Journal of Public Health and Pharmacy
2775-4952 (Online - Elektronik)
Research Articles Open Access

Empowering Adolescent Girls Through Social Organisation-Based Mentoring to Prevent Malnutrition

Nur Khafidhoh[1]*, S.A. Nugraheni[2], Ayun Sriatmi[3], Sri Winarni[4]
[1]Department of Midwifery, Polytechnic of Health of Ministry, Semarang, Jawa Tengah
[2]Department of Public Health Nutrition, Faculty of Public Health, Universitas Diponegoro Semarang, Jawa Tengah, Indonesia
[3]Department of Health Policy and Administration, Faculty of Public Health, Universitas Diponegoro Semarang, Jawa Tengah, Indonesia
[4]Department of Biostatistics and Demography, Faculty of Public Health, Universitas Diponegoro Semarang, Jawa Tengah, Indonesia

***Corresponding Author:** E-mail: nurafidh@yahoo.com

ARTICLE INFO

Manuscript Received: 08 Oct, 2024
Revised: 30 Jan, 2025
Accepted: 08 Mar, 2025
Date of publication: 01 Jul, 2025
Volume: 5
Issue: 2
DOI: 10.56338/jphp.v6i1.6216

KEYWORDS

Empowering Adolescent;
Malnutrition;
Knowledge;
Calorie Adequacy;
Iron Intake

ABSTRACT

Introduction: Adolescent girls are prone to nutrition-related problems, ranging from anaemia, SEZ, undernutrition and overnutrition. Currently, more interventions are conducted on school-aged adolescents, while adolescents who are no longer in school have not been addressed. Implementation of interventions in the community, such as youth organisations and religious organisations, not only in schools. This can increase accessibility and participation among adolescents who are not in formal education young women-based social organisations can be involved in interventions to prevent adolescent malnutrition through a mentoring model. The aim of this study was to analyse the effect of organisation-based mentoring on improving knowledge, this study aims to analyse the differences in knowledge, practice of malnutrition prevention in the form of measurement of calorie adequacy and iron intake.
Methods: This research design is a quasi-experimental pre and post-test with a control group. This study was conducted on 189 adolescent girls, which were divided into an intervention group of 98 people and a control group of 91 people. Respondents were taken by purposive sampling based on inclusion criteria. The study was conducted for 10 weeks. Data were obtained by structured interviews. Data were analysed using paired t test and wilcoxon, while between group analysis with manwithney.
Results: The results showed that there was a difference between knowledge, behaviour before and after the intervention between the treatment group and the control group with $p < 0.05$. There was a significant increase in knowledge, attitude and behaviour in the intervention and control groups.
Conclusion: Community organisation-based mentoring has been shown to be effective in improving adolescent health. It is necessary to strengthen regulations in regulating the role of community organisations, especially adolescents, through structured assistance and education for vulnerable groups including adolescents. The results of the study can be duplicated to be implemented in other organisations that focus on adolescents.

Publisher: Pusat Pengembangan Teknologi Informasi dan Jurnal Universitas Muhammadiyah Palu

INTRODUCTION

The public challenge of malnutrition is increasing, especially the issue of multiple nutrition. This issue is increasingly common in developing and developed countries and can significantly affect adolescent health and development. 1 in 3 low- and middle-income countries are affected by the double burden problem (1).

Malnutrition, particularly anaemia and chronic energy deficiency (CED), remains a significant health problem in Indonesia, especially among premarital adolescent girls (2–4). Adolescents, who are in the transition phase to adulthood, have an important role in human resource development, including as future mothers (5,6). Nutritional problems experienced by adolescent girls can affect their health during pregnancy, hinder foetal development, and increase the risk of pregnancy complications. Adolescents (7). The incidence of anaemia among adolescent girls reaches 15.5% nationally, and 70% of brides-to-be in Central Java are anaemic. In Kendal District, many premarital women experience SEZ and anaemia, which has an impact on fetal health, including a high rate of low birth weight babies (LBW) (8,9).

Malnutrition can occur in adolescents including premarital adolescents (2). Premarital adolescents are particularly vulnerable to nutrition-related problems, such as anaemia, underweight, overweight and SEZ (3). The results of the 2018 Basic Health Research (Riskesdas) explain that 84.6% of the incidence of anaemia in pregnant women is suffered by women in the age category of 15-24 years, namely 32%. This means that 3 out of 10 adolescent girls are anaemic(10). Another nutritional problem among adolescent girls is the high rate of SEZ, which is 36.3%(8,11). The incidence of anaemia among unmarried women of childbearing age was higher (14.3%) compared to married women (6%)(12). The health condition of these adolescent girls will have an impact on their health when they become mothers (8,9).

