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Original Research Article

The effect of mentoring on knowledge and implementation of my plate in adults

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ABSTRACT

Background: The prevalence of non-communicable diseases (NCDs), including hypertension and cancer, in Indonesia had increased, as shown by the result of Riskesdas 2018. To prevent the increase in the prevalence of NCDs, it is recommended to implement a healthy lifestyle in accordance with Indonesia balanced nutrition guidelines, including my plate. This study aimed to see the effect of nutrition education and mentoring on knowledge and implementation of my plate among adults.
Methods: This study used non-equivalent quasi experimental design. Respondents were 60 adults who were divided into control and treatment groups with 4 weeks of treatments.
Results: The age of respondents were between 22 to 44 years old with most of them were female (66.7%) in the treatment group and male (56.7%) in the control group. After four weeks of treatments, there were significant increases in nutritional knowledge ($p=0.001$) in both groups, but the results of the independent t-test showed no differences between groups. The study also showed that the number of respondents with daily meals similar to my plate increased from 33.3 to 50% in both groups. However, the average body weight of respondents also increased after treatments, but they were insignificant ($p>0.05$).
Conclusions: Nutrition education and mentoring can increase the nutritional knowledge of adults significantly. However, changing nutrient intake and body weight would take a longer time.

Keywords: Healthy lifestyle, Mentoring, My plate, Nutrition education

INTRODUCTION

Non-communicable disease (NCD) is medical conditions and diseases that are known to have long durations and slower progressions, including cancer, diabetes mellitus, and cardiovascular diseases.[1] They are also known as chronic diseases and most them are non-infectious. However, the impact on morbidity, productivity, and health service burden can be as burdensome as infectious diseases. In Indonesia, having multiple NCDs is associated with higher use of health service facilities, massive health expenditure, and lower productivity. Even in 2020, about 60% of total spending of the Indonesian national health insurance (BPJS) was spent on the treatment of NCDs.[2]

Globally, NCDs killed as many as 42 million people and made up of 74.37% of all deaths with 17 million people died before the age of 70 in 2019. In the same year, there were 7 billion people who suffered from NCDs and it made up almost 96% of diseases prevalence worldwide. Cardiovascular diseases caused most of NCD deaths with 18 million deaths (32.8%), followed by cancer with 10 million deaths (17.8%), and chronic respiratory diseases with almost 4 million deaths (7.03%).[3]

Based on the result of basic health research of Indonesia (Riskesdas) 2018, the prevalence of non-communicable diseases (NCDs) in Indonesia, including hypertension, stroke, and cancer, had increased over the year, especially in DKI Jakarta.[4] The prevalence of hypertension based on

the measurement at the national level increased from 25.8% (2013) to 34.1% (2018). The prevalence of stroke as cardiovascular disease and cancer also increased from 7‰ (2013) to 10.9‰ (2018) for stroke and 1.4% in 2013 to 1.8% in 2018 for cancer. As one of the key risk factors of NCDs, the proportion of overweight increased from 11.5% (2013) to 13.6% (2018), while the proportion of obesity increased from 14.8% (2013) to 21.8% (2018). The proportion of overweight and obesity in DKI Jakarta was the second highest of all provinces in Indonesia.[5]

To prevent the increasing prevalence of non-communicable diseases, it is necessary to implement healthy lifestyle through the healthy living movement abbreviated as GERMAS (Gerakan Masyarakat Hidup Sehat in Bahasa). GERMAS recommendations include increasing physical activity, consuming fruits and vegetables, and doing health check-ups regularly. The recommendation for a healthy lifestyle is also included in the Indonesia balanced nutrition guidelines which consist of four pillars, namely eating a variety of foods, implementing clean and healthy living behaviors, increasing physical activity, and maintaining the ideal weight.

The government also created a media to facilitate understanding of balanced nutrition guidelines called my plate (Isi Piringku in Bahasa). My plate is a guide that shows the proportion of food and drink at every meal, from breakfast, lunch, and dinner in order for people to eat healthy.[6] Based on Indonesians eating habit, a plate of meal should be divided into a third for vegetables, a third for carbohydrates sources, and a third that is left is for protein sources, both animal and plant-based, and fruits. There also several variations of my plate guidelines that are customized for certain ages and health conditions, including my plate for toddlers and the t-plate for diabetics. However, national research showed that there was an increase to the lack of consumption of fruits and vegetables among Indonesians from 93.5% in 2013 to 95.5% in 2018. It also happened to the lack of physical activities among Indonesians who aged 10 years and above from 26.1% in 2013 to 33.5% in 2018.[5]

Based on the health belief model theory, changes in individual behaviour caused by interactions between susceptible feeling towards problems, seriousness of the problem, benefits from the behaviour, and any hurdles in implementing the healthy behaviour.[7] With the rise of deaths that are caused by NCDs, people are starting to live healthier and changing their behaviours since they feel the seriousness of the impact of NCDs and the benefits that they feel since they live healthier, including improved health condition and less fatigue.

