

## Effectiveness of pocketbook as the media of preconception nutrition education

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### Article Info

#### Article history:

Received Feb 4, 2023

Revised Oct 9, 2023

Accepted Oct 17, 2023

#### Keywords:

Education

Lecture

Nutrition

Pocketbook

Preconception

### ABSTRACT

Nutrition improvement in preconception women is a new paradigm in dealing with nutritional problems. Preconception nutrition intervention is a strategic way to break the phenomenon of stunting between generations. This study aimed to compare the effectiveness of nutrition education through pocketbooks and lectures on knowledge and attitudes. This study was used as a quasi-experiment with a pretest-posttest control group design. The population in this study were all pharmaceutical students and health analysts at Politeknik Kesehatan Medan. The minimum sample is using Hypothesis tests for two proportions ( $n=100$ ). Sample selection used a simple random sampling technique. The intervention group was given a pocketbook and the control group was given a lecture. Respondents' knowledge and attitudes were measured before and after treatment using a questionnaire. Data were analyzed by paired t-test and independent t-test. Nutrition education through pocketbooks and lectures had a significant effect on knowledge and attitudes about preconception nutrition ( $p<0.001$ ), but the pocketbook was more effective than the lecture method in increasing knowledge ( $p<0.001$ ) and attitudes ( $p=0.017$ ). Preconception nutrition education by providing pocketbooks is effectively used as a preconception nutrition intervention with a wider target range, and time efficiency, and does not depend on material providers.

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## 1. INTRODUCTION

One of the factors that influence the progress of a nation is the quality of individuals who live and develop in the country. Young people who are the spearhead of the nation's progress need to be prepared as early as possible both physically, morally, and materially. The quality of the nation's next generation can be formed starting from the mental readiness and health of a mother in the face of her pregnancy [1]–[5]. Adolescent nutrition problems and preconceptions become a global public health problem not only affecting the health of adolescents and adult women but also affecting the next generation. Preconception health services are a health strategy to improve a mother's health to reduce maternal and child mortality [6], [7].

Analysis of the nutritional situation of preconceptional women and program findings emphasize the importance of reaching out to preconceptional women. There are still many nutritional problems in preconceptional women. The results of the 2018 Riskesdas found that the number of women of childbearing

age with chronic energy deficiency (WUS KEK) was still high even though it had decreased from the results of the 2013 Riskesdas. In the 2018 Riskesdas, WUS KEK was pregnant by 17.3% and WUS KEK was not pregnant by 14.5% [8]. Anemia in Indonesia among women of childbearing age (15-49 years) has increased from 21.6% in 2018 to 22.3% in 2019 [9]. Preconception service is the service of women of reproductive age before pregnancy to ensure that conditions and behavior of women during pregnancy can pose risks to mother and baby that can be identified and managed so that they can be detected early in the pregnancy. Based on this, the improvement of nutrition must start from preconception [5], [10].

Efforts to improve preconception nutrition throughout the world are carried out to reduce the adverse effects of pregnancy. Because many women don't realize that they are pregnant until the fifth week of pregnancy. When important fetal processes have begun, the first antenatal visit is relatively late to address perinatal risk factors [11]. Preconception care is a series of interventions that aim to identify and modify biomedical, behavioral, and social risks to women's health or pregnancy outcomes through prevention and management, emphasizing factors that must be followed before conception so that early pregnancy has a maximum impact [12], [13]. Nutritional adequacy in couples, especially in prospective mothers, can reduce the risk of low birth weight (LBW) babies born, premature, inflammation, and infection rates in infants and can break the chain of malnutrition problems during pregnancy. Several observational studies have shown that body size such as height, weight, and body mass index (BMI) during the preconception period were associated with LBW [14].