Strategies to address this issue include preconception interventions, such as the provision of blood supplementation tablets and health education. Social organisations, such as the Ikatan Pelajar Putri Nahdlatul Ulama (IPPNU), have an important role in disseminating health education among adolescent girls. IPPNU, as an autonomous body under NU, consists of female students aged 13 to 24 years, both in formal and non-formal education. IPPNU also has a clear structure from the village level to the centre. With the existence of IPPNU, health education can take advantage of existing networks and structures to conduct organisation-based education, which is more flexible and contextual. With this approach, it is hoped that it can broaden the horizons and encourage changes in the behaviour of young people in maintaining their condition before marriage. Current adolescent health programmers mostly target adolescents who are in school. Previous research related to adolescent malnutrition has also been conducted on adolescents who are in school, so through this specific social organization breakthrough, it is hoped that it will be more targeted.

Adolescence is a process of life transformation with the growth and maturation of the body's physiological systems. During this period, there is a close relationship between adolescent nutrition and development *(5)*. The current health status of adolescents is still not optimal, including the nutritional status of adolescents. Anaemia, malnutrition and obesity are problems that occur in adolescents (6,7). These problems include the behaviour of adolescents who lack knowledge and concern for their health (13,14).

Behaviour change can be done individually or in groups or organisations. Health promotion strategies in developing countries will be more effective through interactions between families and small groups (15). The behaviors of the organization will influence the behavior of its members (15,16). Community social organisations tend to be able to build more active relationships within the community at any point in time(17). The health education process will be more effective if it is conducted through groups/organisations (15). Through organisations, interventions are expected to be sustainable and able to provide input to stakeholders. The organisation will be more active in working with several parties with unlimited time and is an innovation in the health system at the grassroots level (18). Empowerment of youth organisations outside of schools in nutrition education is still not widely done, with most interventions being done through school organisations. Education through empowering youth social organisations will be more effective because it is directly related to the target (17). Social Organization (CSOs) have found that social networking can be used as a tool to reach out to target groups more effectively through the role of digital communication within the organisation (19). Implementation of interventions in the community, such as youth

organisations and religious organisations, not only in schools. This can increase accessibility and participation among adolescents who are not in formal education (20).

METHOD

Study Desain and setting

The research is a quasy experimental study with a pre-test and post-test approach with a control group to see the effectiveness of mentoring conducted by the organisation on the knowledge, attitudes and practices of premarital age adolescent girls in preventing malnutrition. The research was conducted from September 2023 to March 2024.

Participants

The subjects in this study were young women who were members of the IPPNU organisation. This study involved 189 premarital age young women as research subjects, which were divided into 2 groups. The treatment group was 98 people and the control group was 91 people. Subjects were taken by purposive sampling method with the criteria of IPPNU members aged 17-24 years, not sitting in junior high school / equivalent or high school / equivalent, having an android mobile phone.

Intervention

The intervention in this study is assistance to adolescent girls conducted by providing online education using booklets and online discussions through WA groups. The education was conducted by a mentor who had been appointed by the organisation. The mentoring was conducted for 10 weeks. The materials provided were in 3 stages. The first week was on adolescent malnutrition, the second on adolescent anemia and the third on SEZ. While the control group was given education using leafled.

Prior to mentoring, mentors from the organisation were trained on non-verbal communication, adolescent malnutrition and how to measure adolescent nutritional status. The materials provided are the results of a needs study that researchers have conducted previously to IPPNU members and have been validated with relevant stake holders, namely the health office, puskesmas, population control and family planning office and elements of the IPPNU organisation. The researcher has also prepared a draft WA for the implementation of the discussion; the draft can be changed by the facilitator to adjust the language style with the assisted members. This is an effort by the researcher to reduce bias in the implementation of the research.

Data Collection

The data collection process was carried out through structured interviews using questionnaires and FFQ sheets to ask what had been consumed for 2 days, namely on effective days and on holidays. The food consumption records were then entered into the Nutri survey program to measure calorie adequacy and iron intake. The questionnaire used in this study had previously tested the validity and reliability of 77 IPPNU members and analysed using Alfa Crombach with a value of $r > 0.3$ and $\alpha = 0.624$.

Statistical Analisys

Data were analysed for completeness and processed using SPSS version 24.00. Data analysis used Manwithney, Wilcoxon and paired t tests. The normality test used the Kolmogorf Smirnov value with the results of the values on the variables studied were not normally distributed. For the homogeneity test using the Lavene test with a value of more than 0.05, so the data is in the homogeneous category.

Ethical Clearance

This research has gone through an ethical review from the ethics section of the faculty of public health, Diponegoro University with number 449/KEPK-FKM/2023 on 23 August 2023.

RESULTS

Respondents in this study consisted of an intervention group and a control group. The intervention group was young women aged 17-24 years old in Kendal Regency as many as 98 respondents. At the beginning of the study

there were 112 respondents, then there were 14 respondents who dropped out. The control group was premarital age adolescent girls in the Batang Regency area totalling 91 respondents. At the beginning of the study there were 106 respondents in the control group, then 13 respondents dropped out during the second examination, and 2 more respondents had incomplete data and only participated in the third examination/posttest.

