

A total of 16.4% of the participants had been accustomed to buying milk even before this research was conducted. The types of consumed milk were UHT Kids Chocolate (5.5%), ultra-milk (5.5%), REAL GOOD milk brand (2.7%), and Milo (2.7%). A portion of 100 g of milk contains about 143 mg of calcium that was digestible in the body. Apart from milk, ice cream also contains calcium and was consumed by 2.5% of the participants. The content of calcium in 100 g of ice cream is 123 mg.

The prevalence of stunting is lower in children who consume milk. Both the amount and frequency of milk consumption in adolescents aged 16–17

years are related to height (8,16). Children aged 1–12 years who consume at least two cups of milk per day will have a reduced risk of stunting ($p < 0.05$) (30).

The 2nd grade students of *SMP Negeri* 2 in Bulagi Banggai Regency of the Central Sulawesi Province of Indonesia usually drink two glasses of milk per day (equivalent to 480 ml), which could decrease stunting events within 2 months ($p = 0.01$) (29). Milk-derived calcium intake of children with stunting aged 24–59 months is lower than 276.17 mg/day and 628.41 mg/day, which is the amount for non-stunting children ($p < 0.05$) (9).

Milk calcium is absorbed by the body during the growth period at about 50-70%, with one glass of milk (equivalent to 240 ml) containing more than 270 mg of calcium— almost one third of the daily calcium needs; therefore, milk consumption is very beneficial for school aged children (31).

Regularly consuming milk is highly recommended to meet calcium needs (32). Milk consumption can improve bone growth, which ultimately influences height and helps reducing the risk of bone mass loss (33).

Milk is considered a good source of calcium, energy, protein, and minerals; it contains nutrients necessary both for bone and height growth (8). Moreover, milk is the best source of calcium and is the largest contributor to daily calcium consumption (34).

Proteins in cow milk—such as casein, whey, and amino acids can stimulate the formation of IGF-1, which plays a role in the proliferation of chondrocytes and osteoblasts, as well as the formation of bone tissue matrix (33). Low calcium intake can lead to low mineralization of the new bone mineralization matrix and affect osteoblast function. Calcium enriches the peak of bone mass and can form new bone tissue 30. Peak bone density occurs at the age of 17 years in males and 11-14 years in females. Optimal bone mass in girls and boys occurs at the age of 11–14 and 14–16 years, respectively. The process of bone formation begins by forming a strong but still soft and flexible matrix. The matrix consists of fibers made of collagen enclosed by gelatin. The matrix begins to become strong and harden through the calcification process, namely the formation of mineral crystals containing calcium compounds. This crystal consists of calcium phosphate or calcium phosphate combination and calcium hydroxide called hydroxyapatite {(3Ca3(PO4)2Ca(OH)2}. Since calcium is the main mineral in this bond, it must be in sufficient quantities in the fluid surrounding the bone matrix (35).

Calcium forms a complex bond with phosphate that can provide strength to bones (30). Poor calcium intake in adolescents can disrupt growth and peak bone mass (36). A total of 51% of peak bone mass accumulates during puberty and reaches 37% of the adult bone mineral density (37). In

adolescence, the increase in bone mass occurs between 40–60% of the total bone mass (38).

The need for calcium and phosphorus increases in adolescence as height growth and bone mass formation rapidly take place (14). Intake of calcium and phosphorus helps calcium absorption. Deposits of calcium and phosphorus inside the organic matrix are in the form of hydroxyapatite crystals during the mineralization process and give strength to the bones. The deficiency of both minerals and inappropriate ratios can affect bone growth (39).

During growth, calcium deficiency can lead to a reduction both in bone mass and hardness, which are in the period of formation. Calcium deficiency not only affects both bone and tooth growth but affects the immune system, nervous system resistance, and impairs heart muscle contraction power as well (35). Long-term calcium consumption deficiency will negatively affect bone structure; moreover, during growth, it can induce growth disorders (36). Calcium is 99% in skeletal bones and 1% in other tissues, as well as bodily fluids that can be distributed throughout the body (40). During adolescence, enough calcium intake helps produce better bone mass. Adequate calcium intake can help protect bones and daily calcium loss through excretion (urine and feces), sweat, and breath. A sufficient daily calcium intake can restore lost calcium (41).

Non-dairy calcium intake for stunting prevention

Before this study was conducted, participants had consumed non-dairy calcium sources. The amount of that food they consume is very small. So it is not sufficient as much as the recommended dietary adequacy. Tofu, tempeh, beans, and green vegetables, contain fiber and oxalate—which form insoluble salts—thus inhibiting calcium absorption. This condition will cause low calcium content bioavailability from the consumed foods (42).

The Price of Milk

The daily allowance received by the study participants on average was IDR 14,417 ± 6,429 (USD$ 1.03 ± 0.46). Calcium content in ultra-high temperature (UHT) Kids Chocolate 115 mL milk pack was 30% with the suggestion of serving two packages per day. The price of milk per box was IDR 2,200 (USD$ 0.15). The lowest price of milk in the canteen around the school is IDR 1,000 (USD$ 0.07) and the highest is IDR 3,200 (USD$ 0.22) per box. However, the brand of milks are different from the intervention milk.

Family income was related to the incidence of stunting in infants ($p = 0.048$). Low family income is at risk of getting stunting (43). The type of purchased food depends on the family's income level (44). The grocery purchasing capability of the family correlates with its income level; a high family income allows the fulfilment of the

nutritional needs of the whole family; however, low family income correlates with a low purchasing power for household food and potentially affect stunting events in children.

Egg Consumption

A total of 2.8% of the participants preferred boiled eggs, while 5.5% liked fried eggs, and 33.3% liked omelets. Except for chicken porridge and fried rice, the midmorning snacks contain eggs. Egg consumption provides nutrition that facilitates increased growth and contributes to reducing stunting ($p < 0.05$) (14). Younger children aged 6–9 months who consumed one medium-sized egg per day for six months could increase height and reduce stunting by 47% (13). The toddlers' frequency of egg consumption who fall into the category has 1.813 times added risk of stunting, compared to those who consume eggs that fall into the frequent category (45).

Egg consumption was 27.8 grams / day by children aged 10-13 years. The frequency of consuming eggs by these children aged 10-13 years was 5 times / week (46).

The Midmorning Snacks

Within the first ten months, participants had not received the midmorning snacks. When participants had not received the midmorning snacks, some participants consumed snacks themselves. The types of snacks that participants consumed were pastel, noodles, tofu, fritters, *pao*, tempeh, rice cake, and eclairs. However, the consumption of theses nacks did not improve the participant's nutritional status. On the 11^{th} month (for 34 consecutive days), the participants were given a variety of meals—during midmorning snack—along with high calcium milk. The meals were purchased from shops near the participants' area. The price of one meal was approximately IDR 8,000 (USD$ 0.56), which is considered very affordable. The lowest price of one meal is IDR 5,000 (USD$ 0.35) and the highest price is IDR 10,000 (USD$ 0.70). Therefore, the participants will be able to purchase the meals even after the completion of the study.

Researchers expect that in the future (after the period of nutrition intervention in the form of midmorning snack has been completed by researchers), stunting teenagers can provide for their own. The first reason is that midmorning snacks are sold around them. The second reason is the price of the midmorning snacks. The students can use snack money to buy midmorning snacks. Researchers have informed stunting teens during midmorning snacks that they need to increase their food intake as much as the midmorning snack the researchers provided. The addition of food intake is to optimize the linear growth of stunting adolescents during the growing chase.

The Height after Nutrition Intervenstion

After the intervention, the height of the participants increased (Table **3**). The control group was formed before being given a midmorning snack. In the first ten months of the study, all participants were not given the midmorning snacks. The nutritional status of all participants in the first ten months is still stunting. The treatment group, which had been given the midmorning snacks for 34 days, began in the eleventh month. A total of 19.4% of participants increased their nutritional status from stunting to normal after consuming the midmorning snacks for 34 days. The height of the participants of the control group was 143.6 ± 5.2 while of the treatment group was 144.9 ± 5.1 cm ($p < 0.00$). The average increase tendency (mean) in participant height after treatment is 1.3 cm (Table **3**).

As a result, the dietary intervention used in this study successfully improved the nutritional status of the participants from stunting to normal. Not only did consuming midmorning snacks and drinking milk increased calcium intake, but it also increased the intake of other nutrients. The intervention improved the nutritional food quality from 52.7 ± 15.5 (28.4 — 86.3) to 84.8 ± 20.3 (30.9 — 100.0) (Table **4**). Calcium was one of the essential nutrients that normalized the nutritional status of the participants.

Habit of Consuming Snack

Consuming snacks maintains energy levels before main meal time (47). The habit of school-snacking occurs because 3–4 hours after breakfast, the individual feels hungry again (48). Consumed snacks and energy contribution to the recommended adequacy are positively correlated (49). Hawker food constitutes beverages, snacks, and full meals—defined as either ready-to-eat or pre-cooked meals at the point of sale—and sold either on the road or in public places (50).

Three-day estimated dietary records were kept for 194 white 3- and 4-year-old children to determine and evaluate the extent, nature, and quality of their snacking. Between-meal eating contributed more than one-third of the average day's energy and approximately one-quarter of most vitamins and minerals to the children's diets. Foods eaten between meals were, however, significantly less nutrient-dense than mealtime foods. Snacks purchased by children are generally fulfilling and rich both in energy and fat; however, these children are highly malnourished (51). The nutritional value of hawker meals does not always satisfy the body's nutritional requirements (52).

Benefits of Midmorning Snacks and Milk to Height

During the 10-month non-intervention period, 8.3% (n =36) of the participants had their nutritional status changed from stunting to normal, meaning

that without any intervention, about 90% of the participants would still be in stunting. This could be due to different growth spurs. Furthermore, as seen here, a 1-month intervention was able to change 19.4% of participant statuses from stunting to normal.

Therefore, it is predicted that if the intervention is continued for up to 6 months, all participants could be able to improve their status from stunting to normal. This prediction was made based on the calculation that for one month, the intervention could reduce by 19.4%, so if the intervention was extended to 6 months, 19.4 x 6 = 116.4% (≈ 100%) became normal, meaning that all participants would have normal nutritional status.

The strength of this study is that the nutrition intervention activities provided to participants are relatively easy to be implemented because midmorning snacks and milk are sold around them, and the price is affordable and can be purchased with the pocket money given by their parents. The time before this research was conducted, they did not know about the types of food they should consume, how much, and when to consume them. Time after the research was conducted, they became aware of this and were able to meet their nutritional needs.

The nutrition intervention underwent only for one month and did not continue for up to 6 months because the coronavirus that causes Covid-19 has infected Indonesia since March 2, 2020 as was conveyed by the President of the Republic of Indonesia; furthermore, the Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 2 of 2020 regarding the prevention and handling of COVID-19, starting March 12, 2020, due to which learning activities in schools were stopped and online learning was administered.

This research should be conducted simultaneously between the group that was given the nutrition intervention and the group that was not given the nutrition intervention. However, due to limited research funding, the design became pre-nutrition intervention and post nutrition intervention were given in the same school. As a suggestion, future research could be undertaken by having a control group of age-appropriate individuals with similar stunting for six months.

CONCLUSION

Calcium intake is crucial in avoiding adolescent stunting. The primary sources of calcium from snacks purchased by stunted adolescents were pastel, noodles, tofu, fritters, *pao*, tempeh, rice cake, and eclairs. These snacks, however, did not increase their nutritional status. As a result, midmorning snacks and calcium-fortified milk were supplied. The midmorning snack menu, which included *gado-gado*, fried vermicelli, *batagor*, *lontong medan*, sandwich, chicken porridge, and fried rice *teri* changed every day. The midmorning snack and a high-calcium milk intake

increased the nutritional status of the participants. In order to prevent stunting, basic calcium sources such as midmorning snacks and high calcium milk must be eaten.

Providing intervention, such as midmorning snacks and milk, maybe an alternative for the Indonesian government in order to reduce stunting rates. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

The participants' parents signed informed consent before the research data was taken by the enumerator.

AVAILABILITY OF DATA AND MATERIALS

The data used by this research will not be shared as it contains personal information.

FUNDING

This work was financially supported by Poltekkes Kemenkes Riau, Pekanbaru, Indonesia, grant number DP.01.02/4.3/0674/2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank the Head of School of SMP 3 Pekanbaru, Riau Province, Indonesia, for their permission to conduct the study; and PT Indolakto, Jakarta, Indonesia, for providing milk for this study.

REFERENCES

1. Christian P, Smith ER. Adolescent undernutrition: global burden, physiology, and nutritional risks. Ann Nutr Metab. 2018;72(4):316–28.
2. Ministry of Health of the Republic of Indonesia. Basic Health Research. Jakarta; 2010. pp 40-49.
3. Trihono, Atmarita, Tjandrarini D. Pendek (stunting) di Indonesia, masalah dan solusinya. Jakarta: Badan Penelitian dan Pengembangan Kesehatan; 2015. pp 24.
4. Gunarsa S, Gunarsa Y. Psikologi perkembangan anak dan remaja. PT. BPK Gunung Mulia. Jakarta; 2008. pp 204.

5. Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Vol. 2, (ACC/SCN) in collaboration with the Asian Developmctn Bank (ADB), Chapter. Manila; 2001. pp 2.
6. Mahmud MK, Zulfianto NA. Tabel komposisi pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. pp 65.
7. Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of milk introduction is a dominant factor of stunting among toddlers aged 24 months in Bogor District: a cross-sectional study. Pakistan J Nutr. 2019;18(10):969–76.
8. Haq AB, Murbawani EA. Status gizi, asupan makan remaja akhir yang berprofesi sebagai model. J Nutr Coll. 2014;3(4):489–94.
9. Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.
10. Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma mincronutrient levels of stunted Egyptian school age children. Kasr El Aini Med J. 2010;16(1):1–5.
11. Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents 1-4. Am J Clin Nutr [Internet]. 2012 [cited 2021 Feb 7];96:1042–50. Available from: http://www.r-project.org/
12. Wang L, Nancollas G. Calcium orthophosphates: crystallization and dissolution. Chem Rev Novemb. 2018;108(11):4628–69.
13. Emawati E, Yani NS, Idar I. Analisis kandungan Fosfor (P) dalam dua varietas kubis (Brassica oleracea) di daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.
14. Devi N. Gizi anak usia sekolah memprihatinkan [Internet]. Kompas. 2011 [cited 2021 Dec 25]. Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan.
15. Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.
16. Hardinsyah H, Damayanthi E, Zulianti W. Hubungan konsumsi susu dan kalsium dengan densitas tulang dan tinggi badan remaja. J Gizi dan Pangan. 2008;3(1):43–8.
17. Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115–

22.

18. World Health Organization. Statistical Information System [Internet]. 2006 [cited 2021 Dec 25]. Available from: http://www.who.int/en/.
19. Gibson RS. Principles of nutritional assessment. Second Edi. New York: Oxford University Press, Inc; 2005. pp 9-19.
20. Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. pp 15.
21. Walpole RE. Pengantar statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. pp 365.
22. Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.
23. Pucket RP. Food service manual for health care institutions. Third Edit. 3rd edition, editor. An American Hospital Association. Chicago: AHA Press; 2004. pp 388.
24. Yuliana R. Berapa kalori yang dibutuhkan dalam sehari [Internet]. Kompas; 2010 [cited 2021 Dec 24]. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
25. Hardinsyah, Marudut, Rimbawan, Setiawan B. Standar mutu dan kecukupan gizi. In: Widyakarya Nasional Pangan dan Gizi (WNPG) [Internet]. Jakarta: Lembaga Ilmu Pengetahuan Indonesi; 2018. p. 1–37. Available from: https://wnpg.lipi.go.id/wp-content/uploads/2018/07/bidang1-3juli2018/Prof-Hardin-Pokja-SMKG-ppt-3-juli-Sangat-Baru.pdf
26. Kementerian Kesehatan Republik Indoensia. Tabel komposisi pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017. pp 1.
27. Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Angka kecukupan gizi (AKG) yang dianjurkan bagi orang Indonesia. In: Widyakarya Nasional Pangan dan Gizi (WNPG). Jakarta: Lembaga Ilmu Pengetahuan Indonesia; 2012. p. 1–18.
28. Hardinsyah. Measurement and determinants of food diversity : implications for Indonesia's food and nutrition policy. The University of Queensland; 1996.
29. Rumondor M, Lariwu C, Ndekano M. Hubungan kebiasaan konsumsi susu dengan kejadian stunting pada siswa kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.
30. Mahan LK, Raymond J, Escott-Stump S. Krause's food & the nutrition care process.

13th ed. USA: Elsevier Health Science; 2016. pp 722.

31. Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera Utara. 2017.
32. Lawrence A. Milk and milk product: essentials of human nutrition. New York: Oxford University Press; 2007. pp 1.
33. Tirtasaputra E, Puspasari G, Lucretia T. Milk consumption correlates with body height in children. J Med Heal. 2019;2(3):878–84.
34. Hernell O. Human milk vs. cow's milk and the evolution of infant formulas. In: Essentials of human nutrition. 2th ed. Switzerlan: Nestec Ltd; 2011. p. 17.
35. Almatsier S. Prinsip dasar ilmu gizi. Jakarta: Gramedia Pustaka Utama; 2015. pp 237-243.
36. Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.
37. Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The HELENA study. Horm Res Paediatr. 2010;74(5):339–50.
38. Kretchmer N, Zimmermann M. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.
39. Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.
40. Nadesul H. Sehat itu mudah. Jakarta: Kompas; 2011. pp 15-21.
41. Cosman F. Osteoporosis: panduan lengkap agar tulang anda tetap sehat. Yogyakarta: B-First; 2009. 292 p.
42. Organization WH. Improving Child Growth. Geneva; 2001.
43. Illahi RK. Hubungan pendapatan keluarga, berat lahir, dan panjang lahir dengan kejadian stunting balita 24-59 bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.
44. Adriani M, Wirjatmadi B. Gizi dan kesehatan balita; peran mikro zinc pada pertumbuhan balita. Jakarta: Kencana Prenamedia Group; 2014. 128 p.
45. Wulandari, Budiasturtik I, Alamsyah D. Hubungan karakteristik sosial ekonomi dan pola asuh pemberian makan terhadap kejadian stunting pada balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.
46. Annisa PA. Densitas energi konsumsi, status gizi, dan daya ingat sesaat anak usia

sekolah dasar. J Gizi dan Pangan. 2015;9(3):187–94.

47. Koukel S. Choosing healthy snacks for children. University of Alaska Fairbanks; 2009.
48. Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2):91–5.
49. Rahayu D, Mende S. Sumbangan energi dan protein makanan jajanan tradisional "jajanan cilok dan penganan gorengan." In: Widyakarya Nasional Khasiat Makanan Tradisional. Jakarta: Kantor Menteri Negara Urusan Pangan; 1995. p. 596.
50. Winarno FG. Potensi dan masalah makanan jajanan. In: Keamanan pangan. Bogor: Institut Pertanian Bogor; 1997. p. 98.
51. Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.
52. Irianto DP. Panduan gizi lengkap (keluarga dan olahragawan). Yogyakarta: CV. Andi Offset; 2006.

Table **1.** Demographic Information of Study Participants.

