DOES INTEGRATIVE NUTRITION EDUCATION TO MOTHER'S TODDLERS AFFECT KNOWLEDGE AND PRACTICE OF FEEDING VEGETABLES AND FRUITS TO TODDLERS?

Maryati Dewi[1], *Yenny Moviana*[2]
[1,2]Jurusan Gizi Poltekkes Kemenkes Bandung
Email: Dewi16gz@gmail.com

Abstract.

Background : Non-communicable diseases in adulthood must be prevented from as early as possible. Vegetables and fruit have special features in preventing non-communicable diseases because they are rich in phytochemicals, fiber, vitamins and minerals. On the other hand, the intake of vegetables and fruit for the Indonesian population, especially children under five, is still low. Efforts are needed to increase through mothers of toddlers so that their intake increases.

Methods : This study is a quasi-experimental pre-post study with control group design with a total participants of 48 people distributed among 24 people in the control group, 24 people in the treatment group. The control and treatment groups were in four different posyandu. In the research area, there were 8 posyandu that met the requirements and then randomly selected 4 posyandu, 2 control groups and 2 treatment groups. The selection of posyandu was done by random sampling. The intervention provided was in the form of integrative group nutrition education. The tools used are flipcharts, food models, food participants. The educational methods applied to the treatment group were brainstorming, lectures, demonstrations; the control group was given education using the lecture method. The statistical analysis used was the median difference test in groups with the Wilcoxon test, the median difference test between groups with the Mann Whitney test because the data distribution was not normal. research result.

Results : The difference in median values in the group before and after the intervention based on the Wilcoxon test was found to be significant in knowledge, fruit intake, and vegetable intake (p=0.000) except in the control group it was not significant (p=0.194).

Conclusion : Hard and continuously efforts are needed through mothers of toddlers so that toddlers can consume fruits and vegetables according to the recommendations in the balanced nutrition guidelines.

Keywords: nutrition education, knowledge, feeding practice, toddler, fruit and vegetables

Background

The prevalence of non-communicable diseases in adults in Indonesia and in the world is suspected to be increasing. One of these non-communicable diseases is neoplasm or cancer. Several studies have found that a lack of fiber, an antioxidant, is associated with cancer risk. Vegetables and

fruit are food sources of fiber and important phytochemicals, whose availability in the diet is highly recommended.

Adequate vegetable intake is positively associated with a reduced risk of metabolic syndrome, so it is recommended for primary prevention of cardiovascular disease (Esmailzadeh et al., 2006). Daily food consumption is an important part that must be considered in the etiology of cancer in adults. This situation is possible is a condition that is cumulative until the occurrence of cancer. The Boyd Orr Cohort study for approximately sixty years found that a person who ate enough vegetables and fruit as a child was associated with a lower mortality rate for cancer (Maynard et al., 2003).

The prevalence of less consumption of vegetables and fruit still does not show a better figure. The results of Riskesdas 2007 showed that 93.6% of Indonesians consume less fruit and vegetables. Meanwhile, the results of the 2013 Riskesdas of the Indonesian people found that 93.5% of Indonesians consumed less fruit and vegetables (Ministry of Health RI, 2007; Ministry of Health RI, 2013). The prevalence of less consumption of vegetables and fruit in the province of West Java as a result of the 2013 Riskesdas was 96.4%, and Cimahi City was 96.4%, exceeding the national prevalence (Kemenkes RI, 2013). The results of the research by Febriana and Sulaeman (2014) show that 99.0% of PAUD children aged 3-6 years consume less vegetables and 74.5% consume less fruit. The research of Priawantiputri and Aminah (2016) found that consumption of vegetables and fruit among children under five in the Pasirkaliki village of Cimahi was 65.8%.

Efforts to prevent non-communicable diseases start as early as possible through balanced nutrition practices, one of which is adequate consumption of vegetables and fruit. The results of research in European countries regarding factors related to vegetable and fruit consumption of elementary and secondary school children, it was found that personal and social factors were the ones that influenced the daily intake of vegetables in school children. Social factors that contribute are parental attention, eating habits in the family, availability of vegetables at home, and lunch (De Bourdeaudhuij et al., 2008).

