

## Risk Factors for Central Obesity in Women 45-54 Years of Age in Indonesia (Riskesdas 2018 Analysis)

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### ABSTRACT:

The prevalence of central obesity in Indonesia, especially in women aged 45-54 years, has increased according to the results of the Basic Health Research (Riskesdas, *Riset Kesehatan Dasar*). Central obesity is associated with a higher risk of diseases such as diabetes, cardiovascular disease, dyslipidemia, and hypertension. This study aimed to identify factors associated with the incidence of central obesity in women aged 45-54 years in Indonesia using the 2018 Riskesdas data with a cross-sectional study design. The study sample consisted of 60,557 individuals, with 64.54% having central obesity. Marital status (PR=1.12; 95%CI 1.09-1.15), low physical activity (PR=1.18; 95%CI 1.14-1.21), and consumption of high-risk foods (PR=1.03; 95%CI 1.01-1.05) were found to be associated with an increased risk of central obesity. In contrast, primary education (PR=0.86; 95%CI 0.83-0.89), employment status (PR=0.91; 95%CI 0.90-0.93), and smoking status (PR=0.89; 95%CI 0.84-0.95) acted as protective factors against central obesity. The results of this study suggest the need for increased nutrition education and physical activity in women aged 45-54 years as well as health support programs for married women.

**Keywords:** Central Obesity, Women, Risk Factors.

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### INTRODUCTION

Central obesity is a condition of fat accumulation in the abdomen, especially located in the mesentery and around the internal organs (Ahmad & Imam, 2015). This type of obesity is associated with a much higher risk of various diseases (Ahmad & Imam, 2015). Central obesity is known to cause dyslipidemia in men by 1.8 times (AOR=1.8; 95% CI 1.74-1.89) and women by 1.6 times (AOR=1.6; 95% CI 1.52-1.69), and cause diabetes in both men and women by 1.35 times (AOR=1.35; 95% CI 1.25-1.46) and 1.6 times (AOR=1.6; 95% CI 1.35-1.90). (Shirasawa et al., 2019). These results were obtained after controlling for age, weight, smoking, alcohol consumption, and physical activity (Shirasawa et al., 2019).

Retrospective cohort study conducted (Cao et al., 2022) on 15,453 Japanese residents (8,419 men and 7,034 women) showed central obesity had a 1.72 times risk of diabetes after controlling for age, gender, BMI, smoking status, alcohol consumption, physical activity, systolic and diastolic blood pressure (HR=1.72; 95%CI=1.16-2.56) (Cao et al., 2022). In addition, central

obesity can also cause hypertension in both men and women by 1.22 (95% CI 1.17-1.27) and 1.23 times (95% CI 1.16-1.31) after controlling for variables of age, weight, smoking, alcohol consumption, and physical activity (Shirasawa et al., 2019)..

Based on the results of the Basic Health Research in Indonesia, the prevalence of central obesity in Indonesia continues to increase. The prevalence of central obesity in 2018 was 31.0% (Riskesdas, 2018). This is an increase compared to 2007 and 2013, where the prevalence of central obesity was 18.8% and 26.6% (Riskesdas, 2007 and Riskesdas, 2013). The Riskesdas results also show that central obesity is mostly experienced by women at 46.7%, compared to men at 15.7% (Riskesdas, 2018). Based on age, central obesity in 2018 in Indonesia was most prevalent in the 45-54 years age group, which was 42.3% (Riskesdas, 2018).

Central obesity can be measured in several ways, such as abdominal circumference, waist-hip ratio, and abdominal circumference-height ratio (Rosário & Martins, 2020). However, in Indonesia, central obesity is measured using abdominal circumference. Abdominal circumference measurement is better at calculating the location of fat distribution in the body. Abdominal circumference is measured at the center between the lowest rib and the iliac crest, and then measured at the level of the navel using a flexible tape (fitted neither too tightly nor too loosely) in a horizontal plane with the subject breathing normally. (Bienertová-Vask, 2011). A person is said to be centrally obese if they have an abdominal circumference >90 cm for men and >80cm for women (Riskesdas, 2018).

