

ORIGINAL ARTICLE

Comparing the Effect of Nutritional Booklets and Social Media on Knowledge and Consumption of Fattening Foods among Adolescents in Surakarta, Indonesia

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ARTICLE INFO

Keywords:

Booklet
Media
Fattening foods
Adolescent
Indonesia

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Received: December 23, 2019
Revised: March 29, 2020
Accepted: April 14, 2020

ABSTRACT

Background: Adolescents would like to search for information about various foods before consumption via social media such as Facebook and Instagram too. This study was undertaken to determine the effect of nutritional booklets on knowledge and consumption of fattening foods among adolescents of Surakarta, Indonesia.

Methods: This study analyzed the effect of nutritional booklets and social media on knowledge and consumption of fattening-foods among adolescents. In a quasi experiment using nonequivalent control group during a period of 30 days, three high schools of 1st, 3rd, and 5th grade in Surakarta, Indonesia were enrolled including 34, 33 and 29 students, respectively based on a probability proportional sampling method. Nutritional education was carried out via nutritional booklets and social media during two weeks.

Results: Nutritional education using nutritional booklets was significantly more effective on knowledge and consumption of fattening foods.

Conclusion: Our findings showed that nutritional booklets and social media could significantly influence the knowledge and consumption of fattening foods among adolescents. Even the effect of nutritional booklets was more prominent.

Please cite this article as: Firmansyah F, Tamtomo DG, Cilmiaty R. Comparing the Effect of Nutritional Booklets and Social Media on Knowledge and Consumption of Fattening Foods among Adolescents in Surakarta, Indonesia. Int J Nutr Sci. 2020;5(2):88-93.

Introduction

As one of the developing countries in the world, Indonesia is currently undergoing an epidemiological transition with the high prevalence of infectious diseases followed by an increasing prevalence of non-communicable diseases (NCD) too starting from adolescence time (1). This increasing trend has been reinforced by changes in dietary patterns high in saturated fats and sugars, consumption of fast foods, and low intake of fibers

(2). The results from National Socioeconomic Survey of Susenas showed that the average fat intake of the Indonesian population was 58.1 g/cup/day in 2002 that has increased to 64.7 g/cup/day in 2009 (3).

One cause of the imbalance in fat consumption can be insufficient nutritional knowledge and lack of socialization about good eating habits (4). The data of Basic Health Research of Riskesdas, Indonesia in 2007, 2010, and 2013 in all age groups showed an

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increase in the prevalence of obesity (BMI > 25 kg/m²) in the country (5). The increased prevalence of obesity in Indonesia was followed by an increase in obesity in various regions, while the Surakarta City Health Profile in 2014 shows the incidence of obesity to reach 27.55% in all age groups (6).

Nutritional knowledge is still an important factor that can influence the nutritional behavior of individuals, families and communities (7). In the digital era, adolescents tend to have an easy access to information through social media and the internet. However, they do not use it to improve the knowledge about nutritional status and health issues (8). A research in Sweden revealed that 46.5% of adolescents had the habit of looking for information about healthy foods through the social media such as Facebook and Instagram before food consumption (9).

Facebook and Instagram are two types of social media that can clearly describe the form of information to be conveyed (10). In searching for information, adolescents prefer using image media in comparison to use of texts (11). It was shown that food images can affect brain activity and the appetite (12). The social media was illustrated to affect health status through several ways such as emotional, instrumental and information supports (13, 14). In addition, nutritional education via the nutritional booklets and social media can significantly increase nutritional knowledge among adolescents (15). The person's level of nutritional knowledge can influence the attitude and behavior of people in food selection, which would ultimately affect the nutritional status (16).

Study on the use of nutritional booklets and social media in improvement of nutritional knowledge among adolescents are still limited in the literature. People are increasingly concerned about the importance of consuming fatty foods (17). Therefore, with the high prevalence of obesity, lack of physical activities, and high rates of consumption of fatty foods in Indonesia, this study was conducted to explore the effect of nutritional booklets and social media on knowledge and consumption of fattening foods among adolescents of Surakarta, Indonesia.

