

THE EFFECT OF NUTRITION EDUCATION USING E-MODULE MEDIA TOWARD FIBER INTAKE IN OVERWEIGHT FEMALE ADOLESCENT

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ABSTRACT

One of the factors causing excess nutritional status in female adolescent (FA) is due to the lack of fiber consumption. The West Sumatra Riskesdas 2019: 82.53% of adolescents in Padang consume less fiber and the prevalence of overweight among FA is higher than male adolescents of 16.45%. Some literature states that one of the interventions to increase the awareness and motivate the FA to consume fiber is nutrition education (NE) by using attractive media. E-module is one of the attractive media and frequently used in the learning process. The material presentation is not merely focus on the text, picture, and graphic, however it is also presenting audio, animation, and video. The purpose of this research is to analyze the effect of NE using e-module media toward the fiber intake in overweight FA. This is a mix (R&D and quasi-experiment) research methods of one group pretest and posttest with control designs. The research subjects were all female students at research target schools who met the inclusion and exclusion criteria. The data instrument used the SQ-FFQ form. The data analysis is using a Mann Whitney test. The results of the study explained that the designed nutritional e-module obtained an average validation value namely 90.5% and the practical value of the overall was 92.83%. The results of the Man Whitney test showed that there was an effect of NE with the e-module and it was very effective toward the change of fiber intake for overweight FA in Padang p-value 0.017 (p<0.05).

Keywords: e-module; female adolescent (fa); fiber; nutrition education (ne)

INTRODUCTION

The increasing problem of overweight status in the current adolescent age group is due to very lack consumption of fiber intake and does not meet the recommended standards for nutritional adequacy rates. The research of Jeser and Santoso (2021) revealed that adequate fiber consumption daily intake will provide a longer time for the gastric in digesting food, so that it gives a longer satiety effect as well as controlling the food consumed (Jeser & Santoso, 2021). The research result conducted by Zahra, et. al (2019) stated that fiber can increase the satiety since it can maximize intraluminal viscosity and minimize gastric emptying process. In addition, fiber can also lower the hunger by maximizing the production of GLP-1 hormone (Zahra Murti & Ermamilia, 2019). In line with that, Maryusman in Zaki (2001) revealed that the satiety can occur since the gastrointestinal fiber is retaining water and forming a thicker liquid (Zaki et al., 2021).

The result of National Riskesdas (2018) stated that in Indonesia it was found that as many as 98.4% of adolescents did not consume enough vegetables and fruit. This proves that there is a double increase in overweight nutritional status in adolescents from the previous year of 7.3% to 13.5% (Ministry of Health RI, 2018). The adolescent tends to consume high calory fast food and low fiber (Yohana Khairunnisa & Kurniasari, 2022). The survey of vegetable and fruit consumption conducted by Woisiri (2022) stated that 50 senior high school students in Jayapura consume less fiber (Woisiri et al., 2022), Fajarwati (2022) also stated that in Bandung District it was found that 50% adolescent is consuming less vegetable and fruit (Fajarwati et al., 2022). Furthermore, Awaliya

(2020) recommended that female adolescent need to increase the consumption of vegetable and fruit based on suggested 2 times a day fruit and 3 times a day vegetable consumption (Awaliya et al., 2020).

The phenomenon of lack consumption of vegetable and fruit among the adolescent happens almost in all cities/districts in Indonesia, including Padang City. According to the survey result of West Sumatera Riskesdas (2019) the proportion of daily fiber intake based on the suggested portion toward the adolescent group in Padang City only reached 2.79% and this research also mentioned that 82.53% of adolescent in Padang City consumed less vegetable and fruit. The research result conducted by Chairunissa (2019) proved that 57.6% senior high school students in Padang only consume 9 gram/day as the average fiber daily intake which categorized as less than necessary (Chairunissa, 2019). Moreover, it is also found that in Padang city the prevalence of nutritional overweight status problem in female adolescent is higher than the male adolescent of 16.45% (Balitbangkes, 2019).

