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Nutrition Education using Booklet Media with and Without Counseling and the Association with Home Food Availability and Parent Feeding Practices in Preschool Children

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Abstract

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BACKGROUND: Fruit and vegetable consumption among preschool children in Indonesia is lower than recommendations, which may be due to types of food availability at home and unhealthy feeding practices such as restriction and parent pressure. Providing nutrition education through booklets and counseling on healthy food (fruit and vegetable) consumption can help to provide information to parent's thus resulting healthy behavior, compared to merely providing booklets without counseling.

AIM: The aim of this study is to determine the effect of nutrition education using booklets with counseling versus without counseling on home food availability and parent feeding practices in preschool children.

METHODS: A quasi-experimental study utilized a pre-test and post-test design with a control group. Sampling methods included both purposive sampling and simple random sampling. Purposive sampling was used to select Danurejan district as the sub-district with the highest obesity percentage in Yogyakarta Municipality. Meanwhile, simple random sampling was applied to select children and schools (Early Childhood Education Program Pendidikan Anak Usia Dini [PAUD] or kindergartens Taman Kanak-kanak [TK]). There were 56 people (28 intervention and 28 controls) taken from 4 PAUD/TK. The intervention group received nutrition education using booklets as well as one 30–60 min counseling session carried out at the participant's home. The control group was provided with booklets, but did not receive counseling. The pre-test was carried out before nutrition education was given, and the post-test was conducted 30 days after the nutrition education. Fruit and vegetable availability at home were assessed using questionnaire, and parent feeding practices were assessed using the Comprehensive Food Feeding Questionnaire. The statistical tests used to assess outcomes between groups included pair *t*-test, Wilcoxon, Mann–Whitney, and independent *t*-test.

RESULTS: There were increase in healthy eating guidance and monitoring before and after nutrition education was provided in the intervention group ($p = 0.00$; $p < 0.05$), but no differences were found in restriction, child control, and parent pressure ($p = 0.11$, $p = 0.48$, $p = 0.28$; $p \geq 0.05$). There was a decrease in child control behavior before and after nutrition education in the control group ($p = 0.00$; $p < 0.05$), but there were no differences in healthy eating guidance, monitoring, restriction, and parent pressure ($p = 0.17$, $p = 0.18$, $p = 0.53$, 0.62 ; $p \geq 0.05$).

CONCLUSIONS: Results demonstrate that using counseling in addition to nutrition education booklets can increase mother's implementation use of healthy eating guidance and monitoring, with the potential to promote healthy weight within families.

Introduction

The prevalence of obesity among children continues to increase in both developed and developing countries. Based on the Basic Health Research Data (Riskesdas) in 2018, the prevalence of obese children under five in Indonesia is 8%, especially in rural areas are higher than in urban areas (8.2% vs. 7.9%) [1]. Meanwhile, the prevalence of obesity among children under five in the Province of the Special Region of Yogyakarta in 2018 was 4.7% [1], where one of the regions (Yogyakarta City) was in the first position with obese children compared to 4 other districts, namely 2.86% [2].

Obesity among children is caused by unhealthy lifestyles, including lack of physical activity [3] and unhealthy eating patterns or consumption of high-calorie but low-fiber foods [4], [5]. A case-control study involving 244 obese and 244 non-obese children in Yogyakarta City (urban) and Bantul Regency (rural) in Indonesia showed that there was a significant difference between obese and non-obese children in terms of the amount and frequency of consumption of fruit and vegetables. Vegetables have a smaller average frequency and amount of vegetable and fruit consumption [6].

Fruit and vegetable are useful for increasing the body's immune system against viruses or bacteria that can cause disease. Weight gain [7] and the risk of non-communicable diseases (cancer, diabetes

mellitus, hypertension, heart disease, and stroke) in adulthood will increase if children avoid eating fruit and vegetable [8]. At present, the consumption of fruit and vegetables for both adults and children in Indonesia is less than the recommended, 3-4 servings/day (equivalent to 300-400 grams/day). Based on the Total Diet Survey in 2014 showed that the consumption of fruit and vegetables in Indonesia was still low at 33.5 g/day and 57.1 g/day, where children were the population with the lowest consumption of fruit and vegetables, namely, 18.9 g/day and 18.9 g/day 2 g/day [9].

There are several demographic factor affecting fruit and vegetable consumption such as social and culture (gender, parental education, age, and culture) [10], exposure to junk food advertisements [11], parental eating behavior [12], feeding behavior [13], [14], feeding [15], and availability or access to food at home [16].