Central obesity is caused by various risk factors. A prospective epidemiologic study in Iran found a significant association between the occurrence of central obesity and age >45 years, female gender, low education (<5 years), physical inactivity, and alcohol consumption. (Sadeghi et al., 2023).. In the study of (Israel et al., 2022) showed that participants who were married, working, and lacking physical activity, and consuming alcohol had a risk of 2.07, 1.41, 2.05, and 2.61 times of central obesity, respectively.

Other factors associated with central obesity are consuming fatty foods, smoking, and consumption of alcoholic beverages (Mulia et al., 2021) and (Sugianti & Afriansyah, 2009). Research results (Mulugeta et al., 2018) 66.2% of respondents who smoked had central obesity. (Mulugeta et al., 2018). The incidence of central obesity occurred both in respondents who were former smokers, and respondents who were still smoking at the time of the study. (Mulugeta et al., 2018). This study aims to determine the risk factors for central obesity in women aged 45-54 years in Indonesia.

Based on the above background, the aim of this research is to identify risk factors associated with the incidence of central obesity in women aged 45-54 years in Indonesia. This study is expected to provide a clearer picture of factors such as marital status, education, occupation, physical activity, smoking habits, and food consumption patterns that contribute to the increasing prevalence of central obesity in this age group.

Thus, in this research, data from the 2018 Basic Health Research (Riskesdas, Basic Health Research) was used to analyze the prevalence of central obesity and its association with various demographic, social, and behavioral variables in women aged 45-54 years in Indonesia. The results of this study are expected to serve as a basis for the development of more targeted health policies in the prevention of central obesity and related chronic diseases, especially in women in middle age.

## RESEARCH METHODS

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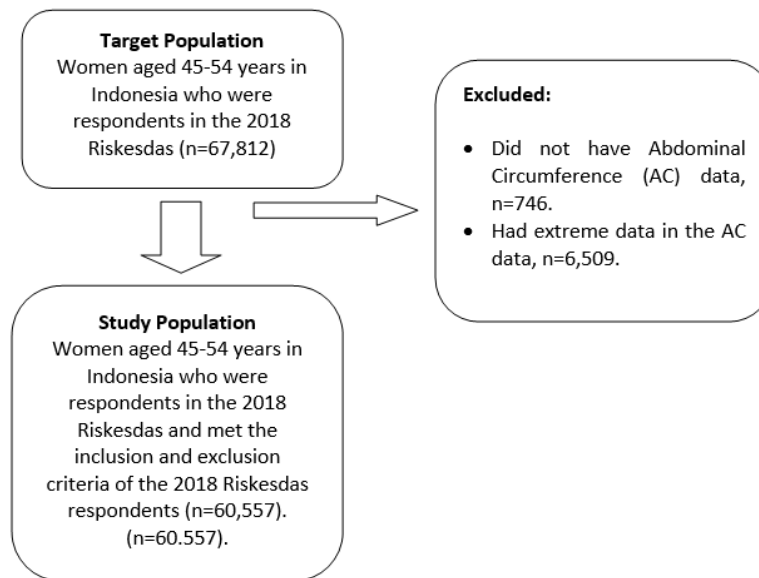
This study used a cross-sectional design using secondary data from the 2018 Basic Health Research (Riskesdas). The inclusion criteria in this study were women aged 45-54 years in Indonesia who had complete data on both the dependent variable and the independent variable to be studied. Meanwhile, the exclusion criteria are women aged 45-54 years in Indonesia who are pregnant during data collection and have extreme abdominal circumference data. The dependent variable in this study is central obesity, while the independent variables include educational status, employment status, marital status, physical activity, smoking status, risky food consumption, and risky beverage consumption.