A research by Uruakpa et al showed that after four months of introduction in United States, the slogan of my plate influenced food choices of approximately 43% participants.[8] Besides, the result from research by Koning at a local food pantry and resource center in North Carolina showed that nutrition education focusing on my plate principles increased nutrition knowledge of the target population significantly.[9] A study by Briliannita et al. in Sorong, West Papua, Indonesia showed that nutrition education that focused on balanced nutrition and My Plate principles through lecture increased the nutrition knowledge of adults and the elderly that became the target.[6]

In Indonesia, there are only few studies on the intervention and evaluation of nutrition guidelines implementations among adults. Therefore, this study aimed to determine the effect of intervention on nutrition knowledge and implementation of my plate on adults through their nutrient intakes and body weights.

METHODS

This study used the non-equivalent quasi-experimental design (NEGD) with the population consisted of employees from health polytechnic Jakarta II and the agency for the empowerment and development of health human resources (PPSDM in Bahasa) in Jakarta. The study was conducted from August to October 2019. Respondents were taken by systematic random sampling with inclusion and exclusion criteria.

Inclusion and exclusion criteria

The inclusion criteria were employees from two offices who aged 20-45 years old and willing to participate in this study and the exclusion criteria were employees who suffered from chronic diseases, including diabetes mellitus, coronary heart disease, and hypertension, and were not willing to participate in the study. From that, we got a total of 60 adults as respondents who were randomly allocated into control and intervention groups with 30 respondents in each group.

To begin with, we collected characteristics data, included age, gender, marriage status, and living places by interviewing respondents with questionnaires and anthropometric data, including body weight by using Tanita weighing scale with the precision to 0.1 kg and height by using microtoise with the precision to 0.1 cm. Nutritional status as one of the characteristics was determined by body mass index (BMI). Food intakes were collected using the 24-hour food recall and knowledge were measured from the pre-test with 30 questions. After the first data collection, researchers then delivered nutrition education regarding nutrition guidelines and my plate to all groups for 15-20 minutes.

For the intervention group, personal mentoring and discussion for each sample were given once a week by nutritionists for 4 weeks straight. In this activity, individuals would have time to discuss their problems and obstacles in implementing the nutrition guidelines and my plate daily, they could also ask for suggestions to overcome those problems. For the control group, they

would get reminders, without any discussion sessions, once a week through messages in WhatsApp for 4 weeks. Every week, respondents also obliged to do food record only for one day in a week to see their food compositions, whether they were in accordance to the guideline and my plate. At the end of the intervention, researchers once again collected the anthropometric data, food intake using 24 hours recalls, and knowledge through the post-test.

The food record results were analysed and scored for each meal (breakfast, lunch, and dinner) from carbohydrate sources (rice, noodle, bread etc.), protein sources, to vegetables and fruits based on the guide in my plate. The score would be 0 for not consuming the food at all, 1 for consuming less than the recommendation in my plate, 2 for eating as recommended by my plate, and 3 for exceeding the recommendation in my plate. After that, the score of each meal would be averaged and categorized to deficient if the score less than 2, adequate if the score was between 2-2.99, and excessive if the score was equal to or more than 3 for the score of eating behaviour per food component per week. The score before would be summed up and averaged with the meal times to know the overall eating behaviour score. The overall score would be categorized into deficient if the score was less than 6, adequate or suitable to my plate principles if the score was between 6-8, and excessive if the score was equal to or more than 8. Energy and other nutrients intake were analyzed from food intake by using Indonesia food database and displayed as average intakes. The same display went to the body weight data. Nutrition knowledge was measured by pre and post-test and they were analyzed with 100 as the full score. The knowledge level will be displayed as the average scores of pre and post-tests. Statistical analysis was done by using percentages for the univariate, paired t-test and Wilcoxon test for before and after the intervention, and independent t-test with Mann-Whitney test to analyzed differences between intervention and control groups.