Variable	Criteria	Values*
Number of Participants	Year I	30.6 (11)
	Year II	41.7 (15)
	Year III	27.8 (10)
Age (Year)	12	13.9 (5)
	13	36.1 (13)
	14	36.1 (13)
	15	13.9 (5)
Sex	Male	50.0 (18)
	Female	50.0 (18)
Birth weight (g)	< 2,500 (low birth weight)	5.6 (2)
	≥ 2,500 (No low birth weight)	94.4 (34)
Body length at birth (cm)	< 48 (Stunting)	19.4 (7)
	48 — 55.6 (Normal)	75.0 (27)
	≥ 55.6 (High)	5.6 (2)
Number of siblings (person)	1	8.3 (3)
	2	22.2 (8)
	3	44.4 (16)
	4	13.9 (5)
	5	5.6 (2)
	6	5.6 (2)
Ethnicity	Malay	100.0 (36)
Place born	Jakarta, Jakarta Province	2.8 (1)
	Pekanbaru, Riau Province	88.9 (32)
	Palembang, South Sumatra Province	2.8 (1)
	Medan, North Sumatera Province	2.8 (1)
	Jambi, Jambi Province	2.8 (1)
Mother's height (cm)	153.5±8.7(120.0 — 175.0)	
	< 150	16.7 (6)
	≥ 150	83.3 (36)
Mother's education level	Elementary school	13.9 (5)
	Junior high school	5.6 (2)
	Senior high school	77.8 (28)
	University	2.8 (1)
Mother's occupation	Housewife	77.8 (28)
	Employee	13.9 (5)
	Businessman	5.6 (2)
	Entrepreneur	2.8 (1)

* %(n)

1573-4013/19 $58.00+.00

Table **2**. Nutritional Content of Midmorning Snack Meals Per Day.

Midmorning Snack	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)
Gado-gado & milk	552.0	21.5	20.5	76.4	462.3
Fried vermicelli & milk	594.5	18.1	30.5	65.8	428.0
Batagor & milk	419.5	23.4	20.4	40.5	474.8
Lontong medan & milk	646.9	27.4	23.9	84.3	668.9
Sandwich & milk	366.8	14.3	11.5	55.9	413.0
Chicken porridge & milk	580.7	21.4	11.8	100.7	405.6
Fried rice *teri* & milk	632.1	19.4	33.1	68.4	559.1
Average	541.8	20.8	21.7	70.3	487.4

Table **3**. Body Height and Z-Score of Participants Based on Age.

	Before Treatment (Control Class)				After Treatment (Experiment Class)		
Age	Measurement Date	Body Height	Z-score		Measurement Date	Body Height	Z-score
12	11/02/2020	135.3±2.3 (133.6 — 137.9)	-2.6±0.3 (-2.90 — -2.65)		11/03/2020	136.4±2.5 (134.7 — 139.3)	-2.6±0.3 (-2.90 — -2.25)
13	11/02/2020	141.5±4.8 (135.4 — 151.7)	-2.5±0.6 (-3.24 — -1.36)		11/03/2020	143.2±5.0 (135.8 — 153.5)	-2.3±0.6 (-3.15 — -1.19)
14	11/02/2020	144.9±3.8 (138.1 — 150.9)	-2.4±0.5 (-3.34 — -1.97)		11/03/2020	146.4±3.7 (140.4 — 153.6)	-2.3±0.5 (-3.10 — -1.68)
15	11/02/2020	147.5±3.8 (143.5 — 154.9)	-2.4±0.3 (-2.87 — -1.91)		11/03/2020	148.1±3.7 (144.2 — 155.2)	-2.3±0.3 (-2.75 — -1.85)
	Average	143.6±5.2 (133.6 — 154.9)	-2.5±0.4 (-3.30 — -1.40)		Average	144.9±5.1 (134.7 — 155.2)	-2.3±0.4 (-3.15 — -1.19)

Table **4**. Correlation Height and Nutritional Adequacy Rate of Participants and Nutritional of Adequacy Rate No Intervention and After Intervention Group.

No	Nutrients	Correlation Height with Nutritional Adequacy Rate					
		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate		Nutritional Adequacy Rate (%)	Correlation height with Nutritional Adequacy Rate	
		No Intervention (April 29th, 2019)	(r value)	(p value)	After Intervention (March 11th, 2020)	(r value)	(p value)
1	Energy	70.7±18.5 (39.6 ⟝ 100.0)	0.118	0.495	66.9±20.3 (30.2 ⟝ 86.6)	-0.037	0.832
2	Protein	77.3±20.0 (44.5 ⟝ 100.0)	0.078	0.650	87.3±18.0 (50.9 ⟝ 100.0)	0.069	0.687
3	Fats	73.2±25.9 (20.8 ⟝ 100.0)	0.048	0.781	76.6±24.5 (42.3 ⟝ 100.0)	0.051	0.769
4	Carbohydrates	61.2±18.0 (24.5 ⟝ 100.0)	0.104	0.547	49.5±19.8 (18.4 ⟝ 100.0)	0.009	0.959
5	Vitamin A	75.1±35.4 (5.0 ⟝ 100.0)	0.202	0.238	77.9±20.6 (35.4 ⟝ 100.0)	0.028	0.873
6	Vitamin E	21.3±13.4 (0.0 ⟝ 58.2)	0.142	0.408	54.6±26.8 (7.3 ⟝ 100.0)	0.000	0.999
7	Vitamin B-1	35.6±21.2 (9.1 ⟝ 100.0)	0.277	0.101	63.0±21.4 (25.0 ⟝ 100.0)	-0.048	0.781
8	Vitamin B-2	62.2±24.6 (20.0 ⟝ 100.0)	0.209	0.222	97.9±5.8 (76.9 ⟝ 100.0)	-0.025	0.884
9	Vitamin B-6	61.9±22.7 (25.0 ⟝ 100.0)	0.166	0.333	78.2±20.5 (38.5 ⟝ 100.0)	0.145	0.400
10	Vitamin C	17.2±24.2 (0.0 ⟝ 85.8)	0.169	0.324	30.4±33.4 (5.4 ⟝ 100.0)	0.029	0.866
11	Sodium	17.0±11.9 (2.0 ⟝ 55.7)	0.291	0.086	76.0±26.2 (18.6 ⟝ 100.0)	0.058	0.738
12	Calcium	27.3±27.8 (3.3 ⟝ 100.0)**	0.433	0.008	59.1±19.0 (15.5 ⟝100.0)	0.071	0.680
13	Magnesium	73.1±21.1 (35.7 ⟝ 100.0)	0.100	0.561	92.8±14.3 (42.8 ⟝ 100.0)	0.133	0.440
14	Phosphorus	55.9±21.2 (25.4 ⟝ 100.0)**	0.406	0.014	87.8±17.0 (45.4 ⟝ 100.0)	0.123	0.476
15	Iron	52.8±29.0 (14.0 ⟝ 100.0)	0.110	0.524	75.5±24.3 (26.4 ⟝ 100.0)	0.093	0.590
16	Zinc	61.2±22.0 (33.3 ⟝ 100.0)	0.208	0.233	84.8±20.3 (30.9 ⟝ 100.0)	0.062	0.719
Nutritional quality of food		52.7±15.5 (28.4 ⟝ 86.3)*	0.281	0.027	84.8±20.3 (30.9 ⟝ 100.0)	0.062	0.720

** = p value <0.01; * = p value <0.05

DAY	TIME		
	07:00 a.m.	10:00 a.m.	12:00 p.m.
MONDAY		 	
	Milk	Gado-Gado + Milk	Milk
TUESDAY		 	
	Milk	Fried Vermicelli + Milk	Milk
WEDNESDAY		 	
	Milk	Batagor + Milk	Milk

1573-4013/19 $58.00+.00

THURSDAY		 	
	Milk	Lontong Medan + Milk	Milk
FRIDAY		 	
	Milk	Sandwich + Milk	Milk
SATURDAY		 	
	Milk	Chicken Porridge + Milk	Milk

SUNDAY			 
	Milk	Fried Rice Teri + Milk	Milk

Picture **1.** The midmorning snack

BNI

Validasi :

Tanggal/ *Date* : 26 Agustus 2021

Formulir Kiriman Uang

Remittance Application

Penerima/*Beneficiary* ☐ Penduduk/ *Resident* ☐ Bukan Penduduk/ *Non Resident*

☐ Perorangan/*Personal* ☐ Perusahaan/*Company*

☐ Pemerintah/*Government* ☐ *Remittance*

Nama/*Name* : Bentham Science Publishers LTD.(FZE)

Alamat/*Address* :

Telepon/*Phone* :

Kota/*City* : Negara/*Country* :

Bank Penerima/*Beneficiary Bank* : National Bank of Fujairah PJSC

Kota/*City* : Negara/*Country* :

No. Rek./*Acc. No.* : 0120012254 54

Pengirim/*Remitter* ☐ Penduduk/ *Resident* ☐ Bukan Penduduk/ *Non Resident*

☐ Perorangan/*Personal* ☐ Perusahaan/*Company*

☐ Pemerintah/*Government* ☐ *Remittance*

Nama/*Name* : ASLIS WIRDA HAYATI

Nama Alias/*Alias Name* :

No. ID : 0301934417

KTP/SIM/*Passport*/KITAS

Alamat/*Address* :

Telepon/*Phone* : 081810644O

Kota/*City* : Negara/*Country* :

Jenis Pengiriman/ *Type of Transfer* ☐ LLG/*Clearing* ☐ RTGS ☐ Draft ☐ SWIFT ☑ NBFUAEA FDXB

Sumber Dana/ *Source of fund*

☐ Tunai/*Cash* ☐ Cek/*BG No.*

☒ Debit Rek./*Debit Acc. No.* 0301934417

Mata Uang/*Currency* : ☐ IDR ☐ USD ☐

Jumlah Dana yang dikirim/*Amount Transfer* :

Jumlah/*Amount*	Kurs/*Rate*	Nilai/*Total Amount*
US$ 161.00		

Biaya/*Charge*	Valas/*Amount in Foreign Exchange*	Kurs/ *Amount*	Nilai/ *Total Amount*
Komisi/*Commision*			
Pengiriman/*Handling*			
Bank Koresponden/*Correspondent Bank*			
Jumlah Biaya/*Amount Charge* :			
Total yang dibayarkan/*Total Amount* :			

Terbilang/*Amount in Words* : seratus enam puluh satu dolar amerika

Tujuan Transaksi (*Transaction Purpose*) : Pembayaran editing bahasa in

Berita (*Message*) : Article 2155 : The Benefits of Midmorning Snack to Combat Stunting.

Biaya dari Bank koresponden dibebankan ke rekening/ *Correspondent bank charges are for account of* :

☐ Penerima/*Beneficiary* ☐ Pengirim/*Remitter* ☐ *Sharing*

PT BANK NEGARA INDONESIA (PERSERO) TBK KANTOR CAPEM TANGERANG BNI

Saya menyetujui sepenuhnya syarat-syarat yang tercantum pada halaman belakang formulir ini / *I unconditionally accept all the terms and conditions on the reverse form.*

Pejabat Bank/*Bank Officer* Teller Pemohon/*Applicant*

Sah jika ada cetakan data komputer atau tanda tangan yang berwenang/*The applicant form will be valid if there is a computerized validation or the authorized signature.*

- Transaksi oleh Walk in Customer (WIC) di atas Rp 100 juta atau nilai yang setara dengan itu wajib mengisi form PMN (KYC)/*Transaction by Walk in Customer amounting exceeds Rp 100,000,000 (one hundred million rupiahs) or equivalent value must fill in the PMN (KYC) Form.*
- Transaksi oleh bukan penduduk di atas USD 10.000 atau ekuivalen wajib mengisi Form LLD1/*Transactional by non-resident amounting over US $ 10,000 or its equivalent must fill in LLD1 Form.*

Lembar 3 : Nasabah

PT. BANK NEGARA INDONESIA (Persero), Tbk
CABANG : PEKANBARU

IBOC - Maintenance (S10)

Teller ID : 84768
Date : 26/08/2021
Time : 11:54:10

Sender's Reference:
:20:S10PBR00088321
Bank Operation Code:
:23B:CRED
Value Date/Currency/Interbank Settled Amount:
:32A:210826USD161,
Ordering Customer:
:50K:/0000000301934417
ASLIS WIRDA HAYATI
JL BANGUN KARYA NO 79 A
PEKANBARU
INDONESIA
Ordering Institution:
:52A:BNINIDJAXXX
Account With Institution:
:57A:NBFUAEAFXXX
Beneficiary Customer:
:59:/AE520380000012001225454
BENTHAM SCIENCE PUBLISHERS LTD FZE
BANK STREET DUBAI P O BOX 2979
DUBAI
UNITED ARAB EMIRATES
Remittance Information:
:70:PEMBAYARAN EDITING BAHASA INGGRIS
ARTICLE 2155 THE BENEFITS OF
MIDMORNING TO COMBAT STUNTING
NBFUAEAFXXX
Details Of Charges:
:71A:OUR
Sender to Receiver Information:
:72://ACC/AT/YR UNITED ARAB EMIRATES BR
/AE520380000012001225454
IBAN

PT. BANK NEGARA INDONESIA (PERSERO) TBK KANTOR CAPEM TANGKERANG

008 - PEKANBARU
JUMLAH : USD 161 1568
NO. REK. : 0088402001010001 KU YAKIR
NO. TRX. : 84768 936195 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 2,348,990- 1568
NO. REK. : 0000003019344l7 Ibu ASLIS WIRDA HAYATI
NO. TRX. : 84768 936195 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 437,700 1568
NO. REK. : 0083604820100l pendapatan Restitusi B
NO. TRX. : 84768 936195 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 35,000 1568
NO. REK. : 0083604208010l PENDAPATAN PROPISI KU
NO. TRX. : 84768 936195 96962 TRAN 26/08/2021 11:45:59

008 - PEKANBARU
JUMLAH : IDR 472,700- 1568
NO. REK. : 0000003019344l7 Ibu ASLIS WIRDA HAYATI
NO. TRX. : 84768 936195 96962 TRAN 26/08/2021 11:45:59

REFERENCE : S10PBR00088321

To: Director Publications
BENTHAM SCIENCE PUBLISHERS LTD
Executive Suite Y-2
PO Box 7917, Saif Zone, Sharjah
UNITED ARAB EMIRATES

Date: 2021-08-08

Fax: +971-6-557-1134 (UAE)
Email: benthams@emirates.net.ae / cnf@benthamscience.net

Dear Sir

Re: Copyright assignment and publishing agreement – BENTHAM SCIENCE Subscription Journals

Please find attached a copy of Bentham Science Publishers Ltd's ("Bentham Science") Subscription Journal Publication Terms & Conditions, along with Schedules related to the subject copyright work (the "Work"), namely:

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

I am the Principal / Corresponding Author of the Work, and my contact details are found in the signature block below. In order to submit the Work for publication with Bentham Science, I understand that:

- it is necessary to complete and submit this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules;
- this Copyright Letter, along with the Subscription Journal Publication Terms & Conditions and the attached Schedules, together comprise the copyright assignment and publishing agreement between myself and Bentham Science relating to the Work; and
- while primarily contemplating publication in Bentham Science subscription journal/s, this documentation also allows me to select an option ("Open Access Plus") and pay an associated fee to have the Work published on an open access basis.

Name: Aslis Wirda Hayati

Principal / Corresponding Author of the Work ("Assignor")

Affiliation: Poltekkes Kemenkes Riau, Nutrition

Address: Jl. Melur 103

Telephone: +62818106440

Fax: ---

Email: aslis@pkr.ac.id

BACKGROUND

1.1. The "Work" is the research article, review article, letter, clinical trial study, report, article, or other copyright work, as identified in the Copyright Letter and further detailed in Schedule 1: Details of the Work (including such form of the copyright work submitted to Bentham Science for publication pursuant to clause 4, below), but excluding (except where context otherwise requires) any diagrams, figures or illustration specifically identified to Bentham Science pursuant to clause 3.2, below.
1.2. Bentham Science and the Assignor agree that these Subscription Journal Publication Terms & Conditions, along with the details set-out in the Copyright Letter and in the Schedules, comprise the agreement between the parties relating to Work (the "Agreement").

2. AUTHORS

2.1. The individual/s identified in Schedule 2: Authors are the authors of the Work ("Author/s"). The Assignor represents and warrants that he or she has full right and power to enter into this Agreement, and (where the Assignor is not the sole author) that the Author/s of the Work consent and agree to the terms of this Agreement and have irrevocably granted all rights in the Work to the Assignor for assignment to Bentham Science in accordance with the terms of this Agreement. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science.
2.2. The Assignor represents and warrants that the Author/s have, to the fullest extent permitted by applicable law, waived or undertaken to refrain from enforcing against Bentham Science, their moral rights in the Work. Upon request from Bentham Science, the Assignor shall at his/her own expense provide written evidence of the same to Bentham Science

3. COPYRIGHT ASSIGNMENT

3.1. Subject to clause 3.2, in consideration of the mutual undertakings contained herein, the Assignor hereby assigns to Bentham Science absolutely with full title guarantee the following rights throughout the world:
(a) the entire copyright and all other rights in the nature of copyright subsisting in the Work and in all preliminary drafts or earlier versions of the Work;
(b) all other rights in the Work of whatever nature (but, for the avoidance of doubt, excluding any intellectual property rights in any theory, apparatus or invention expressed in the Work), whether now known or created in the future, to which the Assignor is now, or at any time after the date of this Agreement may be, entitled by virtue of the laws in force in any part of the world; and
(c) all rights in and to all physical and digital materials of any kind which embody the Work in whole or in part;

together with all related rights and powers arising or accrued, including the right to bring, make, oppose, defend, appeal and obtain relief (and to retain any damages recovered) in respect of any infringement, or any other cause of action arising from ownership, of any of these assigned rights, whether occurring before, on, or after the date of this Agreement.
3.2. To the extent that copyright in any of the diagrams, illustrations or figures incorporated into the Work does not belong to the Assignor, the Assignor undertakes to specifically identify such diagrams, illustrations or figures to Bentham Science, and to procure (and warrants that it has procured) for Bentham Science such rights as will enable Bentham Science to use (without limitation) such diagrams, illustrations and figures, without restriction, in the course of publishing the Work. Where context requires, references to "Work" in this Agreement shall include references to such diagrams, illustrations or figures.
3.3. Bentham Science may charge, assign and/or license the benefit of this Agreement in whole or in part, including (without limitation) any and all rights assigned to Bentham Science hereunder, and the benefit of any representations, warranties, indemnities and undertakings of the Assignor, to any third party.

4. DELIVERY AND PUBLISHING

4.1. Bentham Science offers publishing via a variety of methods. The parties agree that, at a minimum, and subject to the terms of this Agreement, the Work shall be published in the subscription journal specified, in Schedule 3: Publishing. Additionally, if so specified in the space provided in Schedule 3: Publishing in respect of "Open Access Plus", and subject to the commercial terms specified therein and the other terms of this Agreement, the Work shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: https://creativecommons.org/licenses/by/4.0/legalcode
4.2. The Assignor may, if so specified in the space provided in Schedule 1: Details of the Work, opt to have Bentham Science, or its third party contractor, provide a short animated video summarising the salient aspects of the Work, on the basis that all rights, title and interest in such short animated video shall become part of the Work for the purposes of this Agreement. The provision of such service by Bentham Science or its third party contractor shall be subject to the prevailing terms and rates relating to such service. Such animated video shall be made available, by Bentham Science, on an open access basis under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY-NC-ND 4.0), a copy of which is available at https://creativecommons.org/licenses/by-nc-nd/4.0/, and Bentham Science shall retain all rights to exploit the video commercially.
4.3. The Assignor undertakes to provide to Bentham Science, by the deadline specified in Schedule 1: Details of the Work (the "Submission Deadline"), an electronic copy of the Work in a high-quality, professionally prepared, production-ready format. The Assignor undertakes to ensure that all pages of the Work so submitted have been proof-read carefully, and that all diagrams, illustrations, figures and captions, are of excellent quality, with regard to both substance and form.

