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The Effect of Full Use of e-Booklet Media on Mother's Knowledge and Its Relationship with the Level of Nutrition Consumption of Elementary School Children Who Experience Excess Nutrition



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Abstract

The prevalence of overweight and obesity among children has become a global epidemic. The causes of obesity are multifactorial. Changes in lifestyle that lead to westernization and sedentary result in changes in eating patterns in children. The objective of this study was to determine the differences in maternal nutritional knowledge before and after counseling on balanced nutrition using e-booklets and their correlation to the consumption level of elementary school children who experience excess nutrition. The research design used was a pre-experimental one-group pretest-posttest design. A sample of 31 mothers and children who are experiencing excess nutrition from SDN 1 and 2 Sambirejo, Trenggalek regency was selected by purposive sampling. Data analysis employed the Paired Sample T-Test and Chi-Square test. There was an increase in the average score of mothers' knowledge from 69.03 to 77.41 with a p-value = 0.003 with $\alpha = 0.05$. However, there was no correlation between a mother's knowledge and intake of energy, carbohydrates, protein, and fat. Nutrition counseling using e-booklet media can increase mothers' knowledge but it is not related to the intake of elementary school children who have more nutrition.

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INTRODUCTION

The prevalence of overweight and obesity has increased sharply worldwide. The WHO has even stated that overnutrition is a global epidemic problem, thus, overnutrition is already a health problem that must be addressed immediately. Overnutrition problems occur in all age groups, including school-age children.

The prevalence of overnutrition (fat) as measured by Body Mass Index compared to Age in children aged 6-12 years in the 2018 Riskesdas increased from 18.8% in 2013 to 20% in 2018 (Kemkes RI, 2018). Trenggalek District Health Office data for 2021, the prevalence of nutrition among school children has increased from the previous year, from 5.3% to 7.5%, which is 5% in the obese category and 2.5% in the obese category.

The results of a preliminary study in May 2021 in school children in grades 2-5 at SDN 1 and 2 Sambirejo, the prevalence of undernutrition was 12%, good nutrition was 60.5%, excess nutrition was 14.9%, and obesity was 12.4%. Furthermore, the school has never received counseling about balanced nutrition so school children's knowledge about balanced nutrition is limited and mothers only do not have knowledge about balanced nutrition guidelines.

Being overweight and obese in children can cause various health problems that are detrimental to the quality of life, for instance, impaired growth of the legs, sleep disorders, sleep apnea, and other respiratory disorders (Kemkes RI, 2012). Nutritional problems are more of a multifactorial disease caused by the interaction of internal and external factors. Children's diet is a trigger for overweight and obesity. Obesity prevention efforts need to be performed holistically by involving the family. The method to promote it is to do nutrition

counseling to mothers of school children (Dwiriani et al., 2009).

A mother's behavior has a tremendously important role in the nutritional status of her child because most of the decision-making in terms of food supply in the household is done by the mother. The e-booklet media is a good learning medium to overcome learning problems that are conducted by mothers because e-booklets are easy to carry and can be studied anytime and anywhere. Research by Setyawati and Herlambang on 2015 showed that the knowledge of mothers who were treated using booklet media experienced an increase in knowledge from the first to the fourth month after treatment (Setyawati & Herlambang, 2015).

The objective of this study was to determine the effect of e-booklet media on mothers' knowledge and its correlation with the level of nutritional consumption of elementary school children who experience excess nutrition.

METHOD

This type of research is quantitative research with a pre-experimental research design. This research was conducted using a one-group pretest-posttest design. Data collection was administered in July to August 2021 at SDN 1 and 2 Sambirejo, Trenggalek regency. The sample of this research was 31 mothers and children of elementary school grades 2 to 5 who were selected by purposive sampling. Mother's knowledge data was obtained using a knowledge questionnaire at the time before and after counseling using e-booklet media, while the level of child nutrition consumption used a 2x24-hour food recall form. Data analysis used the Paired Sample T-Test and Chi-Square test from SPSS.

RESULT

Table 1: Mothers's charactersitic of school children who experience excess nutrition

No.	Characteristic	f	%
1	Age category:		
	• 26 to 35 years old	17	54.8
	• 36 to 45 years old	9	29.1
	• 46 to 55 years old	5	16.1
2	Education:		
	• Basic (Elementary and Junior High School)	14	45.1
	• Senior High School	12	38.7
	• High School	5	16.2

Continued Table 1: Mothers’s charactersitic of school children who experience excess nutrition.