According to the explanation above, it can be understood that by improving the consumption of fiber based on the nutritional adequacy rate by age group can overcome the problem of overweight nutritional status in adolescent. Some literature showed that one of the intervention forms which aimed to direct into a better behavior is by improving the knowledge of nutrition of the female adolescent. The research conducted by Azhari and Fayasari (2020) revealed that nutritional education affects attitude, behavior, and amount of consumption of vegetable and fruit in adolescent (Azhari & Fayasari, 2020). The research conducted by Andriani (2019) also stated that nutritional education by using media will provide an optimum result comparing to the one without using media, since the use of media in the education process can stimulate the senses and interest of the recipient of the material, so that success rate reaches 75% (Andriani et al., 2019). The research result conducted by Lathifa and Mahmudiono (2020) proved that nutrition education by using media resulted in positive impact and can change student's eating behavior into a better state (Lathifa & Mahmudiono, 2020). The similar research result also proved in research conducted by Arif and Fayasari (2020) in which nutrition education by using video media is more effective and can influence student's attitude and behavior (Azhari & Fayasari, 2020).

Current technological developments make it easy for adolescents to access information since generally adolescents already have mobile phone/smartphone connected to the internet network, so that the media used for health education also experiences developments on a digital basis, such as electronic module media (e-module). The use of e-module in the learning process can be used both for presenting the learning material in the form of text, picture, and graphic, as well as for presenting audio, animation, and video. E-module as a learning media has fulfill the appropriateness test as a learning material to support teaching and learning activities with score or rate percentage >80% by the media expert, learning material expert, even the respondent also contributes similar score or rate. This has been proven in the research conducted by Pasili (2022) who stated that there is a significant difference between before and after intervention of health education by using e-module media (Pasili et al., 2022).

E-module as the media of nutrition education toward adolescent has not been used frequently. Therefore, the authors are in need to conduct nutrition education by using e-module media as well as to analyze its effectivity in improving intake of fiber consumption and to overcome overweight

nutrition problem toward female adolescent in Padang City. According to the background mentioned above, hence, the authors found it interesting in conducting this research entitled “The Effect of Nutrition Education Using E-Module Media Toward Fiber Intake in Overweight Female Adolescent”.

METHOD

The research method employed is a mix method between Research and Development (R&D) and quantitative research. The research is initiated by designing e-module as an education media that will be used. This media is designed by using development method, Research and Development (R&D), which is a method used to resulted in research product (Khusnuddin & Indarjo, 2020). The next step is to continue it with quantitative research, that is quasi-experiment by using one group pre-test and post-test with control research design to investigate the effect of nutrition education by using e-module media toward the shift of fiber intake in overweight female adolescent. The research is conducted in SMA/MA located in the working area of Puskesmas Ambacang in Padang City, precisely in MAN 1 and SMA 1 Muhammadiyah in Padang City. These schools were chosen since they have the prevalence of female student with the highest overweight status according to the data of Annual Health Report of Padang City in 2022. The subjects of the research were all female who fulfilled the inclusion criteria and divided into 2 groups, namely, intervention group and control group.

The determination of minimum amount of research subject for each experiment research group is based on Gay and Diehl in Az (2019) that is of 15 people in total (Az, 2019). In addition, the calculation of the percentage of sample addition to anticipate lack number research subject according to Thabane in Murti (2013) is at least minimum of 38 total people as the research subject (Murti, 2013). Purposive sampling is employed as the sampling technique in determining the research subject by paying attention to the established restriction criteria (Probandari et al., 2020). The restriction criterion is divided into two, namely, inclusion and exclusion criteria. The inclusion criteria of this research were female student of MAN 1 Padang and SMA 1 Muhammadiyah Padang ranging from 15-18 years old, with overweight nutritional status, have never been educated with the similar topic of nutrition education, possess personal smartphone, are willing and agree to be the research subject. As for the exclusion criteria of this research were students who are undergoing hormone therapy or undergoing diet by using certain product such as body slimming product, female students who are absent during the nutrition education session, and female students who are not following any of the research sequences.