4.4. The Assignor represents and warrants that the Work has been prepared in accordance with the relevant Guidelines, and checked for all possible linguistic inconsistencies and errors, including grammar, style and typography, by someone with a high command of the English language and familiarity with academic writing in the English language. ("Guidelines" means the Instructions to Authors available on the Bentham Science website, as well as the Aims & Scope applicable to the relevant Bentham Science publication). Bentham Science's nominated service provider, Eureka Science, offers English language support services which Assignor may elect to utilise in respect of the Work by completing the applicable box in Schedule 1: Details of the Work. The provision of such services by Eureka Science shall be subject to Eureka Science's prevailing terms and rates relating to such type of optional support.

4.5. In the space provided in Schedule 1: Details of the Work, the Assignor shall disclose whether or not the Work reports experiments involving humans or animals.

4.6. Bentham Science shall be entitled to carry-out such minor amendments or adjustments to the Work as it considers necessary in order to ensure conformity with Bentham Science's production and presentation requirements. If Bentham Science notifies the Assignor that the Work requires amendments or adjustments beyond what Bentham Science considers to be minor, then the Assignor may opt to either: i. address such issues directly (within a reasonable timeframe specified by Bentham Science), or ii. instruct Bentham Science to address such issues. If the Assignor instructs Bentham Science to address the issues, Bentham Science's terms and rates relating to this type of optional support shall apply, and Bentham Science shall confirm the likely costs to the Assignor before commencing any such work.

4.7. For quality monitoring purposes, Bentham Science will seek a review of the Work by specialists familiar with the subject matter. The Assignor acknowledges and agrees that acceptance of the Work by Bentham Science and publication of the same shall be subject to positive peer review by independent referees. Bentham Science may consult such referees as it considers appropriate, including referees identified by reference to publication records, recommendations of editorial board members, or otherwise.

4.8. Nothing in this Agreement shall restrict Bentham Science, as assignee of the copyright in the Work, from publishing and marketing the Work in any manner (including via third parties such as third party aggregators). Bentham Science reserves the right to refrain from publishing the Work, or to withdraw the Work from circulation following publication, at its own discretion. Without limitation, Bentham Science may exercise this right if it determines that the Work contains language errors that exceed 5% or more of the total Work (based on total word count), if the work fails to conform with Bentham Science's production and presentation requirements, if the work attracts undesirable or negative publicity that Bentham considers may impact on the reputations of the Author/s or Bentham Science, and/or for its own commercial reasons.

5. SELF-ARCHIVING POLICIES

By signing the Copyright Letter the authors retain the rights of self-archiving. Following are the important features of self-archiving policy of Bentham Science journals:

(a) Authors can deposit the first draft of a submitted article on their personal websites, their institution's repositories or any non-commercial repository for personal use, internal institutional use or for permitted scholarly posting only.

(b) Authors may deposit the ACCEPTED VERSION of the peer-reviewed article on their personal websites, their institution's repository or any non-commercial repository such as PMC, arXiv after 12 MONTHS of publication on the journal website. In addition, an acknowledgement must be given to the original source of publication and a link should be inserted to the published article on the journal's/publisher's website.

(c) If the research is funded by NIH, Wellcome Trust or any other Open Access Mandate, authors are allowed the archiving of published version of manuscripts in an institutional repository after the mandatory embargo period. Authors should first contact the Editorial Office of the journal for information about depositing a copy of the manuscript to a repository. Consistent with the copyright agreement, Bentham Science does not allow archiving of FINAL PUBLISHED VERSION of manuscripts unless under an open access mandate as above.

(d) The link to the original source of publication should be provided by inserting the DOI number of the article in the following sentence: "The published manuscript is available at EurekaSelect via http://www.eurekaselect.com/[insert DOI]."

(e) There is no embargo on the archiving of articles published under the OPEN ACCESS PLUS category. Authors are allowed deposition of such articles on institutional, non-commercial repositories and personal websites immediately after publication on the journal website.

6. CONFLICTS

The Assignor shall disclose, in Schedule 1: Details of the Work, details relating to all actual or potential conflicts of interest relating to the Work, and all financial contributions relevant to the Work and its publication pursuant to this Agreement. If requested by Bentham Science, the Assignor shall provide Bentham Science with any further information it may request in respect of such matters.

7. WARRANTIES

The Assignor warrants and undertakes that, as at the date of this Agreement:
a) the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. the Work does not contain any plagiarism; the Work is the original work of the Author/s, and has not been copied wholly or substantially from any other work or material or any other source. Bentham Science Publishers uses the iThenticate software to detect instances of overlapping and similar text in submitted manuscripts. iThenticate software checks content against a database of periodicals, the Internet, and a comprehensive article database.
b) the Assignor is the sole legal and beneficial owner of the rights purported to be assigned pursuant to this Agreement, and (if applicable) the Assignor has obtained any and all necessary assignments or other permissions from co-authors and/or employers to ensure that the Assignor is able to comply with its obligations and to assign the rights purported to be assigned pursuant to this Agreement
c) the Assignor is exclusively entitled to give all warranties, indemnities, assurances, confirmations, waivers and agreements set out in this Agreement
d) the Work has not been published by any third party, or submitted to any third party for consideration for publication, and will not be published by any third party or submitted to any third party for consideration by or on behalf of the Assignor or any of the Author/s;
e) once the Work has been submitted to Bentham Science for publication in accordance with clause 4, the Assignor will not attempt to withdraw the Work from publication;
f) the Assignor has not assigned or granted to any third party any of the rights assigned or granted pursuant to this Agreement;
g) the exploitation of the rights assigned or granted by this Agreement will not infringe the rights of any third party, including without limitation, any third party intellectual property rights and any rights to register the same;
h) the Assignor is unaware of any infringement, or likely infringement, of any of the rights assigned or granted pursuant to this Agreement;
i) the rights assigned by this Agreement are free from any security interest, option, mortgage, charge or lien;
j) the Work is factually accurate and contains no matter which is scandalous, libellous, unlawful, or otherwise actionable;
k) there are no actual or potential conflicts of interest, except as specified in Schedule 1: Details of the Work;
l) there has been no financial contribution to the Work, except as specified in Schedule 1: Details of the Work; and
m) there have been no experiments involving humans or animals, except as specified in Schedule 1: Details of the Work.

8. INDEMNITIES

8.1. The Assignor shall indemnify Bentham Science against all liabilities, costs, expenses, damages and losses (including any direct, indirect or consequential losses, loss of profit, loss of reputation and all interest, penalties and legal costs (calculated on a full indemnity basis) and all other professional costs and expenses) suffered or incurred by Bentham Science arising out of or in connection with:
(a) any breach by the Assignor of any of the warranties contained in clause 7; and
(b) the enforcement of this Agreement.
8.2. At the request of Bentham Science, and at the Assignor's own expense, the Assignor shall provide all reasonable assistance to enable Bentham Science to resist any claim, action or proceedings brought against Bentham Science as a consequence of any breach by the Assignor of the warranties contained in clause 7. This indemnity shall apply whether or not Bentham Science has been negligent or at fault.

9. FURTHER ASSURANCE

9.1. At its own expense the Assignor shall, and shall use all reasonable endeavours to procure that any necessary third party shall, promptly execute such documents and perform such acts as may reasonably be required for the purpose of giving full effect to this Agreement, including assisting Bentham Science in perfecting title, defending and enforcing the copyright or any other rights granted to Bentham Science pursuant to this Agreement, and assisting with any other proceedings which may be brought by or against Bentham Science against or by any third party relating to the rights assigned by this Agreement.
9.2. The Assignor irrevocably appoints Bentham Science to be its attorney in its name and on its behalf to execute documents, use the Assignor’s name and do all things which are necessary or desirable for Bentham Science to obtain for itself or its nominee the full benefit of this Agreement. This power of attorney is irrevocable as long as any of the Assignor's obligations under this Agreement remain undischarged. The attorney may, in any way it thinks fit and in the name and on behalf of the Assignor:
(a) take any action that this Agreement requires the Assignor to take;
(b) exercise any rights which this Agreement gives to the Assignor; and
(c) appoint and remove one or more substitute attorneys with full power as the Assignor's attorney on terms that the attorney thinks fit.

The Assignor must ratify and confirm everything that the attorney and any substitute attorney does or arranges using the powers granted under this clause.

10. BENTHAM SCIENCE - PRIVACY POLICY

Bentham Science Publishers Ltd. is committed to respecting your privacy. Please visit our privacy policy at https://benthamscience.com/privacy-policy.php.We describe how we collect and use your information, and the rights you have in relation to such information. We are the data controller of the personal data you provide to us for processing in accordance with this privacy notice.

11. GENERAL TERMS

11.1. **Entire agreement:** This Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter. Each party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that are not set out in this Agreement. Each party agrees that it shall have no claim for innocent or negligent misrepresentation or negligent misstatement based on any statement in this Agreement.

11.2. **Confidentiality:** Each party undertakes that it will not at any time hereafter use, divulge or communicate to any person, except to its professional representatives or advisers or as may be required by law or any legal or regulatory authority, any confidential information concerning the business or affairs of the other party which may have or may in future come to its knowledge and each of the parties shall use its reasonable endeavours to prevent the publication or disclosure of any confidential information concerning such matters.

11.3. **Waiver:** No failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict the further exercise of that or any other right or remedy. No single or partial exercise of such right or remedy shall prevent or restrict the further exercise of that or any other right or remedy.

11.4. **Variation:** No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives).

11.5. **Severance:** If any provision or part-provision of this Agreement is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this clause shall not affect the validity and enforceability of the rest of this Agreement. If any provision or part-provision of this Agreement is invalid, illegal or unenforceable, the parties shall negotiate in good faith to amend such provision so that, as amended, it is legal, valid and enforceable, and, to the greatest extent possible, achieves the intended commercial result of the original provision.

11.6. **Governing law and jurisdiction:** This Agreement and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the law of the Dubai International Financial Centre. Each party irrevocably agrees that the courts of the Dubai International Financial Centre shall have non-exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this Agreement or its subject matter or formation (including non-contractual disputes or claims).

I (Aslis Wirda Hayati , Poltekkes Kemenkes Riau, Nutrition , Jl. Melur 103 , +62818106440 , aslis@pkr.ac.id) agreed to the terms and conditions laid down in copyright letter.

SCHEDULE 1: DETAILS OF THE WORK

TITLE OF WORK:

The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

TYPE OF WORK:

Research Article

DESCRIPTION OF WORK:

The midmorning snack that is given to teenagers is a snack meal available in the school canteen that they can buy with pocket money. It is necessary to socialize about the importance of consuming high calcium midmorning snack to teenagers. The activity of consuming high-calcium midmorning snack by adolescents can be continued independently. So far, teenagers don't use pocket money to buy midmorning snack that are high incalcium, but they buy other types of snacks that are low in calcium, consisting of soto (soup noodle), pastel, chicken noodles, tofu, fritters, meat pao, tempeh, rice cake and eclairs. So far, no nutritional intervention has significantly increased the nutritional status of stunted children to normal levels; however, this type of intervention may become a viable option in the future.

Is the Work likely to be of particular interest to pharmaceutical or biotechnology companies?

NO

If Yes, provide details of the company that you believe will be interested in your submission, together with a brief summary of why you think this will be of interest.

DECLARATION OF COMPLIANCE WITH APPLICABLE STANDARDS:

1. Does the Work report experiments involving human subjects?

NO

•If Yes, were the reported experiments in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the *Helsinki Declaration* of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931)?

NO

(If Yes, the Assignor must submit a copy of the approval and consent-to-disclose form to Bentham Science Publishers by fax or email.) Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.

(If No, the Assignor must mention an institutional or regional guideline.)

---

2. Does the Work report experiments involving animals?

NO

• If Yes, were the reported experiments in accordance with the standards set forth in **one of below national guidelines and regulations:**

◦ The US National Research Council's "Guide for the Care and Use of Laboratory Animals,"
◦ The US Public Health Service's "Policy on Humane Care and Use of Laboratory Animals," and "Guide for the Care and Use of Laboratory Animals."
◦ UK : the Animals (Scientific Procedures) Act 1986 Amendment Regulations (SI 2012/3039).

NO

(If Yes, the Assignor must submit a copy of the approval to Bentham Science Publishers by fax or email and please also state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.)

(If No, the Assignor must mention an institutional or regional guideline.

CONFLICTS OF INTEREST

Conflicts of interest arise when authors, reviewers, or editors have interests (such as financial or personal interests) that are not made clear and that may influence their judgment on the content of their work. Authors and editors who submit work for publication with Bentham Science are required to disclose and acknowledge all forms of financial support relating to the work to be published, all commercial or financial involvement that might present an appearance of a conflict of interest in respect of the work, and all agreements relating to sponsorship of any research upon which the work is based.

Are there any actual, or potential, conflicts of interest?

NO

If Yes, details of the actual or potential conflicts of interest must be set-out in the spaces provided below.

DISCLOSURE REGARDING ACTUAL OR POTENTIAL CONFLICTS OF INTEREST:

DISCLOSURE REGARDING THIRD PARTY FINANCIAL CONTRIBUTIONS:

LANGUAGE AND EDITING:

Does Assignor require assistance in having the English grammar and style of the Work checked and improved by Bentham Science?

NO

If Yes, Bentham Science will provide a quote for this.

US GOVERNMENT EMPLOYEES / CONTRACTORS:

1. Was any Author a US government employee when the Work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

2. Was Author an independent contractor to the US government when the work was created?

NO

(If Yes, the relevant Author/s must each execute and submit to Bentham Science, using Bentham Science's form letter, the supplemental terms applicable to the Author.)

SCHEDULE 2: ALL AUTHORS (include Principal/Corresponding Author details; add spaces for additional authors if required)

NAME: Aslis Wirda Hayati

AFFILIATION: Poltekkes Kemenkes Riau, Nutrition

EMAIL: aslis@pkr.ac.id

AUTHOR CONTRIBUTION: Study Concept or Design

ORCID: 0000-0003-3672-5356

We agree to the terms as set out in the Agreement.

Signed by:_____

NAME: Hardinsyah Hardinsyah

AFFILIATION: IPB University, Community Nutrition, Faculty of Human Ecology

EMAIL: hardinsyah_ridwan@yahoo.com

AUTHOR CONTRIBUTION: Data Analysis or Interpretation

ORCID: 0000-0002-0748-4373

We agree to the terms as set out in the Agreement.

Signed by:_____

SCHEDULE 3: PUBLISHING

TITLE OF SUBSCRIPTION JOURNAL(S):	Current Nutrition and Food Sciences
"**Open Access Plus**" Option	If the Assignor also wishes to have the Work made available on an open access basis, the Work shall be made available on an open access basis, by Bentham Science, under the terms of the Creative Commons Attribution 4.0 International Public License CC-BY 4.0, subject to the payment of a one-off Fee of [825 USD]. Does the Assignor also require such "open access" publication, and agree to pay the applicable Fee in accordance with the terms below? *YES*

ANIMATED VIDEO:	**Animated Abstract Option:**
	The Animated Abstract Fee, payable in respect of the publication by Bentham Science of the Work in the above stated journal is in accordance with the terms below.
	The Assignor may elect (subject to the payment of a one-off fee of **US$ 1190** for English language, and **US$ 1690** for Foreign language articles and provided that Bentham Science shall remain exclusively entitled to exploit the Work on a commercial basis as Bentham Science deems fit, acting in its sole discretion) to require Bentham Science to make the Work available on an "open access" basis via e-journal publication for all to view and download in accordance with the terms of Creative Commons License CC BY-NC-ND 4.0 - Attribution-NonCommercial-NoDerivatives 4.0 International.
	Assignor hereby requests such "open access" publication of the Animated abstract and agrees to pay the applicable Fee in accordance with the terms below:

	YES The Fee shall be paid initially with a **US$ 700** advance payment on giving the Publisher the instruction to start work on the Animated Abstract, and **US$ 490** (English language edition) or **US$ 990** (Foreign language edition) on completion of the Animated Abstract.

PAYMENT TERMS:	Bentham Science shall invoice the Assignor in respect of the Fee. The Assignor shall pay the Fee to Bentham Science within 15 days of the dateof invoice by means of cheque made payable to “Bentham Science Publishers Ltd”, or by credit card payment or by bank wire transfer. On making bank payments, please ensure that reference is made to our invoice number to avoid your payment not being traced. The Fee shall be paid in full without any deduction or withholding other than as required by law and the Assignor shall not be entitled to assert any credit, set-off, deduction, counterclaim or abatement of any nature whatsoever against Bentham Science in order to justify withholding payment of any such amount in whole or in part. If the Assignor is required, pursuant to any applicable present or future law, rule or regulation of any competent governmental or other administrative body, to make any deduction or withholding from any amount payable to Bentham Science pursuant to this Agreement, the Assignor shall pay to Bentham Science an additional amount as will, after the deduction or withholding has been made, leave Bentham Science with the same amount as it would have been entitled to receive in the absence of any such requirement to make a deduction or withholding; promptly pay to the relevant authority the amount of such deduction or withholding; and provide evidence of the same to Bentham Science on request.

KEMENTERIAN KESEHATAN RI
POLTEKKES KEMENKES RIAU
KOMISI ETIK PENELITIAN KESEHATAN
Jl. Melur Nomor 103 Pekanbaru Kode Pos 28122 Telepon: (0761)36581 Fax: (0761) 20656
Website : www.pkr.ac.id Email : kepk.pkr@pkr.ac..id

KETERANGAN LOLOS KAJI ETIK
ETHICAL CLEARANCE

Nomor : LB.02.03/6/04/2019

Komisi Etik Penelitian Kesehatan Poltekkes Kemenkes Riau, setelah membaca dan menelaah, menyatakan bahwa

Judul Penelitian	:	Penggunaan *Pyridinium Crosslinks* Urin Sebagai Biomarker Sensitivitas *Stunting* pada Anak Usia 10 -11 Tahun
Peneliti	:	Dr. Aslis Wirda Hayati, SP, M.Si
Institusi Peneliti	:	Poltekkes Kemenkes Riau
Tanggal Persetujuan	:	23 Juli 2019 (berlaku 1 tahun setelah tanggal persetujuan)

Telah memenuhi prinsip-prinsip yang dinyatakan dalam Deklarasi Helsinki tahun 2008 dan Pedoman Nasional Etik Penelitian Kesehatan (PNEPK) Departemen Kesehatan tahun 2011. Oleh karena itu dapat dilaksanakan dengan memperhatikan prinsip-prinsip tersebut.

Komisi Etik Penelitian Kesehatan berhak untuk memantau kegiatan penelitian tersebut.