No.	Characteristic	f	%
3	Occupation:		
	• Entrepreneur	8	25.9
	• Petani	5	16.2
	• Teacher	2	6.4
	• Civil Servant	7	22.5
	• Housewife	9	29.0

Characteristics of mothers and children, knowledge of mothers, categories of child nutritional intake, and cross-tabulations between mothers’ knowledge and children’s nutritional intake are presented in the table below. Mothers who have working status (occupation) (Table 1) can add to the income of the family. The higher the level of income, the higher the ability of households to access food (Mangkoeto, 2009).

Table 2: Characteristics of school children in grades 2-5 who experience excess nutrition

No.	Characteristic	f	%
1	Gender:		
	• Male	21	67.7
	• Female	10	33.3
2	Age:		
	• 7 to 9 years old	22	70.9
	• 10 to 11 years old	9	29.1
3	Nutrition status:		
	• Overweight	19	61.3
	• Obesity	12	38.7

The prevalence of nutritional status is more common in boys than girls (Dewi & Sidiartha, 2013), because boys consume more energy and protein than girls (Arisman, 2004).

Table 3: Categories of mother's knowledge before and after being given counseling using e-booklet media

Knowledge	\bar{x}	sd	Min	Max	<i>p-value</i>
Pre-Test	69.03	11.9	53.3	93	0.003
Post-Test	77.41	17.5	33.3	100.0	

Based on the results of the T-test analysis (Table 3), elaborates an increase in the average knowledge and *p-value* = 0.003, which can be interpreted that counseling using e-booklet media affects mothers’ knowledge.

Table 4: Consumption categories of elementary school children who experience excess nutrition

Intake type	Consumption category					
	Good		Moderate		Less	
	f	%	f	%	f	%
Energy	12	38.7	12	38.7	7	22.6
Proteins	7	22.6	4	12.9	20	64.5
Fat	10	32.3	10	32.3	11	35.4
Carbohydrate	10	32.3	16	51.6	5	16.1

Based on table 4, what needs to be of concern to mothers of children who are experiencing excess nutrition is that more than half of the children lack protein intake, and one-third lack fat intake.

Table 5: The results of the χ^2 test on the correlation between mother's knowledge and the consumption category of children who experience excess nutrition

Intake type and category	Mother's knowledge								p-value
	Good		Moderate		Less		Total		
	f	%	f	%	f	%	f	%	
Energy:									
• Good	1	25	9	37.5	2	66,6	12	38.7	0.45
• Moderate	1	25	10	41.6	1	33,3	12	38.7	
• Less	2	50	5	20.8	0	0,0	7	22.6	
Carbohydrate:									
• Good	0	0	8	33.3	2	66,6	10	32.3	0.57
• Moderate	3	75	12	50.1	1	33,3	16	51.6	
• Less	1	25	4	16.6	0	0,0	5	16.1	
Protein:									
• Good	0	0	7	29.2	0	0,0	7	22.6	0.71
• Moderate	1	75	2	8.3	1	33,3	4	12.9	
• Less	3	25	15	62.5	2	66,6	20	64.5	
Fat:									
• Good	0	0	9	37.5	1	33,3	10	32.2	0.71
• Moderate	1	75	8	33.3	1	33,3	10	32.2	
• Less	3	25	7	29.1	1	33,3	11	35.4	

The results of the chi-square test in table 5 illustrate that the mother's knowledge has no correlation with the level of consumption of children who are experiencing excess nutrition, which is demonstrated that the p-value 0.05.

DISCUSSION

A. Mother's Knowledge

Knowledge is the result of knowing and this occurs after people do sensing (eyes, ears, nose, etc.) an object (Notoatmodjo, 2012). The increase in knowledge before and after the intervention was due to the compliance of the respondents in listening to and understanding the material both in the counseling videos and in the booklets provided. The increase in knowledge is due to the learning process by the respondent and occurs due to an increase in the subject's sensitivity or readiness for the test given to the respondent. Increasing knowledge itself is influenced by several factors, encompassing education, personal experience or other people, the mass media, and the environment (Notoatmodjo, 2012).

B. Differences in Mother's Knowledge about Nutrition before and after Counseling Using e-Booklet Media

The mother's knowledge increased after being given counseling through booklet media and counseling videos. The booklet media delivered through the WhatsApp application makes it easier for mothers to access it anywhere without being bound by time and requiring a lot of fees/internet quota. According to Rahartri and Research by

Coleman & O'Connor, regarding WhatsApp focuses on the educational benefits of instant messaging/Instant Messenger Application (IMA) and strategies that have been used in the health sector (Coleman & O'Connor, 2019; Rahartri, 2019). Besides that, the delivery of counseling through YouTube videos can also make it easier for respondents to increase their sensitivity in absorbing material. The counseling video explains the material contained in the booklet so that if there are things that are not understood in the booklet, they can be explained again through the counseling video. Video counseling is also a type of audio-visual media that relies on the senses of hearing and sight. This media can increase the mother's interest in learning because the mother can both listen and see pictures (Asyhar, 2011).

