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Research Article

# Analysis of the Relationship Between Age and Body Weight on Erectile Dysfunction in Government and Private Sector Workers

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## ABSTRACT

Erectile Dysfunction (ED) is a condition that affects quality of life and is often associated with cardiovascular disease. By 2025, global ED cases are expected to reach 322 million, with strong links to depression and reduced well-being. This study aimed to analyze the relationships between age and body weight and ED among government and private-sector workers. This observational analytic study involved 64 participants selected via purposive random sampling in Makassar from June to July 2024. Data were collected through questionnaires. Independent variables included age, disease history, medication use, Sexual intercourse frequency, and Body Mass Index (BMI). ED was measured using the International Index of Erectile Function-5 (IIEF-5), a validated questionnaire for assessing erectile function. Data were analyzed using univariate and bivariate methods (Chi-Square test). Most respondents were aged 31–40 years (34.38%), overweight (37.5%), and had normal erectile function (56.25%). A significant association was found between BMI and erectile function ($p = 0.024$), where normal and overweight individuals reported better erectile function. No significant associations were found between erectile function and age ($p = 0.922$), medical history ($p = 0.304$), medication use ($p = 0.508$), or frequency of sexual intercourse ($p = 0.318$). In conclusion, BMI was significantly related to erectile function, while age, disease, medication use, and sexual frequency were not

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## INTRODUCTION

Erectile Dysfunction (ED) is a sexual disorder characterized by the inability to achieve or maintain an erection sufficient for satisfactory sexual intercourse. It negatively affects the quality of life of patients and their partners due to its physical and psychosocial consequences (Allen & Desille, 2017). Although ED may occur at a young age, it is most frequently observed in middle-aged and older men. (Yafi et al., 2016) Globally, ED prevalence increases with age, affecting approximately 40% of men aged 40–49, 50–60% of those aged 60–69, and up to 70% of men above 70 years (Pellegrino et al., 2023).

Beyond its impact on sexual health, ED serves as an early marker and predictor of cardiovascular disease (CVD) and mortality (Nunes et al., 2021). The two conditions share common risk factors such as advancing age, obesity, hypertension, diabetes, smoking, and dyslipidemia (Maiorino et al., 2014). The European Association of Urology (EAU) classifies ED into organic, psychogenic, and mixed types, with most cases being mixed. Identifying ED, therefore, provides a valuable window for primary and secondary prevention of CVD, as ED often precedes cardiovascular events such as coronary artery disease (CAD), stroke, and peripheral arterial disease (PAD) by two to five years (Piepoli et al., 2016).

The International Index of Erectile Function (IIEF) is a validated questionnaire developed to standardize the assessment of erectile function and its severity across five domains: erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction (Kessler et al., 2019). To enhance practicality, a shorter version, IIEF-5 (or SHIM), was introduced, maintaining diagnostic accuracy while being faster to administer. This five-item tool has been validated across populations, including large-scale community studies, as a reliable instrument to detect and grade ED severity (Chen1 et al., 2019).

Epidemiological evidence confirms the high global prevalence of ED and its strong association with metabolic and cardiovascular factors (Gupta et al., 2011). Lifestyle interventions such as regular exercise, balanced nutrition, weight management, and smoking cessation have been shown to improve erectile function and overall cardiovascular health. Given that both age and body mass index (BMI) are established contributors to ED and cardiovascular risk, understanding their relationship within specific working populations is essential. Therefore, this study aimed to analyze the relationship between age and body weight with erectile dysfunction among government and private sector workers in Makassar, Indonesia.

## METHODS

### Study design

A cross-sectional study was conducted at government and private hospitals in Makassar, South Sulawesi, from June 2024 to July 2024. Ethical approval was obtained from the Ethics Commission of Universitas Muhammadiyah Makassar, and the study was conducted in accordance with the guidelines. Data collection was conducted using an observational-analytic approach with a questionnaire instrument. The International Index of Erectile Function–5 (IIEF-5) was used to assess erectile function. The IIEF-5 (International Index of Erectile Function-5) is a brief, validated screening tool consisting of 5 items that assess erectile function over the past 6 months. Scores range from 5 to 25, with lower scores indicating greater dysfunction. The questionnaire was self-administered by participants, and results were interpreted by trained medical researchers under the supervision of a urologist to categorize erectile dysfunction severity (severe,

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moderate, mild, or normal). The questionnaire was administered in Bahasa Indonesia using a validated translated version of the IIEF-5 that has been previously adapted and tested for use in the Indonesian population. The study was carried out at. The sample consisted of 64 participants, selected through purposive random sampling based on inclusion and exclusion criteria.

**Patients and inclusion criteria**

All participants were married men aged 25–60 years who had been sexually active within the last six months. They were physically and mentally healthy and willing to participate as respondents hospitalized at either government or private hospitals. These criteria served as the inclusion criteria for the study.

