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Research article

The Relationship Between Medication Compliance and Body Mass Index in Elderly Patients with Hypertension

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ABSTRACT

Background: Hypertension is a major public health concern, especially among the elderly, as it increases the risk of cardiovascular diseases, stroke, and kidney failure. Effective management requires strict medication compliance, but adherence remains low due to factors like forgetfulness, complex regimens, and side effects. This study aimed to to analyze relationship between body mass index and medication compliance in hypertensive patients.

Method: This cross-sectional study examined the relationship between medication compliance and Body Mass Index (BMI) in 76 elderly hypertensive patients. Data were collected using the Morisky Medication Compliance Scale (MMAS-8), BMI measurements, and medical records. Statistical analysis, including the Chi-Square test, was conducted using SPSS.

Result: The findings a significant relationship between Body Mass Index (BMI) and medication compliance, showing that individuals with normal BMI (28.9%) have higher adherence (25.0%) compared to those who are underweight (39.5%) or obese/overweight (31.6%), with the latter group exhibiting the highest rate of poor compliance (52.6%) and none adhering well, emphasizing the statistical significance of this relationship (P= 0.000) and the need to understand how health-related behaviors interact with physical health indicators like BMI.

Conclusion: This study shows a significant relationship between Body Mass Index and medication compliance, with individuals who are obese or overweight having the highest rates of poor compliance, while those with normal BMI demonstrate better adherence, possibly due to fewer health-related complications.

INTRODUCTION

Hypertension is a major public health concern worldwide, particularly among the elderly population (Mills et al., 2020). It is a leading risk factor for cardiovascular diseases, stroke, and kidney failure, contributing significantly to morbidity and mortality (Zhou et al., 2021). Effective management of hypertension requires strict compliance to prescribed medications, as non-compliance can lead to uncontrolled blood pressure, increasing the likelihood of severe complications. Despite the availability of antihypertensive medications, compliance rates among elderly patients remain suboptimal due to various factors, including forgetfulness, complex medication regimens, and perceived side effects (Al-Makki et al., 2022).

Medication compliance is influenced by multiple determinants, including socioeconomic status, education level, cognitive function, and healthcare accessibility (Afshari et al., 2024). In elderly patients, additional factors such as polypharmacy, declining physical health, and psychological conditions like depression further impact compliance levels (Chen et al., 2024). Research has shown that poor

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medication compliance is associated with adverse health outcomes, including inadequate blood pressure control, frequent hospitalizations, and higher healthcare costs. Addressing medication compliance in elderly hypertensive patients is, therefore, a crucial aspect of chronic disease management (Shani et al., 2024).

Body mass index (BMI) is another critical factor in managing hypertension. Obesity and being overweight are well-established risk factors for hypertension due to their impact on vascular resistance, cardiac output, and metabolic dysfunction (Zhao et al., 2024). Conversely, underweight individuals may also experience adverse health effects, including frailty and poor drug metabolism, which can influence the effectiveness of antihypertensive therapy (Kasaudhan et al., 2024). Maintaining an optimal BMI through lifestyle modifications, such as balanced nutrition and regular physical activity, plays a vital role in managing hypertension among elderly individuals (Çakmur, 2023; Masan et al., 2021; Oktaviyani et al., 2022).

Several studies have explored the relationship between medication compliance and BMI in various populations, yet findings remain inconsistent (Lettieri et al., 2024; Qin et al., 2024; Wang et al., 2024). Some research indicates that overweight and obese individuals are less likely to adhere to their prescribed medications due to factors such as medication-related weight gain concerns, while others suggest that higher BMI may be associated with better compliance due to increased healthcare engagement (Guy et al., 2024). The complexity of this relationship necessitates further investigation, particularly in elderly hypertensive patients, where both medication compliance and BMI significantly influence health outcomes.

Medication compliance and Body Mass Index (BMI) in elderly patients with hypertension in Kotamobagu, Indonesia, presents a critical area for public health attention. A higher BMI, particularly in the overweight and obese categories, is often associated with poorer medication compliance, potentially due to the complexity of managing multiple comorbidities and the physical burden of obesity. By analyzing medication compliance and its correlation with BMI, this research provides valuable insights into the factors influencing treatment compliance and overall health outcomes. The findings could contribute to developing more comprehensive and patient-centered approaches to hypertension management in elderly populations. Focus on this research that intersection of medication compliance, BMI, and hypertension in an ageing population, an area that has received limited attention in existing literature. While previous studies have examined medication adherence in isolation, this research seeks to provide a comprehensive analysis by considering BMI as a contributing factor. Understanding this relationship is essential for developing tailored interventions that. address the specific needs of elderly patients, ultimately improving health outcomes and quality of life. This study aimed to analyze the correlation between medication compliance and BMI in elderly hypertensive patients.

METHODS

The study employed a quantitative research design using an analytical descriptive method with a cross-sectional approach. This design was chosen to assess the relationship between medication compliance and body mass index (BMI) in elderly hypertensive patients at a specific point in time. The research was conducted at UPTD Puskesmas Motoboi Kecil, Kota Kotamobagu, Indonesia, from August to December 2024. The study population consisted of 312 elderly patients diagnosed with hypertension within the working area of the health center. A purposive sampling technique was applied, and 76 elderly patients who met the inclusion criteria were selected as study participants.

