

Initiation of *Sekolah Sadar Gizi* by conducting nutritional status assessment and nutritional education to junior high school student

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ABSTRACT School is a strategic place to form nutrition behaviors of the students, for example by initiating Sekolah Sadar Gizi (Nutrition Awareness School). The first step to initiate Sekolah Sadar Gizi is collecting the nutrition situation data of the students. Nutrition education and nutritional status assessment are examples of how the data can be collected. This is a community services program aimed to provide the nutrition situation of the students and to educate the students to initiate Sekolah Sadar Gizi. The activities were conducted in August – October 2017 at Muhammadiyah 3 Junior High School. There were 2 main activities, nutritional status assessment, and nutrition education. The results show that over-nutritional and under-nutritional problem happened in all classes, either class 7, 8, or 9. The highest number of stunted and obese children is in class 8 which was around 7% and 15%. Meanwhile, the number of wasted children was around 5% and obese children were around 20%. From nutrition education which followed by Palang Merah Remaja of the school, the score of 60% of the participants was increasing. Considering the burden of nutritional problems in the school, initiation of Sekolah Sadar Gizi is highly recommended.

KEYWORDS sekolah sadar gizi; nutrition education; nutrition assessment; obesity; stunting; wasting

1. Introduction

School is a potential place to improve knowledge, attitude, and community practice about balanced nutrition.¹ Knowledge and nutrition-related information are the urgent needs to create a productive and healthy generation in the future. A review by Wang and Stewart² stated that friends of the same age and the types of foods provided are more influential towards nutritional behavior of the students than the influence of the parents. A full-day school program which is applied at some

schools in Indonesia should be balanced with the provision of healthy and nutritious facilities and food in schools.

One of the health promotion activities at school is creating *Sekolah Sadar Gizi* or Nutrition Awareness School. This activity is inspired by *Keluarga Sadar Gizi* program which is focused on the improvement of nutrition behavior of the family. *Sekolah Sadar Gizi* focuses on the nutritional status, students' health, and increasing the role

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of nutrition that supports children's learning achievement. Nutrition promotion at school. Nutrition promotion in schools can also be done by trying to create a conducive environment so that children can choose healthy foods over non-healthy ones. The ability of children to choose healthy foods independently is expected to reduce morbidity and mortality related to malnutrition, obesity, and nutritional deficiencies.²

Initializing of *Sekolah Sadar Gizi* can be done with healthy school assessment tools based on the *Monitoring and Evaluation Guidance for School Health Program* prepared by The United Nations Children's Fund (UNICEF) and World Health Organization (WHO). This concept not only assesses the nutritional status of the students but also assesses the school environment and local health services in supporting *Sekolah Sadar Gizi*.³

According to Nutritional Status Assessment year 2016, there are still many school-related nutritional problems that happened to children and adolescents. National prevalence of wasted children aged 5-12 years old were 7.8% while severely wasted was 2.7%. In adolescents aged 13-15 years old, the problem of wasted was 7.4% while severely wasted was 2.4% nationally. Meanwhile, special region of Yogyakarta, the prevalence of wasted children aged 5-12 years old even exceeding the national prevalence with the number of 8.7% and so do the prevalence of wasted adolescent with the number of 8.4%.⁴ The data reflects the magnitude of nutritional problems that occur among school students in Indonesia, especially in Yogyakarta. Therefore, monitoring nutritional status needs to be done on school students to find out the magnitude of the problems that occur in each school.

Muhammadiyah 3 Junior High School is one of the junior high schools in Yogyakarta province. This school has been established since 1951 and is now known as one of the International Islamic Schools in Indonesia. As one of the role models that has an Islamic education background, Muhammadiyah 3 is suitable to be used as a pilot project in initiating the *Sekolah Sadar Gizi* program.

Knowledge about students' nutritional status is important to determine the strategic intervention for the students. Therefore, this community empowerment which was carried out at Muhammadiyah 3 Yogyakarta Junior High School had 3 objectives, as follows: 1) providing data on students' nutritional situation to school, 2) increasing the awareness of students and other school members about the importance of implementing good nutritional behavior, and 3) provide nutrition education for students.