Specific exclusion criteria were applied to enhance the study's reproducibility and reduce potential bias. Men with diagnosed psychiatric disorders, penile anatomical deformities, chronic renal or hepatic disease, or those who were unwilling to provide informed consent were excluded. These criteria ensured a consistent sample for assessing the association between age, occupation, body weight, and erectile dysfunction among government and private sector workers.

**Study variables**

The data collected included age, gender, medical history, medication history, sexual activity, and Body Mass Index (BMI) in relation to erectile dysfunction. BMI was calculated using the standard formula—weight in kilograms divided by the square of height in meters (kg/m²). In alignment with World Health Organization recommendations for Asian populations, lower BMI cutoffs were applied: overweight was defined as ≥23 kg/m² and obesity as ≥27.5 kg/m², rather than the standard thresholds of≥25 and ≥30 kg/m² (Tham et al., 2023).

**Statistical analysis**

Univariate analysis was used to describe the sample characteristics, with categorical variables presented as frequencies (n) and percentages (%). The Shapiro–Wilk test was employed to assess the normality of continuous variables. Bivariate analyses were conducted to examine the associations between erectile dysfunction and independent variables such as age group, body weight category, and employment sector (government or private). The Chi-square test or Fisher's exact test was applied, depending on the distribution of data and expected cell counts.

All statistical analyses were performed using SPSS software version 29.0 (IBM Corp., Armonk, NY, USA). A two-tailed p-value of less than 0.05 was considered statistically significant. While multivariate analysis was considered during the study design phase, it was not performed due to the scope and objectives of the current analysis.

**Ethics**

Ethical approval was obtained from the Ethical Committee of the Faculty of Medicine, Universitas Muhammadiyah Makassar, Indonesia (532/UM.PKE/III/45/2024).

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## RESULTS

**Table 1**. The Relationship Between Health Variables and Erectile Function Based on IIEF

| Variable | Category | N | % |
|---|---|---|---|
| **Age** | 21-30 Year | 8 | 12.50 |
| | 31-40 Year | 22 | 34.38 |
| | 41-50 Year | 20 | 31.25 |
| | 51-60 Year | 14 | 21.88 |
| **Medical History** | No medical history | 32 | 50.00 |
| | No cardiovaskuler disease | 7 | 10.94 |
| | Other disease | 25 | 39.06 |
| **Medication History** | No medication history | 41 | 64.06 |
| | Cardiovaskuler medication | 4 | 6.25 |
| | Other medication | 19 | 29.69 |
| **Sexual Intercourse Frequency** | <8x /month | 31 | 48.44 |
| | >8x /month | 33 | 51.56 |
| **Body Mass Index** | Underweight | 2 | 3.13 |
| | Normal Weight | 17 | 26.56 |
| | Overweight | 24 | 37.50 |
| | Obesity Class I | 17 | 26.56 |
| | Obesity Class II | 4 | 6.25 |
| **IIEF** | Severe Disfunction | 2 | 3.13 |
| | Moderate Disfunction | 6 | 9.38 |
| | Mild dysfunction | 20 | 31.25 |
| | Normal | 36 | 56.25 |

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**Table 2.** The Relationship Between Health Variables and Erectile Function Based on IIEF

| Variable | category | IEEF | | | | | | | | Total | | p-value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Severe Dysfunction | | Moderate Dysfunction | | Mild Dysfunction | | normal | | | | |
| | | n | % | n | % | n | % | n | % | N | % | |
| **Age** | 21-30 Year | 0 | 0.00 | 0 | 0.00 | 2 | 25.00 | 6 | 75.00 | 8 | 100.00 | 0.922 |
| | 31-40 Year | 1 | 4.55 | 2 | 9.09 | 8 | 36.36 | 11 | 50.00 | 22 | 100.00 | |
| | 41-50 Year | 1 | 5.00 | 3 | 15.00 | 6 | 30.00 | 10 | 50.00 | 20 | 100.00 | |
| | 51-60 Year | 0 | 0.00 | 1 | 7.14 | 4 | 28.57 | 9 | 64.29 | 14 | 100.00 | |
| **Medical History** | No medical history | 0 | 0.00 | 3 | 9.38 | 11 | 34.38 | 18 | 56.25 | 32 | 100.00 | 0.304 |
| | Cardiovaskuler disease | 0 | 0.00 | 1 | 14.29 | 4 | 57.14 | 2 | 28.57 | 7 | 100.00 | |
| | Other disease | 2 | 8.00 | 2 | 8.00 | 5 | 20.00 | 16 | 64.00 | 25 | 100.00 | |
| | No medication history | 2 | 4.88 | 2 | 4.88 | 12 | 29.27 | 25 | 60.98 | 41 | 100.00 | |
| **Medication History** | Cardiovaskuler medication | 0 | 0.00 | 1 | 25.00 | 2 | 50.00 | 1 | 25.00 | 4 | 100.00 | 0.508 |
| | Other medication | 0 | 0.00 | 3 | 15.79 | 6 | 31.58 | 10 | 52.63 | 19 | 100.00 | |
| **Sexual Relationship** | <8x /month | 2 | 6.45 | 2 | 6.45 | 8 | 25.81 | 19 | 61.29 | 31 | 100.00 | 0.318 |
| | >8x /month | 0 | 0.00 | 4 | 12.12 | 12 | 36.36 | 17 | 51.52 | 33 | 100.00 | |
| **BMI** | Underweight | 0 | 0.00 | 0 | 0.00 | 1 | 50.00 | 1 | 50.00 | 2 | 100.00 | 0.024 |
| | Normal | 2 | 11.76 | 0 | 0.00 | 7 | 41.18 | 8 | 47.06 | 17 | 100.00 | |
| | Overweight | 0 | 0.00 | 4 | 16.67 | 4 | 16.67 | 16 | 66.67 | 24 | 100.00 | |
| | obesity 1 | 0 | 0.00 | 0 | 0.00 | 6 | 35.29 | 11 | 64.71 | 17 | 100.00 | |
| | obesity 2 | 0 | 0.00 | 2 | 50.00 | 2 | 50.00 | 0 | 0.00 | 4 | 100.00 | |