The central obesity variable is measured using LP, where women are said to be centrally obese if they have LP > 80 cm (Riskesdas, 2018). The educational status variable was categorized into 3, namely basic education ( $\leq$  Junior High School / MI), secondary (High School / MA), and higher education (Diploma or university graduates). This is in accordance with the Minimum Service Standards for Education of the Minister of Education, Culture, Research and Technology (RI, 2022). Employment status was categorized into 2 (working and not working), marital status (married and not married), physical activity (sufficient and insufficient). Smoking status (smoking, quit smoking, and non-smoking), consumption of risky foods and beverages (risky and non-risky).

The sampling process in this study used total sampling so that all data included in the inclusion and exclusion criteria would be included in the research analysis. Data analysis included univariate, bivariate and multivariate analysis. Univariate analysis was conducted to determine the distribution of research variables. Meanwhile, bivariate analysis was conducted to determine the relationship between dependent and independent variables. At the time of analysis, the independent variable was said to have a relationship with the dependent variable if the p-value was <0.05. The test used in bivariate and multivariate analysis in this study used Cox-regression with the time setting in the study made into 1 in all data. The magnitude of the association between the independent variable and the dependent variable in this study used the Prevalence Ratio (PR).

**RESULTS AND DISCUSSION**

This study used secondary data from Riskedas in 2018. The research sample was women aged 45-54 years in Indonesia. In Figure 1, it is known that the number of women aged 45-54 years in Indonesia in 2018 was 67,812 people. A total of 7,255 (10.7%) people were excluded because they did not have abdominal circumference data and had extreme abdominal circumference data. So the total sample in this study was 60,557 people.



**Figure 1. Flow of Research Sample Selection**

Table 1 shows that women aged 45-54 years in Indonesia based on the 2018 Riskedas analysis are centrally obese (64.54%), have primary education status (70.84%), work (61.14%), and are married (84.41%), less physical activity (88.08%), do not smoke (95.77%), consume risky foods (61.70%) and consume risky drinks (39.48%).

**Table 1. Characteristics of women aged 45-54 years in Indonesia in 2018**

Covariate Variable	n	%
<b>Central Obesity</b>		
Yes	39.084	64,54
No	21.475	35,46
<b>Education Status</b>		
Elementary (≤Graduated from junior high school/ MI)	42.900	70,84
Intermediate (High school graduate)	12.117	20,01
Higher (Diploma or college graduate)	5.540	9,15
<b>Employment Status</b>		
Work	37.024	61,14
Not Working	23.533	38,86
<b>Marital Status</b>		
Mating	51.118	84,41
Not Married	9.439	15,59

Covariate Variable	n	%
<b>Physical Activity</b>		
Less	53,336	88,08
Simply	7.221	11,92
<b>Smoking Status</b>		
Smoking	1.799	2,97
Quit Smoking	764	1,26
No Smoking	57.994	95,77
<b>Consumption of Risky Foods</b>		
At Risk	37.363	61,70
Not at Risk	23.194	38,30
<b>Consumption of Risky Drinks</b>		
At Risk	36.648	60,52
Not at Risk	23.909	39,48

In the bivariate analysis (Table 2), it was found that women aged 45-54 in Indonesia who were centrally obese had primary education ( $\leq$  junior high school) (67.92%), worked (59.01%), were married (85.83), had less physical activity (89.67%), did not smoke (95.97%), consumed risky foods (62.48%) and consumed risky drinks (60.10%).

Based on bivariate analysis, there are several independent variables associated with the occurrence of central obesity, such as primary education status ( $\leq$  junior high school graduate) ( $p < 0.001$ , 95%CI 0.83-0.89), working ( $p < 0.001$ ; 95%CI 0.90-0.93), married ( $p < 0.01$ ; 95%CI 1.09-1.15), less physical activity ( $p < 0.01$ ; 95%CI 1.14-1.21), smoking ( $p < 0.001$ ; 95%CI 0.84-0.95), consuming risky foods ( $p = 0.002$ ; 95%CI 1.01-1.05). In addition, for secondary education status ( $\leq$  junior high school graduate) ( $p = 0.392$ ; 00.95-1.02), has quit smoking ( $p = 0.056$ ; 95%CI 1.00-1.18); and consuming risky drinks ( $p = 0.094$ ; 95%CI 0.96-1.00) did not have an association with central obesity.