Improvement of nutrition in preconception women is a new paradigm in dealing with maternal nutrition problems in Indonesia. Awareness and insight of adolescents who will become bride candidates need to be elevated, namely that the birth of a child is not the initial concern that must be given. But long before that, namely when a couple of husband and wife began to prepare themselves for the presence of the baby and at the beginning of pregnancy. Early pregnancy is the starting point where attention is given to the baby, especially in maintaining good nutritional intake optimally, at least for the next 1,000 days [5], [15], [16].

Knowledge of nutrition is knowledge of the correlation between food consumption and body health. Teenagers who have good knowledge of nutrition are expected to be able to prepare themselves for pregnancy such as reaching a healthy weight before pregnancy, knowing nutrition preparation before conception, choosing foods that have good nutritional value, and balance for themselves, the fetus, and family. Good knowledge of nutrition can help someone to learn about how to store, process, and use quality food for consumption. The purpose of this research is to analyze the effect of nutrition education through a bride candidate's nutrition pocketbook on knowledge and attitudes, to analyze the influence of preconception nutrition education through lectures on knowledge and attitudes, and to analyze the effectiveness of preconception nutrition education through pocketbooks and the lecture method to knowledge and attitudes.

Preconceptional nutrition interventions are any interventions given to women and couples of childbearing age, regardless of pregnancy status or desire before becoming pregnant, to improve the health of women, newborns, and children [17], [18]. In Indonesia, preconception interventions have been carried out through health programs at the health office (*Dinas Kesehatan*) which are specific strategies for preventing stunting. In Medan City, preconception interventions began to be carried out in 2018 with interventions starting with the signing of an agreement between the health service and the Office of Religious Affairs (KUA) in providing preconception nutrition education to prospective brides.

The preliminary survey was conducted by researchers at the community health center (*puskesmas*), the collaboration was still on signing the agreement and the preconception nutrition education process for the prospective bride and groom had never taken place. In an interview with the coordinating midwife at the Puskesmas, the person in charge of the activity stated that the obstacle in implementing this intervention was that there was no definite schedule for the visit of the bride and groom, making it very difficult to adjust it to the activities at the Puskesmas. Another preconceptional intervention that has taken place is giving Ferrous Fumarate (Fe) tablets to adolescents. The health office through the Puskesmas distributed Fe tablets to schools. The results of the preliminary survey showed that the distribution of Fe tablets to students was not accompanied by nutrition education due to time constraints. For this reason, an effective nutritional education method is needed that does not depend on health workers or health service providers.

Nutrition education is important to produce quality human resources. Nutrition education is an effort to make changes in knowledge, attitudes, and skills or practices in terms of food consumption. Nutrition education is very important because even though people's purchasing power is high and food is available, if people's knowledge of nutrition is not good, then people cannot meet their nutritional needs. Drummond, Reyes, Cooke, and Stage (2022) state that: "The goal of food and nutrition education is directed so that each target has sufficient insight in terms of nutritional needs and has technical skills in selecting, processing and serving food at the household level." Thus food and nutrition education is important to be given to everyone so that they have food and nutrition knowledge and skills for survival in a quality future [19]. Several previous studies have confirmed the effect of pocketbooks on counseling such as research by [20], [21]. In

this research, we aim to analyze the use of pocketbooks for programs that are new and have never been heard of by the general public such as preconception nutrition. This preconception of nutrition intervention is a new paradigm in Indonesia and the general public has never heard of it [22]–[24]. This research provides a new understanding of the development of effective and efficient preconception nutrition interventions.

## 2. METHOD

### 2.1. Types of research

We conducted a quasi-experiment with a pretest-posttest control group design to analyze the effectiveness of nutrition education through preconception nutrition pocketbooks and nutrition education through lectures and to assess the effectiveness of the pocketbooks in preconception nutrition education. The research was conducted at the Department of Pharmacy and Health Analyst, Health Polytechnic, Ministry of Health, Republic of Indonesia, Medan. One major for intervention and one for control. The population in this study were all female students of the Department of Pharmacy and Health Analyst at the Health Polytechnic of the Republic of Indonesia's Ministry of Health in Medan. The minimum sample used a Hypothesis test for the two proportions (one-tailed test,  $n_1$  and  $n_2=100$ ). Respondents for pocketbooks ( $n_1=50$ ) and for lecture ( $n_2=50$ ) for lecture. Selection of the sample using a simple random sampling technique. Inclusion criteria: Third-semester students, healthy and willing to participate in all research processes and sign informed consent. Exclusion criteria; students who have academic problems and students who have special assignments from course lecturers.