Various efforts were made to increase the family's vegetable intake, especially children. Color your plate is an intervention in the form of a campaign aimed at increasing children's vegetable intake. This campaign emphasizes that the food on the plate should be colored by vegetables. This activity emphasizes the important role of parents in increasing children's vegetable consumption (Gans et al., 2016).

The introduction of vegetables and fruit should be started as early as possible, when children start getting complementary foods for breast milk (MP-ASI). The age of children's early introduction to vegetables and fruit has a positive relationship with children's preferences (Febriana and Sulaeman, 2014). Research conducted by Dewantari and Widiani (2012) in Bali explains that elementary school children who have good vegetable consumption are introduced to vegetables and fruit by their parents at the age of 4-5 months and 6-9 months.

Based on a study by Unicef Indonesia, the high prevalence of nutritional problems among children under five in Indonesia is inadequate knowledge and inappropriate nutrition practices, shown by only 41% of children aged 6-23 months who were given appropriate complementary feeding (Unicef Indonesia, 2012). There is still a high prevalence of inappropriate feeding practices for toddlers, Unicef Indonesia recommends providing nutrition education to mothers and caregivers of toddlers (Unicef Indonesia, 2012). Nutrition education is a learning process about food, how the body uses the food that is consumed, and why food is needed for general health (Harper, 1985). Bhandari et.al (2004) found that the provision of nutrition education interventions was able to increase mother's knowledge and feeding practice. Dewi and Aminah's research (2016) found an increase in maternal feeding practice scores by 2.1 points after providing nutrition education to mothers and caregivers of stunting toddlers 6-24 months in Cimahi City.

Based on the studies that have been done, nutrition education plays an important role in improving nutritional behavior. Given the important role of vegetables and fruits as

sources of fiber and important phytochemicals for humans; still low consumption of vegetables and fruit in toddlers; the high prevalence of poor toddler feeding practices; there is still not much research on efforts to increase the intake of vegetables and fruit in toddlers, it is necessary to research the effect of nutrition education interventions for mothers of toddlers on vegetable and fruit intake in toddlers.

Methods

Study Design

This is a quasi-experimental design pre-post test with control group design. The experimental design is as follows:

Y'_e	X_1	Y''_e
Y'_c	X_2	Y''_c

keterangan:

Y'_e is pre-intervention for treatment group

Y'_c is pre-intervention for control group

Y''_e is post-intervention for treatment group

Y''_c is post-intervention for control group

X1 is intervention implemented to treatment group

X_2 is intervention implemented to control group

The intervention implemented to the treatment group was integrative nutrition education using a group counseling approach by applying several learning methods. The intervention implemented to the control group was nutrition education using a group counseling approach using lecture and question and answer methods.

Study Setting

The time of data collection was carried out in May - August 2018 with research locations in 4 RWs in the Pasirkaliki Village area, North Cimahi District, namely RW 1, RW 4, RW 6, RW 12 by simple random sampling from eight RWs, determining the control group and the treatment group, carried out by random sampling using lottery paper.

Based on research data by Priawantiputri and Aminah (2016), the prevalence of insufficient consumption of vegetables and fruit in this region is quite high, namely 65.8%.

Participants

The total participants of the study was 48 mothers, spread over 24 people in the control group and 24 people in the treatment group. The participants selection of mothers was carried out by purposive sampling according to the research group that had been determined. The inclusion criteria for the control group and the treatment group are as follows:

1. Mothers have children aged 12-48 months at the time of data collection.
2. The child does not have a physical disability that makes it difficult to eat solid food.
3. The mother is the one who provides and feeds the toddler. Not a nanny or other family.
4. Mother does not have hearing loss and easy to communicate
5. Having a minimum education is passing 6 years of basic education (elementary school level)
6. Willing to be a proven research participant by signing the informed consent

The participants exclusion criteria are:

1. Toddlers are sick and must be treated at the hospital
2. Mother did not participate in the study until it was completed (drop out)

Methods of Data Collection

Prior to intervention, participants were screened according to the participants inclusion criteria. The following were carried out: (1) Simple randomization by lottery to determine the control group and treatment group, (2) Explanation of the manuscript before the study. If they agree, the participants sign the informed consent form, (3) Explanation of research activities starting from stages 1,2,3,4 and post intervention.