2. Methods

This community empowerment carried out at Muhammadiyah 3 Yogyakarta Junior High School in August – October 2017. There were several processes including preparation, implementation, and evaluation process. Several activities on preparation phase were as follows 1) situation analysis, 2) program planning, 3) coordination with school management, and 4) preparing equipment and materials to be used. After preparation, stages of implementation are carried out with 2 methods, namely assessment of nutritional status and nutritional education. The next stage is evaluation and analysis of data so that it becomes useful information.

Examination of students' nutritional status was conducted towards students of 7th, 8th, and 9th-grade of Muhammadiyah 3 Yogyakarta Junior High School. Assessment carried out included measurements of height, weight, and body mass index. Measurement of body weight using a digital scale with a precision level of 0.01 kg while measuring height using stature meter with a precision level of 0.01 cm. From the data, the researcher calculated height for age z-score (HAZ) and body mass index for age z-score (BAZ) using *software* WHO Anthro Plus. The value of HAZ used to determine whether the child is stunting or not while the BAZ is used to determine whether the child is overweight, normal, or underweight.

Nutrition education is given to student representatives who joined the Youth Red Cross organization of Muhammadiyah 3 Yogyakarta.

Nutritional education was carried out with counseling methods and included 3 materials, 1) anemia in adolescents, 2) measurement of body weight and height, and 3) balanced nutrition in adolescents, first aid in accidents, and clean and healthy lifestyle. The success of nutritional education is measured by giving pretest and post-test questions and is called successful if more than 50% of extension participants experience an increased value.

Statistical analysis is only done on nutritional status assessment data. Analysis using One-Way ANOVA was carried out to determine differences in the values of body weight, height, body mass index, and anthropometric index between 7th, 8th, and 9th-grade students. The results of the interpretation of the nutritional status of students as well as the pretest and posttest were not analyzed statistically but descriptively.

3. Results

3.1 Nutritional assessment

The nutritional status assessment of 560 students was categorized as 7th-grade (137 students), 8th-

grade (226 students), and 9th-grade (197 students) by measuring height for age z-score (HAZ) and body mass index for age z-score (BAZ). Based on the assessment of nutritional status, it was known that malnutrition occurred in all classes (Table 1). The most nutritional problems occurred in 8th-grade students, such as stunting as much as 7.08% and obese as much as 15.49%. Under- and overnutrition problems occur in almost the same amount in each class group. However, the highest number of underweight students was in the group of 9th-grade students (5.58%) and the highest number of obese students was in the group of 7th-grade students (21.90%).

From table 2, it can be seen the higher the level of the student class, there was a significant increase in height and weight ($p < 0.05$). The body mass index of student also experienced an increase even though it was not statistically significant.

3.2 Nutrition education

Nutrition education was conducted on 61 students who joined the Youth Red Cross. Based on the assessment before and after counseling, it was

Table 1. Frequency distribution of nutritional status class 7, 8, and 9

Class 7 (n= 137)		Body mass index for age (BAZ)				
		Wasted (%)	Normal (%)	Overweight (%)	Obese (%)	Total HAZ (%)
Height for age z-score (HAZ)	Stunting	0 (0.00)	6 (4.38)	0 (0.00)	0 (0.00)	6 (4.38)
	Normal	7 (5.11)	74 (54.01)	30 (21.90)	20 (14.6)	131 (95.62)
	Total BAZ (%)	7 (5.11)	80 (58.39)	30 (21.90)	20 (14.6)	137 (100.00)
Class 8 (n= 226)						
Height for age z-score (HAZ)	Stunting	1 (0.44)	14 (6.19)	0 (0.00)	1 (0.44)	16 (7.08)
	Normal	9 (3.98)	121 (53.54)	46 (20.35)	34 (15.04)	210 (92.92)
	Total BAZ (%)	10 (4.42)	135 (59.73)	46 (20.35)	35 (15.49)	226 (100.00)
Class 9 (n=197)						
Height for age z-score (HAZ)	Stunting	0 (0.00)	4 (2.03)	0 (0.00)	2 (1.01)	6 (3.04)
	Normal	11 (5.58)	120 (60.91)	40 (20.3)	20 (10.15)	191 (96.95)
	Total BAZ (%)	11 (5.58)	124 (62.94)	40 (20.3)	22 (11.17)	197 (100.00)