Peneliti diwajibkan menyerahkan:

- Amandemen Protokol jika ada perubahan pada protokol
- Laporan kejadian bahaya yang ditimbulkan
- Laporan akhir penelitian

Pekanbaru, 23 Juli 2019

Ketua KEPK Poltekkes Kemenkes Riau

KEMENTRIAN KESEHATAN
KOMISI ETIK
PENELITIAN KESEHATAN
POLTEKKES KEMENKES RIAU

Alkausyari Aziz, SKM, M.Kes
NIP. 197107252000031001

Rebuttal Letter

Manuscript Provisional Acceptance letter | BMS-CNF-2021-67

Submission Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia

EMAIL	REVISED	BEFORE	AFTER
Email on Desember 8 th 2021 Please note that the final acceptance of your article is subject to a detailed scrutiny and approval of the following:			
	a The standard of English language in the articles should be suitable.		
		This article has been through proofreading twice The first was on November 8th 2020 by Elsevier Language Editing Services (certificate attached) The second was August 26th 2021 by BENTHAM SCIENCE PUBLISHERS LTD (Invoice and proof of payment attached)	
	b "IMRAD" Structure: Headings such as Introduction/background, Methods and Materials, Experimental, Result and Discussion are mandatory for research articles.		

EMAIL	REVISED	BEFORE	AFTER
		"IMRAD" Structure: Headings such as Introduction/background, Methods and Materials, Experimental, Result and Discussion are already in accordance with the writing guidelines	
		Experimental, Result and Discussion are written into one, namely Result and Discussion. Experimental include in the Result and Discussion. Experimental is placed in the main paragraph of each sub-heading.	
		"IMRAD" Structure terdiri dari: 1. INTRODUCTION 2. MATERIALS AND METHOD 3. RESULTS AND DISCUSSION CONCLUSION	
	c Abstract should be in the format of a STRUCTURED ABSTRACT, having explicit headings such as background, introduction, method, result and conclusion.		
		Abstract is in accordance with the format of a STRUCTURED ABSTRACT, having explicit headings such as background, introduction, method, result and conclusion.	
#REF!		The abstrack consists of •Aim •Background •Objective •Methods •Results •Conclusion	

EMAIL	REVISED	BEFORE	AFTER
		•Other Keywords	
d	References should be in the correct format. This will vary from journal to journal.		
	Page 4 column 1 paragraph 1		
		period (.)	The period (.) has been removed before the reference number
		In addition, fish and seafood have more calcium than beef or chicken . (9).	In addition, fish and seafood have more calcium than beef or chicken (9).
		Comma (,)	Space has been added after a comma (,) between the two reference numbers.
		Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight (10 , 11).	Bone growth during childhood can be hampered by calcium deficiency. Stunting is a side effect of losing weight [10, 11].
	Page 4 column 1 paragraph 2	Comma (,)	Space has been added after a comma (,) between the two reference numbers.
		Height can be utilized as an indicator of the quality of growth and bone formation (16 , 17).	Height can be utilized as an indicator of the quality of growth and bone formation [16, 17].
	Page 5 column 1 paragraph 2		
			The uppercase letters of each word in the title have been changed to lowercase.

EMAIL	REVISED	BEFORE	AFTER
			The period after the journal name is omitted.
		Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of Milk Introduction is a Dominant Factor of Stunting Among Toddlers Aged 24 Months in Bogor District: A Cross-Sectional Study. Pakistan J Nutr. 2019;18(10):969–76.	Fikawati S, Adhi EK, Syafiq A, Bakara SM. Age of milk introduction is a dominant factor of stunting among toddlers aged 24 months in Bogor District: a cross-sectional study. Pakistan J Nutr 2019; 18(10): 969–76.
		Haq AB, Murbawani EA. Status Gizi, Asupan Makan Remaja Akhir yang Berprofesi sebagai Model. J Nutr Coll. 2014;3(4):489–94.	Haq AB, Murbawani EA. Status gizi, asupan makan remaja akhir yang berprofesi sebagai model. J Nutr Coll 2014; 3(4): 489–94.
		Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stuntingusia 24-59 bulan. J Gizi Klin Indones. 2016;12(4):152–9.	Sari EM, Juffrie M, Nuraini N, Sitaresmi MN. Asupan protein, kalsium dan fosfor pada anak stuntingdan tidak stunting usia 24-59 bulan. J Gizi Klin Indones 2016; 12(4): 152–9.
		Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma Mincronutrient levels of Stunted Egyptian School Age Children. Kasr El Aini Med J. 2010;16(1).	Khairi S, Mattar M, Refaat L, El-Sherbeny S. Plasma mincronutrient levels of stunted Egyptian school age children. Kasr El Aini Med J 2010; 16(1): 1-5.
		Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr. 2012;96(5):1042–50.	Prentice A, Dibba B, Sawo Y, Cole TJ. The effect of prepubertal calcium carbonate supplementation on the age of peak height velocity in Gambian adolescents. Am J Clin Nutr 2012; 96(5): 1042–50.
		Emawati E, Yani NS, Idar I. Analisis Kandungan Fosfor (P) Dalam Dua Varietas Kubis (Brassica oleracea) Di Daerah Lembang Bandung. Indones J Pharm Sci Technol. 2017;1(1):8–14.	Emawati E, Yani NS, Idar I. Analisis Kandungan fosfor (P) dalam dua varietas kubis (Brassica oleracea) di daerah Lembang Bandung. Indones J Pharm Sci Technol 2017; 1(1): 8–14.

EMAIL	REVISED	BEFORE	AFTER
		Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol. 2010;5(SUPPL. 1):23–30.	Peacock M. Calcium metabolism in health and disease. Clin J Am Soc Nephrol 2010; 5(Suppl. 1): 23–30.
		Hardinsyah H, Damayanthi E, Zulianti W. Hubungan Konsumsi Susu Dan Kalsium Dengan Densitas Tulang Dan Tinggi Badan Remaja. J Gizi dan Pangan. 2008;3(1):43.	Hardinsyah H, Damayanthi E, Zulianti W. Hubungan konsumsi susu dan kalsium dengan densitas tulang dan tinggi badan remaja. J Gizi dan Pangan 2008; 3(1):43–48.
		Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones. 2011;7(3):115.	Ramayulis R, Pramantara ID, Pangastuti R. Asupan vitamin, mineral, rasio asupan kalsium dan fosfor dan hubungannya dengan kepadatan mineral tulang kalkaneus wanita. J Gizi Klin Indones 2011; 7(3): 115–122.
		Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr. 2001;131(7):1946–51.	Bhandari N, Bahl R, Nayyar B, Khokhar P, Rohde JE, Bhan MK. Food supplementation with encouragement to feed it to infants from 4 to 12 months of age has a small impact on weight gain. J Nutr 2001; 131(7): 1946–51.
		Rumondor M, Lariwu C, Ndekano M. Hubungan Kebiasaan Konsumsi Susu dengan Kejadian Stunting pada Siswa Kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg. 2019;7(3):317–31.	Rumondor M, Lariwu C, Ndekano M. Hubungan kebiasaan konsumsi susu dengan kejadian stunting pada siswa kelas VII SMP Negeri 2 Bulagi Kabupaten Banggai Kepulauan. J Community Emerg 2019; 7(3): 317–31.
		Tirtasaputra E, Puspasari G, Lucretia T. Milk Consumption Correlates with Body Height in Children. J Med Heal. 2019;2(3):878–84	Tirtasaputra E, Puspasari G, Lucretia T. Milk consumption correlates with body height in children. J Med Heal 2019; 2(3): 878–84.

EMAIL	REVISED	BEFORE	AFTER
		Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J). 2008;84(5):386–94.	Bueno AL, Czepielewski MA. The importance for growth of dietary intake of calcium and vitamin D. J Pediatr (Rio J) 2008; 84(5): 386–94.
		Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The Helena study. Horm Res Paediatr. 2010;74(5):339–50.	Gracia-Marco L, Vicente-Rodríguez G, Valtueña J, Rey-López JP, Díaz Martínez AE, Mesana MI, et al. Bone mass and bone metabolism markers during adolescence: The Helena study. Horm Res Paediatr 2010; 74(5): 339–50.
		Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci. 2012;25(4):552–8.	Li J, Yuan J, Guo Y, Sun Q, Hu X. The influence of dietary calcium and phosphorus imbalance on intestinal NaPi-IIb and calbindin mRNA expression and tibia parameters of broilers. Asian-Australasian J Anim Sci 2012; 25(4): 552–8.
		Illahi RK. Hubungan Pendapatan Keluarga, Berat Lahir, dan Panjang Lahir dengan Kejadian Stunting Balita 24-59 Bulan di Bangkalan. J Manaj Kesehat. 2017;3(1):1–14.	Illahi RK. Hubungan pendapatan keluarga, berat lahir, dan panjang lahir dengan kejadian stunting balita 24–59 bulan di Bangkalan. J Manaj Kesehat 2017; 3(1): 1–14.
		Wulandari, Budiasturtik I, Alamsyah D. Hubungan Karakteristik Sosial Ekonomi dan Pola Asuh Pemberian Makan Terhadap Kejadian Stunting pada Balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model. 2015;53(9):1689–99.	Wulandari, Budiasturtik I, Alamsyah D. Hubungan karakteristik sosial ekonomi dan pola asuh pemberian makan terhadap kejadian stunting pada balita di Puskesmas Uluk Muid Kabupaten Melawi. J Chem Inf Model 2015; 53(9): 1689–99.

EMAIL	REVISED	BEFORE	AFTER
		Annisa PA. Densitas Energi Konsumsi, Status Gizi, dan Daya Ingat Sesaat Anak Usia Sekolah Dasar. J Gizi dan Pangan. 2015;9(3):187–94.	Annisa PA. Densitas energi konsumsi, status gizi, dan daya ingat sesaat anak usia sekolah dasar. J Gizi dan Pangan 2015; 9(3): 187–94.
		Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars. 2004;12(2).	Sihadi. Makanan jajanan bagi anak sekolah. J Kedokt Yars 2004; 12(2): 91-95.
		Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J. 1990;78(8):472–5.	Bremner B, Langenhoven ML, Swanepoel AS, Steyn M. The snacking habits of white preschool children. South African Med J 1990; 78(8): 472–5.
		1 Organization WH. Improving Child Growth. Geneva; 2001.	1 Christian P, Smith ER. Adolescent Undernutrition: global burden, physiology, and nutrtitional risks. Ann Nutr Metab 2018; 72: 316–28.
		2 Health M of. Survei Kesihatan Nasional. Kemenkes. Jakarta; 2007.	2 Ministry of Health Republic of Indonesia. Riset Kesehatan Dasar (Riskesdas) 2010. Ministry of Health Republic of Indonesia: Jakarta 2010; pp. 40 — 49.
		35 Almatsier S. Prinsip Dasar Ilmu Gizi. Edisi Kese. Jakarta: Gramedia Pustaka Utama; 2015.	35 Almatsier S. Prinsip dasar ilmu gizi. Gramedia Pustaka Utama: Jakarta 2015; pp. 237–243.
		40 Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: Gramedia Pustaka Utama; 2010.	Dihapus karena sama dengan reference 35
		6	6

EMAIL	REVISED	BEFORE	AFTER
		Mahmud MK, Zulfianto NA. Tabel omposisi Pangan Indonesia (TKPI). Elex Media. Gramedia K, editor. Jakarta; 2009. 65 p.	Mahmud MK, Zulfianto NA. Tabel komposisi pangan Indonesia (TKPI). Elex Media: Jakarta 2009; pp. 65.
		26 Kementerian Kesehatan Republik Indoensia. Tabel Komposisi Pangan Indonesia. Jakarta: Direktorat Jenderal Kesehatan Masyarakat; 2017.	Kementerian Kesehatan Republik Indonesia. Tabel Komposisi Pangan Indonesia. Direktorat Jenderal Kesehatan Masyarakat: Jakarta 2017; pp. 1.
		41 Nadesul H. Sehat Itu Mudah. Jakarta: Kompas; 2011.	41 Nadesul H. Sehat itu murah. Kompas: Jakarta 2006; pp. 15–21.
		38 Kretchmer N. Developmental Nutrition. Edition 1st, editor. Allyn & Bacon; 1997. 682 p.	38 Kretchmer N, Zimmermann M. Developmental nutrition, 1st ed. Allyn & Bacon: Boston 1997; pp. 682.
		44 Adriani M, Wirjatmadi B. Gizi dan Kesehatan Balita; Peran Mikro Zinc pada Pertumbuhan Balita. Jakarta: Kencana Prenamedia Group; 2014.	44 Adriani M, Wirjatmadi B. Gizi dan kesehatan balita; peran mikro zinc pada pertumbuhan balita. Kencana Prenamedia Group: Jakarta 2014; pp. 128.
		31 Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera. 2017.	31 Nisa F. Hubungan konsumsi susu dengan tinggi badan dan prestasi belajar pada siswa/i di Sekolah Dasar Muhammadiyah 02 Kampung Dadap Medan. Univeristas Sumatera: Medan 2017; pp. 11.
		3	3

EMAIL	REVISED	BEFORE	AFTER
		World Health Organization. Child growth indicators and their interpretation. World Health Organization. Geneva; 2010.	Trihono, Atmarita, Tjandrarini DW, et al. Pendek (stunting) di Indonesia, masalah dan solusinya. Badan Penelitian dan Pengembangan Kesehatan: Jakarta 2015; pp. 24.
		4 Gunarsa PDSD, Gunarsa DYD. Psikologi Perkembangan Anak dan Remaja. PT. BPK Gunung Mulia. 2008.	4 Gunarsa SD, Gunarsa YSD. Psikologi perkembangan anak dan remaja. PT BPK Gunung Mulia: Jakarta 2008; pp. 204.
		5 Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Chapter. 2001;2.	5 Allen LH, Gillespie SR. What works? A review of the efficacy and effectiveness of nutrition intervention. United Nations Administrative Committee on Coordination Sun-Committee on Nutrition. Collab with Asian Dev Bank (ADB), Manila 2001; pp. 2.
		12 Mahan L, Escott-Stump S. Krause's Food, Nutrition & Diet Therapy. 10th ed. Pennsylvania: W. B. Saunders Co; 2000.	12 Wang L, Nancollas GH. Calcium Orthophosphates: crystallization and dissolution. Chem Rev November 2008; 108(11): 4628–69.
		19 Gibson RS. Principles of Nutritional Assessment. Second Edi. New York: Oxford University Press, Inc; 2005.	19 Gibson RS. Principles of nutritional assessmen 2nd ed. Oxford University Press: New York 2005; pp. 9–19.
		20	20

EMAIL	REVISED	BEFORE	AFTER
		Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Vol. 86, Journal of the American Statistical Association. Geneva: World Health Organization; 1991. p. 1149.	Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. World Health Organization; Geneva 1991; pp. 15.
		21 Walpole RE. Pengantar Statistika 3. Edisi Ke-3. Jakarta: Gramedia Pustaka Utama; 1995. 365 p.	21 Walpole RE. Pengantar statistika, 3rd . Gramedia Pustaka Utama: Jakarta 1995; pp. 365.
		25 Gizi WNPD. Ketahanan pangan dan gizi di era otonomi daerah dan globalisasi. BBKP. Jakarta: LIPI Press; 2004.	25 Hardinsyah, Marudut, Rimbawan et al. Standar mutu dan kecukupan gizi: 2018: Proceedings of the 11th Widya Karya Pangan dan Gizi; 2018 July 3-4; Jakarta, Indonesia, Hotel Bidakara: Lembaga Ilmu Pengetahuan Indonesia 2018.
		27 Kartono D, Hardinsyah H, Jahari AB, Sulaeman A, Astuti M, Soekatri M, et al. Ringkasan - Angka Kecukupan Gizi (AKG) yang dianjurkan bagi Orang Indonesia 2012. In: Widyakarya Nasional Pangan dan Gizi (WNPG). 2012. p. 1–18.	27 Kartono D, Hardinsyah, Jahari AB et al. Angka kecukupan gizi (AKG) yang dianjurkan bagi orang Indonesia 2012: Proceedings of the 10th Widya Karya Pangan dan Gizi; 2012 Nopember 20; Jakarta, Indonesia, Gedung LIPI: Lembaga Ilmu Pengetahuan Indonesia 2012.
		28 Hardinsyah H. Mutu Gizi dan Konsumsi Pangan. Pangan. PM dan K, editor. Jakarta: Pergizi Pangan; 2001	28 Hardinsyah. Measurement and determinants of food diversity : implications for Indonesia's food and nutrition policy. PhD dissertation. Brisbane. The University of Queensland 1996.

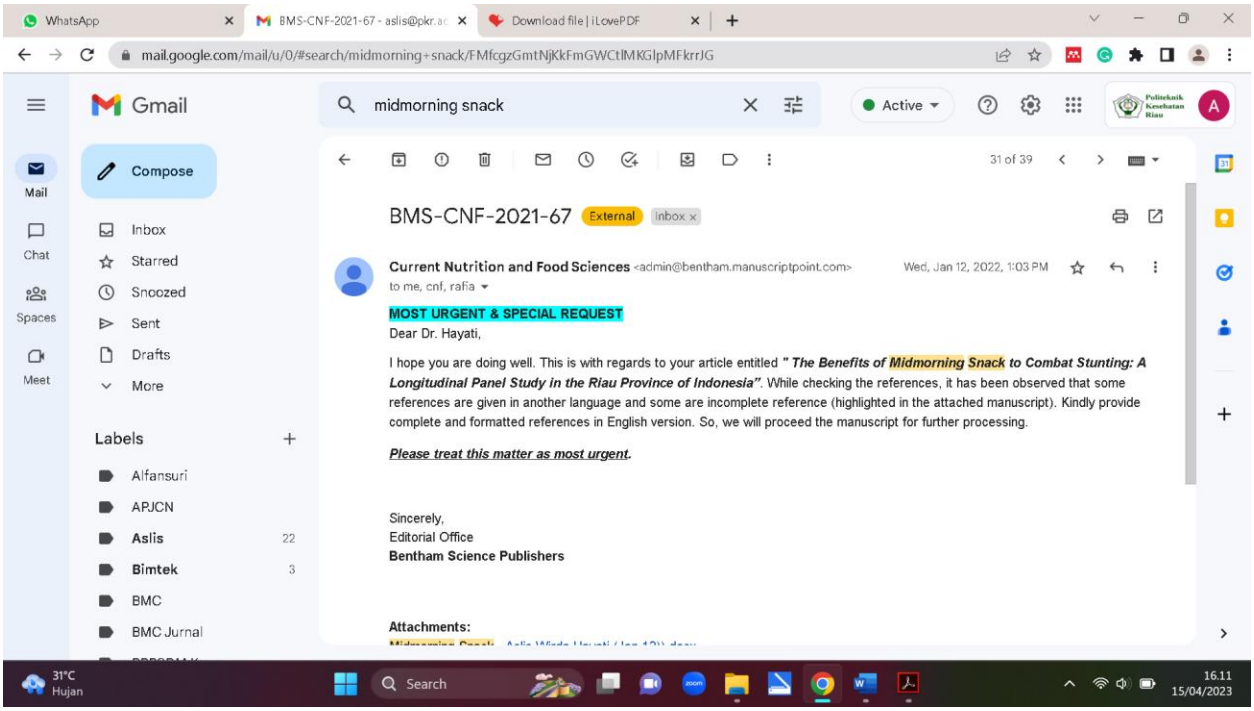
EMAIL	REVISED	BEFORE	AFTER
		30 Mahan LK, Raymond J, Escott-Stump S. Krause's Food & the Nutrition Care Process. 13th, editor. Saunders. 2012.	30 Mahan LK, Raymond JL, Escott-Stump S. Krause's food & the nutrition care process. 13th ed. Elsevier Health Sciences: USA 2016; pp. 722.
		23 Pucket RP. Food service manual for health care institutions. Third Edit. American Hospital Association. San Fracisco: AHA Press; 2004.	23 Puckett RP. Food service manual for health care institutions 3th ed. An American Hospital Association Company: Chicago 2004; pp. 388.
		32 Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007.	32 Hernell O. Human milk vs. cow's milk and the evolution of infant formulas. In: Essentials of human nutrition 2nd ed. Nestec Ltd: Switzerland 2011; pp 17.
		50 Winarno F. Keamanan Pangan. Potensi dan Masalah Makanan Jajanan. Bogor; 1997.	50 Winarno FG. Potensi dan masalah makanan jajanan. In: Keamanan pangan. Institut Pertanian Bogor, Bogor 1997; pp. 98.
		47 Koukel S. Choosing Healthy Snacks for Children. University of Alaska Fairbanks; 2009	47 Koukel S. Choosing healthy snacks for children. University of Alaska Fairbanks; Alaska 2009; pp. 7.
		52 Irianto DP. Panduan Gizi Lengkap. Yogyakarta: CV. Andi Offset; 2006.	52 Irianto DP. Panduan gizi lengkap {keluarga dan olahragawan). CV Andi Offset: Yogyakarta 2006; pp. 7.
		49	49