Descriptive Statistics

The characteristics of respondents that researchers see in this study are age, education, occupation and income. Age characteristics are presented based on frequency distribution without grouping data based on certain categories. Education characteristics are categorised into 3 groups, namely basic education consisting of elementary and junior high school graduates, secondary education is respondents who graduated from high school, while higher education is respondents with tertiary education, both academic and applied. Employment is categorised as working and not working. Income characteristics were categorised based on regional minimum wage of Kendal Regency and Batang Regency in 2023.

Table 1. Characteristics of Premarital Age Adolescent Girls Based on Age, Education, Occupation, and Family Income

No	Variabel	Intervention Group		Control Group	
		n	Percentage	n	Percentage
1	Age				
	17-20 years	70	71.4	63	69.2
	21-24 years	28	28.6	28	30.8
2	Education				
	Low	26	26.5	24	26.4
	Middle	70	71.4	60	67.0
	High	2	2.0	6	6.2
3	Employment				
	Not Working	48	49.0	68	75.6
	Employed	50	51.0	22	24.4
4	Income				
	Less than regional minimum wage	75	76.5	45	49.5
	More than regional minimum wage	23	23.5	46	50.5

Table 1 shows that the majority of the intervention group was 17-20 years old and the control group was 17-20 years old. Education in the two groups was mostly in the middle education category (graduated from high school / equivalent). The majority of intervention group respondents were employed, while the majority of control group respondents were not employed. The majority of income in both groups was below the minimum wage

Primary Outcome Measures

Differences in Knowledge, Attitude and Behaviour of Premarital Age Adolescent Girls After Intervention in each group

The results of statistical tests before and after the intervention proved that in each group there were differences with a p value <0.05 (Table 2).

Table 2. Knowledge, Calorie adequacy and Iron intake of Premarital Age Adolescent Girls Before and after the intervention in each group

No	Variable	Intervention Group			Control Group		
		Mean±SD	Z Score	*p*-value	Mean±SD	Z Score	*p*-value
1	Knowledge						
	Pretest	13.97±1.95	-7.277	0.0001[a*]	13.25±1.859	-1.241	0.215[a]
	Post Test	16.12±1.78			12.98±1.972		
2	Practice in Calorie adequacy						
	Pretest		-5.164	0.0001 [b*]		-3.764	0.0001 [a*]

No	Variable	Intervention Group			Control Group		
		Mean±SD	Z Score	*p*-value	Mean±SD	Z Score	*p*-value
	Post Test						
		70.62±23.60			78.74±36.68		
		79.15±20.13			98.00±39.81		
3	Practice in iron intake						
	Pretest	34.89±21.25	-2.881	0.004 [a*]	32.7±20.86	-0.548	0.584 [a]
	Post Test	43.78±22.00			30.65±19.13		

[a] Analysis using Wilcoxon test [b] Analysis using Paired T Test

[*]Statistically significant at p=0.05

Table 2 shows that there are significant differences in the variables of knowledge, calorie adequacy and iron intake before and after treatment in the intervention group. While the control group had significant differences only in the variable of calorie adequacy.