Table 2. Anthropometric and index anthropometric assessment

Class	Height (cm)	Weight (kg)	BMI (kg/m ²)	HAZ	BAZ
7	151.83 ± 10.36 ^a	48.14 ± 13.33 ^a	20.30 ± 4.98	-0.35 ± 0.96	0.63 ± 3.18
8	156.26 ± 7.60 ^b	51.84 ± 1.35 ^b	20.99 ± 4.76	-0.56 ± 0.96	0.49 ± 1.92
9	160.61 ± 7.41 ^c	55.19 ± 12.52 ^c	21.35 ± 4.50	-0.52 ± 0.83	0.24 ± 1.40
	<0.001	<0.001	0.132	0.091	0.236

One-Way ANOVA, *post hoc* Bonferroni. Data shown as mean ± standard deviation (SD)

^{a,b} Different superscript in the same column shows significant difference

BMI: body mass index; HAZ: height for age z-score; BAZ: body mass index for age z-score

Table 3. Knowledge comparison after nutrition education

Level	n (%)	Pretest average	Posttest average
Low	3 (4.91)	73.33	63.33
Constant	12 (19.67)	77.50	77.50
Increase	46 (75.41)	65.00	86.96
Total	61 (100.00)	67.87	83.93

found that 75.4% of students experienced an increase in the value of the pretest and posttest (Table 3). Only 5% of students experienced a decline in value and 19.7% of students experienced no change in value.

4. Discussion

Based on the research that has been done, it is known that nutritional problems occur evenly in all class groups. Among 560 students who took part in this activity, it was known that 24 students (4.28%) were stunted, 1 student (0.18%) was stunted and underweight, 3 students (0.54%) were stunted and obese, 27 students (4.82%) were underweight, 116 students (20.71%) were overweight, and 74 students (13.21%) were obese.

Stunting is a cumulative effect that occurs due to malnutrition since the first 1000 of life and is indicated by the height lower than 2 standard deviations from the average height of other children in his age group.⁵ Data of Nutritional Status Monitoring year 2016 towards 12-18 years old female adolescents showed that 24.1% of them were stunted and 7.5% were severely stunted.⁴ Other studies in Jakarta towards 141 primary school children showed 44% were stunting.⁶

The condition of stunting are affected by nutritional status of the mother, economic situation and family demographics, births disparity, infections that occur in infants, and hygiene-sanitation problems.⁷⁻⁹ According to Dominguez¹⁰, the effect of interventions to combat stunting in children over 2 years does not effects as large as when children are under 2 years old. However, several ways can be pursued to improve the quality of life of stunted children, include conducting nutrition education for mothers, paying attention to children's nutritional intake, strengthening the function of nutritional counseling and health care facilities, especially at schools and primary health facilities.^{11, 12}

Some respondents of this activity are known to experience the double burden of malnutrition, whether stunting and underweight or obese and stunting. This condition is likely due to poor nutrition management in stunting toddlers, causing them to experience a double burden of malnutrition when they are teenagers. Thinness or wasting can occur due to inadequate energy intake in children. This is characterized by weight for age z-score index (WAZ) lower than -2 SD from the average population of the same age.⁹ As for obesity occurs because of excess

energy intake. In children and adolescents, the condition of obesity can be determined according to the body mass index for age (BAZ) above +2SD from the average population.¹³ According to the WHO 2007 growth chart reference, the minimum height suitable for 13-year-old girls is 143 cm while for young men it is estimated to be 142 cm. The normal body mass index for female adolescents aged 13 years is approximately 15 – 21.5 kg/m² while for male adolescents ranged from 15 – 20.8 kg/m².¹⁴

