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Nutrition Counseling in Changing of Eating and Physical Activity Behavior in Overweight and Obesity Adolescent at Lab High School Bandung

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ABSTRACT

Introduction: Based on Health Research Association of Indonesia in 2007, the prevalence of overweight in adolescent (9-14 years old) is 9.5% for boys and 6.4% for girls. Nutritional counseling by a behavioral approach is a way to reduce the prevalence of obesity with simple and secure for health. This aim of the research is to determine the effect of nutritional counseling, using Trans-theoretical Model, on total energy intake, fat, fiber and physical activity, and also to explore effort on changing.

Method: The research design is a mixed methods the sequential explanatory strategy with case study approach. The research was done at SMA Lab School Bandung in January to February 2013. Students who are classified as overweight and obese are received 6 times frequency of face-to-face counseling, with interval in a week and duration of counseling was about 15-30 minutes. Stage of respondents based on the transtheoretical model was precontemplation, contemplation, preparation, and action.

Result: There are 37 (7%) respondents was recruited based on students data in 2012. Significant effect of nutritional counseling was found on total energy intake, fat and physical activities ($p < 0,05$). However, nutritional counseling gave no effect on dietary fiber intake ($p = 0.914$). There were 24 respondents were categorized as precontemplation, contemplation 8 and preparation 4 before intervention. Whereas after the intervention the category was change into precontemplation become 2, contemplation 5, preparation 9 and action 20.

Conclusion: Factors of favor to decline of energy and fat intake, increased physical activity, for the respondent is an awareness and self motivation. Efforts to reduce food in high carbohydrates and saturated fats, extra curriculum sports at school outside, improve day-to-day activities. Lack of effort on low fiber intake in this study relates to the characteristics of adolescents who prefer fast food and junk food, lack of family support in the provision of food sources of fiber (vegetables and fruits), and also in the school canteen, school rules, and limited pocket money.

Keywords: Nutrition counseling, adolescent obesity, Transtheoretical Model

INTRODUCTION

Obesity in children and adolescents is a prominent nutritional issue and need to be aware. Obesity can lead to the risk of chronic and degenerative diseases such as hypertension, dyslipidemia osteoarthritis, some types of cancer, fatty liver and metabolic syndrome. Obesity in

adolescents is not only going to cause health problems in the future, but it can bring significant problems to the social life and emotional for teenager.¹

Based on preliminary surveys conducted by researchers at 2 to 4 October 2012, there were approximately 7% of the student is overweight / obesity

in SMA Lab School Bandung. Average daily energy intake of 2644 kcal, 75 grams of protein, 78 grams of fat, carbohydrates and dietary fiber 381gram and 9.13 grams. SMA Lab School is one of the leading private schools are located in urban areas that most students come from upper middle class. The location of SMA Lab School is adjacent to the shopping center in Bandung culinary. This will make it easier for the students in these schools to more frequently consume fast food and junk food.

The occurrence of obesity in children and adolescents are caused by various factors, such as lifestyle and eating habits affect the patterns that tend to consume a lot of foods that are high energy and high in fat. Process of modernization and economic growth affect diet and physical activities. Surely, this contributed to an increase in the number of obesity.¹ Prepared foods or junk food with calorie and high fat content the more sold, especially in urban areas. This type of food to be one factor contributing to the high obesity among children and teenager.⁸ The lack of fibrous foods consumption in the diets of children and adolescents is also a contributory factor to the other factor of obesity.² Another factor is the cause of obesity in children and adolescents is the lack of physical activities caused by having too much time is spent on passive activities such as watching television or using computer.³

One of the efforts to reduce the prevalence of obesity is simple and safe for health is to provide intensive nutritional counseling, structured and sustained. Nutritional counseling is one way to increase the knowledge and ability of individuals and families about nutrition.⁴

Nutritional counseling with a theoretical approach / model of behavior change is one way to assist clients in changing their behavior. Trans-theoretical Model is the theory that assesses the

readiness of individuals to act / behave well, by creating strategies or processes of change to help people through the stages of change have not yet ready to action and maintenance stages. Stages in the Trans-theoretical models include pre-contemplation (not ready), contemplation (preparation), preparation, action, maintenance and relapse (recurrence).⁵

The purpose of this study is to analyze the impact of nutrition counseling with the Trans-theoretical Model approach to the intake of energy, fat, Protein, carbohydrates, dietary fiber and physical activities in overweight and obese adolescents at SMA Lab. School Bandung, as well as explore ways and barriers/constraints of respondents who are at the stage of pre-contemplation, contemplation and preparation in changing eating behavior and physical activities.