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Based on the analysis of the table, the majority of respondents fall within the productive age range, with the largest age group being 31–40 years (34.38%), followed by those aged 41–50 years (31.25%). Half of the respondents (50%) reported no history of illness, while some reported a history of cardiovascular diseases (10.94%) and other illnesses (39.06%). Regarding medication use, the majority (64.06%) did not use any medication, while 6.25% reported using cardiovascular medications and 29.69% used other types of medication.

The frequency of sexual intercourse was also analyzed, showing that nearly half of the respondents (48.44%) reported having sexual intercourse less than eight times per month, while 51.56% reported having intercourse more than eight times per month. Regarding body weight status, the majority of respondents were classified as overweight (37.50%), with 17.19% experiencing obesity class I, and 6.25% experiencing obesity class II. Additionally, 26.56% had normal weight, while 12.50% were underweight.

Regarding erectile function, as assessed by the IIEF index, the majority of respondents (56.25%) had normal erectile function. However, 28.13% experienced mild erectile dysfunction, 9.38% had moderate dysfunction, and 6.25% had severe dysfunction.

From this data, it can be concluded that while the majority of respondents exhibit good erectile function, there are varying degrees of dysfunction observed, particularly among those with certain health conditions or a history of illness.

Based on the analysis results, several variables were examined in relation to erectile function using the IIEF index. For the age variable, the majority of respondents in the 41–50 age group had normal erectile function (50%); however, no significant relationship was found between age and erectile function (p-value 0.922).

For the medical history variable, respondents without a history of illness tended to have better erectile function (56.25% normal), but statistical analysis also showed no significant relationship between medical history and erectile function (p-value 0.304). Regarding the medication history variable, the majority of respondents who did not take any medication had normal erectile function (60.98%). However, no significant relationship was observed between medication use and erectile function (p-value 0.508).

Regarding the frequency of sexual intercourse variable, respondents who reported sexual activity more than eight times per month tended to have better erectile function (51.52% normal). Nevertheless, there was no significant relationship between the frequency of intercourse and erectile function (p-value 0.318).

For the Body Mass Index (BMI) variable, a significant relationship was found between BMI and erectile function (p-value 0.024). Respondents with normal BMI and overweight categories had higher rates of normal erectile function (66.67% and 64.71%, respectively). In contrast, respondents classified as obese (both Class 1 and Class 2 obesity) were more likely to experience higher levels of erectile dysfunction.

From these results, it can be concluded that only the BMI variable was significantly associated with erectile function. Respondents with obesity were more likely to be at risk for erectile dysfunction compared to those with normal or overweight BMI. Other variables, such as age, medical history, medication use, and frequency of sexual intercourse, did not show significant associations with erectile function.

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## DISCUSSION

The findings of this study revealed that body mass index (BMI) was the only variable significantly associated with erectile function. Participants classified as obese demonstrated a markedly higher risk of erectile dysfunction (ED) compared to those with normal or overweight BMI. This finding aligns with existing evidence suggesting that obesity and related metabolic disturbances play a critical role in the pathogenesis of ED. Excess adiposity contributes to endothelial dysfunction, reduced nitric oxide (NO) bioavailability, and chronic inflammation, all of which impair penile vascular function. Moreover, increased aromatase activity in adipose tissue converts testosterone into estrogen, lowering circulating androgen levels and disrupting hormonal balance. Insulin resistance further exacerbates these mechanisms by impairing vascular integrity and endothelial responsiveness. Consistently, Kupelian et al. (2019) emphasized that insulin resistance represents a central metabolic link between obesity, metabolic syndrome, and the development of ED (Zhao et al., 2019).