**Table 2. Relationship between Independent Variables and Central Obesity in Women 45-54 Years of Age in Indonesia 2018**

Variables	Central Obesity		PR	95% CI	p-value
	Yes n (%)	No n (%)			
<b>Education Status</b>					
Basic ( $\leq$ Junior high school graduate)	26.544(67,92)	16.356(76,17)	0,86	0,83-0,89	<0,001
Medium (Graduated from high school/MA)	8.561 (21,90)	3.556 (16,56)	0,98	0,95-1,02	0,392
High (Diploma/PT graduates)	3.979 (10,18)	1.561 (7,27)	Reff		
<b>Employment Status</b>					
Work	23.065 (59,01)	13.959 (65,01)	0,91	0,90-0,93	<0,001
Not Working	16.019 (40,99)	7.514 (34,99)			
<b>Marital Status</b>					
Mating	33.547 (85,83)	17.571 (81,83)	1,12	1,09-1,15	<0,001
Not Married	5.537 (14,17)	3.902 (18,17)			

Variables	Central Obesity		PR	95% CI	p-value
	Yes n (%)	No n (%)			
<b>Physical Activity</b>					
Less	35.046 (89,67)	18.290 (85,18)	1,18	1,14-1,21	<0,001
Simply	4.038 (10,33)	3.183 (14,82)			
<b>Smoking Status</b>					
Smoking	1.037 (2,65)	762 (3,55)	0,89	0,84-0,95	<0,001
Already stopped	537 (1,37)	227 (1,06)	1,09	1,00-1,18	0,056
No Smoking	37.510 (95,97)	20.484 (95,39)	Reff		
<b>Consumption of Risky Foods</b>					
At Risk	24.418 (62,48)	12.945 (60,29)	1,03	1,01-1,05	0,002
Not at risk	14.666 (37,52)	8.528 (39,71)			
<b>Consumption of Risky Drinks</b>					
At Risk	23.491 (60,10)	13.157 (61,27)	0,98	0,96-1,00	0,094
Not at risk	15.593 (39,90)	8.316 (38,73)			

The results of the analysis also showed that educational status, employment status, smoking status, and consuming risky foods had a negative relationship or became a protective factor from the occurrence of central obesity (PR < 1). Meanwhile, marital status, physical activity, and consuming risky foods are risk factors for central obesity (PR>1). Women aged 45-54 years who are married, have less physical activity, and consume risky foods have a risk of 1.12 times, 1.18 times and 1.03 times of central obesity respectively compared to those who are not married, have sufficient physical activity, and do not consume risky foods.

The prevalence of central obesity in Indonesia continues to increase and occurs in women aged 45-54 years. Based on the analysis, the prevalence of central obesity in women aged 45-54 years in Indonesia in 2018 was 64.54%. This prevalence is much higher than the national prevalence of 46.7%. This suggests that women aged 45-54 years have a higher risk of developing central obesity. In a study (Israel et al., 2022) it was also produced at the age of  $\geq 45$  years at a risk of 3.75 times having central obesity (Israel et al., 2022).

Marital status is known to have an association with the occurrence of central obesity, where women aged 45-54 years in Indonesia who are married have a risk of 1.18 times having central obesity compared to those who are not married (PR = 1.12; 95%CI 1.09-1.15). This result is in line with research (Omar et al., 2020) which showed that married participants had a relationship and a risk of 2.75 times having central obesity compared to those who were not married (OR = 2.93; 95%CI 1.95-4.39) (Omar et al., 2020). The relationship between marital status and central obesity can be influenced by changes in lifestyle and body image. A person who is married and has given birth to children no longer pays attention to body image (Janghorbani et al., 2008).

In addition, at the age of 45, women in Indonesia are known to start entering menopause, which is the end of the menstrual cycle characterized by not having menstruation for at least 12 months (Ministry of Health, 2022). During menopause, hormonal changes occur in women,

where a decrease in the hormone estrogen is a major contributor to central obesity, decreased subcutaneous fat and increased fat tissue in women (Kumar & Rizvi, 2022).

