

The association of age, gender, and physical inactivity with obesity

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Abstract

Obesity is a growing global health concern, including in Indonesia. This study aimed to determine the relationship between obesity and age, sex, and physical inactivity. This study used secondary data from Puskesmas Johar Baru in Central Jakarta in 2021. The total initial data were 102,647 patients, the data eligible for sampling was 72,680 patients, and 22,297 (24 %) patients were obese. Data processing was performed using SPSS 25 software, bivariate analysis (chi-square test), and multivariate analysis (multiple logistic regression with the enter method), at a significance level of 0.05. The Chi-Square test showed that age, sex, and lack of physical activity had a significant relationship with obesity ($p \leq 0.05$). In multivariate analysis, the gender variable had the highest OR value of 12.925, where the majority of respondents who suffered from obesity were female, so they had a greater risk of suffering from obesity. These findings underscore the importance of sex variables in the context of obesity in Puskesmas Johar Baru and highlight the differences in obesity prevalence by age and sex. Middle-aged adults, especially women, are more prone to obesity, which is supported by a lack of physical activity.

Keywords: obesity, sex, age, physical activity

Introduction

Obesity is a global health problem that is increasing in prevalence, including in Indonesia.¹⁻³ The Puskesmas Johar Baru, Central Jakarta, as a public health service unit, witnesses changes in lifestyle and factors that contribute to obesity. Epidemiologic studies have shown that the prevalence of obesity tends to increase with age.⁴ Age is one of the risk factors for non-communicable diseases, as age can affect metabolism and the tendency to accumulate fat, possibly playing an essential role in the incidence of obesity.⁵ Therefore, understanding the relationship between age and obesity can provide a foundation for developing more targeted preventive interventions⁶, especially in vulnerable age groups. This understanding can also help determine more effective health strategies for an aging society to manage and prevent obesity.⁷

In addition, biological, metabolic, hormonal⁸, and behavioral differences between the sexes may contribute to variability in obesity incidence rates.⁹ Several findings from epidemiological studies suggest that the incidence of obesity tends to be higher in the female population.^{9,10} World Health Organization (WHO) states that globally, obesity is higher in women than in men.¹¹ The results of Basic health research Indonesian data show an increase in the prevalence of obesity in the population ≥ 18 years old based on Body Mass Index (BMI), which reached 21.8%, with 14.5% in men and 29.3% in women.¹²

However, it is essential to remember that the factors leading to obesity are complex and can involve interactions between genetics¹³, environment¹⁴, diet, and physical activity levels.¹⁵ Lack of physical activity, which has come about as a result of modern lifestyle changes, has been identified as one of the main factors

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contributing to the increasing prevalence of obesity.¹⁶ This study aimed to evaluate the association between age, sex, and level of physical activity with the incidence of obesity in Health Center Johar Baru. The importance of this study lies in its efforts to prevent and manage obesity at the community level. By understanding the factors associated with obesity, the Health Center Johar Baru can develop more effective and targeted intervention programs for the community in the area. The results of this study can provide valuable insights for health workers, researchers, and policymakers to address public health problems associated with obesity.

Method

This study adopted a quantitative approach with an analytical observational design, using a cross-sectional method. The study population included all data on patient visits to the Johar Baru Health Center in 2021 (102, 647 patients). The sample size was determined using a non-probability sampling technique, considering the completeness of patient data, so that the total sample size was 72,680 patient data after the data cleaning and normalization process. In this study, 22,297 patients were obese. This research instrument does not involve validity and reliability testing, because it relies on secondary data.

The study variables included independent factors, such as age, sex, and physical inactivity, while the incidence of obesity was the dependent variable. Age variables were categorized as unproductive (≥ 64 years) and productive age (15-64 years). Gender variables were classified as male and female, physical activity level variables were categorized as less and sufficient, body mass index variables were ordered as usual (18.5-24.9 kg/m²), overweight (>25-27 kg/m²) and obese (>27 kg/m²).¹⁷ Data were analyzed using SPSS 25 with the Chi-Square test for bivariate analysis, where variables with a p-value ≥ 0.05 would be included in the multivariate test using multiple logistic regression of the enter method, with a significance level of 0.05. This study followed ethical principles, including practicality, confidentiality, and fairness, and obtained prior ethical approval (letter 015/KEPK/UNPRI/II/2023). The continuation of this study is expected to significantly contribute to the understanding of the risk factors of obesity in the Community Health Center, Johar Baru, Central Jakarta.