RESULTS

Table 1 showed that the majority of respondents, both from intervention and control groups, came from the age group of 30 to 49 years (66.7 and 56.7%), married (60% each), and stayed at private houses (83.3 and 80.0%). The majority of respondents in the intervention group were female (66.7%) and most respondents in the control group were male (56.7%). About half of the respondents in the intervention and control groups were overweight and obese (53.3% and 50%). About 76.7% of respondents in the intervention group already knew about my plate, while most respondents in the control group (56.7%) did not know about my plate. They mostly knew it from health promotion in various events, including Edu health fair (Table 1).

Table 1: Characteristics of respondents.

Characteristics	Intervention group (%)		Control group (%)	
Age (years)				
19-29	33.3		43.3	
30-49	66.7		56.7	
Gender				
Male	33.3		56.7	
Female	66.7		43.3	
Status				
Married	60.0		60.0	
Single	40.0		40.0	
Place to live				
Private house	83.3		80.0	
Renting	16.7		20.0	
Informed about my plate				
Yes	76.7		43.3	
No	23.3		56.7	
Nutritional status	**Before (%)**	**After (%)**	**Before (%)**	**After (%)**
Wasting	10.0	3.0	3.0	3.0
Normal	36.7	40.0	46.7	46.7
Overweight	16.6	20.0	26.7	26.7
Obese	36.7	36.7	23.3	23.3

After 4 weeks of intervention in the form of mentoring, respondents who consumed adequate quantity of vegetables according to my plate in breakfast increased from 10% to 13.3%, while adequate fruit consumption remained the same. Meanwhile, in the control group, respondents who consumed vegetables adequately

according to my plate also increased to 16.7%, while adequate fruit consumption decreased to 20% (Figure 1).

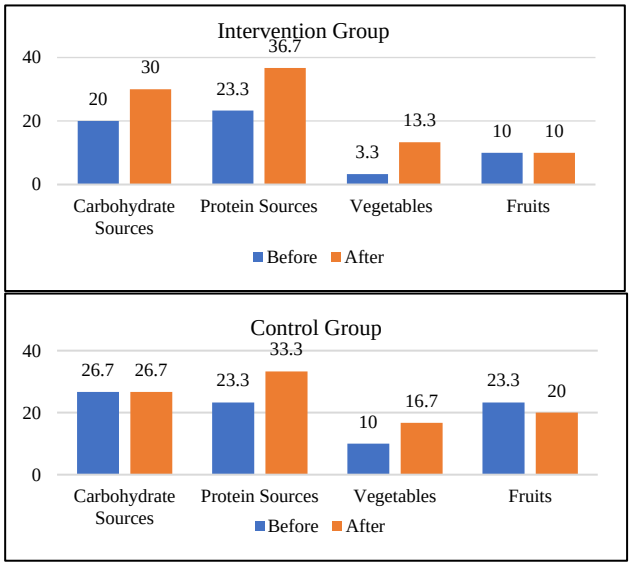

Figure 1: Adequate or suitable implementation of my plate on respondents' breakfasts (%).

Figure 2 showed that after intervention, respondents who ate vegetables adequately during lunch increased from 3.3 to 13.3%, along with adequate fruit consumption from 6.7 to 13.3%. In the control group, respondents who consumed vegetables adequately according to my plate also increased from 13.4 to 20% and adequate fruit consumption remained the same (23.3%). After the intervention, respondents who consumed vegetables adequately during dinner increased from 10 to 20%, while it remained the same in the control group (13.3%). Adequate fruit consumption remained the same in both the intervention and control groups (16.7%) (Figure 3).

Table 2 shows changes in respondents' daily meals after intervention. Respondents who consumed meals adequately or suitable to my plate increased in both groups, from 33.3 to 50%, with decreases in the deficient category. Table 3 describes changes in nutrition knowledge of respondents before and after treatments. It shows significant increases of nutrition knowledge in both groups ($p<0.05$) from average scores of 53.7 to 70.5 in the intervention group and 48 to 68.2 in the control group. However, the result of independent t-test showed that there was no significant difference between the results, meaning that both treatments, nutrition education only and nutrition education with mentoring, equally improved respondents' nutrition knowledge.

Table 4 and 5 show changes in nutrient intakes and body weight of respondents before and after treatments. The results showed there were increases in energy, fat, vitamin C, and sodium intake in both groups and decreased fiber intake in the intervention group. Average body weight of respondents in both groups increased after treatments from 66.8 to 67.4 kg in the intervention group and 68.4 to 69.1 kg in the control group. However, the results of statistical tests on Table 4 and 5 showed that these differences were not significant ($p>0.05$).

