# Effect of e-booklet media about obesity prevention on knowledge levels in junior high school students in Yogyakarta

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**Abstract**. Obese adolescents in the world continued to increase from year to year. In the Special Region of Yogyakarta (DIY), there were 8% of adolescents aged 13–15 years were obese. Prevention of increasing obesity in school-age children in DIY needed to be done because Yogyakarta City is a district that has the highest prevalence of obesity in DIY. Awareness of health care behavior could be created by providing health education to prevent an increase in obesity in adolescents. This study aimed to determine the effect of e-booklet health education on knowledge. This research was quasi-experimental research by measuring the pre and post-test scores. This research was given health education through e-booklet media. Knowledge data obtained from the pre and post-test questionnaires. There were differences in knowledge before and after health education ($p < 0.05$). Health education on obesity prevention through e-booklet media influences knowledge.

## 1. Introduction

Obesity is related to the mortality rate that occurs almost all over the world. Obese adolescents in the world continue to increase from year to year. According to a report from the World Health Organization (WHO), there are more than 1.9 billion adolescents, and adults who are overweight and 650 million are obese[1]. In Indonesia, as much as 8.8% of children aged 5–12 years are obese and adolescents aged 16–18 years are 1.6%. In Yogyakarta Special Region (DIY) the number of children aged 5–12 years who are obese is 10.2% and adolescents aged 13–15 years are 8%[2]. Prevention of the increase in obesity in school-age children in DIY needs to be done because Yogyakarta is the area with the highest obesity prevalence, namely 14.2% compared to other districts[3].

Obesity can be caused by an imbalance between incoming and outgoing energy. Changes in diet and physical activity can lead to an increase in energy intake that contains high fat and sugar and an increase in physical inactivity along with changes in the environment and the development of transportation[4]. In adolescence, signs of puberty begin to appear, followed by physical, psychological and social changes. Adolescents at this time experience an increase in appetite but also experience a decrease in physical activity which can be associated with the risk of obesity. Current nutritional status and knowledge can have a significant impact on the nutritional status of adolescents in the future. Thus, adolescents who are currently obese also have the possibility of being obese in adulthood[5].

Obesity is the presence of excessive fat accumulation which can cause the risk of several diseases. Obesity can be caused by an imbalance between the number of calories consumed and the calories expended. Changes in diet and physical activity lead to an increase in the intake of energy-dense foods high in fat and sugar and an increase in physical inactivity along with changes in the environment and

the development of transportation. Obesity can be caused by the interaction between genetic and environmental factors, such as nutrient intake, physical activity, lifestyle and socio-economic conditions. A person is obese if the Body Mass Index (BMI) is more than 30[6]. Classification of obesity in adolescents can be done by calculating the value of the standard deviation of BMI against age (BMI/U). Someone is obese if they have a z-score > 2SD. The following is the classification of the BMI/U indicators based on Riskesdas (2013)[7].

**Table 1.** Classification of BMI/U indicators

| Category | *Z-score* |
|---|---|
| Underweight | ≥-3SD s/d <-2SD |
| Normal | ≥-2SD s/d ≤1SD |
| Overweight | >1SD s/d ≤2SD |
| Obesity | >2SD |

BMI is obtained from the measurement of body weight in kilograms then divided by the square of height in meters. Determination of adolescent nutritional status requires consideration of age based on sex (BMI for age). The following is a grouping of BMI for age[8].

**Table 2.** BMI for age

| Age (year) | Sex | *Z score* (BMI in kg/m$^2$) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | -3 SD | -2 SD | -1 SD | Median | 1 SD | 2 SD | 3 SD |
| 12 | Boy | 13,4 | 14,5 | 15,8 | 17,5 | 19,9 | 23,6 | 30,0 |
| | Girl | 13,2 | 14,4 | 16,0 | 18,0 | 20,8 | 25,0 | 31,9 |
| 13 | Boy | 13,8 | 14,9 | 16,4 | 18,2 | 20,8 | 24,8 | 31,7 |
| | Girl | 13,6 | 14,9 | 16,6 | 18,8 | 21,8 | 26,2 | 33,4 |
| 14 | Boy | 14,3 | 15,5 | 17,0 | 19,0 | 21,8 | 25,9 | 33,1 |
| | Girl | 14,0 | 15,4 | 17,2 | 19,6 | 22,7 | 27,3 | 34,7 |
| 15 | Boy | 14,7 | 16,0 | 17,6 | 19,8 | 22,7 | 27,0 | 34,1 |
| | Girl | 14,4 | 15,9 | 17,8 | 20,2 | 23,5 | 28,2 | 35,5 |

Adolescence is a period of transition from childhood to adulthood. This period is followed by signs of puberty as well as physical, psychological and social changes. According to WHO, there are 3 stages of development according to the physical, psychological and social changes of adolescents, including early adolescence, 10/13–14/15 years; mid-adolescence, 14/15–17 years and late adolescence, 17–21 years.

Junior high school students are included in the early adolescence stage. Some teenagers consider themselves healthy without realizing that they already have nutritional problems. They often skip breakfast and have irregular eating habits and tend to like fast food. Besides, puberty experienced by adolescents causes an increase in appetite, which encourages them to consume additional foods that are sweet, energy-dense and high in fat. At this time adolescents also experience a decrease in physical activity which is closely related to the risk of obesity. The increasing number of food stalls that provide fast food in Yogyakarta City encourages teenagers to tend to consume fast food. This certainly creates health problems for adolescents.