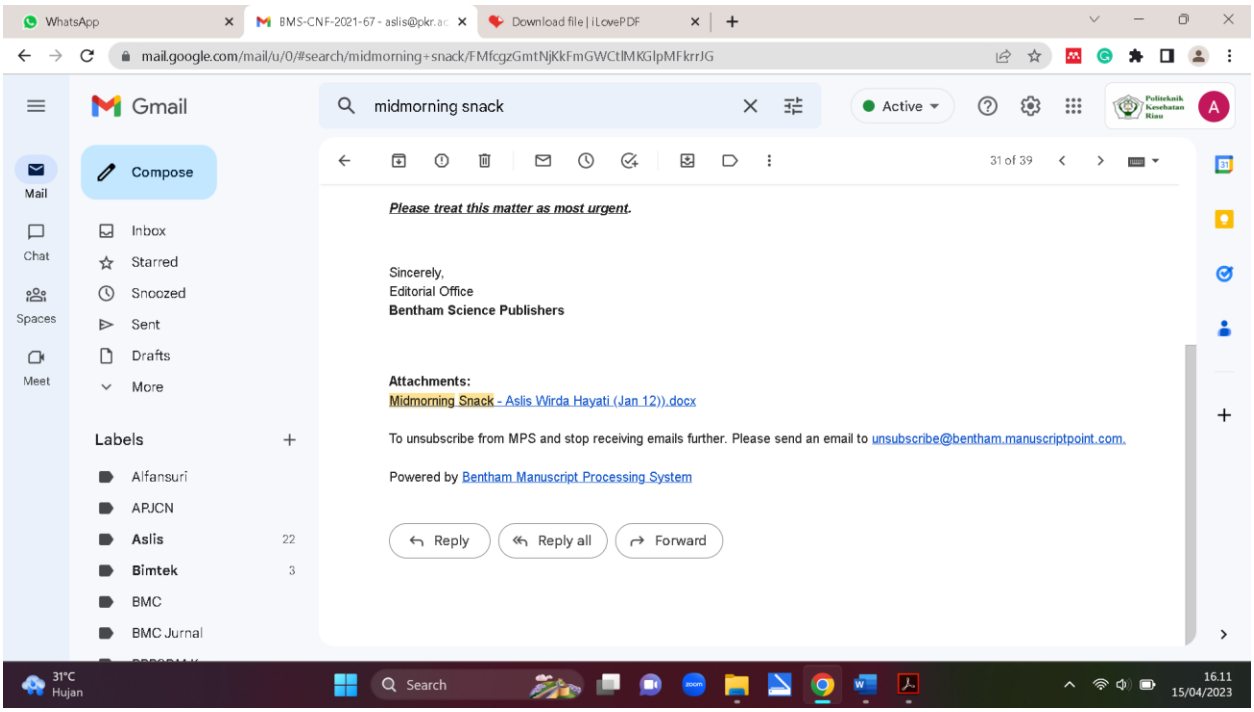
EMAIL	REVISED	BEFORE	AFTER
		Rahayu D, Mende S. Sumbangan Energi dan Protein Makanan Jajanan Tradisional “Jajanan Cilok dan Penganan Gorengan.” Jakarta: Widyakarya Nasional Khasiat Makanan Nasional; 1995. 596 p.	Rahayu D, Mende S. Sumbangan energi dan protein makanan jajanan tradisional “Jajanan cilok dan penganan gorengan.” Jakarta: 1995: Proceedings of the Widya Nasional Khasiat Makanan Tradisional; 1995; Jakarta, Indonesia: Kantor Menteri Negara Urusan Pangan 1995
		42 Cosman F. Osteoporosis: Panduan Lengkap Agar Tulang Anda Tetap Sehat. Yogyakarta: B-First; 2009. 292 p.	42 Cosman F. Osteoporosis: panduan lengkap agar tulang anda tetap sehat. B-First: Yogyakarta 2009; pp. 292.
		32 Lawrence AS. Milk and Milk Product: Essentials of Human Nutrition. New York (US): Oxford University Press, Inc; 2007. pp. 1.	32 Lawrence AS. Milk and milk product: essentials of human nutrition. Oxford University Press: New York 2007; pp. 1.
		24 Yuliana R. Berapa Kalori yang Dibutuhkan dalam Sehari [Internet]. Kompas; 2010. Available from: https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari	24 Yuliana R. Berapa kalori yang dibutuhkan dalam sehari [Online] 2010 [cited 2021]. Available at https://lifestyle.kompas.com/read/2010/09/11/10002336/Berapa.Kalori.yang.Dibutuhkan.dalam.sehari
		18 World Health Organization. Statistical Information System [Internet]. 2006. Available from: http://www.who.int/en/	18 World Health Organization. Statistical information system [Online] 2006 [Cited 2021]. Available at: http://www.who.int/en/.
		14	14

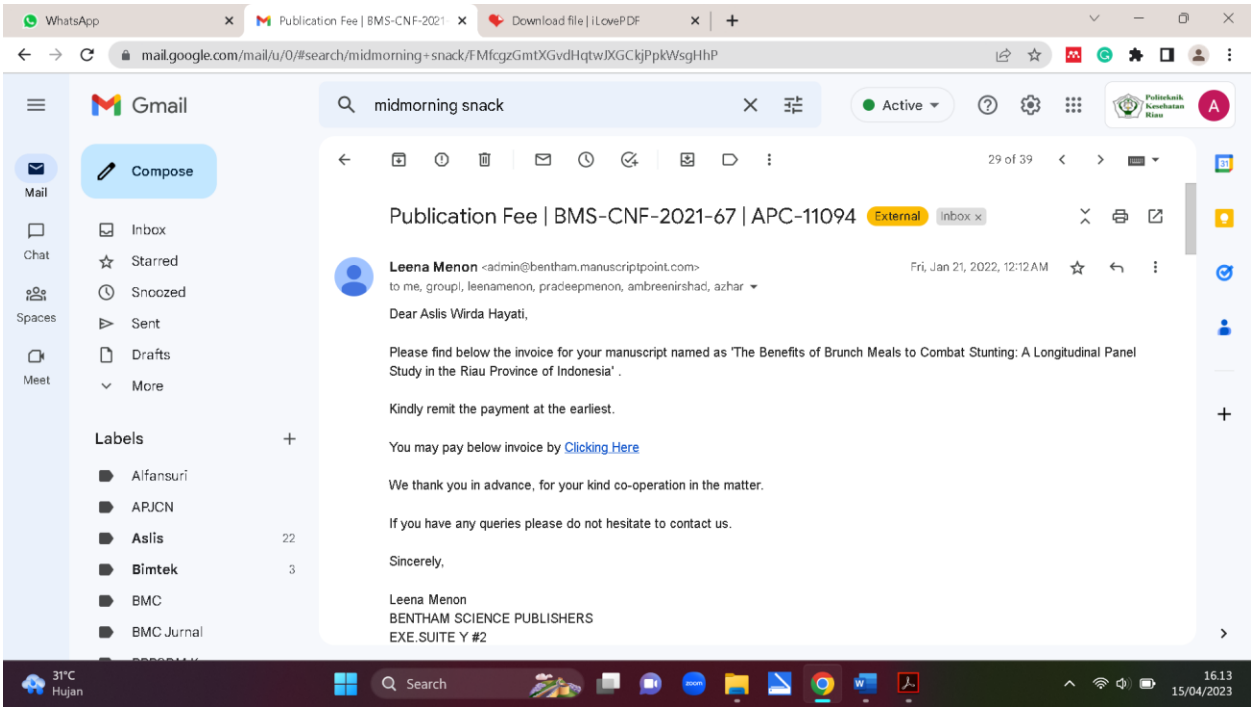
EMAIL		REVISED	BEFORE	AFTER
			Devi N. Gizi Anak Usia Sekolah Memprihatinkan. Kompas [Internet]. 2011; Available from: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan	Devi N. Gizi anak usia sekolah memprihatinkan [Online] [cited 2021]. Available at: https://nasional.kompas.com/read/2011/01/25/0416225/Gizi.Anak.Usia.Sekolah.Memprihatinkan.
	e	All references mentioned in the reference list should be cited in the text, and vice versa.	already appropriate	
	f	The quality of the figures in the articles should be as per Publisher's standard mentioned on the website.	already appropriate	
	g	Permission should have been obtained, for use of copyright material from the appropriate sources (including the Internet) and submitted to us.	The article is not using of copyright material so it does not require permission.	
	h	There should be no difference in the list of Authors in the revised manuscript, from what was submitted at the time of submission of the article. Please remember that the author list cannot be modified at a later stage.	The author list is not be modified at a later stage.	
	i	If your study involves human or animal subjects, you should have obtained ethical approval. Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.		

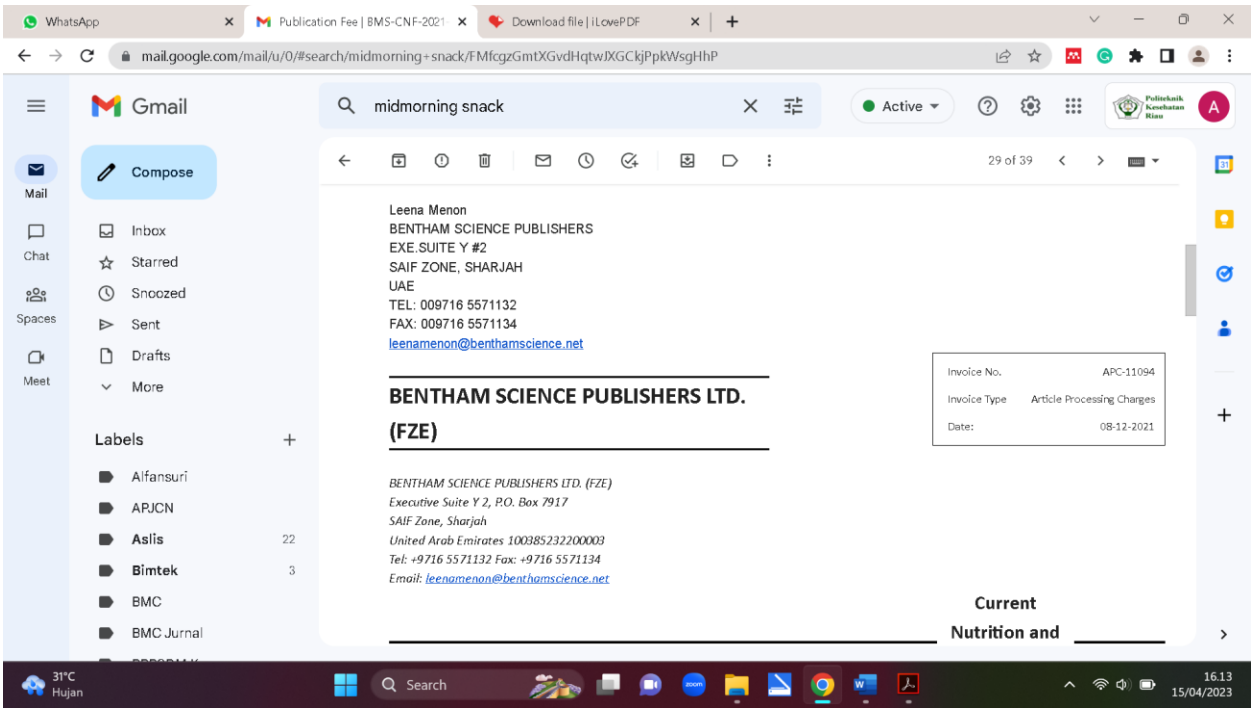
EMAIL	REVISED	BEFORE	AFTER
		Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).	The study complied with the World Medical Association Declaration of Helsinki–Ethical Principles for Medical Research involving human subjects and ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).
	Ethical Committee Name:	Ethical approval was obtained from the Riau Polytechnic Ethics Committee (Reference Number: LB.02.03/6/04/2019).	
	Guidelines for Human or Animal:	Teleh memenuhi prinsip=prinsip yang dinyatakan dHas complied with the principles stated in the 2008 Declaration of Helsinki and the Ministry of Health's 2011 National Guidelines for Health Research Ethics (PNEPK).alam Deklarasi Helsinki tahun 2008 dan Pedoman Nasional Etik Penelitian Kesehatan (PNEPK) Departemen Kesehatan tahun 2011.	
Please ensure that all the above points have been properly taken care of to avoid delays in final acceptance and publication. For any further clarifications, please send your query to info@benthamscience.net	All the above points have been properly taken care.		
We wish to thank you for submission of the manuscript to "Current Nutrition and Food Sciences" and look forward to continued collaboration in the future.			

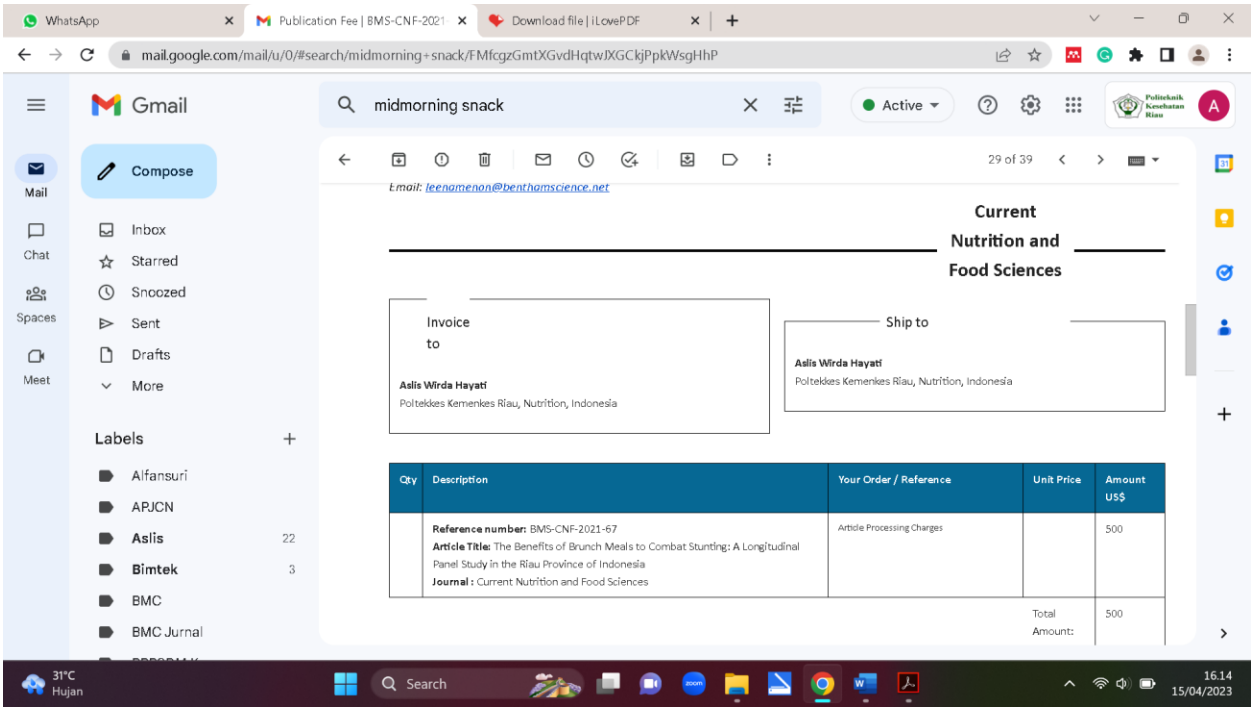
EMAIL	REVISED	BEFORE	AFTER
We wish to thank you for submission of the manuscript to "Current Nutrition and Food Sciences" and look forward to continued collaboration in the future. FINISH			

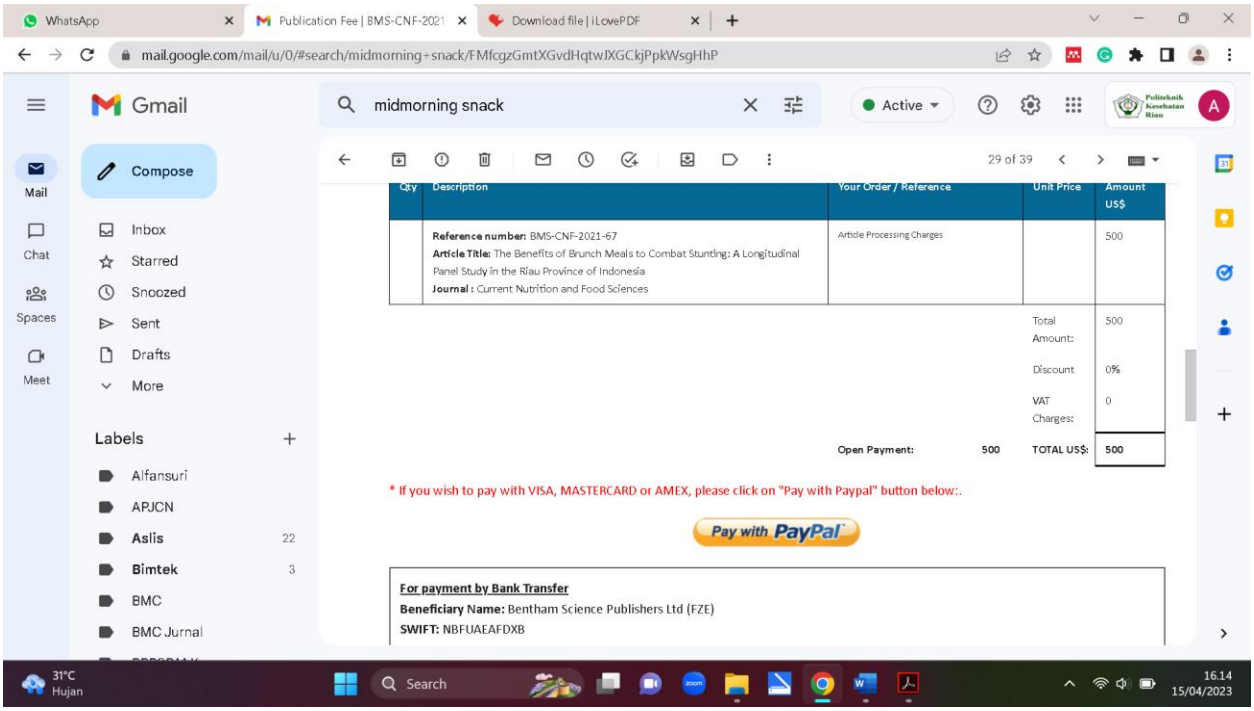

WhatsApp
BMS-CNF-2021-67 - aslis@pkr.ac
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtNjKkFmGWCtlMKGlpMFkrrJG
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
31 of 39
BMS-CNF-2021-67 External Inbox
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com> Wed, Jan 12, 2022, 1:03 PM
to me, cnf, rafia
MOST URGENT & SPECIAL REQUEST
Dear Dr. Hayati,
I hope you are doing well. This is with regards to your article entitled " The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia". While checking the references, it has been observed that some references are given in another language and some are incomplete reference (highlighted in the attached manuscript). Kindly provide complete and formatted references in English version. So, we will proceed the manuscript for further processing.
Please treat this matter as most urgent.
Sincerely,
Editorial Office
Bentham Science Publishers
Attachments:
31°C Hujan
Search
16.11 15/04/2023