According to the Global Nutrition Report 2015, stunting and wasting conditions are often found in malnourished children in the world, especially in developing countries.¹⁵ Several studies conducted on toddlers in Tanzania and India also showed a coexistence between stunting and wasting. Given the long-term impacts that can be caused both from stunting and wasting, the intervention provided should not separate wasting and stunting as two different cases, but complementary.^{16, 17}

Hoffman et al.¹⁸ prove that stunted children were more at risk of being overweight in adulthood. This was because stunting children tended to experience impaired fat oxidation metabolism. Therefore, stunted children given excessive nutrition would not improve their nutritional status. Excessed nutrition can lead to increased fat deposits in the body so that children are at risk of obesity in adolescence. Overeating behavior would also cause children to have difficulty controlling their appetite.¹⁹

In this activity, it was known that students who were overweight or obese reached more than 20%. Being overweight often occurs because of more than one factor. Several studies revealed determinant factors of overweight in children and adolescents including socioeconomic factors (mother's occupational status, pocket money, television), nutritional factors (consumption of junk food, overeating patterns), nutritional status of parents, and lack of physical activity.²⁰⁻²² Being overweight is very dangerous because it can lead to other diseases. The World Health Organization in 2017 reports that many studies have proven

the effect of obesity on the increased risk of type II diabetes mellitus, sleep disorders, hypertension, and cardiovascular disease. Besides, obesity can reduce the quality of life of adolescents, for example in terms of managing emotions and behavior. This report also stated that 4 out of 5 obese adolescents will remain obese in adulthood.²³

From anthropometric measurements, it is known that the higher the grade level, the more weight and height of the child. This is following the growth theory where the acceleration of growth in adolescents is characterized by changes in body shape, size, and composition, also known as puberty. In general, the acceleration of growth in female adolescents is starting at the age of 11 years while male adolescents are from the age of 13 years.²⁴ Respondents of this study were students aged 11 and 13 years which in general is the age range of elementary to junior high school students, so it is known that the participants of this community empowerment activity were teenagers who were experiencing puberty.

As much as 75.41% of students experienced an increase in the post-test scores after nutrition education. It could be said that the method of nutrition counseling to increase knowledge had succeeded. However, the increase in post-test scores in this activity does not mean that the knowledge has been or can be applied by the participants in their daily life.

Kong et al., stated that nutrition education is an effective and efficient way to increase students' knowledge about good nutritional behavior.²⁵ However, nutrition education also has its obstacles and challenges. According to McNulty, challenges faced by the implementation of nutrition education include the availability of competent, sustainable teachers and adjustments to the national curriculum.²⁶ In addition, a further approach is needed so that the knowledge provided can be applied and become a habit of students. Research conducted by Silveira et al.²⁷ mentioned that nutrition education accompanied by the practice of eating vegetables and fruit is more effective in reducing the incidence of overweight and obesity.

Data obtained from this activity has several disadvantages. First, the data cannot describe the relationship between variables. This limitation makes it not possible to know the causes of the malnutrition phenomenon among students. Second, nutrition education activities are only carried out at one time (unsustainable) so it is not known whether the nutrition knowledge provided can survive and be practiced by children. Third, nutrition education is targeted to student representatives. It caused not all students get the same knowledge with student representatives. Although the researcher expected there would be sharing knowledge from the representatives to their peers, it could not be assessed.

This data has advantages in terms of the number of children who joined nutritional status assessment. A total of 560 students become respondents consisting of 7th, 8th and 9th graders so that all class groups are represented. This examination could provide baseline nutritional status data for students which showed the urgency of nutrition intervention for the children. This is a strong basis that nutrition education is very necessary both for implementation at the curriculum level or daily life in schools. One method that can be proposed is *Sekolah Sadar Gizi* initiation.

5. Conclusion

The results show that over- and undernutrition remains big problems among students, especially at Muhammadiyah 3 Yogyakarta Junior High School. The implementation of nutrition education is proven to increase students' knowledge. Initiation of *Sekolah Sadar Gizi* is proposed as a method for improving the nutritional status of school children. Further research needs to be done to solve the nutrition-related problems among children and adolescents, especially in the school context.

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Conflict of interest

There are no conflict of interests

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