Materials and Methods

From August to December 2017, a quasi-experiment with nonequivalent control group design was conducted in three senior high schools in Surakarta City, Indonesia enrolling subjects based on cluster random sampling method. The inclusion criteria were being adolescent and in class XI, age of 16-18 years, having the anthropometric screening results of being overweight, and finally having a personal smartphone. The research protocol was approved by the Ethics Committee of Sebelas Maret University Surakarta (no. 354/IV/HREC/2017). The number and the interventions were demonstrated in Figure 1.

Data on knowledge about fattening foods were assessed. The answers to the questions about the subjects' knowledge in relation to fat consumption, fat function, types of food with fat sources, the amount of needed fat, and the side effects of excessive fat consumption were recorded. Assessment of nutritional knowledge was done by scoring method.

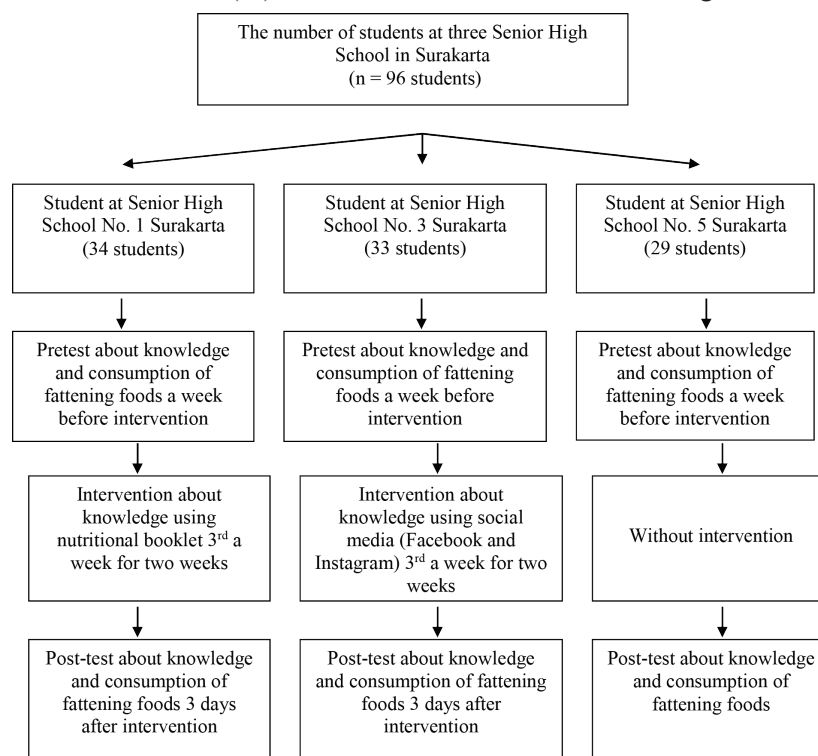


Figure 1: Described number and the types of interventions.

If the respondents answered correctly, the score was considered 1; and for the incorrect answers, the score was defined 0. Evaluation of the subjects' responses was divided into three categories according to a previous report (18); while defined low if the correct answers were <60%, considered medium if they were between 60-80%, and was high if they were >80%.

The data on the level of consumption of fattening foods were obtained by direct interviews using 24-hour recall forms and Semi Quantitative Food Frequency Questionnaire. The variables were total amount of consumed fats [Deficient (<15% of total energy), Sufficient (15-30% of total energy), and Excessive (>30% of total energy)]; the level of consumption of saturated fatty acids: [Deficient (<8% of total energy), Sufficient (8-10% of total energy), and Excessive (>10% of total energy)]; the level of consumed monounsaturated fatty acids: [Deficient (<15% of total energy), and Sufficient (\geq 15% of total energy)] and the level of consumption of polyunsaturated fatty acids: [Deficient (<10% of total energy), and Sufficient (\geq 10% of total energy)] as reported before (19).

The data analysis was performed using the Statistical Package of Social Sciences (SPSS) software (version 16.0, Chicago, IL, USA). Data were statistically analyzed using the Fisher's exact test. The logistic regression test was used for multivariate analysis and the degree of significance was defined as <0.05.