Research shows that feeding behavior by forcing (pressure to eat) consuming healthy foods (vegetables), limiting unhealthy foods (restriction), and letting children regulate their food intake (child control) causes children to avoid and dislike healthy food (fruit and vegetables) so that they switch to eating foods high in calories and fat [17]. In addition, based on research on parent feeding practices with healthy eating guidance [18], pressure to eat [18], [19], and restriction [10], [18] associated with child weight. In line with a case-control study in Yogyakarta, Indonesia, which involved 101 obese children and 101 non-obese children, it showed that parent pressure and restriction were a risk factor for obesity [20]. In addition, one important aspect that can affect food intake in children is home food availability [21], because children tend to consume food that is available at home [22]. Several studies have reported that children's consumption of a certain type of food is significantly related to the availability of that food at home [16], [23].

The development of eating habits in the early stages of life plays an important role in the growth and development of children [24]. The preschool years are an ideal age to develop behaviors that can support healthy eating habits throughout the lifespan [25]. Children's food preferences develop through taste, sight, and smell and by observing other caregivers in the home food environment [26]. Children's closet environmental influence is their who can help to build healthy eating habits related to fruit and vegetable consumption from an early age [27].

Forming healthy food consumption behavior (fruits and vegetables) from an early age for children cannot be separated from the role of parents [25]. It is known that parental knowledge determines the quality of food given to children in terms of knowing the recommended amount of intake, food portions, and types of food provided [13], [28], [29].

One of nutrition education to resuscitate parents and increase knowledge about the importance of vegetable and fruit consumption for preschoolers is through the use of media booklets and counseling. The booklet is a prop that can support the smooth running of educational activities because it can be received and captured by the five senses and information seen by the eye can channel knowledge to the brain [30].

In addition, the booklet delivered a message in the form of a book with a combination of narration and pictures so that the information contained is more complete, more detailed, clear, and educative [30], [31]. While nutrition counseling is a two-way communication process between counselor and client to help identify and solve client problems, aiming to assist in behavioral change related to nutrition, to increase the person's health status. In nutrition education, what has been changed includes the domains of knowledge, attitudes, and behaviors related to nutrition [32]. Negative behavior is changed into positive behavior, for example, unhealthy feeding practices (restriction, parent pressure, and child control) is changed to healthy feeding practices (healthy eating guidance, and monitoring) [33] and the less consumption of fruit and vegetables is changed into sufficient consumption of fruit and vegetables.

A study in Bangladesh in 2019 involving 3009 mothers also showed that the experimental group provided nutritional counseling on dietary diversity for children, the level of knowledge became better compared to the control group. A study in adolescents in Indonesia showed that nutrition education using booklet media is quite effective in increasing knowledge compared to the control group, increased knowledge coupled with low consumption of fast food and calorie intake [34].

Preschool is regarded as a critical period for growth and development [35]. A nutritionally balanced diet is important to ensure a healthy and active child development. Nutrition education is one of the efforts that can be done to overcome nutritional problems through increasing one's knowledge, attitudes, and behavior. Thus, researchers are interested in knowing the effectiveness of nutrition education using booklet media with counseling and without counseling on the parent feeding practices and home food availability.

Methods

Study design

This study is quasi-experimental with a pre- and post-test control group design. It was conducted from March to May 2019, in a Pendidikan Anak Usia Dini (PAUD) (Early Childhood Education Program)

Taman Kanak-kanak (TK) (kindergartens) at Danurejan Sub-District, Yogyakarta Municipality, Indonesia. This location was chosen based on weight data for children under five years in 2018, where the highest percentage of those with overweight was located in this sub-district [36].

Participants

Participants included mothers of preschool children ($n = 56$). Inclusion criteria included; parent of preschool (mothers) children that are aged 3–6 years, do not have full day learning time, attends school, and reside in Yogyakarta Municipality area, parents provided informed consent for their participation. The sampling techniques used included purposive and simple random sampling. The first technique was used to select the sub-district, particularly that with the highest overweight cases in Yogyakarta Municipality. Danurejan sub-district was then chosen [36]. Simple random sampling was used to select PAUD/TK and participants. The 56 participants were all from PAUD/TK, namely Lempuyangwangi, Trisula Aba, Purborini, and Mubarak. All 56 participants were then evenly divided into an intervention group (28 participants) and control group (28 participants).