### 2.2. Research process

The research started by forming two training groups, namely the intervention group and the control group. The formation of the intervention group and the control group was carried out by randomly selecting samples according to predetermined criteria. The research process for the two training groups was the provision of preconception nutrition pocketbooks to the intervention group and preconception nutrition lectures to the control group. The preconception nutrition pocketbook was designed and tested before being given to the intervention group. The process of designing a pocketbook begins with the stages of library search and drafting, then discussions with experts consisting of obstetricians, pediatricians, and nutritionists. The next stage discusses graphic design so that the display and narration of the pocketbook are attractive. Acceptance test of pocketbooks was carried out by qualitative approach, namely in-depth interviews after one week, a pocketbook was given to the informant. The results of this acceptance test will then be analyzed and improved to be printed as a preconception nutrition education media at the intervention stage. Informant search was carried out by researchers in the marriage counseling group of GBKP Church (Protestant church of the Karo Batak ethnic) at Pasar VI, Franciscan Asisi Church at Pasar VI of Padang Bulan Medan, and Office of Religious Affairs. Informants were selected with different educational levels criteria such as secondary education (graduating high school equivalent) and tertiary education (D3, S1). The informants of pocketbook acceptance test amounted to 10 peoples, with an assessment in the form of pocketbook display covering cover, writing, color, and shape of a pocketbook; assessment of language comprehension in pocketbook writing and assessment of understanding pocketbook content.

After the trial, the pocketbooks were distributed to the sample in the intervention group. Before the pocketbooks were distributed, an assessment of knowledge and attitudes about preconception nutrition was carried out (pre-test) and one month after the distribution of the pocketbooks, an assessment of knowledge and attitudes about pre-conception nutrition was carried out (post-test). The re-assessment was carried out a month later (post-test) to provide time for the respondent to internalize the information. The underlying assumption is the information processing theory by Robert Gagne. This theory states that in learning there is a process of receiving information and then processing it to produce output in the form of learning outcomes. In information processing, there is an interaction between internal conditions and individual external conditions. According to Gagne, the stages of information processing include eight phases, namely motivation, understanding, acquisition, storage, recall, generalization, treatment, and feedback [25].

In the control group, preconception nutrition education was carried out using the lecture method with the same material as the pocketbook. Assessment of knowledge and attitudes about preconception nutrition was carried out before the lecture was given (pre-test), and re-assessment was carried out (post-test) after one month of the lecture using the same questionnaire instrument in the intervention group and the control group. The research process is briefly explained in Figure 1.

### 2.3. Instrument

A structured questionnaire is used to assess knowledge and attitudes. There are 25 questions of knowledge and 20 questions of attitude to identify respondents' understanding of preconception nutrition preparation, micronutrients, nutrition in the first 1,000 days of life, balanced diet, and the impact of

malnutrition on preconception. The sentence and format of the questionnaire were made simple. A panel of nutritionists determines content validity, while a group of students ( $n=30$ ) is used to assess the validity of the instrument before data collection. Internal consistency (Cronbach's alpha) for the knowledge and attitude section was 0.678 and 0.732, respectively. In the knowledge question, if the respondent answers correctly, the value is one and if it is wrong, the value is zero. Positive statements in the attitude statement if the respondent answers: Strongly agree score four, agree score three, disagree value two, and disagree value one. Negative statements in the attitude statement if the respondent answers: Strongly agree value one, agree value two, disagree value three, and disagree value four. The scale for measuring the level of knowledge and attitudes is divided into three categories as follows [26]: i) the level of knowledge is in a good category if the value is  $\geq 75\%$ ; ii) the level of category knowledge is enough if the value is 56-74%; and iii) the level of knowledge category is less if the value is  $\leq 55\%$ .