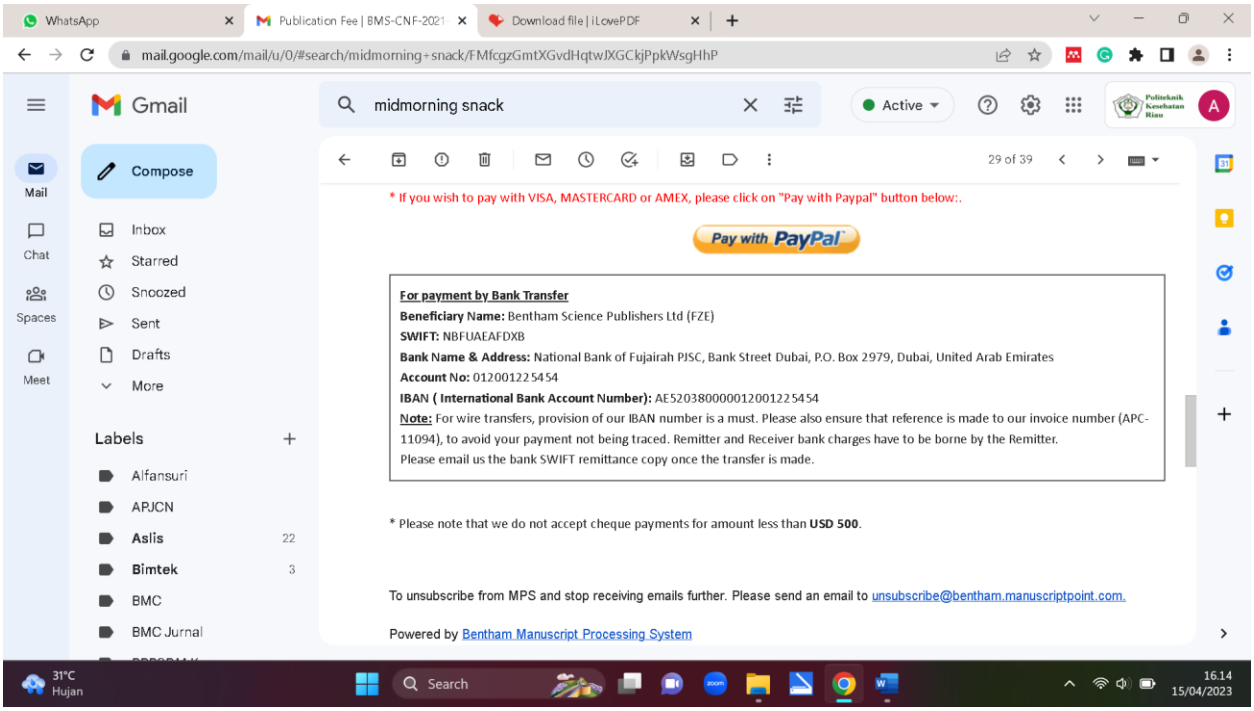

WhatsApp
BMS-CNF-2021-67 - aslis@pkr.ac
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtNjKkFmGWCtlMKGlpMFkrrJG
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
31 of 39
Please treat this matter as most urgent.
Sincerely,
Editorial Office
Bentham Science Publishers
Attachments:
Midmorning Snack - Aslis Wirda Hayati (Jan 12)).docx
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
Reply
Reply all
Forward
31°C Hujan
Search
16.11 15/04/2023

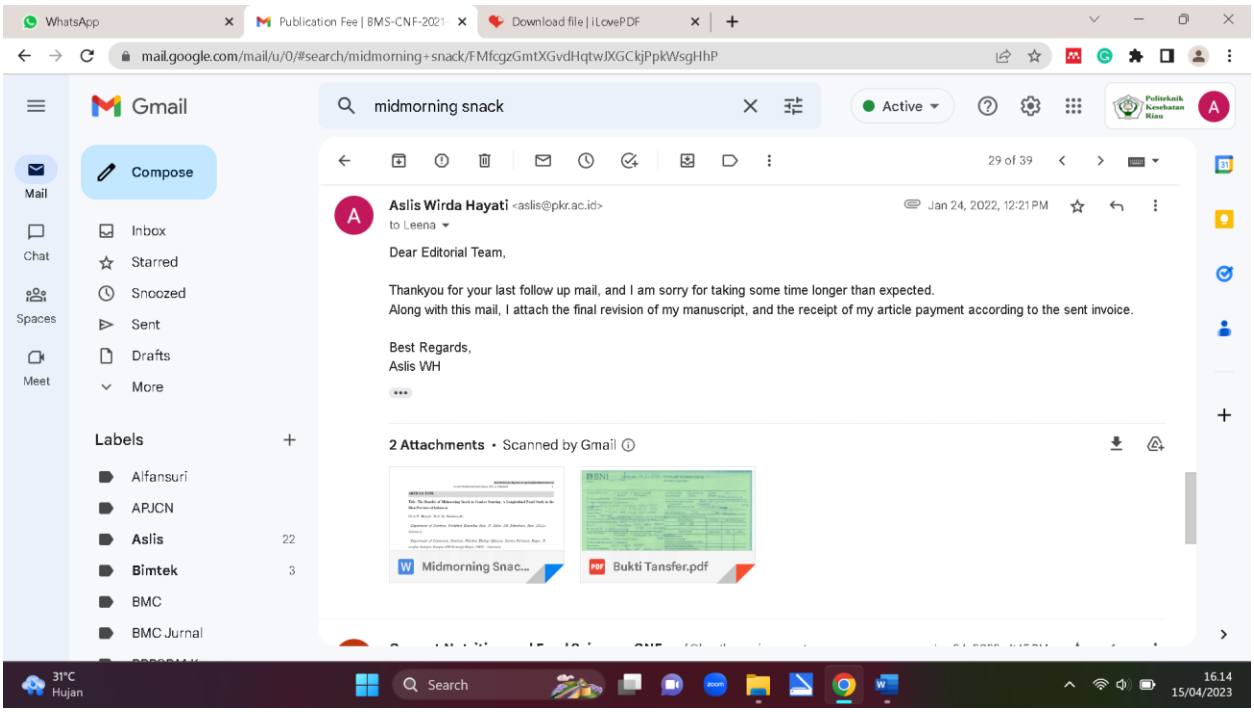

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
Publication Fee | BMS-CNF-2021-67 | APC-11094 External Inbox
Leena Menon <admin@bentham.manuscriptpoint.com> Fri, Jan 21, 2022, 12:12 AM
to me, groupl, leenamenon, pradeepmenon, ambreenirshad, azhar
Dear Aslis Wirda Hayati,
Please find below the invoice for your manuscript named as 'The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia' .
Kindly remit the payment at the earliest.
You may pay below invoice by Clicking Here
We thank you in advance, for your kind co-operation in the matter.
If you have any queries please do not hesitate to contact us.
Sincerely,
Leena Menon
BENTHAM SCIENCE PUBLISHERS
EXE.SUITE Y #2
31°C Hujan
Search
16.13 15/04/2023

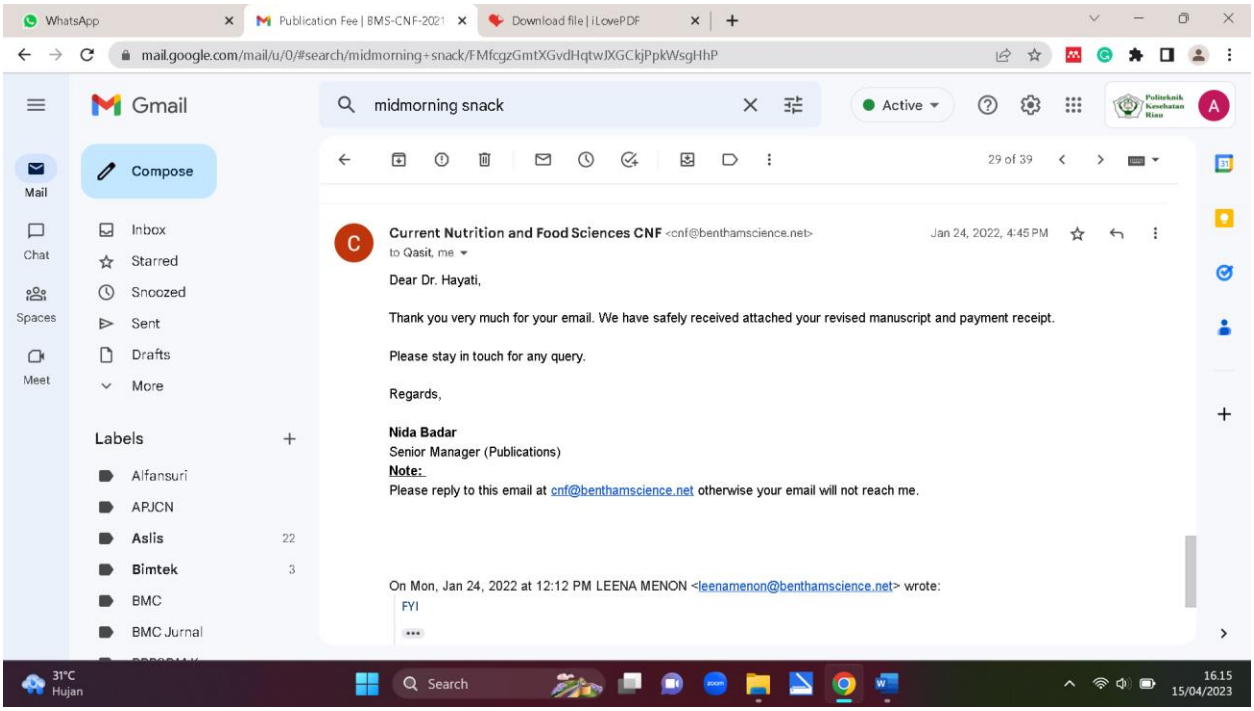

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
Leena Menon
BENTHAM SCIENCE PUBLISHERS
EXE.SUITE Y #2
SAIF ZONE, SHARJAH
UAE
TEL: 009716 5571132
FAX: 009716 5571134
leenamenon@benthamscience.net
BENTHAM SCIENCE PUBLISHERS LTD. (FZE)
Invoice No. APC-11094
Invoice Type Article Processing Charges
Date: 08-12-2021
BENTHAM SCIENCE PUBLISHERS LTD. (FZE)
Executive Suite Y 2, P.O. Box 7917
SAIF Zone, Sharjah
United Arab Emirates 100385232200003
Tel: +9716 5571132 Fax: +9716 5571134
Email: leenamenon@benthamscience.net
Current
Nutrition and
31°C Hujan
Search
16.13 15/04/2023

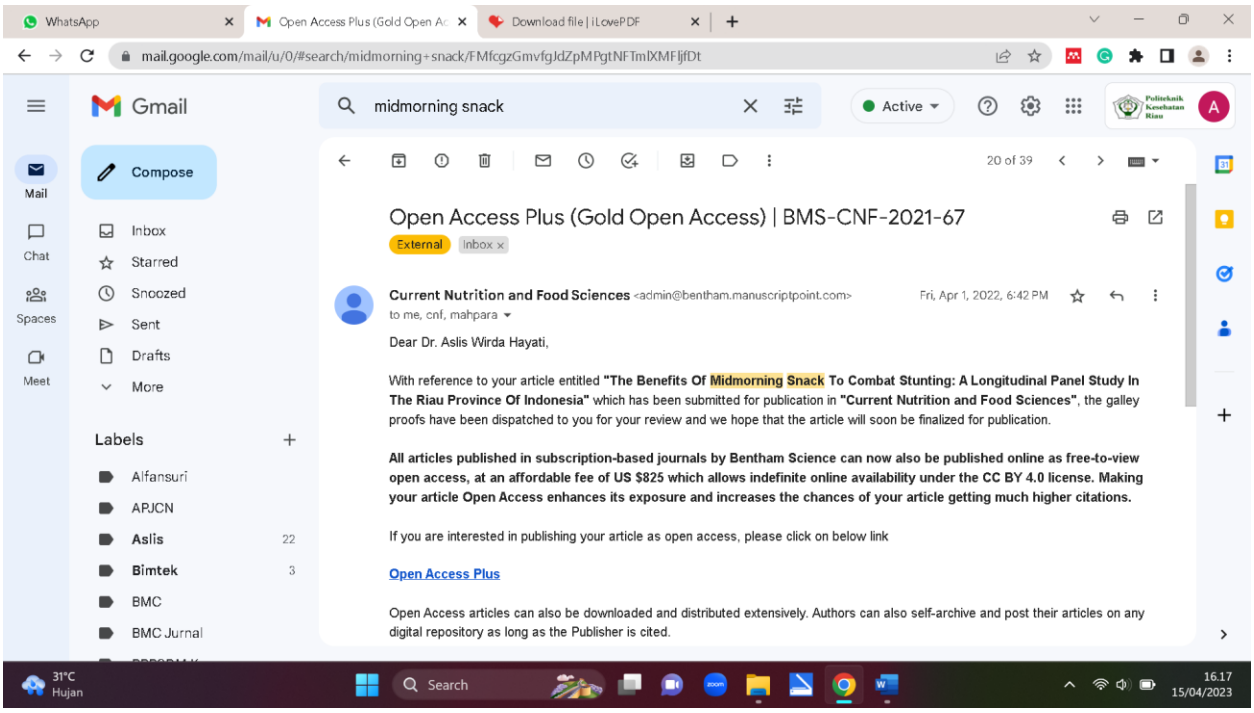

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
E-mail: leenamenon@benthamscience.net
Current Nutrition and Food Sciences
Invoice to
Aslis Wirda Hayati
Poltekkes Kemenkes Riau, Nutrition, Indonesia
Ship to
Aslis Wirda Hayati
Poltekkes Kemenkes Riau, Nutrition, Indonesia
Qty
Description
Your Order / Reference
Unit Price
Amount US$
Reference number: BMS-CNF-2021-67
Article Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Journal : Current Nutrition and Food Sciences
Article Processing Charges
500
Total Amount:
500
31°C Hujan
Search
16.14 15/04/2023

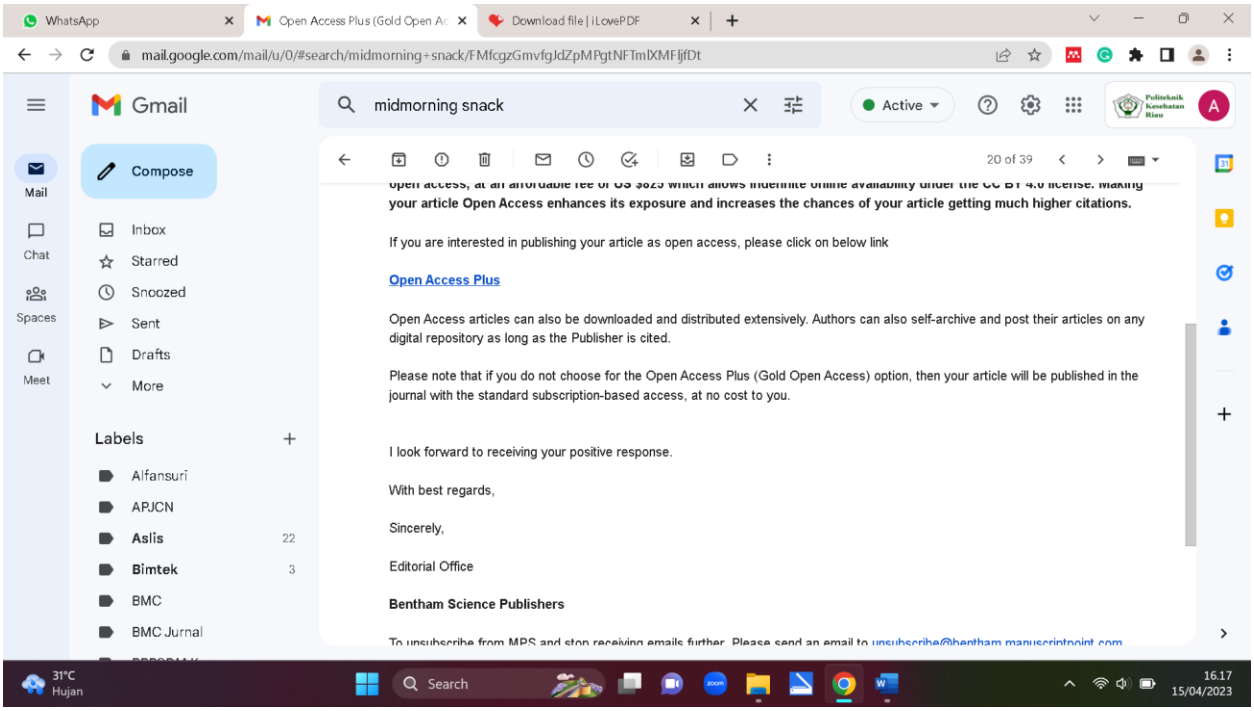

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
Qty
Description
Your Order / Reference
Unit Price
Amount US$
Reference number: BMS-CNF-2021-67
Article Title: The Benefits of Brunch Meals to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Journal : Current Nutrition and Food Sciences
Article Processing Charges
500
Total Amount:
500
Discount
0%
VAT Charges:
0
Open Payment:
500
TOTAL US$:
500
* If you wish to pay with VISA, MASTERCARD or AMEX, please click on "Pay with Paypal" button below:.
Pay with PayPal
For payment by Bank Transfer
Beneficiary Name: Bentham Science Publishers Ltd (FZE)
SWIFT: NBFUAEAFDXB
31°C Hujan
Search
16.14 15/04/2023