METHOD

The research design is a method of combination of quantitative and qualitative research (mixed methods), with the sequential explanatory strategy with case study approach. The sequence begins with the design of quantitative research results are then explored further with the approach qualitative.⁶ The research was conducted in SMA Lab School Bandung from January to February 2013.

The sample of the research is the full sample, the number of samples to be examined totaled 37, but at the time of the research samples reduced to 36 with reasons to move to another school. Samples taken were all students/SMA Lab School Bandung which has nutritional status of overweight and obesity.

Quantitative data collection was also performed using instruments of Food Frequency Questioner (FFQ) and 1x 24-hour Food Recall that has been modified.

Physical activity data collection is done by a closed questionnaire concerning the frequency of sports in 1 week and the length of time the subject of doing an exercise activity. Qualitative data collection with in-depth interviews conducted with the use of closed questions and field observations.

Analysis of quantitative data covering uni-variable and bi-variable. Quantitative data analysis was conducted to determine uni-variable categorical distribution of subjects based on demographic, nutritional status, and physical activities. Quantitative analysis was conducted to determine uni-variable numerical average (x), standard deviation (SD), median, range of intake of calories, fat and dietary fiber intake. Bi-variate quantitative numerical data analysis was conducted to determine differences in the average, standard deviation, median and range of energy intake, fat and dietary fiber on the subject before and after the intervention, using the *Wilcoxon Signed Ranks Test* and *Mc Nemar - Bowker Test* with confidence level of 95 %. Qualitative data analysis began with transcription of interviews or field notes, data reduction, giving code (coding), categorization, determination and mapping the concept or theme of the concept / theme.

RESULT

Characteristics of Respondents by Age, Gender, Nutrition and Physical Activity Status

The average age of subjects was 16 years with the youngest age is 14 years old and the oldest 17 years old. Most of the research subjects were males as many as 22 people (61.1%) and more of the nutritional status of overweight by 28 people (77.8%). Exercise habits after treatment increased from 66.7% to 88.9%, with the frequency of exercise > 3 times/week with a duration of 20 minutes

to 1 hour increased from 19.4% to 36.1% (Table 1)

Table 1 Characteristics of Research Subjects by Age, Gender, Nutrition and Physical Activity Status

Variable	n	%
Age		
Mean (elementary school)	16	(0,86)
Median (range)	16 (14-17)	
Sex		
Male	22	61,1
Female	14	38,9
Nutritional Status		
<i>Overweight</i>	28	77,8
<i>Obesity</i>	8	22,2
Before Treatment		
Exercise habit		
Yes	24	66,7
No	12	33,3
Frequency of sports		
≥3x/week (20-60 minute)	7	19,4
<3x/week (20-60minute)	17	47,2
No	12	33,3
After Treatment		
Exercise habit		
Yes	32	88,9
No	4	11,1
Frequency of sports		
≥3x/week (20-60 minute)	13	36,1
<3x/week (20-60 minute)	19	52,8
No	4	11,1
Total	36	100,0

Distribution of respondents based on the classification of the Trans-theoretical Model (TTM) may be seen in Table 2. At the beginning of the research, the majority, which were 69.4%, of

respondents in the category of pre-contemplation and had no action. In the last intervention the majority of respondents (58.3%) was the action

category and only 5.6% of respondents who are still in the pre-contemplation category.