This research is initiated by conducting anthropometry screening and needs analysis of e-module model toward all female students in SMA 1 Muhammadiyah and MAN I Kota Padang by employing google form. Then proceed with the process of designing and developing nutrition e-module based on modified research and development by Borg and Gall and Sukmadinta in Khusnuddin (2019), namely, initial study, designing and developing media model, media validation, and media limited try out test (Khusnuddin & Indarjo, 2020). Next step is to proceed the observation toward research subject group before intervention by using pre-test and after intervention by using post-test. The source of primary research data is the result of anthropometry measurement and interview by using SQ-FFQ form in order to reveal the amount of fiber intake of the research subject. Meanwhile, the source of secondary research data is school general description and the number of female students obtained from the school. The next step is the

analysis toward primary data to reveal the effect of the use of e-module media toward fiber intake of female student by using Independent-Samples T-Test in case the distribution is normal, and Mann Whitney U Test in case the distribution is abnormal.

RESULTS AND DISCUSSION

The Development of E-Module Nutrition Media

E-module is one of the learning media with electronic format which is arranged systematically and employing easily understandable language, so that student can learn independently. The electronic model is also one of the alternatives of the students who found it hard to find printed book due to unaffordable price or unavailability of the book itself. Numbers of research results stated that the use of e-module as a learning media is very effective and efficient, so that it can train student independence (Lestari et al., 2022). The procedure of nutrition e-module development of this research is employing by Borg and Gall and Sukmadinta that has been modified in Khusnuddin (2019), through many stages, namely, preliminary study, designing and developing media model, media validation, and limited try out of media (Khusnuddin & Indarjo, 2020).

The needs analysis is applied toward all female students in the research subject school to enable information gathering about female students' experience during nutrition education session by the previous health workers and to reveal the interest of the female students with the offer of nutrition education by using electronic media, that is e-module. The result of the needs analysis revealed that there were large numbers of female students who have never been receiving nutrition education about fiber intake for the overweight female adolescent and almost all of female students stated that they were interested with the nutrition education by using electronic media. Based on the result of the needs analysis, it can be concluded that designing and developing e-module media in the nutrition education have become one of the effective and practical education media for the female students to gain access of nutrition information.

The design and development of e-module media is a process of draft model making consists of formulation of goals, material preparation and arrangement, and validation instrument arrangement to measure the appropriateness of nutrition e-module. Nutrition e-module is developed by using software flip PDF corporate edition to produce result in the form of link. The e-module display is divided into 3 parts, namely, initial part, content part, and reference. The content of nutrition material is obtained from many reference books and articles related with the research problem. The selected nutrition material will be presented in a creative and attractive display, not only in text form, but also in the forms of picture and video animation. The result of nutrition education media design will be validated by the experts (Khusnuddin & Indarjo, 2020).

Media validation is a step of appropriateness assessment toward e-module nutrition performed by 3 experts, namely, material expert, language expert, and media expert (Sarah, 2022). The validator of e-module nutrition media consists of 1 lecturer of nutrition, 1 Indonesian Language teacher of SMA (Senior High School), and 1 practitioner of SMA (Senior High School) learning media. The assessment result performed by the experts obtained an average score of 90.5%. Based on these research result, it can be concluded that nutrition e-module media designed by the researcher is valid according to the aspects of material, language, and media. The designed e-module nutrition is appropriate to be used in the step of limited try out toward the female students (Khusnuddin & Indarjo, 2020). Limited try out is the step of e-module usage try out toward female students after

the designed e-module is stated as valid by the 3 experts. The limited try out is performed toward 8 female students from different school of the need analysis location, that is toward female students of SMAN 3 Padang. The purpose is to avoid bias in the research (Astuti, 2022). The purpose of the limited try out step is to seek for the practicality of the designed e-module nutrition (Sarah, 2022). The result of practicality assessment of e-module nutrition can be seen in the following Table 1.

