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The effect of delivering lectures assisted with guideline book and WhatsApp broadcasts on the knowledge and attitudes among pregnant women

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ABSTRAK

Latar Belakang: *Saat ini kejadian stunting masih menjadi salah satu permasalahan gizi yang terjadi pada balita di dunia. Balita stunting termasuk ke dalam masalah gizi kronik yang penyebabnya meliputi banyak faktor, salah satunya adalah gizi ibu saat kehamilan. Pengetahuan dan sikap gizi pada ibu hamil diupayakan dapat diubah melalui pendekatan secara sistematis dan terus-menerus terhadap ibu hamil. Salah satu cara yang akan digunakan adalah edukasi dengan menggunakan buku pedoman berisi materi seputar gizi kehamilan.*
Tujuan: *Menganalisis pengaruh pemberian buku ceramah disertai buku pedoman dan WhatsApp broadcast terhadap perubahan pengetahuan dan sikap ibu hamil di Kabupaten Ponorogo.*
Metode: *Jenis penelitian adalah eksperimental kuasi dengan rancangan pretest-posttest with non-equivalent control design. Penelitian ini diikuti oleh ibu hamil di Kabupaten Ponorogo sebanyak 54 responden yang dibagi ke dalam dua kelompok subjek yaitu kelompok kontrol dan kelompok perlakuan. Masing-masing kelompok akan diberikan pretest dan posttest. Kelompok kontrol adalah kelompok yang hanya mendapat edukasi gizi berupa ceramah, sedangkan kelompok perlakuan adalah kelompok yang mendapatkan edukasi gizi berupa ceramah disertai buku pedoman dan pesan broadcast melalui WhatsApp. Analisis statistik yang digunakan adalah Wilcoxon Signed Rank Test dan Mann-Whitney U Test.*
Hasil: *Hasil uji Wilcoxon Signed Rank Test menunjukkan bahwa terdapat perbedaan rerata yang signifikan ($p<0,05$) pada variabel pengetahuan gizi dan sikap gizi sebelum dan sesudah diberikan intervensi pada masing-masing kelompok perlakuan dan kontrol yaitu masing-masing kurang dari 0,001. Hasil uji Mann Whitney U Test menunjukkan bahwa terdapat perbedaan yang signifikan ($p<0,05$) dengan nilai p value 0,042 pada variabel pengetahuan gizi namun tidak terdapat perbedaan yang signifikan ($p>0,05$) pada variabel sikap gizi dengan nilai p value 0,531.*
Kesimpulan: *Memberikan edukasi gizi melalui ceramah yang disertai dengan buku panduan dan pesan broadcast WhatsApp memiliki pengaruh pada pengetahuan gizi ibu hamil, tetapi tidak memiliki pengaruh pada sikap gizi ibu hamil.*

KATA KUNCI*: buku; gizi; ibu hamil; pengetahuan; perilaku*

ABSTRACT

Background: *Stunting remains one of major nutritional problems affecting toddlers worldwide. Stunted toddlers are categorized as experiencing chronic malnutrition, whose causes include various factors, one of which is maternal nutrition during pregnancy. Nutritional knowledge and attitudes among pregnant women can be altered through systematic and continuous approaches to education. One method used is education using guideline books containing pregnancy nutrition content.*

Objectives: *To analyze the effect of delivering lectures assisted with guideline book and WhatsApp broadcasts on changes of the knowledge and attitudes of pregnant women in Ponorogo Regency.*

Methods: *This study employed a quasi-experimental design with a pretest-posttest with non-equivalent control group design. It involved 54 pregnant women in Ponorogo Regency, divided into two groups: the control group and the intervention group. Each group underwent pre-tests and post-tests. The control group received nutritional education in the form of lectures only, while the intervention group received nutritional education through lectures assisted with guideline books and WhatsApp broadcasts. Statistical analyses included the Wilcoxon Signed Rank Test and Mann Whitney U Test.*