Table 2 Characteristics of Research Subjects by Classification

Variabel	K 0		K 1		K 2		K 3		K 4		K 5	
	n	%	n	%	n	%	n	%	n	%	n	%
Klasifikasi TTM												
Precontemplation	25	69,4	6	16,7	4	11,1	2	5,6	2	5,6	2	5,6
Contemplation	8	22,2	20	55,6	7	19,4	7	19,4	5	13,9	5	13,9
Preparation	3	8,3	9	25,0	16	44,4	4	11,1	9	25,0	8	22,2
Action	0	0,0	1	2,8	9	25,0	23	63,9	20	55,6	21	58,3
Total	36	100,0	36	100,0	36	100,0	36	100,0	36	100,0	36	100,0

Description: K0 = group before the intervention, K1 5 = group after receiving the intervention to-1

The mean intake of energy, protein, fat, carbohydrates and fiber Food on Respondents

The mean energy intake of the respondents prior to the intervention was 2644 kcal with a standard deviation of 961.4 kcal. The mean of protein intakes were 75.4 grams with a standard deviation of 31.7 grams. Mean fat intake was 77.8 grams with a standard deviation of 49.2 grams. The mean intake of carbohydrates 381.0 grams with a standard deviation of 152.9 grams and the

mean intake of fiber is 9.13 grams with a standard deviation of 6.1 grams.

After intervention the mean energy intake was 1581.7 kcal with a standard deviation of 506.5 kcal. The mean protein intake was 44.9 grams with a standard deviation of 13.4 grams. Mean fat intake was 39.3 grams with a standard deviation of 15.9 grams. Mean carbohydrate intake was 356.2 grams with a standard deviation of 81.8 grams and the mean intake of fiber is 9.01 grams with a standard deviation of 2.7 grams. Table 3.

Table 3 The mean intake of energy, protein, fat, carbohydrates and fiber respondents during the observation

Variable	TK 0		TK 1		TK 2		TK 3		TK 4		TK 5		TK 6		core p ^{*)}
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Intake															
Energy	2644,4	61,4	2263,0	950,4	1823,7	651,5	1593	750,2	1271,2	519,7	1181,9	519,7	1356,7	532,4	<0,001
Protein	75,4	31,7	59,89	25,5	49,9	19,0	41,4	18,0	35,7	18,2	35,7	18,2	43,2	19,5	<0,001
Fat	77,8	49,2	43,9	22,5	39,2	18,7	38,4	21,8	37,2	26,2	37,3	26,2	43,9	25,3	<0,001
carbohydrate	381,0	152,9	394,3	177,0	309,6	115,5	266,7	129,0	174,6	74,2	174,7	74,3	191,9	79,4	<0,001
Fiber	9,13	6,1	7,47	4,5	11,9	6,3	12,08	6,51	9,5	6,0	6,2	4,4	6,9	3,8	<0,001

Note: TK0 = intake before the intervention, TK1 6 = intake after receiving the intervention to 1 5

The Impact of nutrition counseling with the Trans-theoretical Model to the intake of energy, protein, fat and carbohydrate on respondents

This research shows that there are effects of nutritional counseling with the Trans-theoretical Model approach to energy and fat intake in overweight and obese adolescents in senior high school (SMA) Lab. School Bandung with a

value of $p < 0.001$ ($p \leq 0.05$), with a statistical test *Wilcoxon Signed Ranks Test* at 95% trust level. Results of statistical tests using *paired T test* at 95% confidence level, indicating there is the impact of nutrition counseling with the Trans-theoretical Model approach to protein and carbohydrate intake with $p < 0.001$ ($p \leq 0.05$). (Table 4)

Table 4 The Impact of nutrition counseling with the Trans-theoretical Model to the intake of energy intake, protein, fat and carbohydrates

Variable	Treatment								Z _w	Score p
	Before				After					
	Mean	SD	Median	Range	Rerata	SD	Median	Range		
Intake										
Energy	2644,4	961,4	2486,6	1174-5978	1581,7	506,5	1470,4	904,7-2834,3	4,904	<0,001 ^{*)}
Protein	75,4	31,7	66,9	22-157	44,9	13,4	43,4	25,6-83	4,650	<0,001 ^{**)}
Fat	77,8	49,2	57,42	22,6-217,1	39,3	15,9	37,3	12,94-79,4	4,053	<0,001 ^{*)}
Carbohydrate	381,0	152,9	352	192,7-930,6	356,2	81,8	239,5	93,4-451,4	4,556	<0,001 ^{**)}

