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# EFFECT OF PHYSICAL ACTIVITY AND FAST FOOD CONSUMPTION FREQUENCY ON OVERWEIGHT LEVEL AMONG HIGH SCHOOL ADOLESCENT

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**ABSTRACT**

***Background**: Obesity was believed to be one of the risk factors of degenerative diseases, such as diabetes mellitus, hypertension, and coronary heart disease. Obesity occurred gradually that started with overweight. Risk factors for overweight are lack of physical activity, and consumption of high caloric fatty food which may cause accumulation of fats inside the body. This research aims to examine the effect of physical activity and fast food consumption frequency on overweight level among high school adolescent in Cirebon.*
***Methods**: It was a cross-sectional study conducted among 262 high school students aged 15-17 years using stratified random sampling.*
***Results**: The result based on Spearman correlation test showed negative correlation between physical activity and overweight level with p= 0,001 (p< 0,05) and correlation coefficient of -0,627. There was positive correlation between consumption fast food frequency with overweight with p=0,037 (p=0,05) and correlation coefficient of 0,423.*
***Conclusions**: Physical activity and fast food consumption frequency have effects on overweight level in high school adolescent in Cirebon.*

***Keywords**: Physical activity, Fast food consumption, Overweight*

## INTRODUCTION

Obesity is a multifactorial disease caused by accumulation of excess fat and is a health problem. Obesity in Indonesia is steadily increasing and is becoming one of the risk factors for degenerative diseases such as diabetes mellitus, hypertension, and coronary heart disease [1,2]. Prevalence of obesity in developed countries like the United States has risen dramatically by 17%, affecting not only adults but also in children and adolescent.

According to Indonesian Basic Health Research (Riskesdas) in 2010, the prevalence of obesity in Indonesia was 9.2% and Riskesdas 2013 reported the prevalence of adolescent overweight of 7.3% with 5.2% overweight cases and 1.6% obesity. This number is higher than 2010 of only 1.4% teenage overweight [3]. Physical activity as defined by World Health Organization (WHO) as any bodily movement produced by skeletal muscles that requires expenditure - including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits [4]. WHO recommends that children and adolescent aged 5-17 years should do at least 60 minutes of moderate to vigorous-intensity physical activity daily and should include activities that strengthen muscle and bone at least 3 times a week [4]. WHO research in 2017 reported more than 80% of teenagers

lacks physical activity ad Riskesdas 2013 reported 35.4% of Indonesian teenagers lack physical activity and the province of West Java with 25.4% of teenagers lacking physical activity [4].

Body weight is classified into three classes: underweight, normal, and overweight [5]. Underweight occurred when the Body Mass Index (BMI) is less than 18.5 kg/m$^2$. A person with normal body weight has a BMI of 18.5-24.99 kg/m$^2$ and BMI above 25 kg/m$^2$ is classified as overweight [6]. Overweight is caused not only by lack of physical activity but also imbalance food consumption causing excess energy [7]. Riskesdas 2013 reported that 48.7% of adolescent aged 15-19 consumed fatty foods 1-6 times weekly [1]. Food consumption pattern that is high in calories and fats with low fibers triggers the increase of obesity. This study aims to study the effect of physical activity and fast food consumption frequency to the overweight level in adolescent.

## METHODS

This was a cross-sectional observational study involving 262 high school students aged 15-17 years old from a high school in the city of Cirebon, West Java, Indonesia. The samples were recruited with stratified random sampling and sample size were calculated using the Slovin formula. The subjects were active student and aged 15-17 during the sampling process. We exclude students who were sick, fasting, and were on a diet.

Body Mass Index is calculated after obtaining height and weight of individual children. The subjects' physical activity status was obtained from a self-made validated questionnaire with 11 questions regarding their daily activities, such as daily transportation mode, physical activity during spare time, type of extracurricular activities, and the frequency of extracurricular activities. Fast food consumption frequency data were collected through questionnaire. For fast food consumption status, a self-made validated questionnaire with 8 questions. Fast food consumption frequency of 5 or more times per week is considered very frequent, 2 to 4 times weekly is considered frequent and once a week is considered rare.

## RESULTS

*Characteristics of respondents*

Most of the subjects in this study were 16 years old (51.7%), followed by 15 years old and 17 years (27.5% and 20.8% respectively). There was also more female than male subjects with 163 females (62.1%) and 99 males (37.9%). A total of 166 subjects (63.3%) have low physical activity and only 17 subjects (6.6%) have high physical activity. Frequent fast food consumption is found in 72 subjects (27.6%) and 36 respondents consume fast food very frequently (13.8%). More than half of the study population was overweight with 88 overweight subjects (33.5%) and 52 pre-obese subjects (19.8%).