1. Knowledge Measurement

The level of knowledge of the participants were measured using a question sheet consisting of 10 open-ended questions. Knowledge measurement was carried out before the intervention for screening, at the end of every nutrition education activity, a week after the final nutrition education activity.

The knowledge score is determined based on the number of questions answered

correctly. Each question has a score of 0-10 so that the maximum value of knowledge is 100 (100%) and the lowest value is 0.

2. Feeding Practice Measurements

The feeding practice score was determined based on the types of vegetables and fruit consumed by the toddlers and the provision of vegetables and fruit to the toddlers, measured using a food recall form 1x24 hours for 3 non-consecutive days. Each type of vegetable and fruit consumed is given a value of 1, regardless of the portion consumed by children under five.

The measurement of feeding practices was carried out before the intervention, before the nutrition education activity began, during the post intervention.

3. Intervention of Nutrition Education

Nutrition education is provided in two models. The first model is a group counseling model with lecture and question and answer learning methods, using posters, food participants and flipcharts. This model will be applied to the control group.

The second model of nutrition education intervention is an integrative nutrition education model. The integrative education model uses a group counseling model using the lecture, question and answer, and brainstorming demonstrations, using posters, food participants and flipcharts implemented to treatment group.

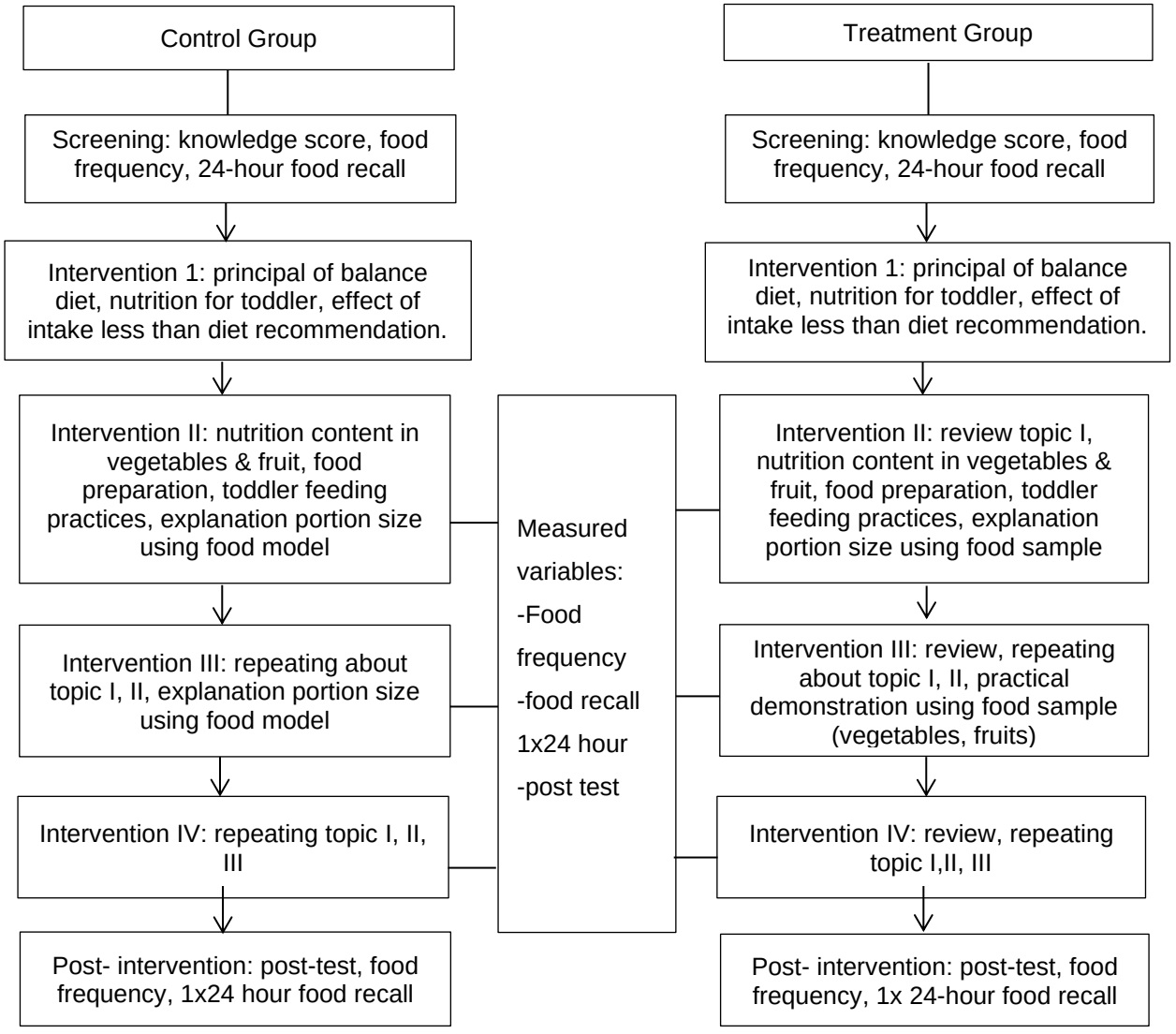

Figure 1. Flow-chart The Treatment Implemented to Participants

Data Analysis

Data analysis was performed using statistical software. Research data will be analyzed descriptively univariate on the participants characteristics data. Furthermore, the research variable data were analyzed to test and obtain:

1. normality of data distribution. The data of initial and final knowledge scores, early and late fruit consumption scores, early and late vegetable consumption scores were not normally distributed.
2. the median value of knowledge scores, vegetable consumption, fruit consumption because the data distribution is not normal.
3. The results of the pre-intervention median difference test for the control group and the intervention group