Results

A total of 96 adolescents were included in this quasi experimental study with the proportion of

females higher than males. Table 1 shows the basic characteristics of the research subjects based on the three interventions. The nutritional status in this study was based on Body Mass Index (BMI) and age, while all the subjects were overweight (23.6 \pm 0.62). The age of the subjects in the three study groups was between 15 and 17 years, while most of them were 16 years old. Most adolescents did not report any family history of overweight.

Table 2 shows the mean value of the nutritional knowledge prior to intervention using nutritional booklets that was 15.79. This value for social media was 16.55, and for the control group was 17.36. After the interventions in all study groups, there was an increase in the mean value. The nutritional education provided by nutritional booklets and the social media could significantly influence the adolescent's knowledge (P=0.001). The mean difference for nutritional knowledge before and after interventions was the greatest among those using nutritional booklets, which was 4.36.

A positive influence was noted when nutritional booklets and the social media were used on knowledge about fattening foods among adolescent, while it was greater for nutritional booklets (Table 3). These interventions could increase the knowledge about fattening-food among adolescents by 1.909 and 1.100 times, respectively when compared to the control group, with an influence rate of 0.2%, while 99.8% were affected by other factors. Table 4 depicts a significant difference for fat consumption among research subjects before and after the treatment, regarding both nutritional booklets and the social media.

Table 1: Characteristics of subjects from high schools in Surakarta City, Indonesia

General characteristics	Nutritional booklet group		Social media group		Control group		Mean \pm SD
	n	%	n	%	n	%	
Sex							
Male	8	23.5	15	45.5	9	31.0	
Female	26	76.5	18	54.5	20	69.0	
Height (cm)							162.5 \pm 5.54
Weight (kg)							62.8 \pm 4.54
Age (years)							
15	7	20.6	6	18.2	2	6.9	
16	25	73.5	25	75.8	23	79.3	
17	2	5.9	2	6.1	4	8.3	
BMI							
Normal	0	0.0	0	0.0	0	0.0	
Overweight	34	100	33	100	29	100	23.6 \pm 0.62
Obesity	0	0.0	0	0.0	0	0.0	
Family History of							
Overweight							
Yes	13	38.2	12	36.3	14	48.2	
No	21	61.8	21	63.7	15	51.8	

n: Number, SD: Standard deviation, BMI: Body mass index

Table 2: The effect of nutritional booklets and social media on fattening food consumption among adolescents

Nutritional knowledge	Pre- post-test mean	Difference value	Minimum score	Maximum score	P value
Nutrition Booklet					
Before	15.79	4.36	15	22	0.001
After	20.14		19	24	
Social media					
Before	16.55	1.52	16	23	0.001
After	18.07		20	24	
Control group					
Before	17.36	0.26	15	22	0.266
After	17.62		15	23	

Table 3: Multivariate analysis of the effect of nutritional booklets and social media on fattening food consumption among adolescents

Predictor	C	P	Exp (B)	95% CI		Nagelkerke R square
				Lower limit	Upper limit	
Nutrition Booklet	0.009	0.829	1.909	0.386	2.140	0.002
Social Media	0.095	0.827	1.100	0.467	2.589	

Table 4: The effect of nutritional booklets and social media on fattening food consumption among adolescents before and after intervention

Variable	Nutrition booklet group		Social media group		Control group	
	Before	After	Before	After	Before	After
	n	n	n	n	n	n
Total fat						
Deficient	2	2	6	3	9	8
Sufficient	13	22	11	20	9	10
Excessive	19	10	16	10	11	11
PUFA						
Deficient	6	3	8	3	10	9
Sufficient	12	21	10	18	10	10
Excessive	16	10	15	12	9	10
MUFA						
Deficient	15	12	18	11	12	13
Sufficient	19	22	15	22	17	16
SAFA						
Deficient	12	10	10	4	16	16
Sufficient	22	24	23	29	13	13

n: Number, PUFA: Polyunsaturated fatty acids, MUFA: Monounsaturated fatty acids, SAFA: Saturated fatty acids

Discussion

The results of our experiment showed that nutritional education by nutritional booklets about nutritional knowledge was significantly effective among adolescents. Nutritional education using nutritional booklets could increase nutritional knowledge among adolescents by 1.909 times higher than the control group. These findings are in agreement with a previous study undertaken on vocational students revealing that students' learning on automotive electrical system materials provided from the nutritional booklets and the social media were higher than using Power-Points (20).