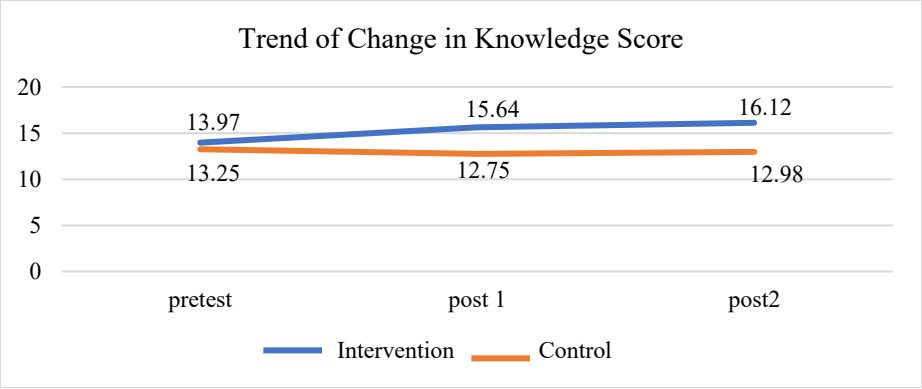

Figure 1. Trend of Changes in Knowledge of treatment and control groups

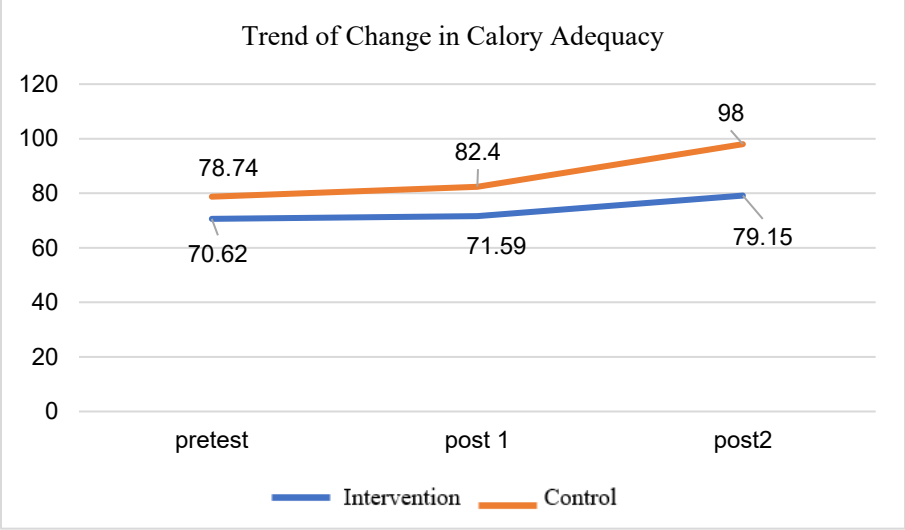

Figure 2. Trend of Changes in Calory Adequacy of treatment and control groups

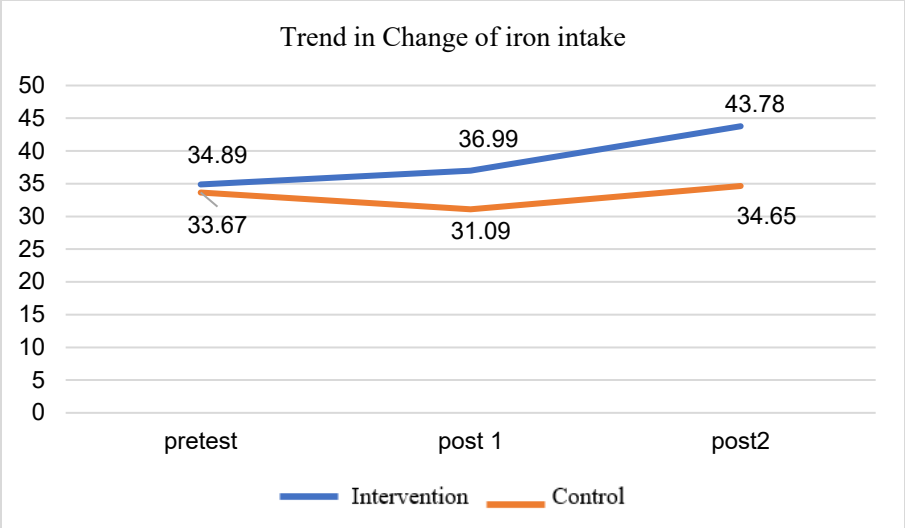

Figure 3. Trend of Changes in Fe Consumption of treatment and control groups

Figure 1 shows that the knowledge variable obtained a higher pretest score of the control group than the intervention group, but at the posttest the intervention group obtained a higher knowledge score.

Differences in Knowledge, Calory in adequacy and iron intake of Premarital Age Adolescent Girls After Intervention between the treatment group and the control group

The results of statistical tests between the treatment group and the control group after the intervention proved the difference between the two groups with a p value <0.05 (Table 4).

Table 3. Comparison of Knowledge, Calory in Adequacy and iron intake of Respondents before and after the Intervention in the control and treatment groups

Variable	Intervention Group	Control Group	*p*-value
	Mean±SD	Mean±SD	
Knowledge			
Before Intervention	13.97±1.95	13.25±1.859	0.0001[a]*
After Intervention	16.12±1.78	12.98±1.972	
Calorie In Adequacy			
Before Intervention	70.62±23.60	78.74±36.68	0.002[a]*
After Intervention	79.15±20.13	98.00±39.81	
Practice in iron intake			
Before Intervention	34.89±21.25	32.7±20.86	0.002[a]*
After Intervention	43.78±22.00	30.65±19.13	

[a] Analysis using manwithney Test
*Statistically significant at p=0.05

Table 3 shows that the variables of knowledge, calory in adequacy and practice in iron intake proved to be different between the treatment group and the control group before and after the intervention with a p-value <0.05.

DISCUSSION

Interpretation of Key Findings

The data from this study showed that there were significant differences in the variables of knowledge, attitude and practice both in the paired t-test and in the intergroup t-test before and after the intervention. This proves that the intervention through e-booklet media is effective to improve the knowledge, practice in calory in adequacy and practice in iron intake of respondents.