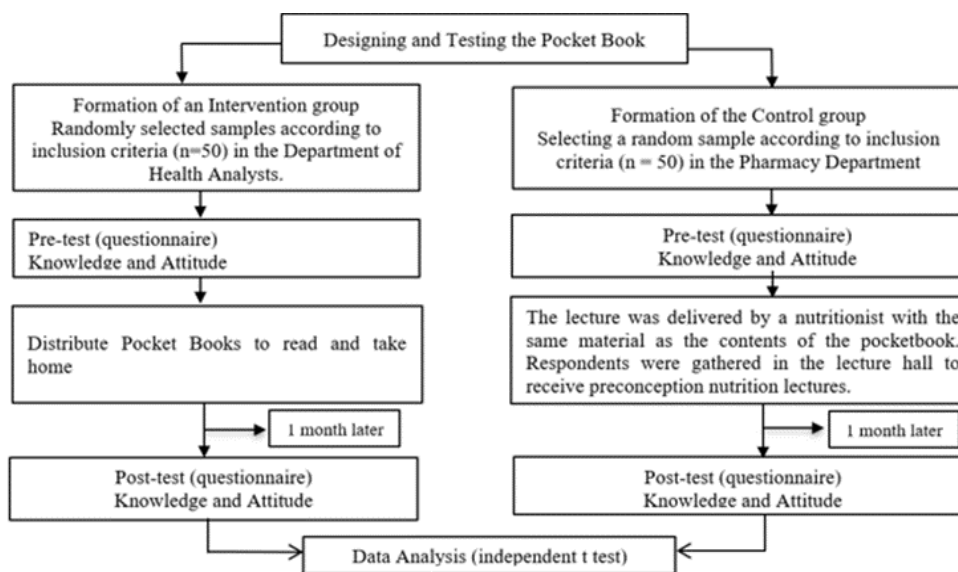


Figure 1. Research stage

#### 2.4. Data analysis

Data were analyzed using IBM SPSS. Distribution of respondent's knowledge and attitude level were analyzed with univariate frequency distribution statistics. Differences in mean knowledge and attitudes before and after being given preconception nutrition education within the groups were analyzed by paired t-test. Differences in mean knowledge and attitudes before and after being given preconception nutrition education between groups were analyzed by independent t-test with a significance level set at  $p$ -value  $< 0.05$  [27], [28].

#### 2.5. Ethics declaration

Informed consent is conveyed to prospective informants and respondents. The researcher explains the aims and objectives of the research. The researcher guarantees the confidentiality of all information provided and is only used for research purposes. Prospective informants and respondents who are willing to sign the consent form. And prospective informants/respondents are not willing, researchers do not come and respect the rights of prospective informants. Prior to conducting the study, the researcher had obtained ethical approval from the Health Polytechnic Ethics Commission of Poltekkes Kemenkes Medan number: 01.006/KEPK/POLTEKKES KEMENKES MEDAN 2020.

### 3. RESULT AND DISCUSSION

#### 3.1. Pocketbook trial with qualitative

Acceptance test of pocketbooks was carried out by qualitative approach, namely in-depth interviews after one week, a pocketbook was given to the informant. The results of this acceptance test will then be analyzed and improved to be printed as a preconception nutrition education media at the intervention stage. From the results of interviews with informants, informants generally stated that the pocketbook was good,

beautiful, and attractive, and the contents were easy to understand, but there were some informants who stated that they still need improvement as the informant told researchers:

*“Wow, the pocketbook is really good, a lot of things that I want to know is going to happen. But the truth is there are still typos. Then ... the picture of the breastfeeding mother is not polite, when you directly draw the mother’s breast, it’s better to draw it in the form of a cartoon.”*

