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TREND OF OVERWEIGHT AND OBESITY PREVALENCE IN ADULT MALES IN INDONESIA 2010-2023

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ABSTRACT

Background: *Overweight and obesity are growing nutritional issues among adult Indonesian males, significantly increasing their risk of chronic diseases. This rise is primarily attributed to an imbalance in nutritional intake and lifestyle changes. This study will analyze the prevalence and distribution of overweight and obesity in adult Indonesian males, utilizing data from the 2010 and 2018 Basic Health Research, and the 2023 Indonesian Health Survey (IHS).*

Methods: *This study is an analytical survey with a cross-sectional approach and quantitative descriptive methods. The study population was adult males >18 years in 38 provinces in Indonesia, grouped into 7 regional areas. Data were obtained from Basic Health Research 2010, 2018, and IHS 2023. Overweight status was determined based on BMI ≥ 25.0 kg/m² to < 27.0 kg/m² and obesity ≥ 27.0 kg/m². Data analysis was performed using SPSS version 22.*

Results: *The prevalence of overweight nationally increased from 8.9% (2010) to 13.5% (2023), while obesity increased from 8.5% (2010) to 15.6% (2023). The Papua region showed the highest prevalence for both categories, increasing from 10.6% (2010) to 15.2% (2023), while the Nusa Tenggara region had the lowest prevalence for both categories, increasing from 6.2% (2010) to 9.8% (2023).*

Conclusion: *Overweight and obesity in adult Indonesian males significantly rose from 2010-2023. Public health efforts are crucial, promoting healthy eating, physical activity, and weight management education to reduce chronic disease risks.*

Keywords: *Prevalence, Overweight, Obesity, Adult Males*

INTRODUCTION

Overweight and obesity have become a growing global health problem in recent decades. The World Health Organization (WHO) reports that since 1975, the global prevalence of obesity has nearly tripled, with more than 1.9 billion adults overweight and 650 million obese in 2016 (WHO. 2021). Each individual requires different nutritional intake depending on age, gender, daily physical activity, body weight, and others (Nur *et al.*. 2023).

Health problems related to nutritional status in Indonesia are currently entering a double burden of nutrition, meaning a combination of two nutritional issues that occur at the same time (Astuti, Huriyati and Susetyowati, 2022), the coexistence of undernutrition and overnutrition in a population caused by the phenomenon of undernutrition at an early age that contributes to or is related to the occurrence of overnutrition in adulthood (Ahriyasna, Laila and Ilham, 2020). The problem of undernutrition has not been fully resolved, while overnutrition is increasing. A person's nutritional status can be seen from their nutritional intake and needs, this problem arises due to incorrect dietary behavior, such as choosing the wrong food ingredients, an imbalance between nutritional consumption and the recommended nutritional adequacy, and adopting an unhealthy lifestyle (Ambar Wati *et al.*, 2022).

Adults with nutritional problems tend to be overweight. Overweight and Obesity are one of the leading health problems in both developed and developing countries such as Indonesia. A study recently published in The Lancet states that currently, two-thirds of people who suffer from overweight and obesity are in developing countries than in developed countries, this is because in developed countries the factors that influence obesity are mostly lifestyle or diet, while in developing countries overweight and obesity are influenced by the transition and adaptation of western lifestyles by the population, rapid changes in diet, demographic changes, geographic patterns, social and economic factors (Pus *et al.*, 2016). Obesity occurs due to excess fat accumulation in adipose tissue (Dahlia *et al.*, 2022).

According to the results of the 2010 Basic Health Research data, nationally the percentage of adults > 18 years old who are overweight (10.0%) and obese (11.7%), which means that the total percentage of the population who are overweight and obese is (21.7%) higher than the population who are malnourished (12.6%) (Health Research and Development Agency, 2010). The results of the 2018 Basic Health Research data, nationally the percentage of adults > 18 years old who are overweight (13.6%) and obese (21.8%), which means that the total percentage of the population who are overweight and obese is (35.4%) higher than the population who are malnourished (9.3%) (Basic Health Research, 2018).

Meanwhile, according to the results of the 2023 IHS data, nationally the percentage of adults > 18 years old who are overweight (14.4%) and obese is (23.4%), which means that the total percentage of the population who are overweight and obese is (37.8%) higher than the population who are malnourished (7.8%). This indicates that there is an increase in the population experiencing overweight and obesity and that overweight and obesity are the most common nutritional problems that occur in adults > 18 years old (BKPK, 2023).