Comparison with Previous Studies

Knowledge is one of the domains that can change a person's behaviour. An increase in the level of knowledge will be followed by an increase in understanding and changes in one's behaviour. Changes in behaviour based on increased knowledge and understanding will be more consistent than changes in behaviour that are not based on knowledge (21,22). Knowledge is a dynamic process where a person justifies personal beliefs about information, this is because knowledge is included in the cognitive domain which leads to a person's thinking ability related to receiving information. Behaviour based on knowledge will have a greater influence and be more difficult to change(23). The knowledge of respondents in the intervention group has increased while the control group has decreased, this is in line with previous research (24–26).

This study combines the use of e booklets, discussions with peer groups through the assistance of organisations that respondents join. This research is in line with research conducted by Faridah, et al (24,27). Adolescents as a transitional period psychologically interact more with their group (26,28). Therefore, providing education through organised peer groups will have an effective impact on increasing knowledge(17,28,29).

This research intervention also uses the WA group application in conducting group mentoring. The WAG allows adolescents to be actively involved in online discussions and creates self-confidence and helps adolescents interact within their group (30). Education through whatsapp media is practical because it can be accessed wherever the mother is through her smartphone (26,31–33).WhatsApp is one of the most popular platforms used for communication within organisations (34). It is also increasingly being implemented in both public and private organisations. It helps to ensure that communication is smooth.

Knowledge improvement in this study uses the incorporation of the WAGrup method of the girls‘ organisation, through the girls’ organisation it is expected that respondents will be more open and comfortable in discussing because they are in the appropriate peer group (28). The health education process will be more effective if it is conducted through organisations (15,17). Adolescents also have problems related to eating patterns (35–37). This stage adolescents also have a need to interact with peers (38,39). This study uses peer groups or friends as educators through mentoring with WAG media. Through this peer education, it is expected to be able to accommodate the needs of respondents as adolescents, so that they are able to convey problems and are more open in receiving input. With good interaction patterns between peer educators and respondents, this is one of the supports for increasing knowledge, attitudes, practices and is expected to have an impact on improving adolescent nutritional status (40). This study is in line with a study conducted in Cameroon on 160 school students where there was a significant difference in knowledge level before and after the intervention (p value 0,0001) (41).

Non-profit organisations have been identified as an important tool and partner in conducting health promotion interventions to achieve a healthy and sustainable society (42). Health promotion in adolescent groups has an important role to play in achieving the 2030 sustainable development goals set by the World Health Organisation (WHO) (43). Organizational behavior will influence the behavior of its numbers (15,16). Community social organization tend to be able to build more active relationships within society at any time period (17). Social organization have found that social networks can be used as a tool to reach target groups more effectively through the role of digital communication in the organization (19).

The results of the research show that there are differences in the practices of young women in making efforts to prevent malnutrition during the preconception period in the intervention group and the control group. The results of this research are in line with research conducted by peer educators in England by Ray Sumantra regarding education about nutrition from senior doctors to junior doctors which can improve knowledge, attitudes and practices in hospital teams (44). Similar research involving the community to carry out interventions in the community is research conducted by Merrit K Rowena (45). Merrit's research is almost the same as researchers because it involves the community group itself to carry out interventions, so that it will provide more comfort to respondents.

Practices in this study were also assessed using calorie adequacy. The intervention group had a significant difference in calorie adequacy before and after the intervention with a mean increase of 8.55 kKal. When viewed from the number of respondents who experienced improvements in calorie adequacy, in the intervention group there were 60.2% while the control group was 57.1%. This study is in line with several studies conducted by Faza, that nutrition training conducted by cadres can increase calorie intake in toddlers (46). Research conducted by Susan

Racette states that by limiting the quality of diet for 2 years can affect calorie adequacy in respondents (47). While research by Ray Hanafi has not shown evidence that nutrition education can improve calorie adequacy (48).

Another practice measured in this study was iron intake. In this study, the mean iron intake in the intervention group was higher than the control group. Statistically, it was also evident that there was a difference before and after the intervention and there was a significant difference when compared to the control group. This study showed that there was an increase in mean iron intake in both the intervention and control groups, but the increase in the control group was higher at 8.89 points compared to the control group which increased by 0.98 points. Statistically it was also proven that there was a difference before and after the intervention, and there was a significant difference when compared to the control group. This study is in line with research conducted by Suryana by providing education about nutrition to mothers with anemic toddlers, showing there is an effect on iron intake and calorie adequacy (49). Osman Syarif's research also mentioned the effect of providing education through pocket media on iron intake (50).

The challenge in this study is the heterogeneous activities of respondents, some of whom are already working, some are still in college and there are young women who only live at home, so that it can affect the consumption patterns of respondents. The researcher felt that this mentoring model was quite effective because it was carried out through the WA group, so that differences in activity could be bridged.

Implications for Public Health

The implication of this research is that there is a significant role for organizations of young women who are no longer in school to be involved in preventing adolescent malnutrition. This is an effort to prepare young women as part of giving birth to a quality next generation for the nation.

