Nutritional booklet and social media: Their effects on adolescents’ fattening-food knowledge and consumption

Firmansyah¹, D G Tamtomo², R Cilmiaty³
¹Master Program of Human Nutrition, Sebelas Maret University, Ir. Sutami Street 36A, Kentingan, Surakarta 57126, Indonesia,
²Medicine Faculty, Sebelas Maret University, Ir. Sutami Street 36A, Kentingan, Surakarta 57126, Indonesia
³Doctoral Program of Medicine, Sebelas Maret University, Ir. Sutami Street 36A, Kentingan, Surakarta 57126, Indonesia

E-mail: fsyah0202@gmail.com

Abstract. One cause of adolescents’ fat-consumption imbalance is inadequate knowledge of nutrition and socialization about good eating habits. Adolescents like searching for food information through social media like Facebook and Instagram before consuming. This study was to analyse the effect of nutrition booklet and social media on the adolescents’ fattening-food knowledge and consumptions. The sample of this quasi-experiment was 96 eleventh-grade Science students of SMAN 1, 3, and 5 Surakarta selected using probability proportional size sampling. This study was conducted in one month. Nutritional education intervention with social media and nutritional booklet was conducted six times in two weeks. The data were analysed using Wilcoxon, Kruskal Wallis, and Logistic Binary Regression with SPSS. Nutritional education with nutrition booklet influenced the fattening-food knowledge (p = 0.000) and consumption (p < 0.05). Nutritional education with social media influenced the fattening-food knowledge (p = 0.001) and consumption (p < 0.05). There were different scores of the fattening-food knowledge (p = 0.001) and consumption (p = 0.005) in the nutritional education group with nutritional booklet and social media. Nutritional booklet and social media influenced adolescents’ fattening-food knowledge and consumption. There were different fattening-food knowledge and consumption in the adolescents using nutritional booklet and social media.

1. Introduction
Indonesia, one of the developing countries in the world, nowadays undergoes an epidemic transition whereby the prevalence of infectious diseases is still high and followed by the increase of non-communicable diseases (NCD) commenced from adolescents [1]. The phenomenon pertinent to the increase of NCD prevalence is supported by dietary changes to the consumption of highly saturated fat, high sugar, fast food, and low fibre [2]. The results of National Socio-Economic survey showed that the average of fat intake of Indonesian population reached 58.1 g/cup/day in 2002 and increased to 64.7 g/cup/day in 2009 [3]. In the meantime, in accordance with Food and Agriculture Organization [4] the proportion of saturated fat and trans fatty acids respectively reaches 8 and 1% from the aggregate energy. It means that with the sufficient energy 2000 kcal, adolescents need to limit their fat consumption at 56 g/day and the consumption of saturated fat at 18 g/day [5].

One of the causes of fat consumption imbalance is the inadequacy of nutrition-related knowledge and the lack of socialization in association with good eating habits [6]. About 65% of adolescents in...
America have more nutritional status as a manifestation of unbalanced fat consumption [7]. The data of basic health research (Riskesdas, an abbreviated term in Indonesian language) in 2007, 2010, and 2013 manifested an increase in the prevalence of obesity (BMI > 25 kg/m) in all age groups, including adolescents [8]. The increasing prevalence of obesity in Indonesia is followed by an increase in obesity in various regions. According to the health profile report of Surakarta City in 2014, the incidence of obesity reached 27.55% in all age groups [9]. The nutrition-related knowledge is still believed to be an important factor influencing the nutritional behaviour of individuals, families and society [10].

In the digital era, adolescents incline to easily access information through social media and the internet. However, this is not optimally used for the efforts to increase knowledge-related nutrition and health by Indonesian youths [11]. The research in Sweden reveals that 46.5% of adolescents have the habit of finding out information about healthy food through social media such as Facebook and Instagram before consuming food [12]. Facebook and Instagram are types of social media that are capable of describing in real terms the form of information to be conveyed [13]. Adolescents nowadays tend to move from texts to the media displaying lots of images to search for information [14]. The research in neuroscience also shows that food images can affect brain activities associated with appetite [15]. According to Li et al, [16] social media can affect health through a couple of ways such as emotional, instrumental and information supports [17]. Furthermore, nutritional education media in the form of booklets can significantly improve the adolescents’ knowledge of nutrition [18]. The level of knowledge of a person's nutrition affects the attitudes and behaviour in food selection which will ultimately affect the nutritional condition concerned [19].