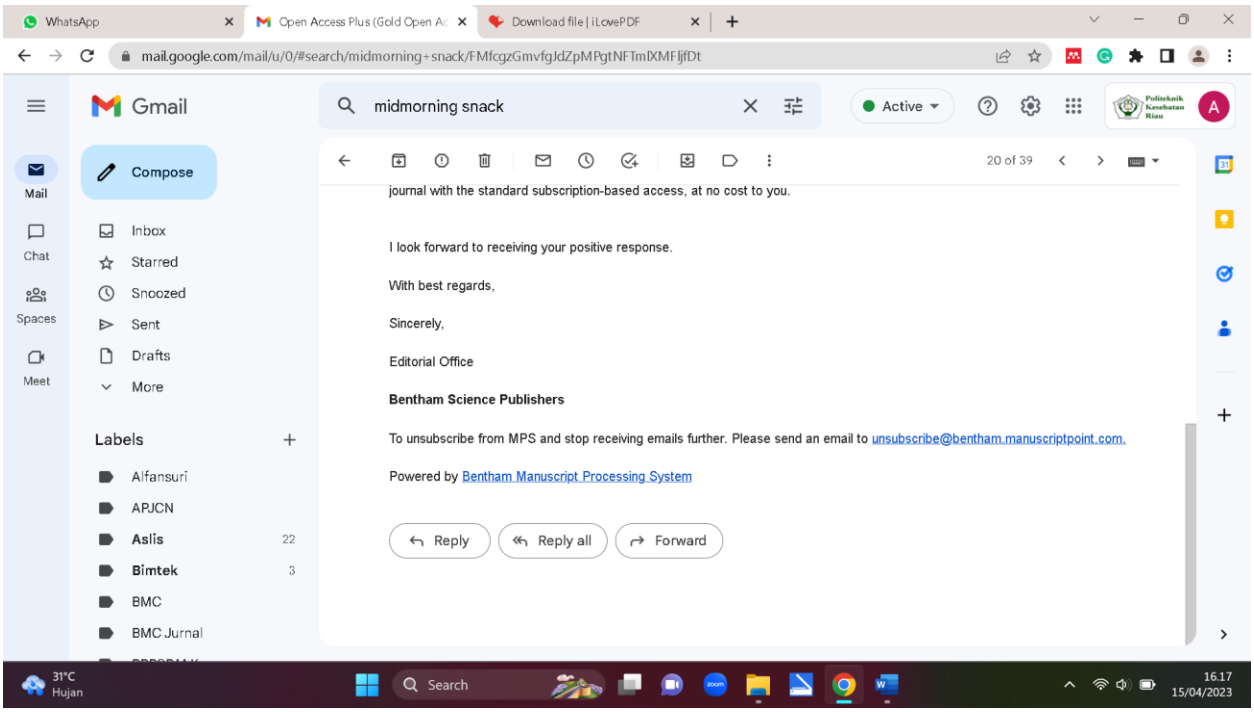

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
* If you wish to pay with VISA, MASTERCARD or AMEX, please click on "Pay with Paypal" button below:.
Pay with PayPal
For payment by Bank Transfer
Beneficiary Name: Bentham Science Publishers Ltd (FZE)
SWIFT: NBFUAEAFDXB
Bank Name & Address: National Bank of Fujairah PJSC, Bank Street Dubai, P.O. Box 2979, Dubai, United Arab Emirates
Account No: 012001225454
IBAN (International Bank Account Number): AE520380000012001225454
Note: For wire transfers, provision of our IBAN number is a must. Please also ensure that reference is made to our invoice number (APC-11094), to avoid your payment not being traced. Remitter and Receiver bank charges have to be borne by the Remitter.
Please email us the bank SWIFT remittance copy once the transfer is made.
* Please note that we do not accept cheque payments for amount less than USD 500.
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
31°C Hujan
Search
16.14 15/04/2023

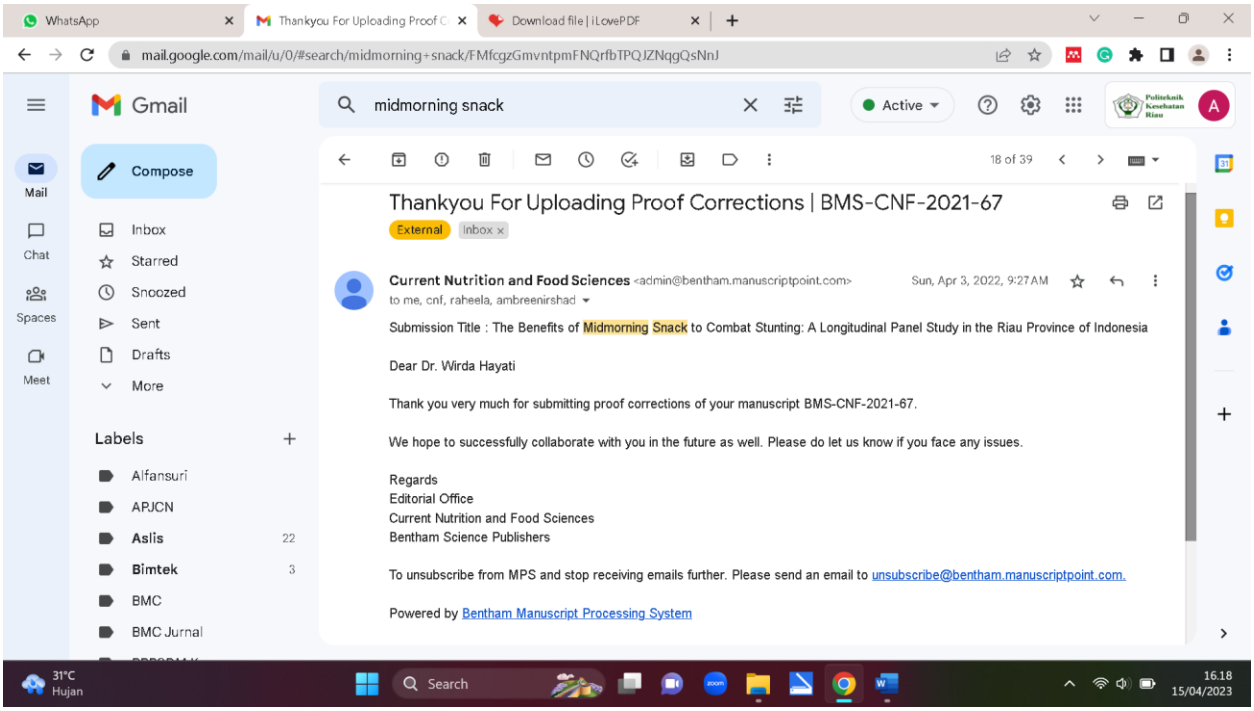

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Leena
Jan 24, 2022, 12:21 PM
Dear Editorial Team,
Thankyou for your last follow up mail, and I am sorry for taking some time longer than expected.
Along with this mail, I attach the final revision of my manuscript, and the receipt of my article payment according to the sent invoice.
Best Regards,
Aslis WH
2 Attachments • Scanned by Gmail
Midmorning Snac...
Bukti Tansfer.pdf
31°C Hujan
Search
16.14 15/04/2023

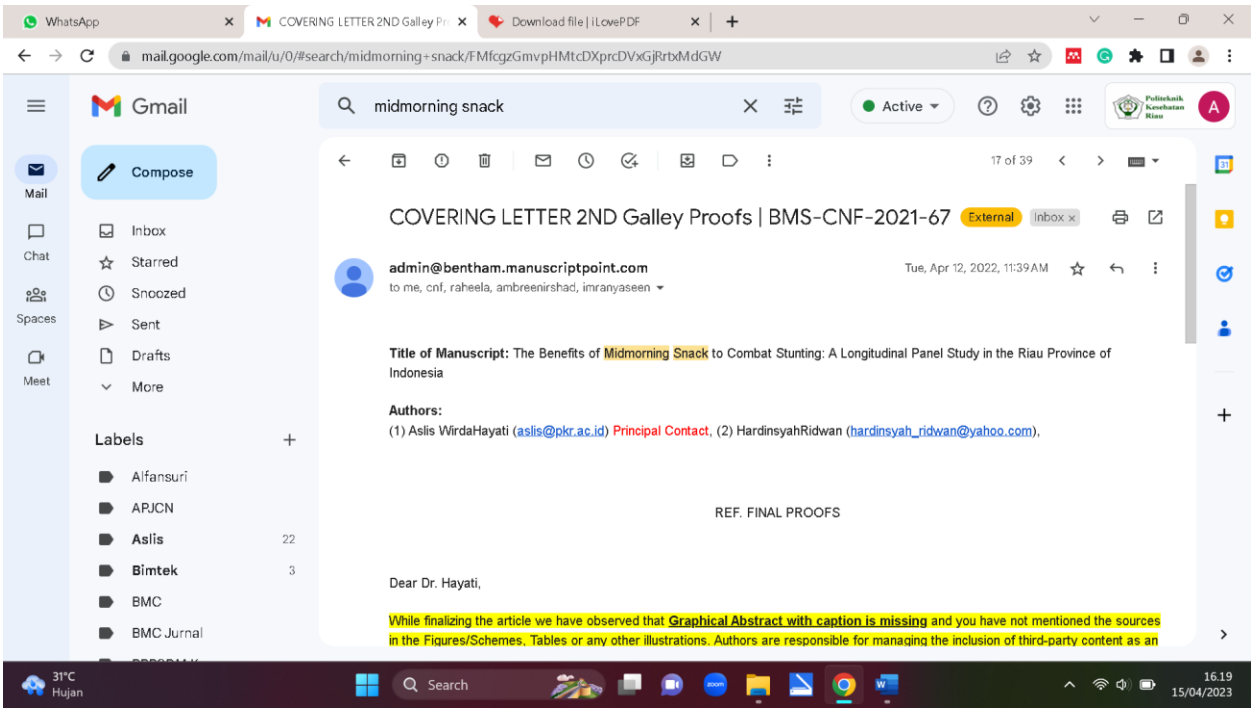

WhatsApp
Publication Fee | BMS-CNF-2021
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmtXGvdHqtwJXGCkjPpkWsgHhP
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
29 of 39
Current Nutrition and Food Sciences CNF <cnf@benthamscience.net>
Jan 24, 2022, 4:45 PM
to Qasit, me
Dear Dr. Hayati,
Thank you very much for your email. We have safely received attached your revised manuscript and payment receipt.
Please stay in touch for any query.
Regards,
Nida Badar
Senior Manager (Publications)
Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.
On Mon, Jan 24, 2022 at 12:12 PM LEENA MENON <leenamenon@benthamscience.net> wrote:
FYI
31°C
Hujan
Search
16.15
15/04/2023

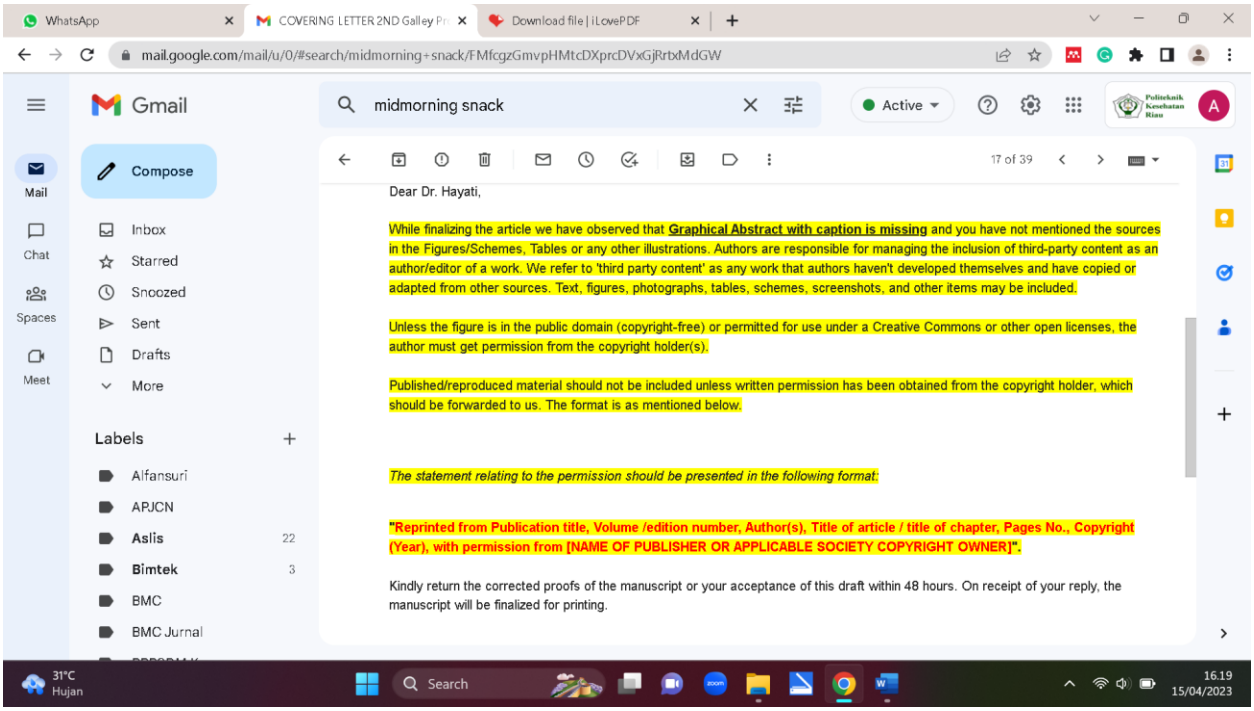

WhatsApp
Open Access Plus (Gold Open Ac
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvfgJdZpMPgtNFTmlXMFljfDt
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
20 of 39
Open Access Plus (Gold Open Access) | BMS-CNF-2021-67
External
Inbox
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Fri, Apr 1, 2022, 6:42 PM
to me, cnf, mahpara
Dear Dr. Aslis Wirda Hayati,
With reference to your article entitled "The Benefits Of Midmorning Snack To Combat Stunting: A Longitudinal Panel Study In The Riau Province Of Indonesia" which has been submitted for publication in "Current Nutrition and Food Sciences", the galley proofs have been dispatched to you for your review and we hope that the article will soon be finalized for publication.
All articles published in subscription-based journals by Bentham Science can now also be published online as free-to-view open access, at an affordable fee of US $825 which allows indefinite online availability under the CC BY 4.0 license. Making your article Open Access enhances its exposure and increases the chances of your article getting much higher citations.
If you are interested in publishing your article as open access, please click on below link
Open Access Plus
Open Access articles can also be downloaded and distributed extensively. Authors can also self-archive and post their articles on any digital repository as long as the Publisher is cited.
31°C
Hujan
Search
16.17
15/04/2023

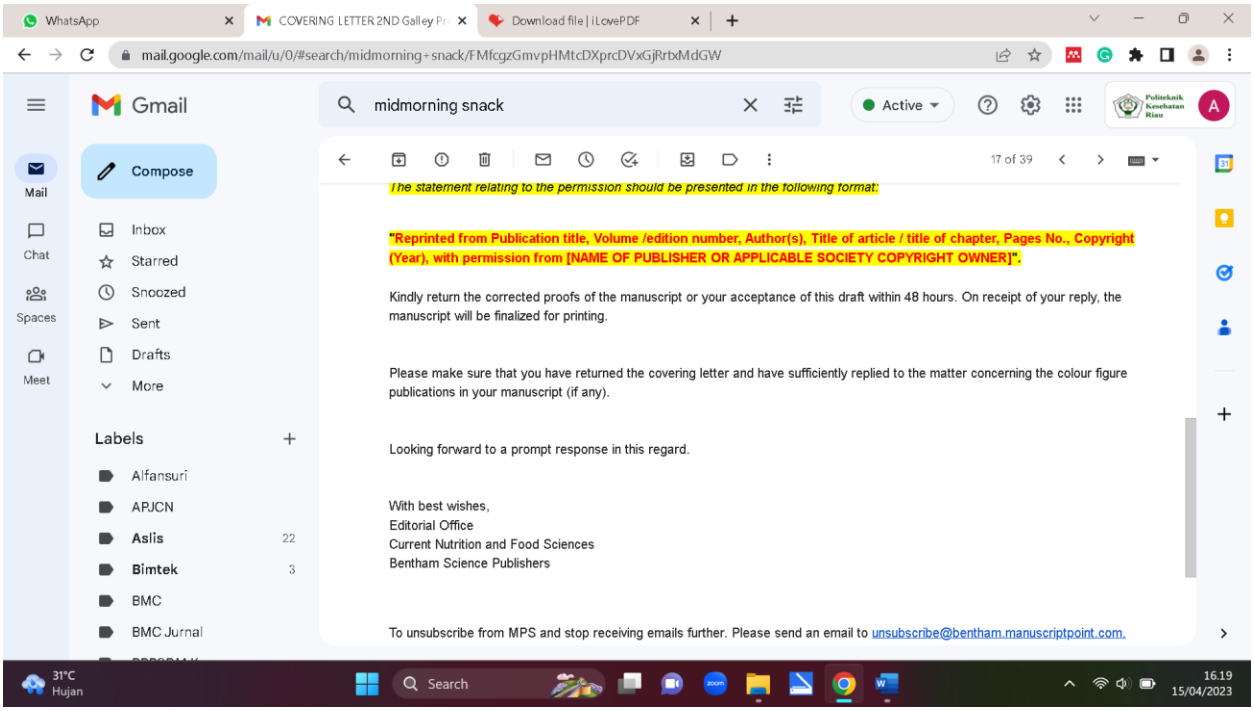

WhatsApp
Open Access Plus (Gold Open Ac
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvfgJdZpMPgtNFTmlXMFljfDt
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
20 of 39
your article Open Access enhances its exposure and increases the chances of your article getting much higher citations.
If you are interested in publishing your article as open access, please click on below link
Open Access Plus
Open Access articles can also be downloaded and distributed extensively. Authors can also self-archive and post their articles on any digital repository as long as the Publisher is cited.
Please note that if you do not choose for the Open Access Plus (Gold Open Access) option, then your article will be published in the journal with the standard subscription-based access, at no cost to you.
I look forward to receiving your positive response.
With best regards,
Sincerely,
Editorial Office
Bentham Science Publishers
31°C Hujan
Search
16.17 15/04/2023

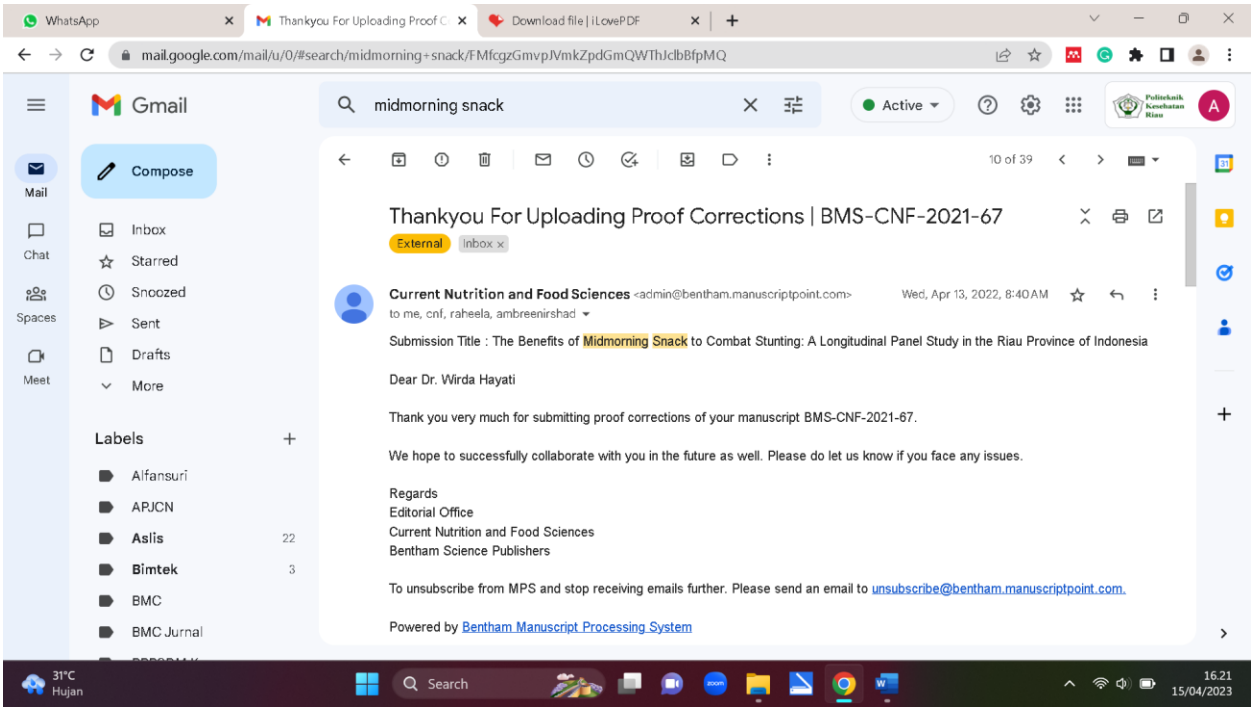

WhatsApp
Open Access Plus (Gold Open Ac
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvfgJdZpMPgtNFTmlXMFljfDt
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
20 of 39
journal with the standard subscription-based access, at no cost to you.
I look forward to receiving your positive response.
With best regards,
Sincerely,
Editorial Office
Bentham Science Publishers
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
Reply
Reply all
Forward
31°C Hujan
Search
16.17 15/04/2023

