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Relationship between physical activity and sedentary lifestyle with the incidence of obesity in bri bank malang kawi employees

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ABSTRACT

Lack of physical activity and sedentary lifestyle habits can lead to obesity. Insufficient physical activity may result in decreased energy expenditure in the body, creating an imbalance between energy intake and output during daily activities. This study aimed to analyze the relationship between physical activity and sedentary lifestyle with obesity among employees of BRI Malang Kawi Bank. This research employed an analytical observational design with a case-control approach. Samples were selected using purposive sampling, consisting of 15 obese and 15 non-obese respondents. Physical activity data were collected using the GPAQ questionnaire, while sedentary lifestyle was assessed using the WSQ questionnaire, both completed by the employees in December 2023. Spearman rank correlation analysis was used. Most respondents had sufficient physical activity, with 60% in the obese group and 80% in the non-obese group. Weekend sedentary time was 7.1 hours for obese and 8.9 hours for non-obese respondents. A significant positive correlation was found between physical activity and obesity ($p = 0.037$), whereas no significant relationship was observed between sedentary lifestyle and obesity ($p = 0.952$). Physical activity significantly influenced obesity incidence, while sedentary lifestyle had no effect among BRI Malang Kawi Bank employees.

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INTRODUCTION

Obesity is a condition characterized by the abnormal accumulation of adipose tissue due to an imbalance between energy intake and expenditure. A body mass index (BMI) > 30 kg/m² is classified as obesity, serving as an important indicator for assessing health risks associated with excess body weight (Fruh, 2017). According to the 2018 Basic Health Research (Riskesdas), the prevalence of obesity has increased significantly, with a BMI ≥ 27 reaching 21.8% and a BMI ≥ 25 at 13.6%, indicating an upward trend in obesity-related issues in Indonesia (Kementerian Kesehatan Republik Indonesia, 2019). This condition is a serious concern, as obesity not only affects physical health but also the overall quality of life of individuals.

Various factors contribute to obesity, including unhealthy dietary patterns and low physical activity (Rahmawati, 2024). Obesity can lead to broad health impacts, such as accelerated aging, cognitive dysfunction, insulin resistance, chronic diseases, and premature mortality (Christianto et al., 2018). Moreover, obesity affects social and economic aspects, including reduced productivity, decreased quality of life, and increased healthcare costs in the community. Physical inactivity is one of the primary risk factors for obesity (Suryadinata & Sukarno, 2019), highlighting the importance of understanding lifestyle contributions in obesity prevention.

One significant lifestyle factor is a sedentary lifestyle, which refers to prolonged sitting or inactivity with energy expenditure <1.5 MET (Silveira et al., 2022). This phenomenon is becoming increasingly common, as most people worldwide are insufficiently physically active and tend to have unbalanced dietary patterns (Hutchesson et al., 2021; Suryadinata & Sukarno, 2019; Thivel et al., 2018). Individuals with a sedentary lifestyle typically spend long periods sitting or lying down and engage in activities such as watching television, reading, or playing games, which elevate the risk of obesity.

Various studies have indicated a relationship between work environments and sedentary behavior. Research in Australia found that office workers had longer sitting durations and lower levels of light-intensity physical activity compared to non-office workers (Parry & Straker, 2013). Meanwhile, a study in Ghana involving 219 bank employees reported that 81.7% exhibited low levels of physical activity (Nketiah et al., 2023). However, other research found that physical activity was not always significantly associated with BMI among bank employees (Nadira et al., 2021), indicating the need for further contextual investigation.

Based on these issues, this study aims to explore the relationship between physical activity and sedentary lifestyle with obesity levels among employees of Bank BRI Malang Kawi (Rabbi, 2022). This approach is expected to provide a deeper understanding of lifestyle factors contributing to obesity in the workplace while offering innovations in the form of physical activity-based intervention recommendations tailored to the characteristics of office employees. Consequently, this research is anticipated to provide new value in obesity prevention and enhancing the quality of life of banking employees in Indonesia.

RESEARCH METHOD

The research was conducted from April 2023 to January 2024. The study location was at BRI Malang, Kawi Branch. This research employed a quantitative approach, using observational-analytic methods with a case-control study design. The target population of this study consisted of employees working at the BRI Malang office, with an accessible population of 30 employees at BRI Malang, Kawi Branch. The sampling technique used was purposive sampling, with a 1:1 ratio; this study selected 15 case samples and 15 control samples, resulting in a total sample of 30 participants. The research instruments included questionnaires, a weighing scale, and a stadiometer. Data processing involved editing, coding, entry, cleaning, and processing. Data analysis comprised univariate and bivariate analyses.