*“The pocketbook is good, consists of a lot of pictures that are interesting. The color is also bright. But there is a brightness, so even reading it, we have to force it to look at it, like the child’s food explanation, the color is very blue.”*

*“His pocketbook is very inspiring. Very good, there are many things we need to pay attention to nutrition. Can I take the book please ma’am? But ma’am, there were some background images. So, the writing is like that. The background image of her pregnant mother interferes with her writing. Then ... there was a picture, but there was a background image like that.”*

### 3.2. Effect of preconception nutrition education

Nutrition education for adolescents (preconception period) is an effort to educate adolescents to behave according to nutritional rules. Preconceptions of nutrition education in this study were carried out by providing a pocketbook to the intervention group and a lecture method to the control group with the same nutrition education material as the material in the pocketbook. Nutrition education is an effort to bring about changes in knowledge, attitudes, and skills or practices in terms of food consumption. In this research, nutrition education was carried out to change knowledge and attitudes. Therefore, before distributing the pocketbooks to the intervention group and nutrition education through lectures in the control group, an assessment of knowledge and attitudes about nutritional preconceptions (pre-test) was carried out and one month after the distribution of the pocketbooks/lectures, an assessment of knowledge and attitudes about nutrition was carried out again preconception (post-test). The distribution of the level of knowledge and attitudes of respondents before and after being given nutrition education in the intervention group and control group can be seen in Table 1.

Table 1. Distribution of respondent’s knowledge and attitude level frequency pre test and post test intervention of pre conception nutritional education

Category	Pocket book				Lecture			
	Pre test		Post test		Pre test		Post test	
	n	%	n	%	n	%	n	%
Knowledge								
Good	4	8	40	80	5	10	30	60
Enough	30	60	10	20	31	62	19	38
Less	16	32	0	0	14	28	1	2
Attitude								
Good	2	4	36	70	6	12	27	54
Enough	34	68	13	26	36	72	20	40
Less	14	28	1	4	8	16	3	6
Total	50	100	50	100	50	100	50	100

#### 3.2.1. Effect of preconception nutrition education with pocket books

Table 1 it can be seen that the level of knowledge of respondents before being given a pocketbook was generally sufficient (60%) and less (32%). After being given a pocketbook, it turned out that the respondents’ level of knowledge was in a good category (80%) and there was no longer found knowledge of the less category. Table 2 it can be seen that there was the influence of preconception nutrition education on the knowledge and attitudes of respondents before and after being given a pocketbook with  $p=0.001$ . The intensity of the respondent’s attention allows to increase every day because the pocketbook has been designed attractively and with motivational words, small in size so that it is easy to carry everywhere, and can be read repeatedly by the respondent. Repeated stimulus allows a significant increase in knowledge so that after the post-test there were no respondents were found with less knowledge. The discovery of a lack of knowledge (32%) at the time of the pre-test was probably due to a lack of information about nutrition, especially the nutrition of teenagers and brides.

The categories of attitudes of respondents before being given pocketbooks are generally sufficient (68%) and there were traits with fewer categories of 28%. After being given a pocketbook, it turned out that the respondent’s attitude category was in a good category (70%) but there was still a respondent with a lack

of attitude (4%). Knowledge of respondents who are less will influence their attitude. After being given a pocketbook, it turned out that there was an increase in the number of respondents in the good category. This is possible because respondents have received a stimulus in the form of health education with pocketbook media. The increase in knowledge and attitudes before and after being given a pocketbook can also be seen from the increase in the average knowledge before (14.72) and the average knowledge after being given a pocketbook (20.72). Increased average attitude before (40.90) and after being given a pocketbook.