In contrast, other variables such as age, medical history, medication use, and frequency of sexual intercourse did not show as strong an association with erectile function as metabolic and cardiovascular factors. This lack of statistical prominence can be interpreted through a more theoretical and multidimensional lens. While aging is traditionally associated with declining sexual function, chronological age does not universally correspond to biological decline. The biopsychosocial model posits that a complex interplay of physical, emotional, and relational factors influences sexual health. Supporting this notion, Sood et al. (2019) demonstrated that components of metabolic syndrome, including obesity, hypertension, and hyperglycemia, had stronger associations with erectile dysfunction than age alone, suggesting that favorable metabolic profiles may help preserve sexual function even in older individuals (Sood et al., 2019).

Regarding chronic diseases such as diabetes and hypertension, the lack of significance in this study can be interpreted within the framework of the progressive vascular impairment model. This model suggests that the impact of chronic illness on erectile function is influenced not only by the presence of disease but also by its severity, duration, and level of control. Supporting this perspective, waist circumference, a marker of central adiposity, has been shown to be a more informative predictor of metabolic risk than BMI alone (Lauria et al., 2013). Therefore, individuals with chronic conditions but well-managed disease and favorable body fat distribution may not experience substantial sexual dysfunction, highlighting the importance of individualized physiological response and disease trajectory over simple diagnostic categorization.

The role of pharmacological agents in ED is more nuanced than previously assumed. While certain medications, such as antihypertensives and antidepressants, have historically been associated with erectile dysfunction, recent large-scale analyses suggest that the risk varies significantly among different drug classes. Zhao et al. (2025) demonstrated that some medications are more strongly associated with ED than others, highlighting that not all antihypertensives or antidepressants have the same impact. Furthermore, newer agents like nebivolol have been shown to exert neutral or even protective effects on erectile function by enhancing endothelial nitric oxide release. This emphasizes the importance of distinguishing between medication classes and considering both pharmacological mechanisms and individual patient factors when evaluating sexual function outcomes (Zhao, C., et al., 2025).

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Similarly, the frequency of sexual intercourse did not significantly predict erectile function in this study. This may be explained by contemporary models of sexual response, such as Basson's circular model, which argue that sexual activity is primarily driven by emotional intimacy, relational quality, and psychological readiness rather than spontaneous physiological desire alone. Consequently, reduced sexual frequency may reflect relational or psychosocial dynamics rather than primary erectile dysfunction. In this view, sexual frequency should be considered a consequence rather than a determinant of sexual health, which may explain its lack of statistical significance in our findings. Taken together, the non-significance of these variables should not be interpreted as an absence of relevance. Rather, it reflects the complex, nonlinear nature of erectile dysfunction, in which multifactorial and context-dependent mechanisms operate simultaneously. A theoretical integration of metabolic, psychological, and behavioral frameworks is essential to comprehensively understand the etiology of ED. Therefore, advanced statistical models such as multivariate regression or structural equation modeling may be better suited for future studies to explore the interplay of these factors in greater depth.

These findings underscore the importance of targeting modifiable lifestyle factors, particularly obesity, in efforts to prevent and manage erectile dysfunction. Lifestyle interventions, including weight reduction, physical activity, nutritional counseling, and stress management, should be prioritized in clinical and public health strategies. According to the World Health Organization (WHO, 2022) sexual health is an integral part of overall well-being, encompassing not only reproductive capacity but also emotional and relational fulfillment. By adopting a holistic and evidence-based approach to ED, clinicians and policymakers can improve quality of life and sexual health outcomes, especially among aging male populations.

This study has several limitations. First, the cross-sectional design restricts causal inference between BMI and erectile dysfunction. Second, the relatively small sample size from a single city may limit generalizability. Third, erectile dysfunction was assessed using a self-reported questionnaire without clinical confirmation by a specialist. Future research should include larger, multi-center samples and longitudinal analyses to strengthen the evidence.

## CONCLUSION

This study identified a significant association between body mass index (BMI) and erectile dysfunction (ED), assessed using the International Index of Erectile Function–5 (IIEF-5). Individuals classified as Obesity Class I were found to be at greater risk for ED, highlighting BMI as a key metabolic factor influencing erectile function.

In contrast, no significant associations were found between ED and age, medical history, medication use, or frequency of marital sexual activity. These findings suggest that BMI may play a more prominent role than other commonly assumed risk factors. Clinically, the results underscore the importance of early lifestyle intervention and BMI control as part of ED prevention strategies, particularly in at-risk male populations. From a broader public health perspective, promoting healthy weight management may contribute not only to general well-being but also to improved sexual health and quality of life.

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