Limitations and Cautions

This research has limitations in terms of testing the retention of knowledge, attitude and practice variables after the mentoring intervention was not carried out.

Recommendations for Future Research

It is hoped that future research will be able to examine post-action retention and the impact of intervention on the nutritional status of adolescents.

CONCLUSION

This research shows that there are significant differences in the level of knowledge, calory in adequacy and practice in Fe consumption of young women in preventing malnutrition between treatment and control group respondents. Existing youth organizations can be a driving force in changing the behavior of their members, especially in terms of preventing malnutrition during adolescence through education provided by the organization.

This research recommends that the Health Service as a policy maker be able to adopt the implementation of this youth mentoring model through a policy and facilitate material and training related to malnutrition for adolescent peer educators in each organization. Organizations are expected to provide assistance to their members regarding health through WA group communication platforms and other platforms example facebook, twitter, or Instagram commonly used by organizations.

AUTHOR'S CONTRIBUTION STATEMENT

Nur Khafidhoh as a researcher conceptualized this research, collected data, and wrote it in manuscript form. S.A Nugraheni as promoter provided guidance in terms of research content and proofreading the manuscript. Ayun Sriatmi as co-promoter contributed to the implementation of the research. Sri Winarni as co-promoter provided extraordinary support in research methods and data analysis.

CONFLICTS OF INTEREST

This research has no conflict of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

In writing this article, the author partly used AI tools in paraphrasing. However, the author conducted a review of the paraphrase results.

SOURCE OF FUNDING STATEMENTS

This research partly received financial assistance from the Indonesian Ministry of Health's PPSDMs.

ACKNOWLEDGMENTS

The researcher would like to thank the PPSDM Agency of the Ministry of Health, the Director of the Poltekkes Kemenkes Semarang and his staff, and all participants, including leaders of IPPNU organizations at district to sub-district level, companions and respondents who have contributed to this research.

BIBLIOGRAPHY

1. Estecha Querol S, Iqbal R, Kudrna L, Al-Khudairy L, Gill P. The Double Burden of Malnutrition and Associated Factors among South Asian Adolescents: Findings from the Global School-Based Student Health Survey. Nutrients . 2021 Aug 20;13(8):2867. Available from: https://www.mdpi.com/2072-6643/13/8/2867
2. Lusyana Gloria Doloksaribu AMS. Effect of Preconception Nutrition Counselling on Knowledge and Attitude of Premarital Women in Batang Kuis Sub-district. Wahana Inov [Internet]. 2019;8(1):63–73. Available from: https://core.ac.uk/download/pdf/235685026.pdf
3. Supariasa IDN, Bakri B FI. Penilaian Status Gizi. Jakarta: EGC; 2014.
4. Getacher L, Wondafrash Ademe B, Belachew T. Lived Experience and Perceptions of Adolescents on Prevention, Causes and Consequences of Double Burden of Malnutrition in Debre Berhan City, Ethiopia: A Qualitative Study. Int J Gen Med . 2023 Jan;Volume 16(January):337–56. Available from: https://www.dovepress.com/lived-experience-and-perceptions-of-adolescents-on-prevention-causes-a-peer-reviewed-fulltext-article-IJGM
5. Norris SA, Frongillo EA, Black MM, Dong Y, Fall C, Lampl M, et al. Nutrition in adolescent growth and development. Lancet. 2022;399(10320):172–84. Available from: http://dx.doi.org/10.1016/S0140-6736(21)01590-7
6. Mohamed EAE, Khalil A, Nassar HM. Evaluation of the Nutritional Status of Adolescent Students At Preparatory Schools in Port Saidcity. Port Said Sci J Nurs. 2022;9(3):86–110.
7. UNICEF Indonesia. Improving Adolescent Nutrition in Indonesia. Jakarta: Uniceff Indonesia; 2021. 66 p.
8. Ministry of Health of the Republic of Indonesia. Performance Report of the Directorate of Public Health [Internet]. Jakarta, Indonesia; 2020. Available from: https://kesmas.kemkes.go.id/assets/uploads/contents/others/20.22.lakip_ditjen.pdf
9. Sungkar A, Bardosono S, Irwinda R, Manikam NRM, Sekartini R, Medise BE, et al. A Life Course Approach to the Prevention of Iron Deficiency Anemia in Indonesia. Nutrients. 2022;14(2):1–8.
10. Kementerian Kesehatan RI. Hasil Utama Riskesdas 2018. Jakarta; 2019.
11. Kementerian Kesehatan RI. Laporan Ditjen Kesehatan Masyarakat. Jakarta; 2017.
12. Aanisah Ardiyanti, Vitria Melani, Nadiyah, Laras Sitoayu YW. Citra Tubuh, Kecukupan Gizi, Status Gizi, dan Status Anemia pada Wanita Pranikah. J Gizi. 2021;10(2):42–52.
13. IDAI. Nutrisi Pada Remaja. Idai.or.Id. 2013 [cited 2023 Jul 6]. p. 1. Available from: https://www.idai.or.id/artikel/seputar-kesehatan-anak/nutrisi-pada-remaja
14. Kemenkes. Masalah Gizi pada Remaja. Kementrian Kesehatan RI. 2023 [cited 2023 Jul 24]. p. 1. Available from: https://yankes.kemkes.go.id/view_artikel/2214/masalah-gizi-pada-remaja
15. Kuswardinah A. Perilaku Organisasi Dan Praktik Kesehatan Ibu Anak Menuju Keluarga Indonesia Sejahtera (Studi pada Kelompok Wanita Tani Kabupaten Semarang). Semarang: Unnes Press; 2014. 212 p.
16. Badu SQ, Djafri N. Kepemimpinan dan Perilaku Organisasi. Gorontalo: Ideas Publishing; 2017. 164 p.