Overweight and obesity are influenced by several factors, namely environmental factors, the selection of types of food that are not nutritionally balanced, the wrong diet, portion sizes per meal, and the level of activity in each individual that is lacking, the WHO report states that more than 30% of adults in developing countries have low levels of physical activity, which contributes to uncontrolled weight gain (WHO, 2019). Epidemiological studies show that the effects of obesity are not only from these factors but can also be influenced by socio-economic and genetic factors which can affect the formation of body fat, someone with this genetic factor tends to build more body fat than other individuals (Syifa and Djuwita, 2023).

Overweight and obesity can also interfere with sexual activity in men, in this case, erectile dysfunction (Situmorang *et al.*, 2022). Research that has been conducted in Europe discusses physical damage and sexual function in men who are overweight and obese, from the results of the study it was found that men with a BMI> 23 kg / m 2 are more likely to show two or more symptoms that lead to physical damage and impaired sexual function (Husain, Tendean and Queljoe, 2015). In addition, being overweight and obese can also have an impact on accelerating the aging process, impaired intelligence, insulin resistance which will manifest as hypertension, dyslipidemia, hyperuremia, endothelial dysfunction and lipotoxicity to beta cells, then also have an impact on cancer, osteoarthritis, cholelithiasis, chronic degenerative diseases such as coronary heart disease, stroke, cancer and type 2 diabetes, and death at a young age (Budyono *et al.*, 2022). This is in line with other studies that say overweight and obesity are associated with an increased risk of various non-communicable diseases (NCDs), including cardiovascular disease, type 2 diabetes, hypertension, and several types of cancer

(Malik *et al.*, 2019). The purpose of this study was to analyze the prevalence and distribution of nutritional status of overweight and obesity in adult men in Indonesia based on data from Riskesdas 2010, 2018, and the Indonesian Health Survey (IHS) 2023.

METHODS

This type of research uses an analytical survey with a cross-sectional study approach with a quantitative descriptive research method to identify the prevalence of overweight and obesity in adult men in Indonesia based on the 2010 and 2018 Basic Health Research data and the 2023 Indonesian Health Survey (IHS) data. This research can be carried out in all provinces in Indonesia. The population used in this study was adult men > 18 years old who lived throughout Indonesia. The data used to conduct this study came from the 2010 and 2018 Basic Health Research data and the 2023 Indonesian Health Survey (IHS), which were conducted in the period from August to October 2023. The survey conducted collected several health-related information, one of which was regarding Anthropometric data. The research variables used were the prevalence of overweight and the prevalence of obesity. Determination of overweight and obesity nutritional status based on Body Mass Index (BMI) with the formula: BMI = Body Weight (kg) / Height $(m)^2$. Weight measurement in the 2010 and 2018 Basic Health Research data and the 2023 IHS data used a digital scale with a precision of 0.1 kg, and height measurement used a height-measuring instrument with a precision of 1 mm. Based on BMI data, the nutritional status category in the 2010, 2018, and 2023 Basic Health Research data is stated as overweight if the BMI value is ≥ 25.0 kg/m^2 to <27.0 kg/m^2 and is said to be Obese if the BMI value is ≥ 27.0 kg/m^2.

The prevalence of overweight according to the 2010, 2018, and 2023 Basic Health Research data is calculated using the formula for dividing the number of overweight residents > 18 years by the number of residents > 18 years measured by Body Weight and Height x 100%. Obesity prevalence according to Basic Health Research 2010, 2018, and IHS 2023 data is calculated using the formula for dividing the number of obese people > 18 years by the number of people > 18 years measured by Body Weight and Height x 100%. The prevalence of overweight and obesity in adult males > 18 years is presented per province in Indonesia. The research instrument used an individual questionnaire developed by the IHS team in 2023 including information related to the weight and height of adult males > 18 years. Anthropometric measurements were carried out by trained enumerators with a minimum educational background of D3 health to ensure the accuracy of the data obtained. Data analysis was carried out using the SPSS version 22 application.

Univariate analysis used measures of distribution (minimum, maximum, average, and standard deviation). The analysis in this study was used to describe the prevalence of overweight and obesity in 38 provinces in Indonesia and divided into 7 regional areas, namely Sumatra (Aceh Province, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung, Riau Islands), Java-Bali (DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java, Banten, Bali), Nusa Tenggara (West Nusa Tenggara and East Nusa Tenggara), Kalimantan (West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, North Kalimantan), Sulawesi (North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi), Maluku (Maluku and North Maluku), Papua (West Papua, Southwest Papua, Papua, South Papua, Central Papua, Papua Pegunungan).