Table 1. Characteristics of Respondents

| No | Characteristics | Frequency (N) | Percentage (%) |
|---|---|---|---|
| 1 | Age | | |
| | 15 | 72 | 27.5 |
| | 16 | 135 | 51.7 |
| | 17 | 55 | 20.8 |
| 2 | Sex | | |
| | Male | 99 | 37.9 |
| | Female | 163 | 62.1 |
| 3 | Physical activity | | |
| | Low | 166 | 63.3 |
| | Medium | 79 | 30.1 |
| | High | 17 | 6.6 |
| 4 | Fast food consumption frequency | | |
| | Rarely | 154 | 58.6 |
| | Frequent | 72 | 27.6 |
| | Very frequent | 36 | 13.8 |
| 5 | Body weight | | |

| No | Characteristics | Frequency (N) | Percentage (%) |
|---|---|---|---|
| | Normal | 122 | 46.7 |
| | Overweight | 88 | 33.5 |
| | Pre-obese | 52 | 19.8 |

*Bivariate analysis*

The effect of physical activity and fast food consumption frequency to overweight were analyzed using Spearman's correlation and Chi-square test using significance level $p<0.05$. Spearman's correlation (rs) analysis showed a statistically significant negative correlation between effect of physical activity to overweight level ($r=-0.627$) and p-value=0.001 ($p<0.05$).

Table 2. Effect of physical activity and fast food consumption frequency to overweight level

| | Overweight | |
|---|---|---|
| | rs | p-Value |
| Physical activity | -0.627 | 0.001 |
| Fast food consumption frequency | 0.423 | 0.037 |

## DISCUSSION

Childhood obesity has reached epidemic levels in developed countries and started to emerge in developing countries. Overweight and obesity in adolescent have significant impact on both physical and psychological health [8]. Every individual has a daily caloric intake requirement that has to be fulfilled for normal physiological process. If the individual has fulfilled his/her caloric intake, the excess calorie will be stored as fat by the body, and since fast food has high calorie and fat content, the increasing caloric intake will increase the amount of fat stored by the body and thus increasing body weight.

This study showed that fast food consumption has a moderate positive correlation with overweight (p-value=0.037, r=0.423) and more than half of the study (53.3%) population were overweight. A cross-sectional study in Malaysia involving 1173 Malaysian adults showed that 17% of respondents consumed fast food at least once a week and the obesity rate was 21.3% [9]. An interesting observation from the Malaysian study was that younger participants were significantly found to be consuming fast food more frequently (52.5%, $p<0.001$)[8].

A study on the impact of U.S chain restaurant and obesity in China and South Korea showed that availability, good service, and low waiting times are the main reason fast food is preferred but interestingly cheap price was not among the top reasons of fast food consumption [10]. A systematic review on obesity in young adults in South Asia showed wide variation of prevalence of obesity (Sri Lanka [2.4%] - Pakistan [11%]) and overweight (Sri Lanka [11%] – India [19%]) with reduced fruit and vegetable consumption, consumption of fast food and soft drink, and skipping breakfast as contributing factors to the level of overweight and obesity [11]. A similar observation was also reported in a study in Finland where 13% of study participants were overweight and having a fast food outlet near school is associated with frequent skipping breakfast and free school lunch and the accumulation of irregular eating habits [12]. A recent cross-sectional study in Indonesia involving 224 grade-5 elementary school children showed only 64.3% of the subjects have breakfast regularly. This habit of skipping breakfast is due to they or their parents do not have enough time for it and this resulted in children buying foods that are available around the school, including fast foods with high calorie and fat contents [13].

Physical activity determines how much calorie is needed by the body and individuals with less physical activity requires less calories compared to individuals who are active physically. If the amount of calorie consumed from food is higher that the calorie required for physical activity, the excess calorie will be stored by the body as fat. Continuous accumulation of fat may lead to overweight/obesity.

This study showed that physical activity has a statistically significant moderate inverse correlation with overweight (p-value=0.001, r=-0.627) and 63.3% of the respondents have low physical activity. A study in Malaysian adults showed that the levels of physical activity were also inversely correlated to the risk

of overweight/obese in men but not in women [14]. The study also reported that overweight/obese men have significantly lower level of physical activity compared to normal-weight men. A meta-analysis on diet and physical activity to prevent or treat obesity in South Asian children showed that school-based physical activity intervention may prove to be effective to prevent or treat obesity in children [15]. Low physical along with increased caloric and salt intake is associated overweight and high waist circumference which was highly predictive of dyslipidemia, elevated glycated hemoglobin, diabetes and other cardiometabolic diseases [16].

In the coming years, the maximum mean BMI in more developed countries might be exceeded by those in less developed ones. Future works should include the socio-economic factors such as family household income, daily spending money, parent's occupation, parent's education, as well as nutritional status such as daily nutritional consumption pattern, breakfast pattern, and type of food consumed within school area. Rather than focusing on obesity at the individual level, education on overweight/obesity causing factors and promoting higher physical activity may prove to be more effective to curb overweight/obesity levels.