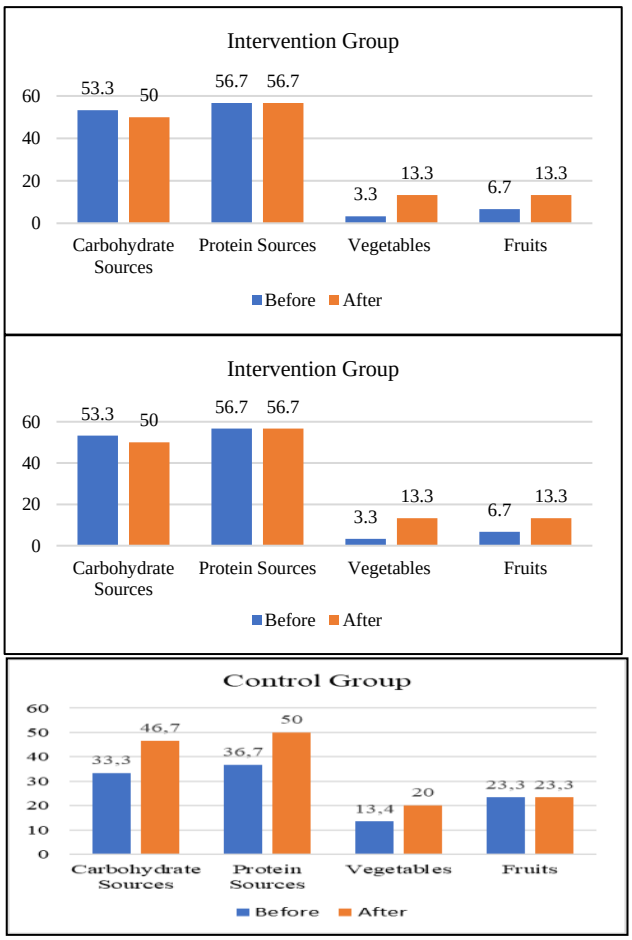

Figure 2: Adequate or suitable implementation of my plate on respondents' lunches (%).

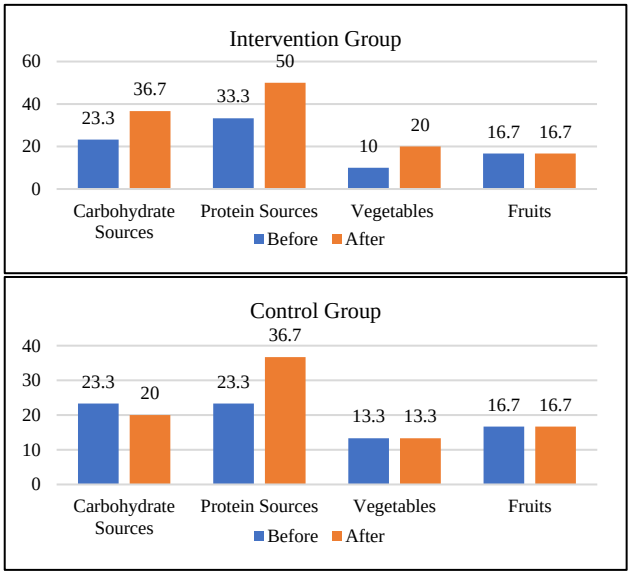

Figure 3: Adequate or suitable implementation of my plate on respondents' dinners (%).

Table 2: Implementation of my plate on daily meals of respondents before and after intervention.

	Deficient				Adequate				Excessive				Total	
	Intervention		Control		Intervention		Control		Intervention		Control			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Before	19	63.3	17	56.7	10	33.3	10	33.3	1	3.4	3	10.0	60	100
After	13	43.3	12	40.0	15	50.0	15	50.0	2	6.7	3	10.0	60	100

Table 3: Average pre and post-test scores of respondents.

	Average scores		P value
	Pre-test	Post-test	
Intervention group	53.7±10.8	70.5±10.4	<0.001*
Control group	48.0±13.6	68.2±9.3	<0.001*

*Significant relationships with Wilcoxon test, but no significant differences between groups using Mann-Whitney test

Table 4: Nutrients intakes of respondents before and after intervention.