Differences in post-test scores in the two groups indicated that the nutritional booklets were significantly effective in improving the students' learning outcomes. The use of nutritional booklets was easy for students to receive abstract materials. The research on Islamic middle school students illustrated that the information in nutritional booklets about human respiratory system could improve learning outcomes about biology. Nutritional booklets were easy to understand materials about the respiratory system (21).

Nutritional education using social media was also shown to increase nutritional knowledge among

Adolescent by 1100 times higher than the control group. Our research is in line with a previous study (22) too that was a project-based learning model assisted by Instagram showing its effect on creative thinking skills among tenth-grade students in the experimental group (82.72), which was higher than the control group (77.12).

In a senior high school, the use of Facebook social networking was demonstrated to increase the students' motivation and learning achievement and could provide a good change in subjects for Natural Sciences, especially biology (23). Social media is considered an online communication media that allows individuals to create contents, share information and connect with each other. Today, teenagers prefer to use technological sophistications to find out various information they need and to assess a variety of interesting contents at the same time. Therefore, social media can be used as an educational media that can reach a large number of targets and is not limited to space and time (24).

Adolescent dietary patterns can determine the amount of nutrients needed for growth and development (25). Social media such as Facebook and Instagram have become a part of everyday life of teenagers for an easy access to information. Based on previous findings, social media such as Facebook, Twitter, Snapchat and Instagram were shown as the media that can provide information about the nutritional content of the foods and various healthy food choices and certain diets. Adolescents would often share photos or videos on social media about the foods they consume to attract others to consume them similarly (26).

In our study, the use of social media in nutritional education was welcomed by our subjects and confirmed by positive responses. The subjects when received the nutritional educational materials about nutrition, their self-control over the foods they consumed got better. There was a limitation in our study for the analyses performed retrospectively; so there is a need for prospective type of studies to confirm our results.

Conclusion

It was shown that nutritional booklets and social media had a significant positive effect on the nutritional knowledge and consumption of fattening foods among adolescents in Surakarta, Indonesia, while this effect was more prominent for nutritional booklets.

Acknowledgment

We would like to thank the headmasters of three senior high schools to allow us to conduct

this research and the research subjects for their participation. Thanks also to Prof. Bhisma Murti, dr., MPH, M.SC, Ph.D, who has guided in analyzing the statistics and to our enumerators and friends who have helped us in this research.

Conflict of Interest

None declared.

References

- 1 Ministry of Health. Indonesia Basic Health Research Report 2013. Health Research and Development Agency, Ministry of Health of the Republic of Indonesia. 2013.
- 2 Popkin BM. An Overview on the Nutrition and Its Health Implications: the Bellagio meeting. *Public Health Nutr.* 2002;5:93-103. DOI:10.1079/phn2001280. PMID:12027297.
- 3 Hardinsyah. Analysis of Indonesian population fat, sugar and salt consumption. *J Gizi Indonesia.* 2011;34:92-100.
- 4 Solikhah ED. The Effect of Nutrition Pocket Book on the Level of Nutrition Knowledge on Fifth-Grade Students of Muhammadiyah Dadapan, Wonokerto Village, Turi District, Sleman Regency, Yogyakarta. *J Kesmas.* 2012;6:162-232.
- 5 Ministry of Health. Indonesia Basic Health Research Report 2013. Health Research and Development Agency, Ministry of Health of the Republic of Indonesia. 2013.
- 6 Health Agency of Surakarta City. Health Profile of Surakarta City in 2014. Surakarta. Health Agency of Surakarta City. 2014.
- 7 Makiabadi E, Kaveh MH, Mahmoodi MR, et al. Enhancing nutrition related literacy, knowledge and behavior among university students: A randomized controlled trial. *Int J Nutr Sci.* 2019;4:122-9. DOI:10.30476/IJNS.2019.82709.1027.
- 8 Mehrabani G, Aminian S, Mehrabani G, et al. Dietetic plans within the multiple sclerosis community: A review. *Int J Nutr Sci.* 2019;4:14-22. DOI:10.30476/IJNS.2019.81531.1007.
- 9 Holmberg C, Chaplin J, Hillman T, et al. Adolescents' presentation of food in social media: An explorative study. *Appetite.* 2016;99:121-9. DOI:10.1016/j.appet.2016.01.009.
- 10 Findahl O. Svenskarna och Internet 2014. <https://www.iis.se/docs/SOI2014.pdf>. Accessed March 26, 2014.
- 11 Fritz GK. Social media use and adolescents: a guide for parents. The Brown University Child and Adolescent Behavior Letter. 2014.
- 12 Beaver JD, Lawrence AD, van Ditzhuijzen J, et al. Individual differences in reward drive