## CONCLUSION

Fast food consumption showed a significantly positive correlation with overweight/obese levels in adolescent and physical activity showed a significantly inverse correlation with overweight/obese. Controlling overweight/obesity levels is a collaborative effort. Healthy eating habits, such as balanced diet and not skipping breakfast must be cultivated as early as possible in the family and this healthy eating habits must continue at school as well. Schools can promote higher physical activity by having a better physical exercise system and promote healthy food in the school cafeterias. The government must educate the community so that the community know the causing factor for overweight/obesity and promote a healthier lifestyle by encouraging physical activity and healthy diet.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

1. Badan Penelitian dan Pengembangan Kesehatan. Riset Kesehatan Dasar (RISKESDAS) 2013. *Lap Nas 2013*. 2013:1-384. doi:1 Desember 2013. [diakses pada 27 juli 2017 ] tersedia di : www.depkes.go.id/resources/download/general/Hasil%20Riskesdas%202013.pdf
2. Sugondo S. *Buku Ajar Ilmu Penyakit Dalam*. VI. (Setiati S, ed.). Jakarta: Interna Publishing; 2014.
3. Kementrian Kesehatan Indonesia. Gizi seimbang, bangsa sehat berprestasi. 2017;(21):1-2. [ diakses pada 27 juli 2017 ] tersedia di : www.depkes.go.id/article/view/.../gizi-seimbang-bangsa-sehat-berprestasi.html
4. WHO. Adolescent.WHO health topics. 2017. [diakses pada 27 juli 2017 ] tersedia di : www.who.int/topics/adolescent_health
5. WHO. Global Database on Body Mass Index. 2018. [diakses 6 Juli 2018] tersedia di: apps.who.int/bmi/index.jsp?introPage=intro_3.html
6. World Health Organization. physical activity: WHO health topics. 2017. [ diakses pada 27 juli 2017 ] tersedia di : http://www.who.int/mediacentre/factsheets/fs385/en/.
7. Biro Komunikasi dan Pelayanan Masyarakat. Hari Gizi Nasional 2017: Ayo Makan Sayur dan Buah Setiap Hari. 2017:2-3. [ diakses pada 27 juli 2017 ] tersedia di : http://www.depkes.go.id/article/view/17012600002/hari-gizi-nasional-2017-ayo-makan-sayur-dan-buah-setiap-hari.html.
8. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. Journal of Family Medicine and Primary Care. 2015;4(2):187-192. doi:10.4103/2249-4863.154628.
9. Abdullah NK, Mokhtar NM, Abu Bakar MH, Al-Kubaisy W. Fast Food Consumption and Obesity. Asian Journal of Quality of Life. 2017; 2(6):11-17.
10. Wright KB, Mazzone R, Oh H, Du J, Smithson AB, Ryan D, MacNeil D, Tong X, Stiller C . The Influence of U.S. Chain Restaurant Food Consumption and Obesity in China and South Korea: An Ecological Perspective of Food Consumption, Self-Efficacy in Weight Management, Willingness to Communicate About Weight/Diet, and Depression. Health Communication, 2016;11:1356-1366.
11. Jayawardena R, Ranasinghe P, Wijayabandara M, Hills A, Misra A. Nutrition Transition and Obesity Among Teenagers and Young Adults in South Asia. Current Diabetes Reviews. 2017;13(5):444-451.
12. Virtanen, M, Kivimai H, Ervasti J, Oksanen T, Pentti J, Kouvonen A, Halonen JI, Kivimaki M, Vahtera J. Fast-Food Outlets and Grocery Stores Near School and Adolescents' Eating habits and Overweight in Finland. European Journal of Public Health. 2015;5(4):650-655.

13. Ekawidyani KR, Karimah I, Setiawan B, Khomsan A. Parents' characteristics, food habits and physical activity of overweight schoolchildren in Bogor City, Indonesia. In: Niehof A, Gartaula HN, Quetulio-Navarra M, editor. Diversity and change in food wellbeing: Cases from Southeast Asia and Nepal. Netherlands: Wageningen Academic Publishers; 2018.
14. Chan YY, Lim KK, Lim KH, Teh CH, Kee CC, Cheong SM, Kho YY, Baharudin A, Ling MY, Omar MA, Ahmad NA. Physical Activity and Overweight/Obesity among Malaysian Adults: Finding from the 2015 National Health and Morbidity Survey (NHMS). BMC Public Health. 2017; 17:733.
15. Brown T, Smith S, Bhopal R, Kasim A, Summerbell C. Diet and Physical Aactivity Interventions to Prevent of Treat Obesity in South Asian Children and Adults: A Systematic Review and Meta-Analysis. Int. J. Environ. Res. Public Health. 2015;12(1):566-594.
16. Adair LS, Gordon-Larsen P, Du SF, Zhang B, Popkin BM. Cardiometabolic disease risk in China. Obes Rev. 2014;15: 49-59.