To see the effect of nutritional education with pocketbooks was analyzed by using statistical tests on the average difference (paired t-test) as seen in Table 2. From the table, it can be seen that there was a significant effect on increasing knowledge and attitudes  $p=0.001$ . This was possible because pocketbooks have been designed and tested so that they are easily understood by the community with a secondary education level. Material and terms about the nutrition of adolescents and brides use simple words, besides that pocketbooks also contain images with attractive colors and motivational words. This study was in line with the research of Syarief *et al.* which showed that nutrition education using pocketbook media on protein and iron intake in the treatment group [24]. The results of the study also showed a tendency for increasing knowledge, attitudes, and practices in students who received an information and education communication model with the provision of pocketbooks of anemia. Education with booklets was effective in increasing knowledge and attitudes about anemia. Pocketbook is effective in health promotion [29]–[31].

The results of this study reinforce the findings of several studies such as Priani *et al.* in this research which preconception education using pocketbooks media increases understanding regarding physical health, nutrition, and lifestyle preconceptions [22]–[24]. Wahyuningsih *et al.* in their research also showed that counseling with pocketbooks on the health and nutrition of the elderly had a significant effect on knowledge [22]–[24]. Likewise, Syarief *et al.* proved the same result, namely that nutrition education using pocketbooks increased protein and iron intake in adolescents [22]–[24].

Table 2. The effectiveness of pre conception nutrition education through pocket book and lecture to knowledge and attitude

Variable	Pocket book		Lecture	
	Mean±SD	p-value	Mean±SD	p-value
Knowledge				
Before	14.72±2.72	0.001 <sup>a)</sup>	14.52±3.18	0.001 <sup>a)</sup>
After	20.72±2.50		19.00±3.05	
Change	7.34±2.52		4.54±2.68	0.001 <sup>b)</sup>
Attitude				
Before	40.90±4.94	0.001 <sup>a)</sup>	37.96±5.17	0.001 <sup>a)</sup>
After	48.68±6.05		44.52±7.05	
Change	10.68±6.15		7.96±6.12	0.017 <sup>b)</sup>

a) p-value within group (Paired t-test);

b) p-value between group (Independent sample test)

### 3.2.2. Effect of preconception nutrition education with lectures

Lectures are the most natural way to communicate with other people, namely by speaking directly, besides the lecture method is the most commonly used method for various health knowledge and facts. The lecture method is the most traditional way of teaching and has long been carried out in an effort to transmit knowledge verbally. The way the lecture can be said also as a lecture technique is a way of teaching that is used to convey information, or a description of a subject matter verbally [32]. The use of lecture methods is often used in the delivery of health material and can be used by quite a number of audiences [33]. In this study, researchers used the lecture method as a control, a method that has often been used in health education. The material given during the lecture was all the material contained in the pocketbook (in the case).

Table 1, it can be seen that the level of knowledge of respondents before being given a lecture in the general category of sufficient (68%) and less (28%). After the lecture, the level of knowledge rose to the good category (60%) even though there was still a lack of knowledge (2%). From Table 2 it can also be seen that there was an increase in the average knowledge after being given nutrition education with lectures. The average increase in respondents' knowledge before the lecture was 14.52 and after being given nutrition education with a lecture of average knowledge rose to 19.00. The categories of attitudes of respondents before being given lectures, in general, were also in the category of adequate (72%) and less (16%). After being given a lecture, the attitude category rose to a good category (54%) and still found a lack of attitude (6%). The increase in average attitude of the respondents also increased after being given a lecture. The average before the lecture was 37.96 and after being given a pocketbook it rose to 44.52.

The increase in knowledge and attitudes in the control group is possible because in the lecture method there was a two-way communication that is between health education providers and questions from respondents making the knowledge provided easy to digest. Two-way communication allows the communicator and the communicant to dialogue with each other, and provide input and opinions. Therefore, miscommunication can be minimized, so that the communication process runs more accurately and precisely. The material giver in this lecture was also given by a person who has very experience in the field of nutrition especially clinical nutrition so she was very good at methods and goals.