^{*)} *Wilcoxon Signed Ranks Test* ^{**)} *Paired T Test*

This study showed no effects of nutritional counseling with the Trans-theoretical Model approach to fiber

intake with $p = 0.914$ ($p > 0,05$). Statistical tests using *paired T test* at 95% confidence level. (Table 5)

Table 5 The Impact of nutrition counseling with the Trans-theoretical Model approach to fiber intake

Variable	Treatment								Z _w	Score p
	After				Before					
	Mean	SD	Median	Range	Mean	SD	Median	Range		
Intake										
Fiber	9,13	6,1	8	1,14-25,6	9,01	2,7	8,8	3,9-16,3	0,03	0,914

^{*)} *Paired T Test*

The Impact of nutrition counseling with the Trans-theoretical Model approach to physical activities

Based on Table 6, note that there are the effects of nutritional counseling with the Trans-theoretical Model approach to physical activities with *McNemar-Bowker test statistic* at 95% confidence level, with a value of $p = 0.021$ ($p \leq 0,05$).

The Efforts and barriers respondents in changing eating behavior and physical activities

Respondents of pre-contemplation category are respondents who came to the last intervention were included in the pre-contemplation category. Respondents in pre-contemplation category almost did not want to try at all despite getting repeatedly nutritional counseling. Respondents in this category tend to be able to overcome the obstacles / barriers

experienced during the implementation of the program to change eating behavior and physical activities. The main constraints experienced by the respondents in this category are self-control, lack of support from parents and peers. Respondents in contemplation

category have the character/personality rather pessimistic, easily disappointed, not independent (depending on the parents) and inconsistent (unstable), but more open communication and relationships with parents is good enough.

Table 6 The Impact of nutrition counseling with the Transtheoretical Model approach to physical activity in overweight and obese adolescents

Exercise Activity	After Treatment				Score p ^{*)}
	Yes		No		
	n	%	n	%	
Before Treatment					0,021
Yes	23	95,8	1	4,2	
No	9	75,0	3	25,0	
Total	32	88,9	4	11,1	

^{*)} McNemar-Bowker Test

Respondents in the category of contemplation have had the intention to attempt to change eating behavior and physical activities. Respondents in this category is still not consistent (unstable) and easily influenced the surrounding social environment (family, friends) as well as easy to come back into the pre-contemplation category of respondents. Effort / work done by respondent category in optimal preparation and enough action and tend to be more consistent. The Efforts to change eating behaviors done by respondents in this category is to choose foods that are in high fiber (vegetables and fruits), respondents in the preparation and action criteria more able to face and overcome various obstacles experienced in the process of changing eating behavior and physical activities. Barriers experienced by respondents in this criterion is due to illness (sick), situation (weather), stress, temptation/peer pressure, lack of family support, the restriction of the parents, and the provision of food. reducing foods that contain high calories (low calorie diet) and increasing physical activities in the form of daily exercise beyond the school

curriculum and familiarize increased activities at home (after school) and increase walking in daily activities. Personality respondents in preparation and action criteria tend to be more open and have a pretty good relationship communication with parents. The average respondent in this criterion tells weight-loss program to her parents. The results also showed that most respondents preparation category and action, lost weight after undergoing intervention.

DISCUSSION

The Effect of nutritional counseling with TTM approach to the total intake of energy and fat

Decrease in total intake OF energy and fat in overweight and obese adolescents at SMA Lab School Bandung respondents related to the effort to reduce the intake of foods high in energy and fat. The effort is a testament to the high motivation and awareness of the respondent in changing eating behavior. Decrease in the percentage of total energy intake and fat in adolescent obesity is also consistent with research of *Frenn et al* in African-Americans. Research of

Nina in 2012 also confirmed that fat intake is a dominant factor to the onset of obesity in adolescents (16-18 years).