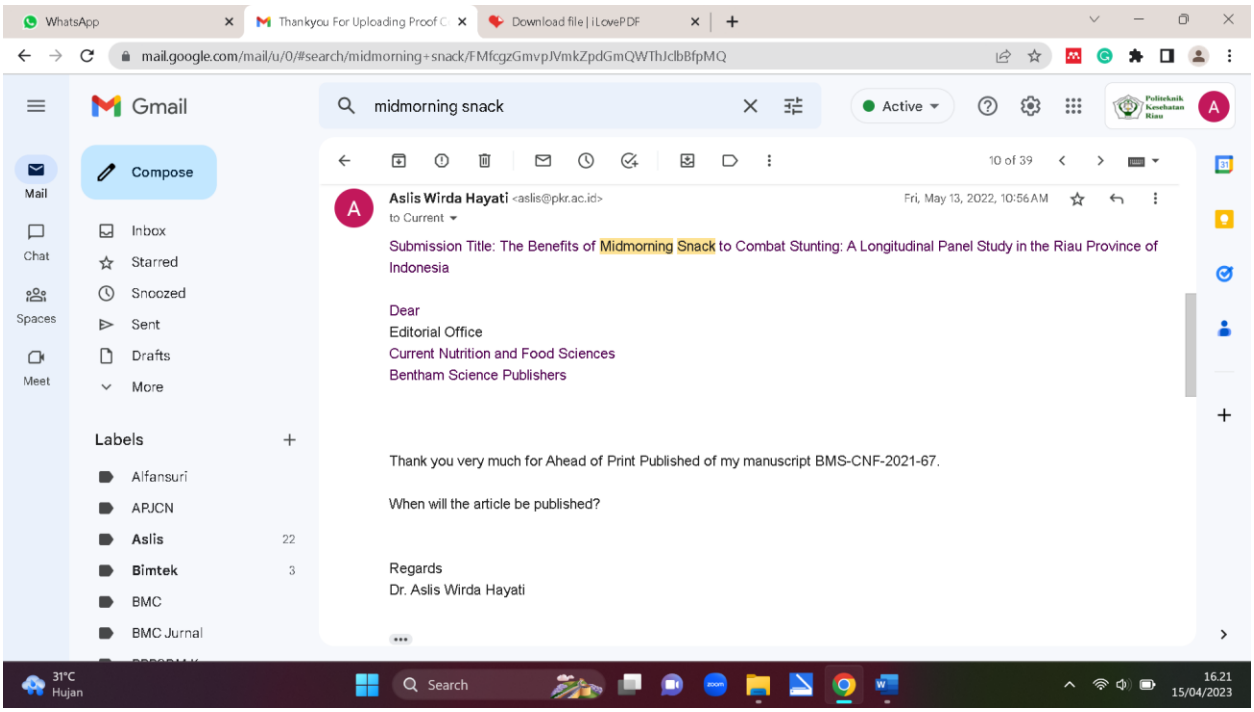

WhatsApp
Thankyou For Uploading Proof C
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvntpmFNQrfbTPQJZNqgQsNnJ
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
18 of 39
Thankyou For Uploading Proof Corrections | BMS-CNF-2021-67
External
Inbox
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Sun, Apr 3, 2022, 9:27 AM
to me, cnf, raheela, ambreenirshad
Submission Title : The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Wirda Hayati
Thank you very much for submitting proof corrections of your manuscript BMS-CNF-2021-67.
We hope to successfully collaborate with you in the future as well. Please do let us know if you face any issues.
Regards
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
31°C
Hujan
Search
16.18
15/04/2023

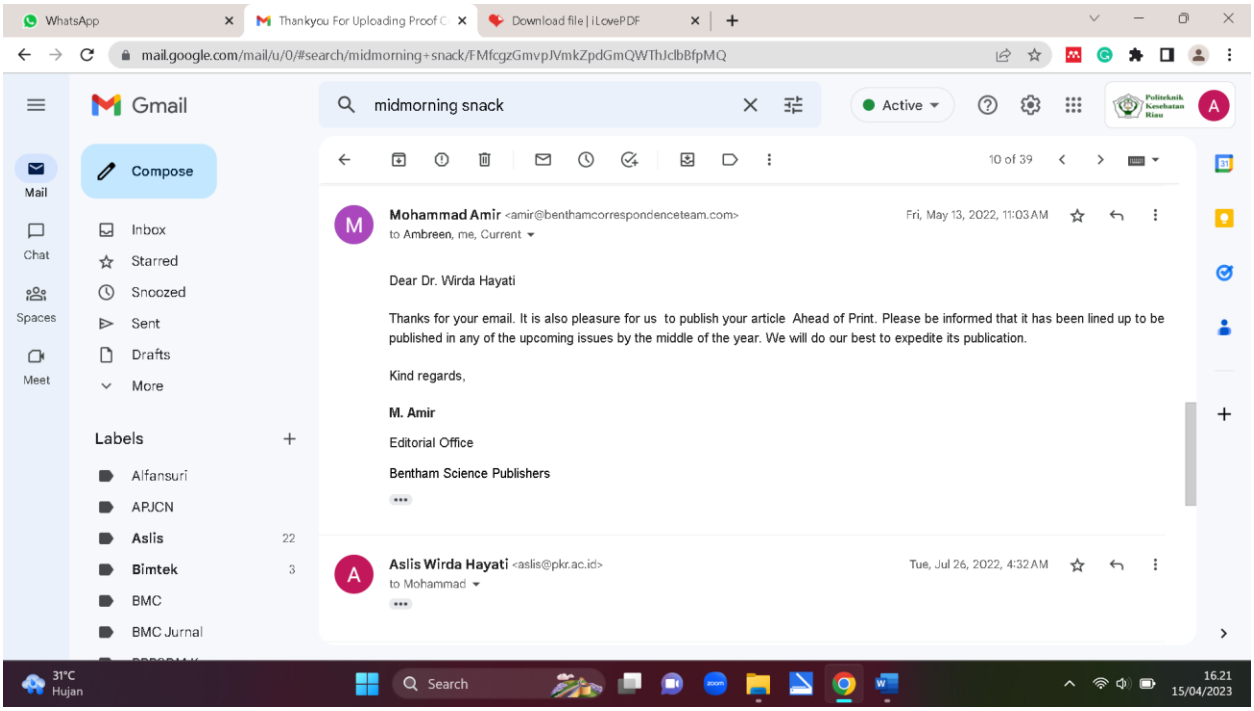

WhatsApp
COVERING LETTER 2ND Galley Pr
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvpHMtcDXprcDVxGjRrtxMdGW
Gmail
midmorning snack
Active
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
17 of 39
COVERING LETTER 2ND Galley Proofs | BMS-CNF-2021-67
External
Inbox
admin@bentham.manuscriptpoint.com
Tue, Apr 12, 2022, 11:39 AM
to me, cnf, raheela, ambreenirshad, imranyaseen
Title of Manuscript: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Authors:
(1) Aslis WirdaHayati (aslis@pkr.ac.id) Principal Contact, (2) HardinsyahRidwan (hardinsyah_ridwan@yahoo.com),
REF. FINAL PROOFS
Dear Dr. Hayati,
While finalizing the article we have observed that Graphical Abstract with caption is missing and you have not mentioned the sources in the Figures/Schemes, Tables or any other illustrations. Authors are responsible for managing the inclusion of third-party content as an
31°C
Hujan
Search
16.19
15/04/2023

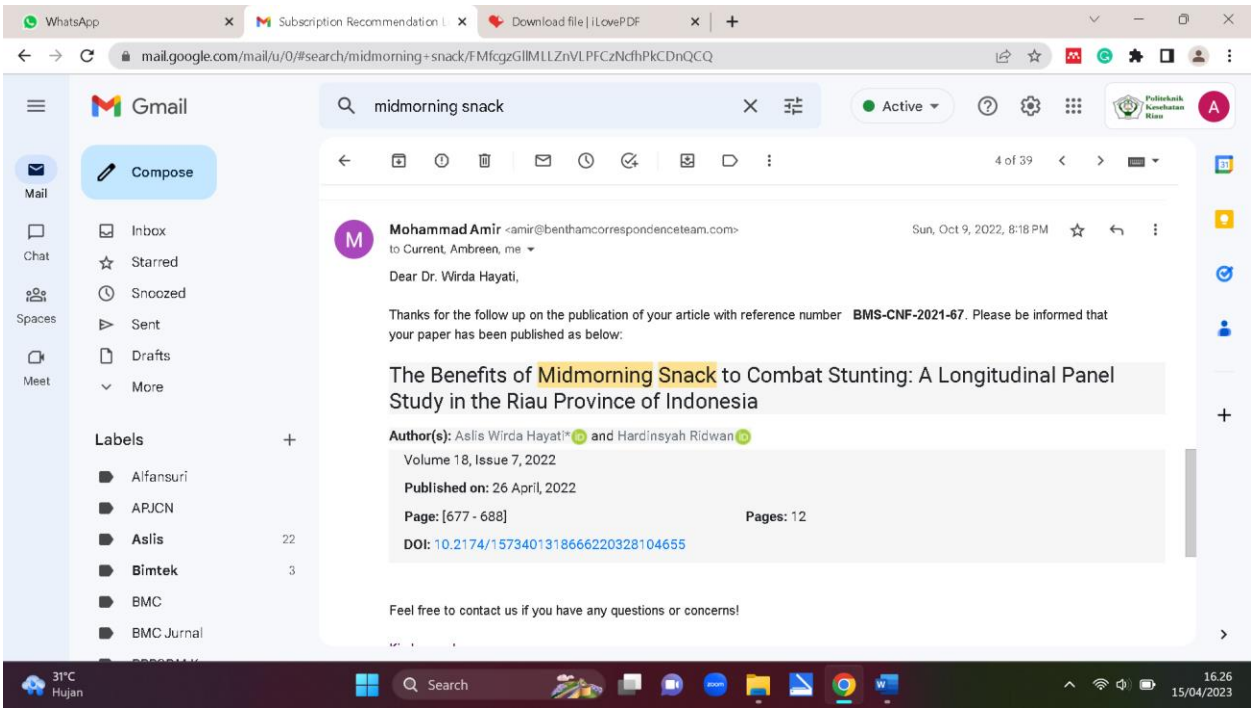

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
17 of 39
Dear Dr. Hayati,
While finalizing the article we have observed that Graphical Abstract with caption is missing and you have not mentioned the sources in the Figures/Schemes, Tables or any other illustrations. Authors are responsible for managing the inclusion of third-party content as an author/editor of a work. We refer to 'third party content' as any work that authors haven't developed themselves and have copied or adapted from other sources. Text, figures, photographs, tables, schemes, screenshots, and other items may be included.
Unless the figure is in the public domain (copyright-free) or permitted for use under a Creative Commons or other open licenses, the author must get permission from the copyright holder(s).
Published/reproduced material should not be included unless written permission has been obtained from the copyright holder, which should be forwarded to us. The format is as mentioned below.
The statement relating to the permission should be presented in the following format:
"Reprinted from Publication title, Volume /edition number, Author(s), Title of article / title of chapter, Pages No., Copyright (Year), with permission from [NAME OF PUBLISHER OR APPLICABLE SOCIETY COPYRIGHT OWNER]".
Kindly return the corrected proofs of the manuscript or your acceptance of this draft within 48 hours. On receipt of your reply, the manuscript will be finalized for printing.

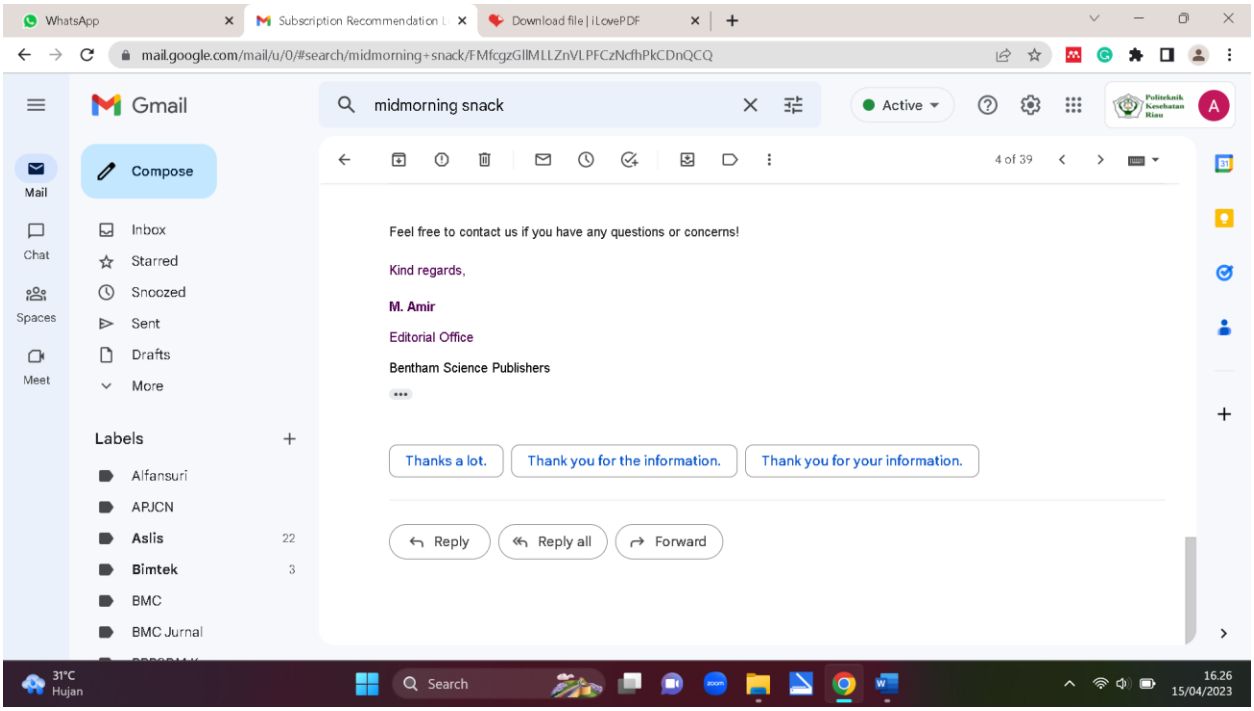

midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
17 of 39
The statement relating to the permission should be presented in the following format:
"Reprinted from Publication title, Volume /edition number, Author(s), Title of article / title of chapter, Pages No., Copyright (Year), with permission from [NAME OF PUBLISHER OR APPLICABLE SOCIETY COPYRIGHT OWNER]".
Kindly return the corrected proofs of the manuscript or your acceptance of this draft within 48 hours. On receipt of your reply, the manuscript will be finalized for printing.
Please make sure that you have returned the covering letter and have sufficiently replied to the matter concerning the colour figure publications in your manuscript (if any).
Looking forward to a prompt response in this regard.
With best wishes,
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.


WhatsApp
Thankyou For Uploading Proof C
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvpJVmkZpdGmQWThJclbBfpMQ
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
10 of 39
Thankyou For Uploading Proof Corrections | BMS-CNF-2021-67
External
Inbox
Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
Wed, Apr 13, 2022, 8:40 AM
to me, cnf, raheela, ambreenirshad
Submission Title : The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear Dr. Wirda Hayati
Thank you very much for submitting proof corrections of your manuscript BMS-CNF-2021-67.
We hope to successfully collaborate with you in the future as well. Please do let us know if you face any issues.
Regards
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
To unsubscribe from MPS and stop receiving emails further. Please send an email to unsubscribe@bentham.manuscriptpoint.com.
Powered by Bentham Manuscript Processing System
31°C
Hujan
Search
16.21
15/04/2023


WhatsApp
Thankyou For Uploading Proof C
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGmvpJVmkZpdGmQWThJclbBfpMQ
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
10 of 39
Aslis Wirda Hayati <aslis@pkr.ac.id>
Fri, May 13, 2022, 10:56 AM
to Current
Submission Title: The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Dear
Editorial Office
Current Nutrition and Food Sciences
Bentham Science Publishers
Thank you very much for Ahead of Print Published of my manuscript BMS-CNF-2021-67.
When will the article be published?
Regards
Dr. Aslis Wirda Hayati
31°C
Hujan
Search
16.21
15/04/2023


midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
BMC Jurnal
Mohammad Amir <amir@benthamcorrespondenceteam.com>
to Ambreen, me, Current
Fri, May 13, 2022, 11:03 AM
Dear Dr. Wirda Hayati
Thanks for your email. It is also pleasure for us to publish your article Ahead of Print. Please be informed that it has been lined up to be published in any of the upcoming issues by the middle of the year. We will do our best to expedite its publication.
Kind regards,
M. Amir
Editorial Office
Bentham Science Publishers
Aslis Wirda Hayati <aslis@pkr.ac.id>
to Mohammad
Tue, Jul 26, 2022, 4:32 AM


midmorning snack
Compose
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis
Bimtek
BMC
BMC Jurnal
Mohammad Amir <amir@benthamcorrespondenceteam.com>
to Current, Ambreen, me
Sun, Oct 9, 2022, 8:18 PM
Dear Dr. Wirda Hayati,
Thanks for the follow up on the publication of your article with reference number BMS-CNF-2021-67. Please be informed that your paper has been published as below:
The Benefits of Midmorning Snack to Combat Stunting: A Longitudinal Panel Study in the Riau Province of Indonesia
Author(s): Aslis Wirda Hayati* and Hardinsyah Ridwan
Volume 18, Issue 7, 2022
Published on: 26 April, 2022
Page: [677 - 688]
Pages: 12
DOI: 10.2174/1573401318666220328104655
Feel free to contact us if you have any questions or concerns!


WhatsApp
Subscription Recommendation L
Download file | iLovePDF
mail.google.com/mail/u/0/#search/midmorning+snack/FMfcgzGllMLLZnVLPFCzNcfhPkCDnQCQ
Gmail
midmorning snack
Active
Compose
Mail
Chat
Spaces
Meet
Inbox
Starred
Snoozed
Sent
Drafts
More
Labels
Alfansuri
APJCN
Aslis 22
Bimtek 3
BMC
BMC Jurnal
4 of 39
Feel free to contact us if you have any questions or concerns!
Kind regards,
M. Amir
Editorial Office
Bentham Science Publishers
Thanks a lot.
Thank you for the information.
Thank you for your information.
Reply
Reply all
Forward
31°C
Hujan
Search
16.26
15/04/2023