Risky Behaviors and Central Obesity: National Ecological Study in Central Java

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Abstract: Based on National Basic Health Research 2018, the prevalence of central obesity in Indonesia was 31% and it had increased successively by around 12,2% between 2007 to 2018. This increasing number contradicts the target from the WHO to decrease the prevalence of obesity in 2025 until it is not higher than the prevalence in 2010. That increasing national prevalence of central obesity was in line with Central Java with increasing around 7,7% from 2007 to 2018. This condition may lead to many non-communicable diseases as well as cardiovascular diseases (CVD) related. So, it needs to be addressed by controlling the modifiable factors by analyzing the correlation between risky behavior and central obesity among people aged ≥15 years old in Central Java. This was an ecological study using city/district in Central Java as a unit analysis. Then, secondary data from Central Java Province Basic Health Research 2018 was used. The collected data was analyzed by Pearson/Spearmen test. Based on the correlation analysis, it showed that there was no correlation between consuming sweet food (p=0.375; r=0.157), fatty food (p=0.060; r=0.326), instant food (p=0.588; r=0.096), and carbonated drink excessively (p=0.465; r=0.130). It also in line with the low consumption of fruit and vegetables (p=0.673; r=0.075) with central obesity in Central Java. Moreover, the high frequency of smoking (p=0.039; r=-0.355) had a negative moderate correlation with central obesity. It was in line with low physical activity (p=0.012; r=0.427) and had a positive moderate correlation with central obesity. So, based on the result of this study, there were two risky behaviors correlated with central obesity, such as smoking behavior and physical activity.
Keywords: Risky behavior, central obesity, and ecological study

INTRODUCTION

Indonesia as one of the Low-Middle Income Countries is still facing the double burden of nutrition such as undernutrition and overweight (World Health Organization, 2021). This condition needs to be concerned more because recently, low-income family has also experienced overweight and obesity, so it needs to be addressed (Popkin et al., 2020; Rah et al., 2021)**.** Due to its impact, the prevalence of Non-Communicable Diseases (NCDs) increased significantly and account for 75% of deaths in Indonesia (World Health Organization, 2018).

One of the risk factors for NCDs is obesity. Obesity is an imbalanced condition between energy intake and expenditure, so the rest of it will be stored as fat in the body (World Health Organization, 2021). Based on the distribution of the fat, there are three types of obesity, such as

central obesity, peripheral obesity, and a combination of those types (central and obesity) (Aras et al., 2015).   Central obesity is the main cause of syndrome metabolic as a non-communicable disease, such as insulin resistance, diabetes mellitus type 2, sleep apnea, hypertension, dyslipidemia, non-alcoholic fatty liver disease (NAFLD), and other risk factors cardiovascular diseases (CVD) related (Castro et al., 2014; Jehan et al., 2017; Muche Ewunie et al., 2022; Powell-Wiley et al., 2021).

Within two decades, the wide world prevalence of obesity has increased three times (World Health Organization, 2021). Globally, the prevalence of overweight and obesity in adults increased by 27,5% from 1980 to 2013 (Tekalegn et al., 2022). Based on National Basic Health Research (2018), the prevalence of central obesity in Indonesia was 31% and it had increased successively by around 12,2% between 2007 to 2018. This increasing number contradicts the target from the World Health Organization (WHO) to decrease the prevalence of obesity in 2025 until it is not higher than the prevalence in 2010 (Ministry of Health Indonesia, 2018a). That increasing national prevalence of central obesity was in line with Central Java. In Central Java, the prevalence of central obesity increased around 7,7% from 2007 (21,1%) to 2018 (28,8%) (Ministry of Health Indonesia, 2018b).

The cause of central obesity is multifactor. The factors are junk food consumption, low consumption of fruit and vegetable, sedentary lifestyle, genetic factor, smoking status, and emotional eating (Tekalegn et al., 2022). So, there are modifiable and non-modifiable factors. Obesity can be prevented by controlling the modifiable as the strategy (Hruby & Hu, 2015).