The Effect of nutritional counseling with TTM approach to increasing of Fiber Food Intake

Fiber consumption among respondents related to eating habits that teens were more likely to eat fast food and junk food than traditional foods which contain enough dietary fiber. In the research of Padmiri in Denpasar Bali the research suggests an association between high prevalence of obese adolescents with the availability of fast food and junk food. This research also showed that a lack of parental support in the provision of food / food sources of fiber (vegetables and fruits) affects the motivation of adolescent overweight and obesity in the senior high school (SMA) Lab. School Bandung. Foods with high crude fiber content was also reported to reduce body weight.

Another factor that is less supportive of increased dietary fiber intake on a lack of media information on the school can improve students' knowledge / student regarding to food/drinks that are high energy and saturated fat, and high fiber content foods (vegetables and fruits). The absence of activity measurements of nutritional status of the students of SMA Lab School on a regular basis, have an impact on the lack of awareness of students in this school to a state of nutritional status. There isn't a Pupil Parents Association (POM) in the senior high school (SMA) Lab. School impact on the lack of communication between school parties with the parents about the health and nutritional status of students. This will have an impact on the lack of parental support in the provision of food sources of fiber.

The state of obesity in children, adolescents and adults will have an impact on the future health problems. It is often the case, and its prevalence is

increasing from year to year is the occurrence of the metabolic syndrome. According to Grundy at Jafar, Metabolic syndrome is a complex metabolic disorder characterized by the presence of obesity, insulin resistance, dyslipidemia and hypertension. Wijaya and Grundy research may show that the factors that are considered as the cause of the metabolic syndrome associated with obesity include diet, lack of exercise, metabolic abnormalities, neuroendocrine mechanisms, psychology, medicine, socioeconomic factors, lifestyle and genetic factors.³

The Efforts and barriers respondents in changing eating behavior and physical activities

Actions or behaviors that made respondents in losing weight are a dietary program (diet) and burning calories (exercise). Diets that do respondents include: reduction in caloric intake and macronutrient intake (protein, fat and carbohydrates) as well as increased intake of high-fiber foods (vegetables and fruits). Results showed respondents effort in changing eating behavior and physical activity are influenced by motivations, barriers and adolescent personality itself.

TTM nutritional counseling approach is one of the mediators for the respondents in raising effort and overcoming the obstacles encountered. This research also shows the main barriers perceived by respondents of women and men of all criteria for TTM. These obstacles, is the lack of self-control, lack of social support (family and friends), lack of support from the neighborhood as well as the provision of facilities and provision of food support. Environmental factors that become an obstacle for respondents in changing behavior is the availability of the majority of school canteens provide high energy food and snacks high in saturated fat (fried foods, chips, crackers, bottled

drinks high in sugar), but less provide fiber foods source(vegetables, fruits)

CONCLUSION

- 1) There is the influence of nutritional counseling with the Transtheoretical Model approach to the reduction of energy, fat, protein and carbohydrates intake in adolescent overweight and obesity in the senior high school (SMA) Lab. School Bandung.
- 2) No effect of nutritional counseling with the Transtheoretical Model approach to increasing dietary fiber intake in overweight and obese adolescents in senior high school (SMA) Lab. School Bandung. Dietary fiber intake.
- 3) There is the influence of nutritional counseling with the Transtheoretical Model approach to increasing physical activities in adolescent overweight and obesity in the senior high school (SMA) Lab. School Bandung.
- 4) The effort done by respondents in changing eating behavior and physical activities:
- 5) Avoid and reduce the intake of foods high in saturated fat and high energy, and to implement the recommended diet counselors.
- 6) Perform regular exercise at school and additional form of sport activity and sport outside the school environment.
- 7) Increasing daily activities on foot.
- 8) The barriers experienced in changing eating behavior and physical activities are the internal and external factors. Internal factors: motivation, self-control, disease (pain), stress and personality. External factors: social support (parents, peers, boyfriends, teachers), physical environment (weather, schools), economic (pocket money), political (school rules).

Recommendation

1. Necessary to evaluate the impact of nutritional counseling with TTM

approach in a longer time (6 months, 12 months etc.)

2. Counseling on overweight and obesity adolescent need a counselor who has the necessary skills to assess client readiness to receive information or nutritional messages.
3. Arrange an effectiveness time for nutritional counseling on adolescent clients, should pay attention to the character and personality of the client and must involve family / friends.

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