Measures

Parent feeding practices were assessed using Comprehensive Food Feeding Questionnaire (CFFQ) [33] before and after intervention delivery. CFFQ has been translated into Indonesian that has been tested for validity and reliability [20]. Subscales used in this analysis consists of 32 items about healthy feeding practices (healthy eating guidance and monitoring) and unhealthy feeding practice (parent pressure, restriction, and child control). Healthy eating guidance (nine items, Cronbach alpha 0.85): Defined as a parent's behavior shown by being an example, teaching, and encouraging children to eat healthy foods. Monitoring (four items, Cronbach alpha 0.93): Defined as parents monitoring what their children eat, especially unhealthy food. Parent pressure (seven items, Cronbach alpha 0.66): Defined as parents pushing the child to eat or use the food to control their behavior Restriction (eight items, Cronbach alpha 0.89): Defined as a parent's behavior shown by limiting unhealthy foods and controlling the child's weight. Child control (four items, Cronbach alpha 0.85): Defined as parents's behavior shown by allowing the child to choose the type of food and set meal times freely. The CFFQ items for favorable items were scored from 1 (strongly disagree) to 5 (strongly agree).

The availability of healthy food (fruit and vegetables) at home contains items about several types of fruit and vegetables found in the house either fresh, cooked,

or canned. There were 26 fruit items and 23 vegetables items that were asked to the participants. The items were score 4 (>1 times/day), 3 (1 time/day), 2 (4–6 times/week), 1 (1–3 times/week), and 0 (never) [37], [38].

Intervention procedures

Booklets containing information about fruit and vegetables such as definition, types, nutritional content, benefits, impacts, recommendations of consumptions, ways for kids want to eat fruit and vegetables (parental feeding practice), storage, processing methods as well as recipe examples were provided to participants. The booklet was reviewed by an expert panel of community health center nutritionist, nutrition lecturers, early childhood education/kindergarten teachers, multimedia expert, and parent of preschool children to improve the content before intervention delivery.

Nutrition education using booklets and counseling was carried out by two nutrition students who had been trained on the booklet's content and counseling (reviewing booklet content, answer a question, and motivational interviewing). Counseling was given to the intervention group once for about 30–60 min in each of the participant's homes. The control group was given booklets without counseling.

Data analysis

Normality data test by Shapiro–Wilk in each group. Analyzing the effect of intervention in each group used Wilcoxon and pair t-test, while the effect of the intervention on changes in the effect of the intervention on changes in the dependent variable between the treatment and control groups used independent t-test and Mann–Whitney. The data analyzed using software SPSS version 21.

Research ethics

This research has received ethical approval from the Ethics Committee of Alma Ata University, Number KE/AA/VI/952/EC/2019.

Results

The characteristics of the participants in both the intervention and control groups are shown in Table 1. Over half of preschoolers were 5 years old. The family income level distribution showed that the higher proportions were around Rp 2.000.000 to 3.000.000 (\$ 120-200).

Table 1: Distribution of participant characteristics

Characteristic	Intervention Group (n = 28)		Control Group (n = 28)	
	(n)	(%)	(n)	(%)
Children's Age (years old)				
3	0	0	1	3.6
4	5	17.9	4	14.3
5	16	57.1	17	60.7
6	7	25.0	6	21.4
Mother's education				
Primary school graduate	2	7.1	2	7.1
Junior high school graduate	1	3.6	1	3.6
Senior high school graduate	18	64.3	18	64.3
College graduate	7	25.0	7	25.0
Father's occupation				
Labor worker	4	14.3	4	14.3
Private company employee	14	50.0	19	67.9
Entrepreneur	8	28.6	4	14.3
Civil servant	4	7.1	1	3.6
Mother's occupation				
Housewife/unoccupied	12	42.3	13	46.4
Labor worker	1	3.6	0	0
Private company employee	9	32.1	11	39.3
Entrepreneur	6	21.4	4	14.3
Civil servant	0	0	0	0
Monthly income (rupiah)				
<2.000.000	5	17.9	8	28.6
2.000.000-3.000.000	18	64.3	18	64.3
>3.000.000	5	17.9	2	7.1

Table 2 shows that high income affects the increase in the availability fruit and vegetable at home. After intervention, income >3.000.000 rupiah in intervention group resulted in an increase in the availability of fruit and vegetables at home is more or equal to 1-3 time/week.