17. Fang W, Qin C, Zhou D, Yin J, Liu Z, Guan X. The Impact of Cooperative Behavior between Social Organizations during the COVID-19 Pandemic Outbreak in Shanghai: A Simulation Approach. Int J Environ Res Public Health. 2023;20(2).
18. Fang W, Qin C, Zhou D, Yin J, Liu Z, Guan X. The Impact of Cooperative Behavior between Social Organizations during the COVID-19 Pandemic Outbreak in Shanghai: A Simulation Approach. Int J Environ Res Public Health. 2023 Jan 12;20(2):1409. Available from: https://www.mdpi.com/1660-4601/20/2/1409
19. García-Galera MC, Fernández Muñoz C, Del Olmo Barbero J. NGOs' Communication and Youth Engagement in the Digital Ecosystem. In: Social Network Analytics [Internet]. Elsevier; 2019. p. 227–47. Available from: https://linkinghub.elsevier.com/retrieve/pii/B9780128154588000128
20. Kurniawan AL, Ranisavljev M, Partap U, Shinde S, Ferrero E, Ostojic S, et al. Community-based interventions targeting multiple forms of malnutrition among adolescents in low-income and middle-income countries: protocol for a scoping review. BMJ Open. 2024;14(3):1–6.
21. Tesfaye A, Tamiru D, Belachew T. Effect of nutrition counseling on nutritional status and gestational weight gain of pregnant adolescents in West Arsi, Central Ethiopia: a cluster randomized controlled trial. Sci Rep. 2024;14(1):1–12. Available from: https://doi.org/10.1038/s41598-024-55709-y
22. Sánchez-Díaz S, Raya-González J, Yanci J, Castillo D. The influence of nutrition education intervention combined with FIFA11+ program on physical fitness attributes, physical activity behaviors, eating habits and nutritional knowledge in young basketball players. Eur J Hum Mov. 2022;48:4–20.
23. Bolisani E, Bratianu C. The Elusive Definition of Knowledge. In: Knowledge Management and Organizational Learning. 2018. p. 1–22.
24. Faridah F, Anies A, Kartasurya MI, Widjanarko B. Online educational intervention: Improving maternal knowledge and attitudes in providing developmental stimulation for stunting toddlers. Narra J. 2024 Feb 26;4(1):e591. Available from: https://narraj.org/main/article/view/591
25. Amalia Rahma, Sholikhah DM, Nur Cahyadi, Endah Mulyani, Zuhroh DF, Has DFS. Nutrition Education and Assistance Based on Behavior Change in Adolescent Girls to Improve Nutritional Status and Hemoglobin Levels. Media Gizi Indones. 2023;18(3):182–7.
26. Arisani G, Wahyuni S. The Effectiveness of Peer Group WhatsApp on Adolescent Knowledge and Attitudes about Risky Sexual Behavior. J Promkes. 2023 Mar 10;11(1):11–8. Available from: https://e-journal.unair.ac.id/PROMKES/article/view/28716
27. Ariani NP, Heriyanto H, Delfina R. Original Article Educational Videos and Booklets Influencing Family Knowledge and Attitudes in The Prevention and First Handling of Covid -19. 2024;24(1):8–16.
28. Zahrah NI, Fanami M, Ardyanto TD. The Association Between Peers Influence and Sweets Consumption Pattern in Adolescent Girls. Int Conf Nutr. 2020;1(1):4–9.
29. Otu AA, Effa EE, Onwusaka O, Omoyele C, Arakelyan S, Okuzu O, et al. MHealth guideline training for non-communicable diseases in primary care facilities in Nigeria: a mixed methods pilot study. BMJ Open. 2022;12(8).
30. Gon S, Rawekar A. Effectivity of E-Learning through Whatsapp as a Teaching Learning Tool. MVP J Med Sci. 2017 May 22;19–25. Available from: https://informaticsjournals.com/index.php/mvpjms/article/view/8454
31. Issuryanti Meinng. Pengaruh Edukasi Melalui Media WhatsApp Terhadap Pengetahuan Ibu Dalam Memberikan Asi Eksklusif. Yogyakarta; 2017.
32. Suroto S, Nandiyanto ABD. The Effectiveness of Using WhatsApp Social Media as Learning Media at Elementary School. Indones J Multidiciplinary Res. 2021;1(1):79–84.
33. Choi Y, Kim HS. Mobile application-based dietary sugar intake reduction intervention study according to the stages of behavior change in female college students. J Nutr Heal. 2019;52(5):488–500.
34. Asti EG, Sumarsid S. Analisis Konseptual Faktor-Faktor Penggunaan Aplikasi WhatsApp pada Manajemen Pendidikan. Labs J Bisnis dan Manaj. 2023;28(2):33–45.
35. Abd. Kadir A. Kebiasaan Makan dan Gangguan Pola Makan Serta Pengaruhnya Terhadap Status Gizi Remaja. J Publ Pendidik. 2016;VI(1):49–55.
36. Fauziyyah AN, Mustakim M, Sofiany IR. Pola Makan dan Kebiasaan Olahraga Remaja. J Penelit dan Pengemb Kesehat Masy Indones. 2021;2(2):115–22.