The nutritional knowledge of adolescents determines the food menu they choose to consume. Sufficient knowledge about balanced nutrition can prevent adolescents from risk of obesity. Changes in the level of knowledge, diet, behavior and lifestyle can influence decisions in choosing the type and amount of food[9]. DIY is one of the provinces with the highest proportion over 10 years with risky foods. Consumption power more than once a day and consumption of risky food more than once a day is 69.2% and 50.7%, respectively[10].

Health education is carried out to raise awareness and increases knowledge in maintaining health. There are several levels of knowledge in the cognitive domain such as know, someone remembers something that has been learned before; understanding (comprehension), a person can explain an object

and interpret it correctly; application, the ability to use a material that has been studied to be applied to certain situations or conditions; analysis, someone can explain the material; synthesis, being able to compile new formulations from the formulations that have been studied and evaluation, being able to assess material or object[11].

Measurement of a level of knowledge can be obtained through interviews or questionnaires containing questions about the material presented. Health education is one of the essential preventive measures implemented for adolescents because it can determine their future and nutritional status. At this time, encouragement from the school environment was more potent than that of families, especially parents. During this period, adolescents can become agents of change for friends, family, and the people around them. Health education can provide an understanding of the prevention of obesity.

In this study, the e-booklet media is expected to be a practical, attractive and effective alternative media in conveying messages to health education as an effort to prevent obesity. E-booklet is an electronic booklet media that is used as an alternative media for health education from printed booklet media. Based on the results of the study, booklets can increase knowledge in overweight and obese adolescents[12]. E-booklet has the advantage of being easily accessible and more economical than printed booklet media. E-booklet as an alternative media for booklets can also effectively influence knowledge.

## 2. Methods

This research was included in quasi-experimental and used pre and post-test designs. The research was carried out in several stages. First, collect the identity of the respondent through a questionnaire, then proceed with a pre-test to determine the respondent's knowledge before being given health education. The intervention given was the e-booklet media about obesity prevention, after the respondent had finished understanding the content of the e-booklet, the respondent was given a questionnaire containing post-test questions to find out the respondent's final knowledge after receiving the intervention and to measure the effect of health education on the respondent's level of knowledge.

This research was conducted at SMP Negeri 5 Yogyakarta. Sampling in this study is purposive sampling, in which the sampling process considers the nature of the population that has similarities with the research objectives. The location of the city of Yogyakarta was chosen by considering the incidence of obesity among adolescents in Yogyakarta City which was the highest compared to other districts in the Province of Yogyakarta. The technique of presenting an e-booklet by displaying a 2-dimensional image or illustration is carried out online. The materials used in health education in e-booklet media were obtained through literature studies from the Ministry of Health's Balanced Nutrition Guidelines (2014)[13].

## 3. Results

In this study, 34 students were used as respondents. The characteristics possessed by respondents include sex and age, which are described in Table 3 below.

**Table 3.** Characteristics of Research Respondents

| Characteristics | Total (n=34) | |
|---|---|---|
| | f | % |
| Sex | | |
| Girl | 23 | 32,4 |
| Boy | 11 | 67,6 |
| Age | | |
| 12 | 3 | 8,8 |
| 13 | 25 | 73,5 |
| 14 | 5 | 14,7 |
| 15 | 1 | 2,9 |

Primary Data, 2020

The sex characteristics of this study indicate that the number of respondents is female. Respondents in this study were divided into the age range of 12–15 years. The influence of e-booklet media as a media for health education is measured in 2 stages, namely the time before and after health education is carried out. Measurement of the level of knowledge is used to compare the pre and post-test scores. Changes in the respondent's level of knowledge can be seen in Table 4 below.

**Table 4.** Changes in Level of Knowledge

| *Pre Test* Mean (SD) | *Post Test* Mean (SD) | p |
|---|---|---|
| 81,29 | 95,41 | 0,01 |

Primary Data, 2020

Table 4 shows an increase in knowledge seen from the score of pre and post-test. Respondent's level of knowledge at the initial measurement had a score of 81.29, which then increased to 95.41. Based on the Wilcoxon test, the pre and post-test scores indicated that there was differences level of knowledge in the pre and post-test scores ($p < 0.05$).

**4. Discussion**

The effect of health education through e-booklet media on obesity prevention in this study is seen from the results of measuring the level of knowledge carried out through two stages of measurement. Measuring the effect of health education on knowledge in this study is the time before and after health education is given.

After being given health education through e-booklet, respondents experienced an increase in the level of knowledge seen from the increase in the pre and post-test scores. E-booklet media used in this study attracted respondents to read the content of health education materials because it was more practical. Health education, which is presented in a more attractive and practical form, can increase the success of delivering information from health education materials to increase reading interest, comprehension skills and the ability to remember information content.

Based on the Transtheoretical Model (TTM), the process that a person goes through in a behavior change consists of several stages, among others, pre-contemplation (not ready or not yet aware and the desire to change); contemplation, preparation stage, already having awareness and desire to change, however not yet acting; preparation, the first step to act in changing behavior; action, starting to act; maintenance, maintaining a new behavior and relapse, repeating a new habit or behavior[14].

Based on some responses from respondents through questionnaires, it can be seen that the health education media in the form of e-booklets are interesting to read, easy to understand and practical. This shows that the objectives of the health education media innovation in this study were achieved. E-booklets as a media for health education about obesity prevention give a good impression to respondents and can motivate respondents to live healthier by having an ideal body weight, eating healthy foods and being active.

## 5. Conclusions and recommendations

Health education on obesity prevention through e-booklet media can influence the level of knowledge in the form of increasing respondent's knowledge. There is a difference in the respondent's level of knowledge before and after being given health education about obesity prevention through e-booklet media. E-booklet media can be used as a supporting media for health promotion in adolescents.

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