Table 2: Income distribution on the average home food availability (fruit and vegetables) in the intervention and control group

Monthly income (Rp)	n	Intervention Group		Control Group	
		Before intervention	After intervention	Before intervention	After intervention
<2.000.000					
Fruit	5	0.46 ± 0.29	0.78 ± 0.24	0.27 ± 0.12	0.32 ± 0.09
Vegetable		0.66 ± 0.23	1.15 ± 0.27	0.36 ± 0.14	0.41 ± 0.09
2-3000.000					
Fruit	18	0.35 ± 0.20	0.76 ± 0.25	0.37 ± 0.18	0.37 ± 0.17
Vegetable		0.45 ± 0.26	1.01 ± 0.30	0.47 ± 0.19	0.48 ± 0.13
>3.000.000					
Fruit	5	0.45 ± 0.11	0.78 ± 0.10	0.41 ± 0.13	0.42 ± 0.06
Vegetable		0.71 ± 0.29	1.23 ± 0.18	0.58 ± 0.23	0.69 ± 0.25

Based on Table 3, there were statistically significant differences in home food availability (fruit and vegetable), healthy eating guidance, and monitoring before and after intervention was given booklet media and counseling in the intervention group (p < 0.05), that was showed an increasing after intervention. However, there were no differences in parent pressure, restriction and child control before and after intervention in intervention group (p ≥ 0.05). Based on Table 4 in the control group, there was a significant difference in child control (p < 0.05). However, there were no differences in home food availability (fruit and vegetable), healthy eating guidance, monitoring, parent pressure, and restriction before and after intervention in control group (p ≥ 0.05).

Based on Table 5, after intervention shows that there were significant differences in home food availability (fruit and vegetable), healthy eating guidance, monitoring, parent pressure, restriction, and child control between the intervention group and control group (p < 0.05).

Table 3: Difference of home food availability (fruit and vegetables) and parent feeding practices before and after intervention in the intervention group

Variable	Mean ± SD		p
	Before Intervention	After Intervention	
Home food availability			
Fruit	0.38 ± 0.20	0.76 ± 0.22	0.00 ^b
Vegetable	0.53 ± 0.27	1.07 ± 0.28	0.00 ^b
Parent feeding practice			
Healthy eating guidance	3.11 ± 0.63	3.80 ± 0.20	0.00 ^a
Monitoring	3.10 ± 0.62	3.84 ± 0.24	0.00 ^a
Parent pressure	2.79 ± 0.96	2.55 ± 0.60	0.28 ^a
Restriction	3.08 ± 0.57	3.33 ± 0.54	0.11 ^b
Child control	3.22 ± 0.88	3.08 ± 0.82	0.48 ^a

^aWilcoxon, ^bPair t-test.

Table 4: Difference of home food availability (fruit and vegetables) and parent feeding practices before and after intervention in the control group

Variable	Mean ± SD		p
	Before Intervention	After Intervention	
Home food availability			
Fruit	0.34 ± 0.16	0.36 ± 0.14	0.12 ^b
Vegetable	0.45 ± 0.18	0.47 ± 0.14	0.38 ^a
Parent feeding practice			
Healthy eating guidance	3.34 ± 0.37	3.43 ± 0.34	0.17 ^b
Monitoring	3.30 ± 0.41	3.40 ± 0.34	0.18 ^b
Parent pressure	2.38 ± 0.84	2.28 ± 0.53	0.62 ^a
Restriction	2.83 ± 0.44	2.93 ± 0.52	0.53 ^a
Child control	2.70 ± 0.71	1.98 ± 0.61	0.00 ^b

^aWilcoxon, ^bPair t-test.

Table 5: Change in the participant's home food availability (fruit and vegetables) and parental feeding practices after the intervention

Variable	Mean ± SD		p
	Intervention Group	Control Group	
ΔHome food availability			
ΔFruit	0.37 ± 0.11	0.01 ± 0.06	0.00 ^a
ΔVegetable	0.54 ± 0.22	0.03 ± 0.08	0.00 ^b
ΔHealthy eating guidance	0.63 ± 0.57	0.09 ± 0.34	0.00 ^b
ΔMonitoring	2.35 ± 2.26	0.11 ± 0.36	0.00 ^a
ΔParent pressure	-0.14 ± 1.07	-0.09 ± 0.34	0.04 ^a
ΔRestriction	0.24 ± 0.76	0.09 ± 0.73	0.01 ^a
ΔChild control	-0.14 ± 1.13	-0.71 ± 1.05	0.00 ^a

^aMann-whitney, ^bindependent t-test.

Discussion

The effect of nutrition education with and without booklet media with and without counseling and the association with home food availability

Regularly dietary issues arise due to the participant's lack of knowledge and information about nutrition. The formation of recent behaviors from knowledge leads to further responses in the form of action or behaviors [39]. Behavior is the response/reaction of an individual to stimuli that come from outside and from within him. Behavior is formed due to predisposing factors (knowledge, attitudes, beliefs, values, etc.), enabling factors (availability of supporting facilities or tools, etc.), and reinforcement factors (laws, regulations, supervision, etc.) [40].