4. The results of the post-intervention median difference test for the control group and the intervention group.

The Wilcoxon test was used to test the median difference in the control group and in the treatment group before and after the intervention with a 95% confidence level.

Results

Based on the characteristics, the age of the participants did not differ between the control and treatment groups after the Mann Whitney test was performed, which means that the age of the control and treatment groups was homogeneous (p> 0.05). Meanwhile, the age of children under five was statistically different between the control group and the treatment group. This condition is a condition that can affect the results of the study because it is related to the food intake of toddlers.

Tabel 1. Characteristics of Study Participants Based on Age and Toddler Age

Variables	Control			Treatment		
	min.	Max.	Med	Min.	,max.	Med.
Age (y)	19	40	31.5	17	39	29.5
Toddler age (m)	12	42	28	12	42	20

Refers to the age of the participants in the control group and the treatment group, they are still classified as productive age, namely 17-40 years. All participants raised themselves and provided food for their toddlers without the help of household assistants. It is assumed by the researcher that the provision of food for all children is carried out by the participants. The education level of the participants in both groups showed that mothers graduated from 6 years of basic education, there was only 1 person who did not finish 6 years of basic education. This means that the participants can read and write and is accustomed to receiving information. The age of the toddlers in the participants, which is spread from 12-42 months of age, will also affect the results. This can happen because at older ages (> 36 months) the variety of types and types of food is greater because the nutritional needs and portions of food are more than children aged 12-36 months (PGS, 2014).

Characteristics of the participants according to education data shows that in the control group the largest proportion is graduated from 9 years of education (SMP) by 58%. Based on education, the proportion of years of education taken by the participants in the treatment group found a higher proportion, with a length of education of 6 years (graduated from elementary school) 42% and 12 years (graduated from high school) 42%. A person with higher education level will make it easier for someone to understand the information conveyed.