According to the Central Java Basic Health Research (2018b), there were several types of behavior that could lead to obesity, such as consuming risky food, alcohol, less fruit and vegetables, smoking status, and low physical activity. Respectively, the proportion of consuming risky food in DKI Jakarta, such as often consuming sweet food, fatty food, instant food, and carbonated drinks was 36,43%, 39,41%, 6,32%, and 1,93% (Ministry of Health Indonesia, 2018b). Moreover, the proportion of never consuming fruit and vegetable in daily, daily smoker, and low physical activity was 13,22%, 22,89%, and 47,81%, respectively (Ministry of Health Indonesia, 2018b).

Based on the fact of that, this study aims to analyze the correlation between risky behaviors as modifiable factors and central obesity among people aged ≥15 years old.

METHOD

This study was carried out by ecological study with the city/ district in Central Java as a unit to be analyzed. It used Central Java Province Basic Health Research 2018 as secondary data. The dependent variable was central obesity among people aged ≥15 years old. Moreover, the independent variables were the modifiable factors in the community's behavior such as consuming sweet food, fatty food, instant food, carbonated drinks, and fruit and vegetable, also smoking and physical activity. Then, the collected data were analyzed by the researcher using the Pearson/Spearmen test for getting the correlation between independent and dependent variable.

RESULTS

Risky behavior as modifiable factors of non-communicable diseases need to be addressed. Based on the National Basic Health Research 2018 there were several risky health-related behaviors, such as prevention behavior from mosquito bites, consuming risky foods, fruits and vegetables, defecation habits, had washing behavior, cigarette consumption, physical activity, and consumption of alcoholic beverages. Meanwhile, there were seven indicators in this study consist of often (≥ 1 time per day) consuming sweet food, fatty food, instant food, carbonated drink, and fruit and vegetables, also smoking everyday and low physical activity. The result of data analysis can be seen in table 1.

Table 1. p-value and r-value of Central Obesity Determinants

No.	Determinant	p-value	r-value
1.	Consuming sweet food (≥ 1 time per day)	0.375	0.157
2.	Consuming fatty food (≥ 1 time per day)	0.060	-0.326
3.	Consuming instant food (≥ 1 time per day)	0.588	0.096
4.	Consuming carbonated drink (≥ 1 time per day)	0.465	0.130
5.	Consuming fruit and vegetable (never)	0.673	0.075
6.	Smoking behavior (every day)	0.039	-0.355
7.	Physical activity (low)	0.012	0.427

The normality test was carried out with Kolmogorov-Smirnov test. Then, p-value of normality test from all data were >0.05 or it is considered as normal. So, the hypothesis test was carried out with the Pearson test.

Based on the statistical analysis of consuming risky food consisting of excessive sweet food, fatty food, instant food, and carbonated drink, the result obtained p=0.375, p=0.060, p=0.588, and p=0.465, respectively. Those p-values were more than 0.05 (p>0.05), it means that there was no correlation between consuming sweet food, fatty food, instant food, and bicarbonate drink

excessively with central obesity. This uncorrelated was also found in low consumption of fruit and vegetables with p=0.673 (p>0.05).

Moreover, the result of the correlation between high frequency of smoking behavior and central obesity was p=0.039 (p<0.05). It means there was a moderate degree of correlation between smoking behavior and central obesity. Moreover, the r-value (r=-0,326) indicates a negative correlation or contradicts each other. So, the higher frequency of smoking, the lower risk of getting central obesity.

Based on bivariate analysis between physical activity and central obesity, the result obtained p=0.012 (p<0.05). It means there was a moderate correlation between low physical activity and central obesity. With r-value indicates inline variables. So, the higher low physical activity, the higher risk of getting central obesity.