Results: *The Wilcoxon Signed Rank Test results indicated significant mean differences ($p<0.05$) in nutritional knowledge before and after the intervention in each treatment and control group, with p value less than 0.001. The results of the Mann Whitney U Test show that there is a significant difference ($p<0.05$) in the nutritional knowledge variable with p value 0,042, but there is no significant difference ($p>0.05$) in the nutritional attitude variable with p value 0,531.*

Conclusions: *Providing nutritional education through lectures assisted by a guideline book and WhatsApp broadcasts has an impact in the nutritional knowledge of pregnant women but does not have an impact on their nutritional attitudes.*

KEYWORD*: behavior; book; knowledge; nutrition; pregnant women*

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INTRODUCTION

Stunting is a critical global nutritional issue characterized by impaired growth and development in children due to chronic malnutrition and recurrent infections. A stunted child is characterized by length or height that is below the established standard. The threshold for stunting, according to the Indonesian Ministry of Health in 2018, is less than -2 standard deviations from the median child growth standard set by WHO (1). In 2017, the prevalence of stunting among children under five worldwide was 22.2%, or around 150.8 million children. More than half of them were from Asia, accounting for 55% (2). Meanwhile, in Indonesia, the prevalence of stunting decreased from 24.4% in 2021 to 21.6% in 2022 (3). However, more effort is needed to reduce the prevalence further because the Ministry of Health has set a target of 14% by 2024.

In 2021, the government designated 360 regencies and cities as focus locations for integrated stunting reduction interventions, in line with the targets in the National Medium-Term Development Plan (RPJMN) for 2020-2024. Ponorogo Regency, with a stunting of 21% in 2021 and 14,2% in 2022, has been identified as one of the priority regions for integrated stunting reduction interventions. Ponorogo Regency was identified as one of the regions included in the expansion of focus locations for integrated stunting reduction interventions in 2021 (4). By 2023, Ponorogo Regency has designated 25 villages and urban areas across 16 sub-districts as Focus Locations for Stunting Reduction. One of the planned activities for the integrated stunting reduction presentation in Ponorogo Regency is the assistance for prospective brides, pregnant

women, mothers giving birth, children under two years old, and children under five years old. Over the past decade, statistics regarding stunting have not shown significant improvement. This indicates that the issue of stunting is highly urgent and requires immediate attention. Stunting in toddlers is a form of chronic malnutrition. The causes of stunting from household and family factors include poor nutrition before pregnancy, during pregnancy, during breastfeeding; short maternal stature; intrauterine growth restriction (IUGR) and premature birth, as well as adolescent pregnancies. Additionally, low birth weight can be caused by mothers not receiving nutritional counseling during prenatal check-ups, premature birth, short maternal height, and smoking during pregnancy (5, 6, 7).

One of stunting interventions initiated by the government is improving access to nutritional and health services (8). Pregnant women have a crucial role in endorsing better interventions to prevent nutritional issues that can occur in young children, including stunting, by strengthening their nutritional status during pregnancy and breastfeeding (9,10,11). Lack of knowledge about diet during pregnancy is a major barrier for mothers to practice good dietary habits and contribute to the occurrence of stunting (5,12,13). Knowledge is correlated with attitude. Women of reproductive age with good knowledge also influence their attitude towards good nutritional intake (14).