RESULTS AND DISCUSSIONS

Results

The characteristics of respondents in this study consisted of gender and age. The characteristics of the respondent subjects are presented in Table 1.

Table 1. Respondent characteristics

Variable	n	%
Gender		
Female	9	30.0
Male	21	70.0

Variable	n	%
Total	30	100.0
Age		
23–26 years	5	16.7
27–30 years	5	16.7
31–34 years	10	33.3
35–38 years	5	16.7
39–42 years	5	16.7
Total	30	100.0

Table 1 shows that the majority of the subjects were male (70%), while only 30% were female. Most subjects were in the age range of 31–34 years, with an average age of 32.2 years.

Table 2. Distribution of subjects' physical activity based on nutritional status

Physical Activity	Obese	Non-obese
	n (%)	n (%)
Low (<600 METS/week)	6 (40)	3 (20)
Adequate (>600 METS/week)	9 (60)	12 (80)
Total	15 (100)	15 (100)
Average	2187.6	10,492

The distribution of subjects' physical activity based on nutritional status, i.e., obese and non-obese, is presented in Table 2. The majority of respondents had adequate physical activity, namely 60% in the obese group and 80% in the non-obese group.

Table 3. Subjects' sedentary lifestyle based on nutritional status

Sedentary Lifestyle	Obese	Non-obese
Weekday (hours/day)	6.2	8.1
Weekend (hours/day)	7.9	8.9
Total, Weekday and Weekend (hours/day)	7.1	8.5

Table 3 shows the sedentary lifestyle of the research subjects measured using the Workforce Sitting Questionnaire (WSQ). The results indicate that the obese group had a lower sedentary lifestyle during the weekend, at 7.9 hours or 474 minutes, compared to 8.9 hours or 534 minutes in the non-obese group.

The normality test conducted in this study was the Shapiro-Wilk Test. The sedentary lifestyle variable had a p-value > 0.05, indicating a normal distribution. In contrast, the data for physical activity, obesity incidence, and Body Mass Index (BMI) had p-values < 0.05, indicating that these three variables were not normally distributed. The dependent variable in this study was obesity incidence, which had a non-normal distribution; therefore, the bivariate analysis used was the Spearman Test.

Table 4. Spearman test of physical activity and sedentary lifestyle with obesity incidence

Dependent Variable	Independent Variable	r (Correlation Coefficient)	p-value
Obesity Incidence	Physical Activity	0.382	0.037
	Sedentary Lifestyle	0.012	0.952

The Spearman test was conducted in this study and is presented in Table 4. The results show a significant and positive relationship between physical activity and obesity incidence, with a p-value < 0.05 and a moderate correlation coefficient. Conversely, there was no significant relationship between sedentary lifestyle and obesity incidence, with a p-value > 0.05.

Discussions

Obesity can be associated with an imbalance between energy expenditure and caloric intake. The human body derives energy from the consumption of proteins, carbohydrates, lipids,

and alcohol. Protein is considered as internal energy (EIN). Carbohydrates serve as the primary source of energy. When carbohydrate intake exceeds the required amount, the excess carbohydrates undergo a conversion process into adipose tissue, commonly known as fat. When carbohydrate concentrations decrease significantly, lipolysis begins, during which fat is mobilized and used as an energy source. During lipolysis, fat is converted into fatty acids and glycerol. Excess assimilated energy undergoes a conversion process in the body, resulting in the transformation of internal body energy into chemical energy, primarily stored in adipose tissue (González Jiménez, 2013; Romieu et al., 2017). Obesity is a key factor in the pathophysiology of diabetes mellitus, insulin resistance, dyslipidemia, hypertension, atherosclerosis, coronary heart disease, stroke, liver disease, sleep apnea, osteoarthritis, psychological disorders, certain musculoskeletal conditions, gynecological complications, and cancers, particularly breast and colorectal cancer (Sultan et al., 2020).

The study results indicate that most subjects were male within the reproductive age range. Men have higher risk factors for obesity compared to women. Obesity is a major risk factor for several chronic diseases, such as cardiovascular diseases, type 2 diabetes, chronic liver and gallbladder diseases, certain types of cancer, osteoarthritis, musculoskeletal disorders, and psychosocial problems. The prevalence of obesity in adults is higher among women than men, but men are more likely to develop complications related to obesity. Obesity induces a state of low-grade chronic inflammation, which has been implicated in the development of metabolic syndrome and related pathophysiological consequences, such as insulin resistance, cardiovascular disease, and many residual symptoms associated with non-metabolic obesity (Prà & Fabris, 2020).