37. Hallström L, Vereecken CA, Labayen I, Ruiz JR, Le Donne C, García MC, et al. Breakfast habits among European adolescents and their association with sociodemographic factors: The HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) study. Public Health Nutr. 2012;15(10):1879–89.
38. Diananda A. Psikologi Remaja Dan Permasalahannya. J ISTIGHNA. 2019;1(1):116–33.
39. Ouyang Y, Ouyang Z, Xu X. Parental and Adolescent Educational Expectations and Adolescent Problem Behaviors: The Role of Deviant Peer Affiliations. Int J Environ Res Public Health. 2023;20(3).
40. Wiafe MA, Apprey C, Annan RA. Impact of nutrition education and counselling on nutritional status and anaemia among early adolescents: A randomized controlled trial. Hum Nutr Metab [Internet]. 2023;31(December 2022):200182. Available from: https://doi.org/10.1016/j.hnm.2022.200182
41. Nwachan MB, Ejoh RA, Noumo NT, Njong CE. The effects of nutrition and health education on the nutritional status of internally displaced schoolchildren in Cameroon: a randomised controlled trial. J Nutr Sci. 2024;13(2).
42. Van Herwerden LA, Reidlinger DP, Palermo C. The role of communication, building relationships, and adaptability in non-profit organisational capacity for health promotion. Health Promot Int. 2022;37(3):1–12.
43. Alruwaili TAM, Alshehri SAK, Thirunavukkarasu A, Elfarargy MS, Alanazi KT, Alruwaili KMR, et al. Assessment of health promotion behavior and associated factors among the northern Saudi adolescent population: a cross-sectional study. PeerJ. 2023;11:1–15.
44. Ray S, Laur C, Douglas P, Rajput-Ray M, Van Der Es M, Redmond J, et al. Nutrition education and leadership for improved clinical outcomes: Training and supporting junior doctors to run "Nutrition Awareness Weeks" in three NHS hospitals across England. BMC Med Educ. 2014;14(1):1–11.
45. Merritt RK, de Groot J, Almajali L, Patel N. Using community-based prevention marketing to generate demand for healthy diets in Jordan. Nutrients. 2021;13(9):1–12.
46. Muhammad Abdillah F, Astria Paramashanti B. Maternal nutrition education by trained cadres increased energy and protein intakes among children under-fives. AcTion Aceh Nutr J. 2020;2(5):156–63. Available from: http://dx.doi.org/10.30867/action.v5i2.313
47. Racette S, Garr Barry V, DeGraff J, Gilhooly C, Das SK. A 2-Year Calorie Restriction Intervention Improves Diet Quality Without Compromising Nutritional Adequacy: The CALERIE Trial. Physiology [Internet]. 2024 May;39(S1). Available from: https://journals.physiology.org/doi/10.1152/physiol.2024.39.S1.1677
48. Hanapi R, Fathonah S. Pengaruh Literasi Gizi terhadap Kecukupan Energi dan Protein pada Mahasiswa Prodi Pendidikan Tata Boga Universitas Negeri SeMarang. Food Sci Culin Educ J. 2023;12(1):1–10.
49. Suryana S, Fitri Y, Yunianto AE, Bustami B, Lusiana SA. Nutritional Education to the Nutritional Maternal Knowledge and Iron Intake among Toddlers with Anemia. Open Access Maced J Med Sci. 2022;10(E):1434–9.
50. Syarief O, Dwiayu AR, Mulyo GPE, Fauziyah RN, Aminah M, Surmita S, et al. The effect of nutrition education using pocketbook media on iron and protein intake. Open Access Maced J Med Sci. 2021;9:936–9.