Tabel 2. Characteristics of Study Participants based on Education and Experience of Nutrition Education

Variables	Control	Treatment
Education		
Lulus SD	21%	42%
Lulus SMP	58%	17%
Lulus SMA	21%	42%
Experience of Nutr. Ed.		
Yes	54.2%	37.5%
No	45.8%	62.5%

Educational experience is expressed by the participants obtained at the health service. The experience of getting messages or information will make it easier for someone to understand if they get the same information at different times and places. However, the delivery method and the media contribute to the length of time information is remembered.

Tabel 3. Analysis of Study Variables Score before and After Nutrition Education Intervention

Variables	Control			P val.	Treatment			P val.
	Min.	Max.	Med		Min.	Max.	Med.	
Knowledge -pre -*post*	41 47	70 73	59 59	0.194*	48 49	75 83	63 75	0.000
Intake of fruits -pre -*post*	0 0	2 7	1 2.5	0.000	0 1	1 5	1 3	0.000
Intake of vegetables -pre -*post*	0 0	1 5	1 2	0.000	0 1	2 4	1 2	0.000

** not significant at 95% level of confidence*

Based on the results of the analysis, information was obtained that in the control group there were 87.5% of participants whose score of vegetable intake increased, 91.7% of participants whose scores increased fruit intake. There are 50% of the control group participants whose knowledge scores increase but the participants that experience a decrease in knowledge scores are also quite large, namely 41.7%. In the treatment group, it was found that 79.2% of the participant's vegetable intake score increased after education, 87.5% of the participant's fruit intake score increased and 95.8% of the participant's knowledge score increased.

The results of the Wilcoxon test analysis, scores of consumptions of vegetables and fruits in the group, in each group before and after the intervention showed significant results. This means that education can increase children's fruit and vegetable intake. However, the increase was only in the increase in types of consumption, not in the frequency and amount of consumption. The results of the consumption recall show that all children consume snacks/packaged foods quite often. This can interfere with food intake because children will feel full and tend to refuse to eat vegetables and fruit. Consumption of fruit and vegetables in the participants of toddlers from those who do not consume to consume is a progress. Every time they start education, the participants is always asked whether they have given vegetables and fruit to children or not. For those who have been given praise and for those who have not been given motivation and reminded of the consequences if they do not consume vegetables and fruit. Neville et. al (2015) in the results of his research stated that strengthening the behavior of consuming vegetables and fruits through mothers of children under five should continue to be carried out after the intervention. The strengthening is through short message service (SMS) messages, providing solutions for mothers who have difficulty in giving vegetables and fruit to toddlers. This research was not carried out.

Conclusion

The results showed that the statistical test between the research groups was only the knowledge variable in the control group which showed not significantly results.

However, nutrition education provided an improvement in the intake of vegetables and fruit for toddlers and It is highly recommended to periodically provide nutrition education to mothers of toddlers so that others will always be reminded to give vegetables and fruit to toddlers.

References

Ahmad Esmailzadeh, Masoud Kimiagar, Yadollah Mehrabi, Leila Azadbakht, Frank B Hu, Walter C Willet. 2006. *Fruit and vegetable intakes, C-reactive protein, and the metabolic syndrome. Am* J Clin Nutr 2006;84:1489-97.

Academy of Nutrition and Dietetics. 2016. *Nutrition Intervention*

Ariawan, Iwan. 1998. *Besar dan Metode Sampel pada Penelitian Kesehatan*. Jurusan Biostatistik dan Kependudukan Fakultas Kesehatan Masyarakat Universitas Indonesia.

Arsyad, A. *Media Pembelajaran*. 2006. Jakarta: Penerbit PT. Rajagrafindo Persada.

Atika, Sumarmi. 2017. *Peran Ibu sebagai Edukator dan Konsumsi Sayur Buah pada Anak*. Amerta Nutritian : 236-242.

Cornelia, Sumedi E, Nurlita H,Afif I,Ramayulis R, Iwaningsih, et.al. 2010. *Penuntun Konseling Gizi*. Jakarta: Abadi Publishing & Printing.