Systematic and continuous approaches are meant to improve nutritional knowledge and attitudes among pregnant women. One of the methods used is providing a guideline book for pregnant women assisted with verbal lectures and followed by self-monitoring by the pregnant women themselves. A guideline book is a book used as a reference for doing something (15). There is an example of a health book designed with pictures that the researcher finds attractive, which is the Maternal and Child Health Book. The nutritional information in the Maternal and Child Health Book includes an iron supplement tablet intake control box, a weight gain chart, preeclampsia screening, and daily food and drink portions (16). Inspired by this, the researcher is creating a guidebook that contains more comprehensive material, specifically about nutrition during pregnancy. This includes definitions of food sources of carbohydrates, proteins, and fats; health problems during pregnancy and their prevention, such as preeclampsia and anemia; ways to address pregnancy-related nutritional issues; as well as facts and myths related to maternal nutrition. This guidebook is illustrated to help visualize the content. Using a combination of various methods and promotional media is highly beneficial in delivering health information to pregnant women about preparing for safe childbirth (17). The author took the initiative to combine the distribution of guideline books to pregnant women with broadcast messages sent regularly to them. These broadcast messages contain explanations on the content of the guideline book. Based on a study, health education about cervical cancer provided through WhatsApp groups was effective in increasing knowledge and motivation (18). To address this, systematic and continuous approaches are essential. This study an educational intervention using a guideline book containing comprehensive maternal nutrition information, coupled with regular WhatApp broadcasts to reinforce learning. The combination of these tools aims to improve nutritional knowledge and attitudes among pregnant women, ultimately contributing to stunting in Ponorogo Regency.

MATERIALS AND METHODS

This study is a quasi-experimental research with a pretest-posttest with non-equivalent control design. The research was conducted in three districts in Ponorogo Regency, East Java, from January to March 2024. In this study, there were two groups of subjects: the control group and the treatment group. Each group was given a pretest and posttest. The control group only received nutritional education through lectures, while the treatment group received nutritional education through lectures and a guideline book assisted by broadcast messages via WhatsApp. The respondents in the control group and the treatment group live in different subdistricts. The respondents in the treatment group are located in the Jenangan subdistrict, while the respondents in the control group are located in the Sooko and Sawoo subdistricts.

The sampling technique is Multistage Sampling, which uses various sampling methods together. The first stage is to cluster random sampling to determine the subdistricts chosen as research locations. Then, the process of selecting subjects within each chosen subdistrict uses purposive sampling technique. In the selection of respondents, inclusion and exclusion criteria are established. The inclusion criteria set are: pregnant women who reside in stunting locus villages (Jenangan Subdistrict, Sooko Subdistrict, and Sawoo Subdistrict), pregnant women who can read, and pregnant women who use WhatsApp as a communication medium. The exclusion criteria established are: pregnant women with food allergies, pregnant women experiencing hyperemesis gravidarum, and pregnant women who did not agree to participate in the study. This study involved a total of 54 pregnant women, with 27 pregnant women in each group. This study has been approved by the Health Research Ethics Committee (KEPK) of the Faculty of Medicine, UNS (214/UN27.06.11/KEP/EC/2023).

The researcher also explained the purpose of the study and the data collection process to the respondents before asking them to sign the written consent form (Informed Consent). The intervention given to the treatment group included lectures held twice, the provision of a guideline book, and WhatsApp broadcasts. WhatsApp broadcasts were sent out 11 times with content according to the guidebook. On the other hand, the intervention for the control group consisted only of lectures held twice. This study was conducted over a period of one month. The pretest data collection was conducted on the 1st day before the respondents were given the intervention, and the posttest data collection was conducted on the 30th day. During the meetings, the researcher explained the material and discussed it with the pregnant women. Some participants asked questions about nutrition that they were not familiar with. The material has covered the entire content of the guideline book. The guideline book was created by the researcher. Before the guideline book was given to the respondents in the intervention group, it was evaluated by subject matter experts, language experts, and communication experts to ensure that it was suitable for use as an educational medium.