RESULTS AND DISCUSSION

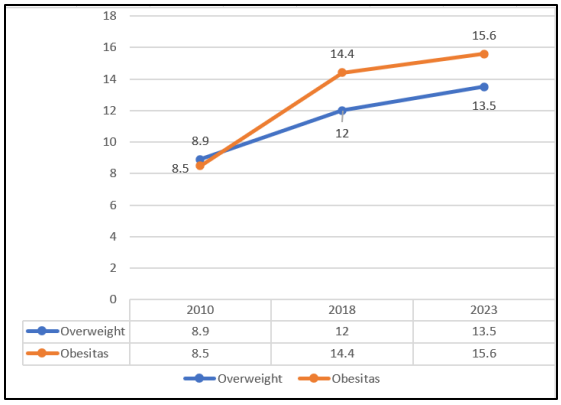

Figure 1. The Prevalence of Overweight and Obesity in Adult Males > 18 years in Indonesia

Figure 1. Presents data on the distribution of average trends in overweight and obesity nutritional status based on national. Based on the graphic above, shows an increase in the prevalence of overweight and obesity every year.

Table 1. Prevalence of Overweight Nutritional Status in Adult Men > 18 Years Based on Indonesian Regions in 2010. 2018. 2023

Regions	n	2010 (%)		2018 (%)		2023 (%)	
		Min-Max	$\bar{X}$ ±SD	Min-Max	$\bar{X}$ ±SD	Min-Max	$\bar{X}$ ±SD
Sumatera	10	6.2-11.7	8.7±2.2	9.6-14.6	12.0±1.5	11.4-17.9	14.4±2.3
Java-Bali	7	7.8-12.1	9.2±1.6	11.0-15.3	12.8±1.8	12.3-16.8	14.1±1.8
NusaTenggara	2	5.9-6.4	6.2±0.4	7.1-9.0	8.1±1.3	9.3-10.4	9.8±0.8
Kalimantan	5	6.1-10.8	8.4±2.0	11.5-14.2	12.5±1.1	12.0-19.0	14.6±2.6
Sulawesi	6	7.7-13.7	9.0±2.3	10.4-16.8	12.4±2.4	12.2-17.4	13.7±1.9
Maluku	2	8.3-12.6	10.5±3.0	11.1-13.6	12.3±1.7	11.4-13.7	12.5±1.6
Papua	6	9.0-12.3	10.6±2.3	13.6-15.1	14.3±1.0	13.5-18.8	15.2±1.9
Indonesia	**1**	**5.9-13.7**	**8.9±0.8**	**7.1-16.8**	**12.0±0.5**	**9.3-19.0**	**13.5±0.6**

Table 1 shows the results of the prevalence of overweight nutritional status in 2010 nationally at 8.9%, the highest occurred in the Papua regional area with a percentage of 10.6% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 6.2%. In 2018 nationally 12.0%, the highest occurred in the Papua regional area with a percentage of 14.3% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 8.1%. In 2023 nationally 13.5%, the highest occurred in the Papua regional area with a percentage of 15.2% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 9.8%.

Figure 2 Presents data on the distribution of the average trend of overweight nutritional status in adult males > 18 years in the period 2010, 2018, and 2023 based on 7 regional areas in Indonesia. Based on the graphic image above, it shows that the highest prevalence of overweight is in Papua and has increased every year, while the lowest prevalence of overweight is in Nusa Tenggara and has increased every year.

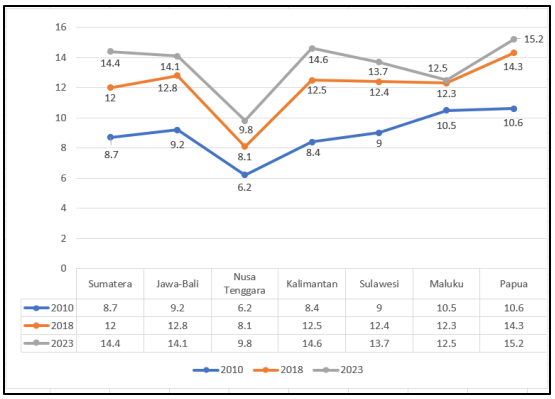

Figure 2. The average prevalence of overweight in adult males > 18 years based on 7 Indonesian Region