Results

Based on Table 1, 72,680 respondents were divided into three categories: normal body mass index of as many as 34,026 people, overweight of 16,357 people, and obesity of as many as 22,297 people. Of the number of respondents who were obese, based on age, the majority came from productive age, totaling 17,521 people, while unproductive age was 4,776. Based on the gender variable category, the majority of obese respondents were female (12, 856 people) and male (9, 441 people). Based on the category of less physical activity, most respondents who suffered from obesity had less physical activity (as many as 17, 207 people), while those who did enough physical activity were 5,090. The results of the bivariate test (chi-square) showed that the variables of age, sex, and physical activity had a significant relationship with the incidence of obesity, with a p-value ≤ 0.000 . The three variables can continue the multivariate test because each variable has a p-value ≤ 0.025 . Further testing in the form of multivariate analysis is expected to provide a deeper picture of the simultaneous relationship between these three variables in the context of obesity incidence.

Table 1. The results of the bivariate test of risk factors associated with obesity

Variable	Category	Body Mass Index			Total	p
		Normal	Overweight	Obesity		
Age	Not productive (≥ 64 years)	7.567	3.230	4.776	15.573	0.000
	Productive (15-64 years)	26.459	13.127	17.521	57.107	
	Total	34.026	16.357	22.297	72.680	
Sex	Male	16.101	7.489	9.441	33.031	0.000
	Female	17.925	8.868	12.856	39.649	
	Total	34.026	16.357	22.297	72.680	
Physical inactivity	Yes	26.070	12.179	17.207	55.456	0.000
	No	7.956	4.178	5.090	17.224	
	Total	34.026	16.357	22.297	72.680	

Table 2. Multivariate test results

Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age	-0.002	0.020	0.009	1	0.926	0.998	0.960	1.038
Gender	0.212	0.019	118.832	1	0.000	1.237	1.190	1.285
Physical inactivity	0.067	0.023	8.339	1	0.004	1.069	1.022	1.118
Constant	-1.224	0.060	414.258	1	0.000	0.294		

The results of a multivariate test using the multiple logistic regression enter method were used to determine the odds ratio and p-value of three independent variables: age, sex, and physical inactivity. The results showed that sex had the highest odds ratio (OR) value of 1.237 with a p-value of 0.000.

Discussion

The results of the chi-square test showed that age, sex, and physical activity had a significant relationship with obesity. Other studies have shown significant differences in the prevalence of obesity according to age and sex. Middle-aged adults were more likely to be obese, with a low prevalence in early adulthood, increasing in the 35–54 age group and then decreasing in older age. In addition, there were significant differences in obesity incidence rates between the sexes, with the prevalence of obesity being higher in women than in men. The study explained that this difference may be related to women's lower and limited physical activity levels, who tend to be more sedentary at home. Simultaneously, men often go out to earn a living. The importance of physical activity variables was also emphasized in this study as a significant determinant of overweight status.¹⁸

Physical activity has an essential relationship with the incidence of obesity, where a person's level of physical activity can affect the risk of obesity.¹⁹ Research in epidemiology and public health science shows that physical inactivity is a significant risk factor in the development of obesity.^{20,21} People who are less physically active tend to have lower calorie burns, leading to excessive body fat accumulation, whereas individuals who regularly engage in physical activity are more likely to maintain a healthy weight and reduce their obesity risk. Physical activity helps control weight by burning calories²², increasing metabolism, and strengthening muscles, which support healthy body function²³ in particular, people who lead a sedentary lifestyle, such as sitting too long in front of a computer screen or television, have a higher risk of developing obesity. The combination of lack of physical activity and unbalanced eating habits can create a favorable environment for the development of obesity. It should be noted that physical activity plays a role in weight loss and maintenance of a healthy heart²⁴, improving mental health, and reducing the risk of various obesity-related diseases such as type 2 diabetes²⁵ and cardiovascular disease. By understanding the significant relationship between physical inactivity and obesity risk, prevention and intervention efforts can be focused on promoting active lifestyles and reducing sedentary behaviors to support overall public health.

Conclusion

The results illustrate that individuals who are female have a greater risk of obesity than male individuals; this provides a deeper understanding of the factors that contribute to obesity. This implies the need to focus on more specific obesity prevention interventions and programs, especially those aimed at females. The results of this study are expected to help in the development of more effective public health strategies to address obesity at the local level.

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