Table 1. Content of WhatsApp Broadcast

Day	Content of WhatsApp Broadcast
1	The First 1000 Days of Life
3	Stunting
5	Balanced Nutrition for Pregnant Women
7	Balanced Nutrition for Pregnant Women: Sources of Carbohydrates
9	Balanced Nutrition for Pregnant Women: Sources of Protein
11	Balanced Nutrition for Pregnant Women: Vegetables and Fruits
13	Nutritional Issues During Pregnancy
15	Preeclampsia
20	Anemia
24	Facts And Myths About Maternal Nutrition
28	Facts And Myths About Maternal Nutrition

The guideline book contains pictures as part of its content (**Figure 1**). The guideline book is printed in color, A5 size, and consists of 29 pages. Before distributed, the guidebook was first validated by material experts, language experts, media experts, and users (pregnant women). Each expert has a background in education, expertise, and experience in their field according to the established criteria. The instruments used in the study include knowledge questionnaires, attitude questionnaires, and dietary pattern questionnaires, which consist of a 24-hour food recall questionnaire and a Food Frequency Questionnaire (FFQ). The knowledge and attitude questionnaires were developed by the researcher, then validated and assessed for reliability on 30 respondents outside the research area. The validity of knowledge and attitudes of pregnant women was tested for both validity and reliability. The validity test results for the knowledge and attitude questionnaires showed that all items had values above the r-table value of 0.3061.

Meanwhile, the Cronbach's alpha reliability score for the knowledge questionnaire was 0.708, and for the attitude questionnaire, it was 0.741, which categorizes both as reliable.

Meanwhile, the 24-hour food recall questionnaire and the FFQ questionnaire were obtained from existing references. The knowledge questionnaire consists of questions related to balanced nutrition, nutrition for pregnant women, supplementation for pregnant women, maternal nutrition status, nutritional issues during pregnancy, stunting, as well as facts and myths about maternal nutritionCorrect answers are scored as "one," while unknown or incorrect answers are scored as "zero." The highest score achievable is 20 points. Meanwhile, the attitude questionnaire consists statements about balanced nutrition, dietary management for pregnant women, supplementation for pregnant women, attitudes related to nutritional issues during pregnancy, as well as facts and myths related to nutrition during pregnancy. The attitude questionnaire contains 5 answer choices. "Strongly disagree" receives a score of 1, "disagree" receives a score of 2, "uncertain" receives a score of 3, "agree" receives a score of 4, and "strongly agree" receives a score of 5. The highest score achievable is 50. Data collection was conducted by 3 enumerators with a background in nutrition education

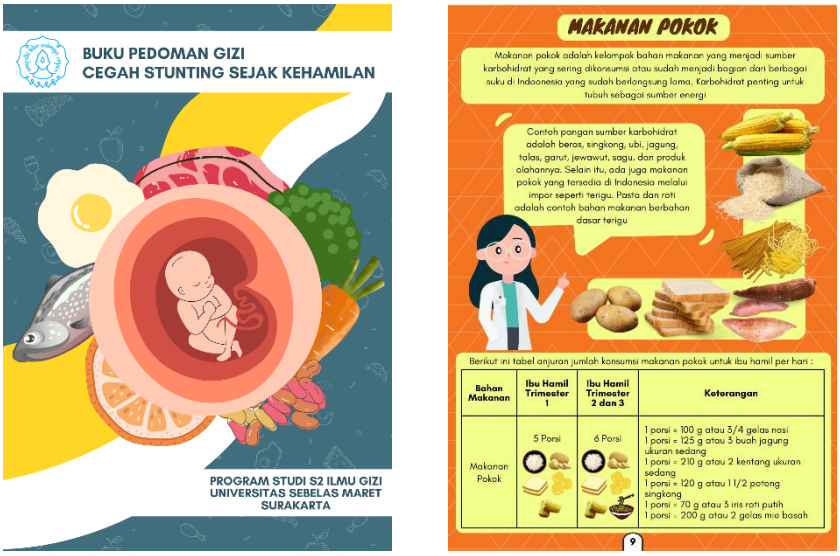

Figure 1. Excerpt from the contents of the guideline book

. Data analysis utilized the Wilcoxon Signed Rank Test to examine if there was a significant difference in knowledge and attitudes before and after the intervention. Additionally, the Mann-Whitney U-Test was conducted to determine if there was a significant difference in post-test knowledge and attitudes between the treatment and control groups. The data were analyzed using SPSS Statistical Package Version 22 with a 95% confidence interval and a p-value <0.05.