Nutrition education using booklets and counseling can affect a person's knowledge, attitude, and behavior improvement, because education carried out with the help of the media will make it easier and

clearer for the participant to receive, understand the content presented and assist educators in conveying the content. While, counseling is a two-way communication process (face to face) between counselors and clients to recognize and overcome client problems [41]. Media booklets and counseling are useful in conveying information and making it easier for someone to understand information that is considered unknown or considered complicated [30]. A study showed that booklets were effective for increasing knowledge as well as changing one's behavior to reduce consumption of fast food and high-calorie and fat foods [31]. In line with this study, there was a significant difference in nutrition education using booklets and counseling on home food availability in the intervention group, which experienced an increase in providing healthy food at home (fruits and vegetables). While in the control group, there was no difference in home food availability before and after the intervention.

In this study, economic factors also influence the home food availability (fruit and vegetable) where families with high incomes provide more vegetables and fruit than families with low incomes. Families with an income of Rp. >3.000.000/month provide more vegetables and fruit at home.

7 The effect of nutrition education with and without booklet media with and without counseling and the association with parent feeding practices

35 The higher a person's knowledge regarding nutrition, the more attention will be paid to the quantity and quality of food [42]. Changes in knowledge that are increasing are the basis for influencing a person's health behavior in this case, namely, parents. Nutrition education is a field of knowledge that allows a person to choose and maintain a diet based on the principles of nutrition science [42], [43]. Based on the results of the study, there were significant differences in parent feeding practices (healthy eating guidance and monitoring) before and after nutrition education in the intervention group. While in the control group there was no difference before and after the intervention. The results are in line with research in a group of mothers who have toddlers aged 6–24 months with underweight, given leaflets and counseling, which shows that there is a change in the attitude of giving complementary feeding compared to giving leaflets alone [44]. Likewise, research on a group of mothers who had under-fives with underweight aged 2–3 years, providing nutritional counseling, the results showed that there was a significant effect on mother's knowledge and the eating patterns of toddlers experienced an increase in vegetable, fruit and animal side dishes [45]. It can be said that parents who receive nutrition education will apply healthy feeding practices to their children by modeling, teaching, and encouraging children to eat vegetables and fruit, such as setting an example for children by consuming vegetables and fruit,

explaining the benefits of vegetables and fruit, seducing. If the child eats vegetables and fruit in small quantities, ask the reason if the child does not finish and give praise if the child wants to eat vegetables and fruit.

The role of parents as educators is a form of implementation in the form of support for children to consume healthy foods. Parents who always introduce various types of vegetables and fruit to their children, always provide information related to the importance of consuming vegetables and fruit in children, and always try to persuade children when children refuse to eat vegetables and fruit, also encourage children to increase their consumption of vegetables and fruit until as recommended by the WHO. The role of parents (mother) as the initiator can be seen from the presence or absence of the mother's role in determining family meals. This role can be seen from the mother's existence in determining menus, spending budgets to purchasing vegetables and fruit as well as determining the types of preparations for vegetables and fruit. Parents also play a good role as initiators by giving children the freedom to choose the menu, determine which vegetables and fruits to buy and help when processing vegetables and fruit on that day causing children to want to eat vegetables and fruit because the fruits and vegetables are purchased according to their wishes [46].

In the intervention group, there was no difference in parent feeding practices (parent pressure, restriction and child control) before and after the intervention. It can be said that mothers who have been given nutrition education are not necessarily able to implement and limit unhealthy foods at home, are forced, and mothers still allow their children to regulate the food they want to consume by themselves. This can be due to the provision of nutrition education in this study only once a month with a duration of 30–60 min, so that mothers have not fully implemented restrictions on unhealthy foods at home and still let their children manage the food they want to consume. A study showed that there were differences in the attitude of giving complementary feeding between groups who were given nutrition education using leaflets and counseling with leaflets only, where the frequency of nutrition education was 1 time/month for 3 months with a duration of 15–20 min. Research in the group of mothers who have toddlers shows that the provision of nutrition education 3 times shows an increase in body weight [47]. Therefore, for the provision of nutrition education to be effective in addition to media and methods (booklets and counseling), it is necessary to pay attention to the frequency of providing nutrition education.

Conclusion

This research based on the results of the study, nutrition education using booklet media and counseling

is effective for behavioral changes in home food availability, healthy eating guidance, and monitoring. It did not affect parent pressure, restriction and child control behavior. Suggestions for further research are to make nutrition education more effective and to increase the frequency of nutrition education.

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