The average body mass index (BMI) in the obese group was 30.5 kg/m², whereas the non-obese group had an average BMI of 24.2 kg/m². Individuals who do not control their body weight, leading to increased nutritional status or waist circumference, are at higher risk of developing metabolic syndrome, making weight control important. A minimal weight reduction of 5–10% is sufficient to have a clinical impact on health conditions such as type 2 diabetes mellitus (41.0%), sleep apnea (40.0%), hypertension (22.0%), dyslipidemia (19.0%), and asthma (18.0%) (Haase et al., 2021; Sarebanhassanabadi et al., 2017). The subjects in this study were also classified as having central obesity due to a waist circumference >90 cm. According to a study conducted by Ono et al. (2022), there is a correlation between changes in waist circumference and changes in BMI ($r = 0.59$, $p < 0.001$) as well as body weight ($r = 0.58$, $p < 0.001$) over a 10-year period in adults (Ono et al., 2022).

This study demonstrates that 40% of individuals engaging in lower levels of physical activity were classified as obese, while 20% had lower physical activity levels but were non-obese. The non-obese group exhibited a higher proportion of individuals performing adequate physical activity, namely 80% or 12 subjects. The obese group showed 60% of individuals engaging in sufficient exercise. Regular physical activity has been shown to positively impact mental health, weight management, disease prevention, bone and muscle strength, as well as enhancing an individual's ability to perform daily tasks (Centers for Disease Control and Prevention, 2022). A study conducted in 2021 revealed a negative correlation between salt consumption and physical activity. High engagement in exercise has been demonstrated to influence behavioral patterns, potentially leading to reduced intake of high-fat foods and increased adoption of healthier dietary choices (Mohammadifard et al., 2021). The results of this study indicate a significant relationship between physical activity and the incidence of obesity, consistent with the findings of Cleven et al. (2020).

The effects of physical activity on insulin resistance can be categorized as acute or chronic. These effects are believed to contribute to enhanced insulin function and reduced blood glucose levels when individuals participate in physical activity. Furthermore, physical activity impacts energy balance by increasing overall energy expenditure, generating an energy deficit that may contribute to weight reduction. Physical activity has the potential to induce responses in adipose

tissue and other body tissues, which can subsequently affect overall energy balance and body composition (Jakicic et al., 2018).

A sedentary lifestyle, coupled with a lack of moderate-to-vigorous physical exercise, has been found to correlate adversely with comorbidities associated with obesity (Strasser, 2013). Current guidelines recommend that individuals up to 64 years of age engage in daily aerobic physical activity consisting of 150–300 minutes at moderate intensity or 75–150 minutes at vigorous intensity. This exercise duration is considered optimal for promoting a healthy lifestyle (WHO, 2020). The emergence of automation and digitalization has led to a substantial increase in physical inactivity. The study population, composed of bank employees, is expected to exhibit sedentary work patterns consistent with these trends.

Findings indicate that the obese group spent less time at work engaging in a sedentary lifestyle, namely 6.2 hours or 372 minutes, whereas the non-obese group spent 8.1 hours or 486 minutes. During holidays or weekends, the sedentary lifestyle of the obese group was 7.9 hours or 474 minutes, while that of the non-obese group was 8.9 hours or 534 minutes. Compared with the non-obese group, the obese group had a total sedentary lifestyle of 7.1 hours (426 minutes), whereas the non-obese group had 8.5 hours (510 minutes). This may be attributed to the more dominant operational roles (teller and customer service) in the non-obese group, where most subjects performed predominantly seated tasks with only occasional standing to serve customers. This gap may also stem from the high-pressure nature of the banking industry, combined with long working hours required of bank employees. As a result of this lifestyle, bankers lack sufficient time for physical exercise (Nadira et al., 2021).

However, this study did not find a statistically significant relationship between a sedentary lifestyle and obesity prevalence, as indicated by a p-value of less than 0.05, due to differences in the work tasks performed by each employee. Additionally, the research subjects in both groups shared similar job responsibilities, so sitting time between groups did not differ. Obesity risk is also not determined solely by physical activity or a sedentary lifestyle, as it is influenced by excessive food and beverage consumption beyond energy expenditure, as well as other variables such as eating habits, lifestyle, sociocultural factors, metabolic changes, neuroendocrine factors, and hereditary factors. Some causes of obesity include changes in consumption habits, such as higher intake of processed foods and beverages (González Jiménez, 2013).

CONCLUSION

Most subjects had a low level of physical activity. Sedentary lifestyle among individuals in the obese group was found to be lower on both weekdays and holidays compared to the non-obese group. The group classified as obese had an average Body Mass Index (BMI) of 30.5 kg/m², while the group classified as non-obese had a BMI of 24.2 kg/m². There was a significant and positive correlation between physical activity and the incidence of obesity. No significant relationship was found between sedentary lifestyle and the incidence of obesity.

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