Table 2. Prevalence of Obesity Nutritional Status in Adult Men > 18 Years Based on Indonesia Regional Year 2010. 2018. 2023

Regions	n	2010 (%)		2018 (%)		2023 (%)	
		Min-Max	$\bar{X}$ ±SD	Min-Max	$\bar{X}$ ±SD	Min-Max	$\bar{X}$ ±SD
Sumatera	10	4.3-15.1	8.1±3.0	9.4-20.6	14.1±3.6	10.0-19.7	14.1±3.4
Jawa-Bali	7	6.2-12.5	8.5±1.9	13.1-23.2	16.7±3.7	14.8-24.7	18.2±3.8
NusaTenggara	2	5.0-5.2	5.1±0.1	7.2-7.7	7.4±0.4	9.4-10.1	9.7±0.5
Kalimantan	5	6.3-13.1	8.6±3.1	11.1-21.6	15.4±4.8	12.2-21.8	16.2±3.8
Sulawesi	6	5.0-14.3	8.7±3.3	11.7-23.0	14.8±4.1	12.4-23.3	15.6±4.4
Maluku	2	9.2-11.4	10.3±1.5	13.7-15.8	14.7±1.5	13.9-15.7	14.8±1.3
Papua	6	9.6-10.9	10.3±0.9	16.0-19.1	17.5±2.2	14.4-26.3	20.8±5.1
Indonesia	**1**	**4.3-15.1**	**8.5±1.2**	**7.2-23.2**	**14.4±1.6**	**9.4-26.3**	**15.6±1.6**

Table 2 shows the results of the prevalence of obesity nutritional status in 2010 nationally at 8.5%, the highest occurred in the Maluku regional area with a percentage of 10.3% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 5.1%. In 2018 nationally 14.4%, the highest occurred in the Papua regional area with a percentage of 17.5% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 7.4%. In 2023 nationally 15.6%, the highest occurred in the Papua regional area with a percentage of 20.8% and the lowest occurred in the Nusa Tenggara regional area with a percentage of 9.7%.

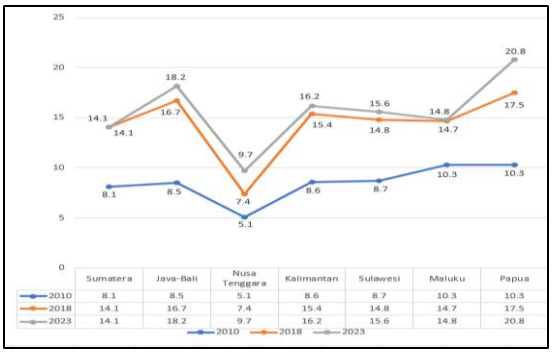

Figure 3. The average prevalence of obesity in adult males > 18 years based on 7 Indonesian Region

Figure 3 presents data on the distribution of the average trend of overweight nutritional status in adult males > 18 years in the period 2010, 2018, and 2023 based on 7 regional areas in Indonesia. Based on the graph above, shows that the highest prevalence of obesity is in Papua and has increased every year, while the lowest prevalence of obesity is in Nusa Tenggara and has increased every year.

This study shows that the prevalence of overweight and obesity in adult men in Indonesia has increased from 2010 to 2023, nationally it can be seen in Figure 1, the prevalence of overweight increased from 8.9% (2010) to 13.5% (2023), while obesity increased from 8.5% (2010) to 15.6% (2023). Regionally it can be seen that the data shows that the Papua region has the highest prevalence of overweight and obesity, with the percentage of overweight increasing from 10.6% (2010) to 15.2% (2023) and the percentage of obesity increasing from 10.3% (2010) to 20.8% (2023), while Nusa Tenggara has the lowest prevalence for both categories of nutritional status. When compared globally according to WHO data, more than 1 billion adults are overweight and 300 million people are overweight. Obesity is common in developing countries with more than 115 million sufferers, this is in line with a study stating that in several countries in Latin America, the highest prevalence of obesity is in Uruguay (18.1%), Costa Rica (12.4%), Chile (11.9%) and Mexico (10.5%). More than 50% of obese people in the world are in ten countries, namely the United States, China, India, Russia, Brazil, Mexico, Egypt, Germany, Pakistan, and Indonesia. The United States contributes 13% of obese people worldwide. This study shows that 62% of obese people in the world are in developing countries and one