RESULTS AND DISCUSSIONS

Respondent Characteristics

Based on age data, 47 respondents (87%) were aged between 20-35 years old, while 7 respondents (13%) were above 35 years old. Most respondents' occupations were housewife, accounting for 40 individuals (74%), and the highest level of education attained by most respondents was senior high school (SMA/SMK), which includes 24 individuals (44%). In terms of income, 28 respondents (52%) had a family income of less than Rp. 2.235.311 per month. The characteristics of the respondents are detailed in the following **Table 2**.

From the observations made during the study for respondent's knowledge, before the intervention, 37% of respondents in the treatment group had poor knowledge, 56% had moderate knowledge, and only 7% had good knowledge. These percentages increased after the intervention, with 22% of respondents having

moderate knowledge and 78% having good knowledge. Similarly, in the control group, before the intervention, 37% of respondents had poor knowledge, 52% had moderate knowledge, and 11% had good knowledge. The percentage of knowledge in the control group also increased after the intervention, with 52% having moderate knowledge and 48% having good knowledge.

Table 2. General Characteristics of Respondents

Characteristic	T	C	Total	%
	n=27	n=27	n=54	
Age				
20-35 years	22	25	47	87
>35 years	5	2	7	13
Occupation				
Housewife	18	22	40	74
Self-employed	6	2	8	15
Employee	3	3	6	11
Education				
Elementary School	3	2	5	9
Junior High School	7	8	15	28
Senior High School	13	11	24	44
Diploma (D1-D3)	0	1	1	2
Bachelor (S1/D4)	4	5	9	17
Family Income				
≥ Rp. 2.235.311*	12	14	26	48
< Rp. 2.235.311	15	13	28	52

Information: T=Treatment Group (Lectures, Guideline Book, and Whatsapp Broadcasts, C=Control Group (Lectures)
*based on Ponorogo Regency Minimum Wage

Table 4 shows that The Mann-Whitney test before intervention for the variables of knowledge have p-values 0,558 and attitude have p-values 0,671 (greater than 0,05), indicating no significant differences in the pretest results between the treatment group and the control group. There is also an increase in the mean values of the knowledge and attitude variables before and after the intervention, both in the treatment group and the control group. The difference in the knowledge variable in the treatment group is 18,52 while in the control group is 14,82. Meanwhile, the difference in the attitude variable in the treatment group is 8,37 and in the control group is 7,48. So, it can be concluded that the difference between the pretest and posttest scores for both variables was higher in the treatment group than in the control group. The results of the Wilcoxon Signed Rank Test for nutritional knowledge and nutritional attitude yielded Asymp. Sig. (2-tailed) values of less than 0.001 for both the treatment and control groups, indicating that there is a significant effect of nutrition education on nutritional knowledge and nutritional attitude in each group

Table 3. Level of Respondent's Knowledge and Attitude

Score		Treatment Group		Control Group	
		Pretest (n)	Posttest (n)	Pretest (n)	Posttest (n)
Level of Knowledge	Good (76-100%)	2	21	3	13
	Moderate (56-75%)	15	6	14	14
	Poor (<55%)	10	0	10	0
Level of Attitude	Good (>80%)	14	23	10	19
	Moderate (60-80%)	12	4	17	8
	Poor (<60%)	1	0	0	0

Table 1. Distribution of respondents based on individual characteristics in the experimental group and control group in 2023

Individual Characteristics	Group				P-Value[a]
	Experiment		Control		
	n	%	n	%	
Age					
≥ 30 years	18	60.0	20	66.7	0.264[b]
< 30 years	12	40.0	10	33.3	
Mother's Education					
≥ Senior high school	21	70.0	15	50.0	
< Senior high school	9	30.0	15	50.0	0.114[c]
Occupation					
Worked	1	3.3	1	3.3	
Nor worked	29	96.7	29	96.7	0.754[c]