The studies about the use of nutritional booklets and social media in improving adolescents’ nutrition knowledge are still limited although people are getting worried about the importance of limiting the consumption of fatty foods [20]. Therefore, this study was conducted due to the high prevalence of obesity, lack of physical activities, and high levels of consumption of fatty foods in Indonesia. It aimed to explore more information about adolescents’ knowledge and the perception of fattening food.

2. Method

2.1. Study design and subjects
This study used a quasi-experimental research with non-equivalent control group design. This study was conducted at three senior high schools in Surakarta City from August to December 2017. The research subjects were selected by using cluster random sampling and met the inclusion criteria: adolescents (students) aged 16-18 years old who studied at the eleventh grade. The result of anthropometric screening indicated that those students had overweighed nutritional status and had smartphones with them. This research protocol had been approved by the ethical committee of Sebelas Maret University Surakarta with number 354/IV/HREC/2017.

2.2. Data collection
The data with respect to fattening foods knowledge were measured based on the answers to questions given about fat which subsumed the subjects’ knowledge regarding fat consumption which was comprised of the definition of fat, fat function, the types of fat source food, the amount of fat needed, and the effects of excessive fat consumption. The assessment of nutritional knowledge was carried out by giving scores whereby if the subjects answered correctly, they were subsequently given a score of 1. For those giving a wrong answer, they were then given a score of 0. The evaluation of the subjects’ answers was categorized into three types according to Khomsan [21]. The categories extended to “low” if the answer was < 60%, “moderate” if the answer was in the range from 60-80%, and “high” if the correct answer was > 80%.

The data on the consumption level of fattening foods of the samples were obtained by conducting direct interview using 24-hour recall form and SQ-FFQ (Semi-Quantitative Food Frequency Questionnaire) form. The parameters used were composed of: the level of total fat consumption: Less
(<15% of total energy); Enough (15-30% of total energy); and Excessive (>30% of total energy). The consumption level of saturated fatty acids: Less (<8% of total energy); Enough (8-10% of total energy); and Excessive (>10% of total energy). The consumption level of monounsaturated fatty acids: Less (<15% of total energy); and Enough (≥15% of total energy). The consumption level of polyunsaturated fatty acids: Less (<10% of total energy); and Enough (≥10% of total energy) [22].

2.3. Statistical analysis
The data analysis used Statistical Package of Social Sciences (SPSS) software 16.0 version. The data were determined using Fisher's exact test. The logistic regression test was used to multivariate analysis with degree of significance.

3. Results
A total of 96 adolescents were included in this Quasi Experimental Design study with female proportion higher than male proportion. Table 1 showed the general characteristics of the research subjects based on three research treatments. The nutritional status in this study was based on BMI/A. The results showed that all subjects of this study had excessive nutritional status (overweight), 23.6 ± 0.62. The range of the subjects’ ages in the three study groups was 15-17 years old, and they were mostly 16 years old. Most adolescents have no family history of overweight.

Table 1. The characteristic of 96 research subjects from 3 senior high schools in Surakarta City.

| General characteristic | Nutritional booklet group | Social media group | Control group | Mean ± 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±5.54 | 62.8±4.54 |
| Weight (kg)            |    |     |    |     |     |     |               |
| 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                    |    |     |    |     | 23.6±0.62 |     |
| Normal                 | 0  | 0.0 | 0  | 0.0 | 0  | 0.0 |
| Overweight             | 34 | 100 | 33 | 100 | 29 | 100|               |
| 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|               |

The results of statistical test using Wilcoxon (Table 2) indicated that the average score of nutritional knowledge before intervention in the nutrition booklet group was 15.79; that in the social media group was 16.55; and that in the control group was 17.36. After being given an intervention, there was an increase in the average score in all research groups. The results also showed that the nutrition booklet group obtained the highest average score of nutritional knowledge after the intervention by 4.36. Based on the test, it can be discerned that nutritional education provided with the intervention of nutritional booklets and social media (p = 0.01) influences the adolescents’ knowledge.
Table 2. The effect of nutritional booklet and social media on the adolescents’ knowledge of fattening food.

| Nutritional knowledge | The average score of pre-test and post-test | The average difference score | The minimal score | The maximal score | p  |
|-----------------------|------------------------------------------|-----------------------------|------------------|------------------|----|
| Nutritional booklet   | 15.79                                    | 4.36                        | 15               | 22               | 0.00|
| Before                | 20.14                                    | 19                          | 16               | 24               |    |
| After                 |                                          |                             |                  |                  |    |
| Social Media          | 16.55                                    | 1.52                        | 16               | 23               | 0.00|
| Before                | 18.07                                    | 20                          | 20               | 24               |    |
| After                 |                                          |                             |                  |                  |    |
| Control Group         | 17.36                                    | 0.26                        | 15               | 22               | 0.266|
| Before                | 17.62                                    | 15                          | 15               | 23               |    |
| After                 |                                          |                             |                  |                  |    |

These results indicated a positive influence of nutritional booklet and social media on the adolescents’ knowledge appertaining to fattening foods (Table 3).