- predict neural responses to images of food. *J Neurosci.* 2006;26:5160-6. DOI:10.1523/JNEUROSCI.0350-06.2006. PMID:16687507.
- 13 Li J, Barnett T, Goodman E, et al. Approaches to Prevention and Management on Childhood Obesity: The Role of Social Networks and the Use of Social Media and Related Electronic Technologies : a scientific statement from the American Heart Association. *Circulation.* 2013;127:260-7. DOI:10.1161/CIR.0b013e3182756d8e. PMID:23212719.
 - 14 Barrot JS. Using Facebook-based e-portfolio in ESL writing classrooms: impact and challenges. *Language Culture Curriculum.* 2016;29:286-301. DOI:10.1080/07908318.2016.1143481.
 - 15 Agustin M. Effectiveness of Health Education Media Booklet Compared to Audiovisual Parents' Knowledge of Dental Caries in Children Aged 5-9 Years in Makamhaji Village. *J Kesmas.* 2014;7:1-16.
 - 16 Hausmann JS, Touloumtzis C, White MT, et al. Adolescent and Young Adult Use of Social Media for Health and Its Implications. *J Adolesc Health.* 2017;60:714-9. DOI:10.1016/j.jadohealth.2016.12.025. PMID:28259620.
 - 17 Shepherd J, Harden A, Rees R, et al. Young people and healthy eating: A systematic review of research on barriers and facilitators. *Health Educ Res.* 2006;21:239-57. DOI:10.1093/her/cyh060. PMID:16251223.
 - 18 Khomsan A. Nutrition Knowledge Measurement Technique. Bogor (ID): Faculty of Agriculture, Institut Pertanian Bogor. 2000.
 - 19 EFSA panel on dietetic products, nutrition, and allergies (NDA). Scientific opinion on dietary reference values for fats, including saturated fatty acids, polyunsaturated fatty acid, monounsaturated fatty acids, trans fatty acids, and cholesterol. *EFSA J.* 2010;8:1461-1508.
 - 20 Sukoco SK. The Effect of Learning Media on Student Learning Outcomes and Learning Motivation on Automotive Electrical System Material. *J Pendidikan Vokasi.* 2013;3:126-37.
 - 21 Noviyanto T, Juaeningsih N, Rosyodatun E. The Use of Learning Media for the Human Respiratory System to Improve Biological Learning Outcomes. *Edusains.* 2015;7:36-57.
 - 22 Utami R, Probosari R, Fatmawati U. The Effect of Instagram Project-Based Learning Model on Creative Thinking Skills of Fifth-Grade Students of SMA Negeri 8 Surakarta. *Bio-Pedagogi.* 2015;4:46-52.
 - 23 Pujiati LM, Kristianto I. The Use of Social Network (Facebook) as a Means of Enhancing Biology Motivation and Achievement. *J Pendidikan Informatika dan Sains.* 2015;4:91-8.
 - 24 Shah V, Kotsenas AL. Social Media Tips to Enhance Medical Education. *Acad Radiol.* 2017 ;24747-752. DOI:10.1016/j.acra.2016.12.023. PMID:28222940.
 - 25 Hendrayati SR. Nutrition Knowledge, Dietary Pattern and Nutritional Status of Tompobulu 4N Middle School Students in Bantaeng Regency. *Media Gizi Pangan.* 2016;9:33-40.
 - 26 Vaterlaus J, Patten E , Roche C, et al. #Gettinghealthy: The Perceived Influence of Social Media on Young Adult Health Behaviours. *Comput Human Behav.* 2015;4:151-7. DOI:10.1016/j.chb.2014.12.013.