of them is Indonesia (Noor, Edi Sugiarto and Adenia Siti Fatimah, 2022). The findings in this study indicate that significant overnutrition problems among adult men are in the Papua region. The consistent increase in the prevalence of overweight and obesity throughout Indonesia, especially in Papua, can be caused by dietary habits and lifestyle, High-calorie, fat, and sugar dietary habits, as well as decreased physical activity with urbanization, are likely the main causes, Research by (Dahlia *et al*,, 2022) shows that a diet high in energy and low in fiber contributes to obesity. Papua is famous for its staple food in the form of sago plants which are often consumed in various forms, according to research (Watumlawar, Warouw, and Gunawan, 2015) sago has a high starch content, which is around 84.70% of its dry matter, higher than the starch content in rice which is around 78.90%, the results of the study stated that in the group of mice given sago experienced an increase in body weight of 33 grams this is because sago contains more amylopectin than amylose, so it is digested faster and produces more energy, therefore this is in line with the high prevalence of overweight and obesity in the Papua region.

The problem of overweight and obesity that a person experiences can cause various non-communicable diseases, such as stroke, heart disease, and type 2 diabetes mellitus which were the leading causes of death in 2012. However, not only that, several other diseases such as musculoskeletal (osteoarthritis, injury) and several types of cancer including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon are also the impact of overweight and obesity problems (Marbun, Sugiyanto and Dea, 2021), especially in adult men, it has an impact on increasing the risk of sexual dysfunction (Husain, Tendean and Queljoe, 2015).

This study has a wide scope, covering 38 provinces and 7 regional areas in Indonesia, thus providing a comprehensive national picture. In addition, the use of Basic Health Research 2010, 2018, and IHS 2023 data provides a strong trend analysis. However, this study still has limitations in terms of data collection which is only based on anthropometric measurements (BMI) without considering other factors such as body fat distribution, diet, and physical activity. In addition, this study has not examined socio-economic and cultural factors that may influence differences in prevalence between regions. The results of this study are useful for health practitioners in designing intervention programs that target reducing the prevalence of overweight and obesity through several solutions, including conducting lifestyle interventions that are important for changing behaviors that are not in accordance with nutritional principles, nutritional education interventions to be able to increase nutritional knowledge and then the nutritional knowledge possessed can influence behavior in choosing and consuming foods that meet the requirements of individual nutritional needs (Rosdiana, 2018), it can also be done by promoting a healthy lifestyle such as patterns, eating behaviors and physical activity which include increasing fruit and vegetable consumption habits, reducing consumption of sweet foods and drinks, reducing consumption of foods high in energy and fat, reducing consumption of junk food, and increasing physical activity and reducing sedentary lifestyle (lazy lifestyle) (Kinansi *et al.*, 2023).

Further research is recommended to integrate data on eating behavior, physical activity levels, and economic status as additional variables. In addition, longitudinal studies can be conducted to understand the factors that cause obesity and overweight over time. Research also needs to identify the role of genetics and the local environment, especially in areas with high prevalence such as Papua.

CONCLUSION

Based on the results of the study, it can be concluded that the prevalence of overweight and obesity in adult men in Indonesia has increased significantly from 2010 to 2023, the Papua region shows the highest prevalence for both categories, while the Nusa Tenggara region has the lowest prevalence, This finding shows that overweight and obesity are serious nutritional problems in Indonesia and require immediate treatment because they will continue into adulthood, The increase in the prevalence of overweight and obesity indicates a shift in the eating patterns and lifestyles of the Indonesian people, especially in adult men,

This has an impact on accelerating the aging process, impaired intelligence, insulin resistance which will manifest as hypertension, dyslipidemia, hyperuremia, endothelial dysfunction and lipotoxicity to beta cells, then also has an impact on cancer, osteoarthritis, cholelithiasis, chronic degenerative diseases such as coronary heart disease, stroke, cancer and type 2 diabetes, and death at a young age, Therefore, public health interventions are needed that focus on promoting healthy eating patterns, increasing physical activity, and education about the importance of maintaining ideal body weight, In addition, further research is recommended to identify the determinant factors that influence the prevalence overweight and obesity, and evaluate the effectiveness of intervention programs that have been implemented.

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CONFLICT OF INTEREST

The author declares no conflict of interest in the publication of this article.

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