Nutrients	Intervention group		Control group	
	Before	After	Before	After
Energy (kcal)	1432±366	1582±472	1563±559	1658±470
Fat (gm)	56±16	63±27	61±29	69±28
Vitamin C (mg)	67±64	69±58	61±48	64±65
Natrium (mg)*	440±412	461±445	401±260	450±369
Dietary fiber (gm)	12±11	11±6	9.7±4.5	9.7±4.3

Pair t-test and independent t-test: No significant differences. *Condiments and table salt were not included

Table 5: Body weight of respondents before and after intervention.

Body weight (Mean±SD)	Before intervention	After intervention	P value
Intervention group (kg)	66.8±13.3	67.4±12.8	0.137
Control group (kg)	68.4±15.5	69.1±15.1	0.076

Pair t-test and independent t-test: No significant differences.

DISCUSSION

This study assessed the effect of nutrition education and mentoring on nutrition knowledge and implementation of my plate among adults. To our knowledge, there is still limited study regarding the effect of nutrition education, especially on the implementation of my plate on daily consumption.

This study showed that the interventions significantly improved nutrition knowledge on both groups, from 53.7 to 70.5 in the intervention group and 48.0 to 68.2 in the control group. The similar result also showed in another study by Andiani et al in Ternate that nutrition education significantly increased nutrition knowledge on adults.[10] Koning's study also showed that education on my plate significantly improved nutrition knowledge among food pantry clients in United States.[9] However, a study by Lindsay showed that nutrition education did not significantly improved nutrition knowledge of adult in low income minority in United States.[11] The differences could be due to difference in respondents characteristics and duration of interventions. The independent t-test showed insignificant results, meaning no significant differences of scores between the group who got nutrition education with message reminder and the group who also got mentoring. The reasons might be due to location of respondents from two groups that was not really far from each other or in the same area.

Beside the effect of intervention on nutrition knowledge, this study also looked at the effect of intervention on the implementation of my plate on respondents' meals. The result showed that there was a change in respondents' meals to be adequate or suitable to my plate recommendation. As shown in Figures 1, 2, and 3, there were increases in consumption of fruits and vegetables to be adequate or suitable to my plate in both groups.

Changes on vegetables and fruits consumption among respondents in the intervention group seemed to be dominated by increases, compared to changes in the control group. It could be said that regular mentoring influenced the consumption of vegetables and fruits in the intervention group. From interviews' results, several respondents stated that the variety of menu in the office environment were lacking. The lack of availability and

variety was assumed to also affect the amount of vegetables and fruits consumed. It was in line with a study conducted by Clohessy et al that availability of healthy vs unhealthy food in workplace was one of the factors that influenced healthy eating behavior of employees.[12] Stadlymayr et al in their study stated that the availability of fruits and vegetables affected fruit and vegetable consumption in adults.[13] Therefore, increasing availability of vegetables and fruits around workplaces needs to be considered to increase the consumption of fruits and vegetables.

This study showed daily meals of respondents that were suitable to my plate increased from 33.3 to 50% in both groups. A quite similar result came from a study by Liu in China that nutrition education could significantly change food habits of the elderly.[14] When associated with theories of behavioral change, nutrition knowledge is a predisposing factor that become the driving force for respondents in complying with dietary guidelines, including my plate.[15] Enabling factors which are supporting factors from the environment also play important roles, one of them is access of information. GERMAS (healthy living movement) campaign had often been echoed in Indonesia since 2016 and became the enabling factor in implementing my plate.[16]

The reasons of respondents for not eating according to my plate recommendation were not used to eat fruits and vegetables regularly and the habit of buying lunch without adding any vegetables. It seemed that the respondents did not have enough motivation or intention to change their eating behavior. Based on health belief model, people will change their behavior if they understand the benefit of new behavior and the barrier to change behavior, therefore it may need more time and effort to have healthy eating behavior.[17] Nutrition education would increase respondents' knowledge on the benefit of implementing my plate and understanding that the barrier in changing was not as big as the benefit.

CONCLUSION

The result of this study showed increases in energy, fat, vitamin C, and sodium intake and decreases of fiber intake in both groups. However, they were not significant. The same happened to body weight of respondents, there were insignificant increases after interventions. Increase in body weight could be caused by increased energy and fat intake along with the implementation of my plate. These insignificant increases might be related to short duration of interventions, which were only for 4 weeks. Meanwhile, changing eating behaviour and the impact from it would take longer according to the study by Bowen et al. where changes in HbA1C of diabetics only appeared significantly after 6 months of nutrition education.[18]

Intervention with nutrition education with mentoring increased nutrition knowledge of Indonesian adults significantly. However, the intervention did not significantly change nutrient intake and body weight of adults in this study.

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