De Bourdeaudhuij, S te Velde, J Brug, P Due, M Wind, C Sandvik, L Maes, Awolf, C Perez Rodrigo, A Yngve, I Thorsdottir, M Rasmussen, I Elmadfa, B Franchini and K-I Klepp. 2008. *Personal, social and environmental predictors of daily fruit and vegetable intake in 11-year-old children in nine European countries.* European Journal of Clinical Nutrition .62:834–841.

Departemen Kesehatan RI. 2009. *Laporan hasil riset kesehatan dasar (riskesdas) provinsi Jawa Barat Tahun 2007*. Badan penelitian dan pengembangan kesehatan Departemen Kesehatan RI.

Dewi Maryati, Aminah Mimin. 2016. *Pengaruh Edukasi Gizi terhadap Feeding Practice Ibu Balita Stunting Usia 6-24 Bulan*. *IJHN*, Juni , vol.3 no.1 suplemen:1-8.

Dewi, Yessica. 2013. Studi Deskriptif: *Persepsi dan Perilaku Makan Buah dan Sayuran Pada Anak Obesitas dan Orang Tua*. Calyptra. Vol.2 (1):1-17

Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski K, Paluch R. 2001. *Increasing Fruit and Vegetable Intake and Decreasing Fat and Sugar Intake in Families at Risk for Childhood Obesity*. Available at Wiley Online Library.

Gans, KM, Gorham G, Risica PM, Dulin-Keita A, Dionne L, Gao T, et al. 2016. *A Multi-level Intervention in Subsidized housing sites to Increase fruit and vegetable access and intake: Rationale, design and methods of the "Live Well,Viva Bien" cluster randomized trial*. *BMC Public Health* (Downloaded 17 October 2016)

Gizi Kurang dan Buruk di Kabupaten Kotawaringin Barat Propinsi Kalimantan Tengah. *Jurnal Gizi Klinik Indonesia* vol.4,no.2, Nopember,2007.

Harper,LJ., Daeton,BJ., Driskel,JA. 1985. *Pangan, Gizi dan Pertanian* (pent. Suhardjo).Penerbit Universitas Indonesia. Jakarta.

Kementerian Kesehatan RI. 2013. *Riset Kesehatan Dasar (Riskesdas)*. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan.

Kementerian Kesehatan RI. 2014. *Pesan Gizi Seimbang*

M Maynard, D Gunnell, P Emmett, S Frankel, G Davey Smith. 2003. *Fruit, vegetables, and antioxidants in childhood and risk of adult cancer: the Boyd Orr coho*rt. J Epidemiol Community Health ;57:218–225 (Downloaded 24 August 2017)

Neville et al. 2015. *Participating In A Fruit And Vegetable Intervention Trial Improves Longer Term Fruit And Vegetable Consumption And Barriers to Fruit And Vegetable Consumption: a follow-up of the ADIT study.* International Journal of Behavioral Nutrition and Physical Activity*;* 12:158. (Downloaded 26 March 2018)

Ni Made Dewantari, Ari Widiani. 2012. *Fruits and Vegetables Consumption Pattern in School Children*. Jurnal Skala Husada vol.8 no.2 September 2011. (Downloaded 21 March 2018)

Notoatmodjo,S. 2010. *Promosi Kesehatan Teori dan Aplikasi.* Rineka Cipta:Jakarta.

Rahmawati,I., Sudargo,T., Pramastri, I. *Pengaruh Penyuluhan dengan Media Audiovisual Terhadap Peningkatan Pengetahuan, Sikap, dan Perilaku Ibu Balita Gizi Kurang dan Buruk di Kabupaten Kotawaringin Barat Propinsi Kalimantan Tengah*. Jurnal Gizi Klinik Indonesia, vol.2, no.2, Nopember 2007.

Unicef Indonesia. Gizi Ibu & Anak. *Ringkasan Kajian*. Oktober. 2012.