Nutrition education such as counseling using the media plays an important role in increasing knowledge. Before the counseling was performed, there was still a lack of knowledge while after the counseling the respondents with less knowledge decreased. It proves that e-booklet media is one of the media that can increase mothers' knowledge about balanced nutrition in addition to other media. Apart from the media factor, the increase in knowledge of mothers is also due to the obedience of mothers in participating in counseling from start

to finish online. To the opinion of Astinah, et al, knowledge can increase by enriching the repertoire of knowledge through reading both through mass media and electric media (internet), hence, even without going through formal education one's knowledge can experience an increase (Astinah et al., 2013).

This research is by the research of Liestyawati in Boyolali District, knowledge of under-aged mothers about Feeding Infants and Children (IYCF) before being given counseling using booklet media was 74.5% and experiencing an increase in knowledge after counseling was 87.2 % (Liestyawati, 2018). This research is not to Pratiwi & Puspitasari's research which elaborates that there is no significant increase in the difference in knowledge scores in the control group and the experimental group ($p=0.114$). Statistically, there is no effectiveness in the use of booklet media on knowledge (Pratiwi & Puspitasari, 2017).

C. Child Consumption

The consumption of overnourished elementary school children at SDN 1 and 2 Sambirejo illustrates that most children have good or poor energy consumption. It is because mothers are implementing a diet for children by reducing carbohydrate sources which are the biggest energy contributors. The application of diet in children depends on the mother's knowledge. The level of education is associated with one's knowledge. Thus, as stated by Apriadi, that the level of education also determines whether or not it is easy for someone to absorb and understand the nutritional knowledge they acquire (Apriadi, 2000). However, this theory is inconsistent with the results of this study in which the average nutritional child with good energy consumption is discovered in mothers with junior education levels.

Meanwhile, the consumption of protein and fat for most children is more. Consumption is more revealed in children with mothers who have jobs. There are differences in the formation of eating habits for children when their mother is a housewife and also a breadwinner. Working mothers, part of their time will be consumed, so their role in preparing food has to be carried out by someone else. The same goes for feeding children. It can affect the nutritional status of children (Suharsa & Sahnaz, 2016).

D. Correlation between Mother's Knowledge Level and Child Consumption

1) Children's Energy and Carbohydrate Consumption Levels

Nutritional knowledge is something that is understood about food about optimal health (Hardinsyah, 2016). Knowledge of nutrition can be influenced by several things, one of which is education about nutrition. The majority of mothers with sufficient levels of knowledge have children with low levels of energy and carbohydrate consumption, while the majority of mothers with less knowledge have children with good levels of energy and carbohydrate consumption. This is due to the mother's experience regarding diet. The majority of children reduced the portion of rice at every meal because their mother told them to.

According to the results of interviews with mothers, reducing the portion of rice can accelerate children's weight loss. It is due to the experience of mothers who have lost weight by eating less rice or even without rice. The opinion of Worthington is that each individual has his assessment of the type and number of certain foods for various reasons (Worthington-Roberts & Williams, 2000). Like someone does not like to eat rice because rice can gain weight. According to Anzarkusuma, one of the factors that greatly influences children's eating habits is experiences (Anzarkusuma et al., 2014).

In addition, there are still children with higher levels of consumption than mothers with a good level of knowledge. It is due to environmental factors, especially the family environment, in which mothers are used to buying high-energy snacks for children because mothers are accustomed to buying groceries and snacks for children at mobile vegetable sellers in their home environment. It has become a mother's habit almost every day. Based on the results of a 2x24-hour food recall, the energy consumption level for children could be higher because on average children often consume high-energy foods such as milk, cakes, and various processed flours with a frequency more than recommended.

According to Arifin, family environmental factors have a significant influence on a person's consumption pattern (Arifin, 2015). Nutritional knowledge has an important role in forming one's eating habits, as this will influence one's choice of type and amount of food consumed (Harper et al. 1985). This research is to Hariyani's research that there is no correlation between the level of caregiver knowledge of nutrition and the level of energy consumption ($p\text{-value} = 0.843$) in toddlers in the

Undaan area, Kudus Regency. Meanwhile, according to Indrawati, et al, there is no correlation between the level of caregiver knowledge of nutrition and the level of energy consumption (Surijadi et al., 2021).