DISCUSSION

This national ecological study was conducted to determine the vulnerability of people in Centra Java from their risky behavior to central obesity event. According to the result from Central Java Basic Health Research's data analysis with the Pearson test, there was no correlation between consuming sweet food and central obesity with p-value=0.375. This result contradicts the study from Jokomarsono et al. (2022) that there was an association between high frequency of high-sugar consumption and BMI with p-value=0.026 (p<0.05). Although there was a study stating that there was no clear evidence if any dietary sugar added has an association with obesity (Kahn & Sievenpiper, 2014).

Related to fatty food consumption, there was an association between high fatty food intake and BMI with a p-value was 0,026 (p<0.05) (Jokomarsono et al., 2022). Meanwhile, from the result of this study, there was no correlation between consuming fatty food and central obesity with p-value of 0.060 (p>0.05). Furthermore, it contradicts the theory about consuming fatty food excessively causes overweight or obesity. It also contradicts the study from Pakaya et al. (2020) that there was an association between consuming fatty food among drivers in Gorontalo with p-value=0,00 (p<0,05).

Then, another result from the Pearson test of consuming instant food showed there was no correlation between instant food consumption and central obesity (p-value=0.588). This result contradicts with the previous study from Alkerwi et al. (2015) that stated the ready-made meal consumption increases the risk of getting abdominal/central obesity. Then, another study had

showed the same result that consuming instant food related to central obesity (OR:1.46, 95% CI: 1.11, 2.26) (Mohammadbeigi et al., 2018).

The contradiction of the study result also found in carbonated drink consumption. In this study showed that there was no correlation between consuming carbonated drink and central obesity (p-value=0.465). However, based on the study from Funtikova et al. (2015) there was an association between carbonated drink consumption and the increasing of waist circumference (WC). It was because based on the result of 10 years of follow up among men and women aged 25-74, the increasing 100 kcal of carbonated drink was associated with the increasing of WC estimated 1,1 cm increase (p-value=0,018) (Funtikova et al., 2015).

Fruit and vegetables consumption which always be assumed to be the protective factor of obesity, but that was not seen in this study. It is because there was no correlation between low fruit and vegetables consumption and central obesity with p-value=0.673. This result contradicts the cohort study carried out by Schwingshackl et al. (2015) that the increased consumption of fruit and vegetables associated with the decreased waist circumference as the indicator of central obesity (beta: -0.04 cm/year; 95% CI, -0.05 to -0.02). Then, the consumption of fruit and vegetables also related with 9% of fat reduction (Schwingshackl et al., 2015).

Smoking associated to have lower risk of obesity, either general or central (López-Sobaler et al., 2016). That result is in line with the result of this study because there was moderate correlation between smoking behavior and central obesity, then it showed a contradicted association between them. So, the higher frequency of smoking, the lower BMI. It was also in line with another study that stated the increasing of frequency and total of tobacco reduces the probability to be obese by 13% (Plurphanswat & Rodu, 2014). It was also because of the effect of nicotine addiction effecting the increasing of many neurotransmitters and lead to decreasing of food intake (Lv et al., 2015).

Lastly, physical activity relate with energy balance in order to control the fat accumulation. This study showed a moderate correlation between physical inactivity and central obesity with p-value 0.012 and the r-value=0.427 showed positive correlation between those variables. This result is in line with the study result from (Nuryani et al., 2021) because that study stating there was an association between physical activity and central obesity with p-value was 0.027 (p<0.05). Moreover, another study also stated that leisure time with less physical activity increased the risk of central obesity (López-Sobaler et al., 2016).

CONCLUSION

According to the results and discussion, it can be concluded that smoking behavior had a negative moderate correlation and physical activity had a positive moderate correlation with central obesity. Meanwhile, other risky behaviors, such as consuming sweet food, fatty food, instant food, carbonated drink, and fruit and vegetables had no correlation with central obesity.

Conflict of Interest

The authors declare that they have no conflict of interest.

Acknowledgment

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