Another factor associated with central obesity in women aged 45-54 years in Indonesia is physical inactivity. The results showed that women aged 45-54 years in Indonesia who had less physical activity had a risk of 1.18 times (PR = 1.18; 95%CI 1.14-1.21). Research (Permatasari et al., 2023) also showed similar results, namely participants who had less physical activity had a risk of 1.29 times having central obesity (PR = 1.12-1.50 95%CI 1.12-1.50) (Permatasari et al., 2023).

In addition, the results showed that women aged 45-54 years in Indonesia with central obesity consumed more risky foods (62.48%). Risky foods in this study are sweet, fatty / fried / cholesterol foods, and instant food. The bivariate analysis also showed that there was a relationship between the consumption of risky foods and the occurrence of central obesity. Women aged 45-54 years in Indonesia who consume risky foods have a risk of 1.03 times (PR = 1.03; 95%CI 1.01-1.05) having central obesity compared to those who do not consume risky foods.

The relationship between physical activity and central obesity is influenced by the consumption of risky foods. Lack of physical activity accompanied by consumption of risky foods will cause an energy imbalance in the body (Mulia et al., 2021). Excess energy will be stored in the form of fat, and if distributed in the abdomen, it will cause an increase in abdominal circumference or central obesity (Jakicic & Otto, 2005).

Primary education is a formal education unit in the form of Primary Schools and Madrasah Ibtidaiyah or other equivalent forms as well as Junior High Schools and Madrasah Tsanawiyah, or other equivalent forms of education (Government of Indonesia, 2003). In the study, primary education status had a negative relationship with central obesity (PR=0.86; 95%CI 0.83-0.89). In the study of Sugianti et al, showed similar results, namely the educational status of elementary / junior high school graduates had a negative relationship with central obesity ( $r = 0.087$ ). Education is associated with beliefs and knowledge, which will affect a person's behavior and lifestyle, including in health (Yoon et al., 2006).

Another factor that had a negative association with central obesity was employment status (PR=0.91; 95%CI 0.90-0.93). This result is in line with research (Kusteviani, 2015) which resulted in employment status being a protective factor from the occurrence of central obesity ( $p < 0.05$ ;  $r = 0.098$ ) (Kusteviani, 2015). Employment is a protective factor from the occurrence of central obesity influenced by physical activity at work. Physical activity in the workplace is a determinant of daily energy expenditure, and physical activity in the workplace has a protective effect on the physical health of workers (Bonauto et al., 2014).

Current smoking status also had a negative association with the occurrence of central obesity (PR=0.89; 95CI 0.84-0.95). Research (Nawawi et al., 2020) also resulted in smoking having a negative association with central obesity (aOR=0.53; 95%CI 0.43-0.58). (Nawawi et al., 2020).

Smoking is associated with central obesity, where the higher the frequency of smoking will reduce the probability of central obesity by 13% (López-Sobaler et al., 2016); (Plurphanswat & RRodu, 2014). In addition, smoking can also reduce appetite, thus affecting food intake and reducing the risk of obesity (Audrain-McGovern & Benowitz, 2011)..

## CONCLUSION

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The prevalence of central obesity in women aged 45-54 years in Indonesia based on the 2018 Riskesdas analysis is higher than the national prevalence in 2018. Risk factors for central obesity in women aged 45-54 years in Indonesia include marital status, physical activity, and consumption of risky foods. In addition, primary education, employment status and smoking are protective factors of central obesity in women aged 45-54 years in Indonesia. This study used a cross-sectional study design so that it could not determine the cause-and-effect of the independent variables on the dependent variable (central obesity). Future researchers can use other indicators in determining central obesity, such as the Abdominal Circumference-Height Ratio (RLPTB), or use other better study designs to determine cause-and-effect relationships, such as case-control or cohort study designs. There is a need to increase nutrition education, physical activity, and programs for married women to maintain good health.

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