2) Child Protein Consumption Rate

The mother's level of knowledge before the counseling was good, then after the nutrition counseling the level of knowledge increased. However, along with increasing knowledge, mothers have not been able to apply balanced nutrition guidelines to their children. Mother's habit is one of the factors that cause causes children to consume too much protein. Thus, it takes a long time to change the habits or behavior of the mother to apply a balanced diet to children. Apart from that, it can also be assumed that the frequency of nutrition counseling is only once, thus, it has not been able to change the feeding habits of more malnourished children properly.

Another factor that influences children's consumption level, especially protein, is the economic factor/purchasing power. Most mothers with a good level of knowledge have children with more protein consumption, this is because the child's mother has a working status that supports purchasing power in meeting children's food needs. Purchasing power depends on the income level of each respondent.

Mothers who work on average always provide food that is easy to process for children due to busy work. Foods that are frequently served are foods high in energy and protein with fast processing such as fried chicken, fried eggs, and nuggets, which have high energy and protein content. Meanwhile, mothers with sufficient and insufficient levels of knowledge can also have more protein consumption due to the mother's working status so mothers prepare foods that are diverse and contain high protein without regard to the amount of food intake of children in a day.

According to Santika, et al., children from the high SES (socio-economic status) group are more likely to consume a variety of foods and receive adequate nutrition than the lower SES group. The high economic status of the mother can make it easier for the mother to regulate the child's diet, and other family members are more likely to meet the nutritional needs of the child (Surijadi et al., 2021). The results of this study are by the research in which the results of statistical tests stated that there was no correlation between the level of caregiver nutrition knowledge and the level of toddler protein

consumption in the Indian Health Center, Kudus Regency, with a significant value of 0.843 ($p > 0.05$). It is possibly caused by the economic factors of the toddler's family in which the toddler's mother works, thereby increasing the purchasing power of the family, particularly the purchasing power of formula milk.

3) Child Fat Consumption Rate

Mothers with a good level of knowledge have children with more fat consumption. While mothers with less knowledge have children with more fat consumption. Hence, it can be concluded that the level of the mother's knowledge does not determine the child's fat intake because, before the nutrition counseling, the mother's knowledge tended to be good and increased after the nutrition counseling was performed but could not change the mother's feeding habits so that the fat intake tended to be higher. Likewise with energy and protein consumption, mothers with a good level of knowledge do not guarantee that they will provide good intake to their children, it is due to the mothers' habits in selecting food ingredients and feeding their children which are still not appropriate. Based on the results of a 2x24-hour food recall, most children still frequently consume foods that are processed by fryings, such as fried chicken, fried eggs, fried sepals, nuggets, fried rice, and other sweet pastries. These foods contribute a large intake of fat and calories to children.

Another factor causing the tendency for high fat intake to occur in overweight children is the economic factor. Mothers with good and poor levels of knowledge are mostly workers. The high economic status of the mother can make it easier for the mother to regulate the child's diet, and also children who are entrusted to the grandmother or other family members are more likely to fulfill the nutrition according to the child's needs. Mothers who work directly can add to the income of the family. The level of income can affect the type and amount of food consumed. Increased income has an effect on increased household consumption such as high-fat foods and meat consumption (WHO, 2000).

This research is to the results of research by Sa'adah, et al, that there is no correlation between the level of knowledge about food sources of fat with the level of fat consumption in the sample ($p > 0.05$) (Laeni Sa'adah et al., 2018). The effect of knowledge on food consumption is not frequently directly proportional, meaning that the higher the

level of knowledge, the better the consumption of food. It is because even though the person has high knowledge, it is not certain that the person is willing to practice, besides that factors such as access to food and other factors can influence consumption (Laeni Sa'adah et al., 2018).

CONCLUSION

Counseling about nutrition using e-booklet media can increase the knowledge of mothers who have children who experience excess nutrition. However, the mother's knowledge is not related to the intake of children who experience excess nutrition.

SUGGESTION

The e-booklet media can be used as educational material for parents and children by schools, especially the School Health Business Unit so that schools recognize and prevent excess nutrition from an early age.

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CONFLICTS OF INTEREST

All authors stated that there was no conflict of interest with any party during the research and publication.

AUTHOR CONTRIBUTIONS

The contribution of each author, namely MFR as a literature searcher, compiling literature, collecting data, compiling manuscripts; BDR as compiling research designs, collecting data, analyzing data, and compiling manuscripts; JH for compiling research designs, collecting data, and compiling manuscripts, and S for compiling research designs, collecting data, analyzing data, and compiling manuscripts.

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