### 3.3. Effectiveness of nutrition education with pocket books and lectures

Nutrition education with pocketbooks is more effective in increasing respondents' knowledge and attitudes. Table 2 can be seen, the results of the average difference test show p-value 0.001, there was a difference in average between nutrition education with pocketbooks and lectures. Preconception nutrition education by using the pocketbooks method was more effective in increasing knowledge compared to the lecture method. In attitude assessment, it turns out that the results of the average difference test turned out to be a p-value 0.017 also showed that there were differences in the average between preconception nutrition education with pocketbooks and lectures. Preconception nutrition education by using the pocketbooks method was more effective in improving attitudes compared to the lecture method.

Increased knowledge and attitudes were more significant for respondents given the pocketbooks method compared to respondents given the lecture method. Table 2 it can be seen that the average increase in knowledge before and after being given a pocketbook is higher (7.34) when compared to the average increase in knowledge in the group that is given a lecture (4.54). The results of the independent t-test statistical analysis also prove that the average increase in knowledge by giving an open pocket is higher than the lecture method with a p-value of 0.001. The average increase in attitude before and after being given the pocketbook was also higher (10.68) when compared to the average increase in attitude in the group that was given the lecture (7.96). The results of the independent t-test statistical analysis also prove that the average increase in attitude by giving an open pocket is higher than the lecture method with a p-value of 0.017. This was possible because the pocketbooks method had been designed and tested so that they were easily understood by respondents with secondary education (SMA) and above. Material and terms about the nutrition of adolescents and brides candidate used simple words, besides that pocketbook also contain images with attractive colors and motivational words. The intensity of the respondent's attention allows increasing every day because of its small size so that it is easy to carry everywhere and can be read repeatedly by the respondent.

The lecture is also a method of health education that effectively increases knowledge and attitudes (the results of paired t-test), but when compared with pocketbooks, pocketbooks are more effective in increasing the average knowledge and attitudes of respondents because, in this study, material that is disseminated is the same as all material contained in pocketbooks. The time needed to deliver all the contents or material of the pocketbook with a lecture of  $\pm 2.5$  hours. From the results of observations of researchers when the lecture took place, at two hours, some respondents did not focus anymore. From the results of the statistical data, it is also seen that the range of knowledge and attitudes of the respondents is greater in the knowledge and attitudes given to the lecture so it can be concluded that material understanding is more the same in the respondents who given pocketbooks than lectures. The concept of transformative learning was introduced in the field of adult education in 1978 in the article 'Transforming Perspectives'. Patricia Cranton analyzes Jung's psychological type theory to integrate her concept with transformative learning theory in adult education. The tendency of the psychological learner to form a type of habit of mind. Repeated reading of the pocketbook is likely to form preconceived nutritional thinking habits [34].

## 4. CONCLUSION

The preconception nutrition pocket book was designed according to the needs of adolescents and was validated by nutritionists and tested on preconception adolescents/women. The results of the study found that: there was an effect of preconception nutrition education by presenting a pocketbook on knowledge (p-value 0.001) and attitudes (p-value 0.001); there is an effect of preconception nutrition education with lectures on knowledge (p-value 0.001) and attitudes (p-value 0.001) but preconception nutrition education with pocketbooks is more effective than the lecture method in increasing knowledge (p-value 0.001) and in improving attitudes (p-value 0.017).

The findings of this study provide a new understanding of public health science, especially community nutrition, namely preconception nutrition education by providing pocketbooks. The intervention of providing pocketbooks is effectively used as a preconception nutrition intervention with a wider target range, and time efficiency, and does not depend on material providers such as health workers or other health service providers. The use of pocketbooks in this study was only tested on the preconception group of adolescents, further research is needed on the preconception group of women of childbearing age who are

married and planning a pregnancy. This research is only limited to measuring knowledge and attitudes, further research is needed to see the effect or impact of using pocketbooks on consumption behavior, nutritional status, and anemia status.

## ACKNOWLEDGMENTS

We are grateful to the Indonesian Ministry of Health for providing research assistance funding with decision letter number: HK.02.02/H.V/258/2017. We also thank all the respondents for this study.

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