Table 1
The Practicality Result of Limited Try Out Step of Nutrition E-Module

Assessed Aspects	Practicality Percentage	Category
Usable	88.28	Very Practical
Easy to use	92.18	Very Practical
Appealing	96.35	Very Practical
Cost-effective	94.53	Very Practical
Average score	92.83	Very Practical

Table 1 revealed that appealing assessment aspect has the highest rate 96.35% and usable assessment aspect has the lowest rate 88.28%. The average score or rate of the whole nutrition e-module practicality is 92.83% with very practical criteria. Based on the research result of product validation and practicality of nutrition e-module model, it can be concluded that the designed e-module nutrition by the researcher can be applied to the groups of the research to uncover the media effectivity.

The Characteristics of Research Subject

Characteristics description of the research subject which included age, nutritional status, and the adequacy of daily fiber intake consumption based on the nutritional adequacy rate of female adolescent age group. The characteristics of research subject can be seen in the following Table 2.

Table 2 .
Characteristics Description of the Research Subject

Variable	Control (n=19)		Intervention (n=19)		Mix n=38)	
	f	%	f	%	f	%
Age of 15-18 years old						
15 years old	4	21.1	6	31.6	10	26.32
16 years old	4	21.1	7	36.8	11	28.94
17 years old	7	36.8	6	31.6	13	34.21
18 years old	4	21.1	-	-	4	10.52
IMT/U						
<i>Overweight</i>	19	100	19	100	36	100
Fiber Intake						
<29 gram/day (Less)	19	100	19	100	38	100

Table 2 revealed that part of the age of the research subject of both groups were mostly 17 years old is of 34.21%. All of the research subjects have overweight nutritional status and less consumption of daily fiber intake less than 29 gram/day is of 100%.

The Effect of Nutrition Education Toward Fiber Intake

The effect of nutrition education usage by using e-module toward fiber intake of overweight female adolescent which was conducted by employing Mann Whitney test due to the collected dissemination data is abnormal in distribution ($p \leq 0.05$). The detail data analysis result can be seen in the following Table 3.

Table 3.

The Effect of E-Module Toward Fiber Intake of Overweight Female Adolescent				
Fiber Intake	f	Median (Min-Maks)	U	P-value
Intervention Group	18	11 (7-22)	99	0.017
Control Group	18	9 (2-20)		

Table 3 revealed that there occurred difference of daily fiber intake between control group and intervention group which is enriched with nutritional education by using e-module media based on p-value 0.017 ($p < 0.05$). according to above table, it can be understood that nutrition education by using e-module media has been proven effective in improving fiber intake on overweight female adolescent. The consumption of fiber on adolescent is influenced by numbers of factors. One of the factors is the knowledge of the adolescent about vegetable and fruit. Nutrition education by using learning media will contribute positive impact toward the knowledge of the adolescent. The shift of adolescent's behavior into a better state will impacting adolescent's attitude and behavior toward the selection of daily food consumption (Az-Zahra & Kurniasari, 2022). These research results are in line with the research conducted by Pasili et al (2022) who stated that there occurred significant difference toward the knowledge of the pregnant women enriched with health education using e-module media on the danger sign of pregnancy (Pasili et al., 2022). The research found conducted by Ardhita (2021) also yelled the similar result in which nutrition education using e-module media is proved as the correct and appropriate method to be used in changing the attitude of nutrition intake in adolescent (Kurnia Ardita et al., 2022).

CONCLUSION

The designed nutrition e-module media is stated as very valid to used with the average validation score or rate obtained from material expert, language expert, and media expert is of 90.5%. Moreover, the practicality aspect of nutrition e-module is of 92.83% with very practical criteria. The use of nutrition education by using e-module media provided a significant effect toward the shift or change of fiber intake in overweight female adolescent in Padang City with p-value 0.017.

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