[a]significance 5%; [b]independent t-test; [c]chi square test

Meanwhile, the Mann-Whitney test after intervention results showed a value of 0,042 for the nutrition knowledge variable, meaning that p<0,05. Therefore, it can be statistically concluded that there is a difference in nutrition knowledge between the treatment group and the control group after the intervention. For the nutrition attitude variable, the result was 0,531, indicating p>0,05, so it can be statistically concluded that there is no difference in nutrition attitudes between the treatment group and the control group after the intervention. Meanwhile, the booklet intervention did not alter the attitudes of nutritional aspects. In line with Rukmana's research, balanced nutrition knowledge was not significantly correlated with attitudes (21).

That happens due to environmental factors such as beliefs, preferences, physiological changes, food habits, and household composition. Those factors can influence the mother's attitude towards the nutritional aspect while the condition of knowledge is good (22). This should receive special attention from mothers of toddlers whose children are stunted, as it was found that maternal nutritional knowledge was found to be less in the group of mothers with stunted toddlers than in the group of normal toddlers (23). Providing optimal nutrition during infancy and toddlerhood is very important because this period is characterized by the rapid growth and development of children. Analyses on independent t-tests prove that there is an influence of booklet media intervention on total literacy in nutrition, clean water, and sanitation, indicated by significant changes in the average score of total knowledge and attitudes from the control and experimental groups (p=0.022). The literacy condition of the experimental group before and after the intervention was classified as good (score=14), the most visible change was nutritional literacy from good to very good. This is in line with research by Suryati and Supriyadi (2019), pretest and posttest knowledge of mothers in the intervention group who were given booklet education showed a significant increase (p=0.001) (24).

Discussion of Nutritional Knowledge

Based on the Mann-Whitney test before the intervention, there was no difference in knowledge between the treatment and control groups before the intervention. Therefore, it can be concluded that the respondents in both groups were homogeneous (having the same level of knowledge). After the Wilcoxon test was conducted, it was found that there is an increase in the mean values of the knowledge with a p-value <0,001, indicating that there is an influence of providing nutrition education on nutrition knowledge in each group

Table 4. Statistics Results and Wilcoxon Test for Pretest and Posttest of Nutritional Knowledge and Attitudes

Variable	Pretest (Before)		Posttest (After)		∆**x**	*p-value*
	Mean ± SD	Min Max	Mean ± SD	Min Max		
Knowledge						
Treatment	63,33 ± 10,377	45 – 80	81,85 ± 8,104	65 – 95	18,52	<0,001
Control	61,85 ± 10,844	45 – 90	76,67 ± 9,405	60 – 95	14,82	<0,001
∆x	1,48	10	5,18	5	-	-
p-value	0,558	-	0,042	-	-	-
Attitude						
Treatment	77,63 ± 8,303	60 – 90	86,00 ± 5,630	74 – 94	8,37	<0,001
Control	77,33 ± 8,152	64 – 92	84,81 ± 6,708	76 – 94	7,48	<0,001
∆x	0,3	4	1,19	0	-	-
p-value	0,671	-	0,531	-	-	-

. The researcher then conducted the Mann Whitney test after the intervention, and the result shows that there was a difference in knowledge between the treatment and control groups after the intervention. The consistent results on nutritional knowledge, showing significance in both the Wilcoxon test and the Mann Whitney test after the intervention, indicate that providing nutrition education through lectures assisted by a guideline book and WhatsApp broadcasts has an impact and makes a difference in the nutritional knowledge of pregnant women. The findings of this study are consistent with a research which demonstrated a significant difference in knowledge about anemia before and after education with illustrated guideline books (19). Another study in line with these results stated that there was a significant difference in the level of knowledge of mothers of malnourished toddlers before and after intervention with pocketbooks (20). Another study in alignment with these findings indicated a significant relationship between the use of Maternal and Child Health Book and respondents' knowledge, where respondents who used Maternal and Child Health Book more frequently had good knowledge (21).