Table 3. Multivariate analysis of the effect of nutritional booklet and social media on the adolescents’ knowledge of fattening foods.

| Predictor          | B     | p     | Exp (B) | CI 95%         | Nagelkerke R Square |
|--------------------|-------|-------|---------|---------------|---------------------|
| Nutritional food   | 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 showed that the level of fat consumption of the subjects had a significant difference before and after given the treatment, with both nutritional booklets and social media. The level of subjects’ fat consumption was obtained from the results of 24-hour recall and SQ-FFQ form to find out the trend of fattening types consumed by adolescents in Surakarta.

Table 4. The effect of nutritional booklet and social media on the adolescents’ consumption level of fattening foods.

| Consumption level | Nutritional booklet group | Social media group | Control group |
|-------------------|---------------------------|--------------------|---------------|
|                   | Before | After | Before | After | Before | After | n   | n   | n   | n   | n   | n   |
| Total fat         |        |       |        |       |        |       |     |     |     |     |     |     |
| Less              | 2      | 2     | 6      | 3     | 9      | 8     |     |     |     |     |     |     |
| Enough            | 13     | 22    | 11     | 20    | 9      | 10    |     |     |     |     |     |     |
| Excessive         | 19     | 10    | 16     | 10    | 11     | 11    |     |     |     |     |     |     |
| PUFA              |        |       |        |       |        |       |     |     |     |     |     |     |
| Less              | 6      | 3     | 8      | 3     | 10     | 9     |     |     |     |     |     |     |
| Enough            | 12     | 21    | 10     | 18    | 10     | 10    |     |     |     |     |     |     |
| Excessive         | 16     | 10    | 15     | 12    | 9      | 10    |     |     |     |     |     |     |
| MUFA              |        |       |        |       |        |       |     |     |     |     |     |     |
4. Discussion
The study results using the Wilcoxon test indicated that there was an influence of nutritional education through nutritional booklet on the adolescents’ nutritional knowledge (p = 0.001). The nutritional education using nutritional booklet could improve the adolescents’ nutritional knowledge 1.909 times compared to the knowledge of those in the control group. This result is in line with the result of study conducted by Sukiyasa and Sukoco [23] on vocational school students whereby it showed that students’ learning outcomes in the learning of automotive electrical system material taught using nutritional booklet media were higher than those taught using PowerPoint media. The difference in the average post-test scores in both groups showed that the nutritional booklet media was more effective in improving students’ learning outcomes. The use of nutritional booklet media in learning made it easy for students to receive abstract lessons. The study result conducted by Noviyanto et al [24] in junior high school students showed that the nutritional booklet media of the human respiratory system could improve biology-learning outcomes. Nutritional booklet media could make it easier for students to understand the respiratory processes that occur in the human body so that they can understand the learning material of the respiratory system as a whole.

The other media used in the process of nutritional education is social media. The nutritional education through social media could improve adolescents’ nutrition knowledge 1.100 times compared to the knowledge of those in the control group. The result of this study is in line with the study conducted by Utami et al [25] that there is an influence of Instagram-assisted project-based learning model on creative thinking skills of students on the X grade of SMA Negeri 8 Surakarta. It is supported by the data of students’ average score in the experimental class (82.72) higher than that in the control class (77.12). The result of Lukitasari et al [26] study on high school students also shows that the use of Facebook as a means of increasing students’ motivation and achievement is able to provide good changes to the Natural Sciences (IPA) subject, especially biology subject.

Social media is an online communication media that allows individuals and groups to create content, various kinds of information connected with one another. Adolescents today prefer to use technological sophistication to search for various kinds of information that they need and are considered not boring because various interesting contents in it can also be accessed at the same time. Accordingly, social media can be used as an educational medium which can reach a large number of targets that are not limited to space and time [27].

5. Conclusion
There is effect of nutritional booklet and social media on the knowledge and consumption level of fattening foods in adolescents. The given intervention is proven able to increase the adolescents’ knowledge of fattening foods 1.909 and 1.100 times and is able to change the consumption level of fattening foods for adolescents in Surakarta.

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