Research on the impact of providing WhatsApp broadcasts on the knowledge of women of childbearing age about early detection of cervical cancer also shows that WhatsApp broadcasts have an effect on increasing their knowledge (22). This aligns too with research on education through WhatsApp for mothers, which found an increase in mothers knowledge about exclusive breastfeeding after receiving education via WhatsApp (23). A study that examined the use of short messages through WhatsApp group to educate mothers of toddlers found that sending short messages through WhatsApp group can improve mother's knowledge about stunting (24). SMS is effective in improving the knowledge of breastfeeding mothers (25).

During the education session, respondents showed enthusiasm in paying attention to the material presented by the researcher. Respondents also found that the guideline book provided was easy to understand and engaging to read. A study suggested that books containing a combination of pictures and text could be well-received by pregnant women from various educational backgrounds (26). Additionally, the use of WhatsApp as a platform for broadcasting messages can be considered as an educational option for pregnant women. The limited number of healthcare workers and the emergence of internet-based technological advancements supporting health promotion are considered to have a positive impact on health education (27).

Discussion of Nutritional Attitude

Based on the Mann-Whitney test before the intervention, there was no difference in nutritional attitude between the intervention and control groups before the intervention. Therefore, it can be concluded that the respondents in both groups were homogeneous (having the same level of

attitudes). After the Wilcoxon test was conducted, it was found that there is an increase in the mean values of the attitude with a p-value <0,001, indicating that there is an influence of providing nutrition education on nutrition knowledge in each group. The researcher then conducted the Mann Whitney test after the intervention, and the result shows that there was no difference in attitude between the treatment and control groups after the intervention. The different results on nutritional attitude, with significance in the Wilcoxon test but no significance in the Mann-Whitney test, suggest that providing nutrition education through lectures, along with a guideline book and WhatsApp broadcasts, does not have an impact on the nutritional attitudes of pregnant women. This is in line with research on the impact of nutritional education through lectures and booklets on improving the nutritional knowledge and attitudes of teenagers, which showed that there was no difference in the change of nutritional attitudes between the two treatment groups (28). Human attitudes have three components, one of which is the affective component. The affective component is the emotional aspect related to the evaluation of the information possessed by an individual. This emotional decision manifests in two forms: positive attitudes and negative attitudes (29). In this study, the attitude of the mothers showed a negative attitude, where the response to the stimulus is not yet observable by others.

Based on its intensity, attitude has levels, which are receiving, responding, valuing, and being responsible (29). In this case, when the researcher conducted the study, respondents received and responded well to the lectures. However, when WhatsApp broadcasts were sent, the responses varied. Some respondents were enthusiastic and provided feedback, while others merely thanked or just read the messages. Additionally, when providing the guideline book, the researcher asked respondents to make a summary as an indication that they had truly read the book. The responses were also varied: some respondents created detailed summaries, some made only brief summaries, and a small part did not make a summary at all. These differing responses were influenced by various factors, such as the choice of words in the broadcast messages that may not have been engaging enough to encourage enthusiastic feedback. Furthermore, factors affecting the creation of summaries included the pregnant women being occupied with other activities and their unfamiliarity with summarizing. These issues represent limitations in the study, and it is hoped that future researchers can address these shortcomings to minimize bias in research results..

CONCLUSIONS AND RECOMMENDATIONS

The conclusion of this study is that delivering nutritional education through lectures assisted by a guideline book and WhatsApp broadcasts, has an impact in the nutritional knowledge of pregnant women, but does not have an impact on their nutritional attitudes. Further research is needed on nutritional education using guideline books assisted by WhatsApp broadcasts, with the addition of other variables such as weight changes during pregnancy.

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