To collect data, both primary and secondary data sources were utilized. Primary data were obtained through a questionnaire and direct physical measurements. The Morisky Medication Compliance Scale (MMAS-8) was used to assess participants' compliance to antihypertensive medication. This eight-question instrument has been widely validated for measuring compliance levels. Meanwhile, BMI was determined using height and weight measurements taken with a Mikrotoise (stadiometer) and a weighing scale, respectively. Secondary data were obtained from medical records at UPTD Puskesmas Motoboi Kecil, providing additional background on the patients' hypertension status. Once data collection was completed, questionnaires were checked for completeness before data processing and analysis.

The data analysis process involved two stages. Univariate analysis was conducted to describe the characteristics of respondents and each study variable using frequency distributions and percentages. Meanwhile, bivariate analysis was performed using the Chi-Square test to determine the relationship between medication compliance and BMI. The test was conducted with a significance level of $\alpha = 0.05$, and the appropriate statistical corrections—such as Continuity Correction, Likelihood Ratio, and

Fisher's Exact Test—were applied depending on data characteristics. Statistical analysis was performed using SPSS to ensure accurate and reliable results.

The research process followed a structured sequence of steps. It began with the identification of eligible participants at UPTD Puskesmas Motoboi Kecil, followed by an informed consent process in which participants were provided with detailed explanations about the study's purpose, benefits, and procedures. Once consent was obtained, data collection was carried out through interviews, MMAS-8 questionnaire administration, and BMI measurements. The collected data were then processed through editing, coding, tabulating, and inputting into SPSS for further analysis. After statistical testing was completed, the results were compiled into a research report for discussion and dissemination.

In ensuring ethical integrity, the study adhered to key research principles, including respect for participants, confidentiality, and informed consent. Participants were given the freedom to withdraw from the study at any time without facing any consequences. Confidentiality was maintained by ensuring that no personal identifiers were recorded on research documents, with all data coded to protect participants' privacy. Before participating, all individuals provided written informed consent, acknowledging their voluntary participation. These ethical considerations safeguarded the rights, well-being, and privacy of participants while ensuring the validity and reliability of the research findings.

RESULTS

The data (table 1) presents the demographic and health characteristics of a sample population, revealing significant variations in age, sex, education, occupation, medication compliance, and body mass index (BMI). The majority of participants are in the 51-60 age group (50.0%), followed by those aged 41-50 (27.6%) and 30-40 (22.4%). A larger proportion of the population is female (67.1%) compared to male (32.9%). In terms of education, most participants have completed elementary school (51.3%), while 18.4% have never attended school, and the remainder have varying levels of education, including junior high (15.8%), senior high/vocational school (10.5%), and higher education (3.9%). Occupationally, a significant proportion of participants are unemployed (43.4%), followed by housewives (38.2%), with smaller percentages working as entrepreneurs (9.2%), farmers (5.3%), and civil servants (3.9%). Regarding health behaviors, over half of the participants (52.6%) exhibit poor medication compliance, while 47.4% have good compliance. BMI analysis shows that 39.5% are underweight, 31.6% are obese or overweight, and 28.9% have a normal BMI. These findings offer a comprehensive view of the socio-demographic and health factors that shape the population's lifestyle and health outcomes.

Table 1. Distribution of respondents

Variable	Frequency	Percent
Aged		
30-40	17	22.4
41-50	21	27.6
51-60	38	50.0
Sex		
Male	25	32.9
Female	51	67.1
Level of Education		
Never Attended School	14	18.4
Elementary School	39	51.3
Junior High School	12	15.8
Senior High School/Vocational School	8	10.5
Higher Education	3	3.9
Occupational Status		
Entrepreneur	7	9.2
Civil Servant	3	3.9
Farmer	4	5.3
Housewife	29	38.2
Unemployed	33	43.4
Medication Compliance		
Poor	40	52.6

Good	36	47.4
Body Mass Indeks (BMI)		
Normal	22	28.9
Underweight	30	39.5
Obesity/Overweight	24	31.6

The data in table 2 provides a breakdown of the relationship between Body Mass Index (BMI) and medication compliance in the sample population. Among participants with a normal BMI (28.9%), 25.0% exhibit good medication compliance, while 3.9% demonstrate poor compliance. In the underweight group (39.5%), 17.1% adhere well to their medication regimen, while 31.6% show poor compliance. The obesity/overweight group (31.6%) reveals a notably high proportion of poor medication compliance (52.6%), with none in this group adhering well to their medication. A significant statistical difference is observed between BMI categories and medication compliance (P = 0.000), suggesting that BMI may influence medication compliance behaviors within the sample. Overall, the data highlights the importance of understanding how health-related behaviors, such as medication compliance, interact with physical health indicators like BMI.

Table 2. The Distribution of the Relationship Between Medication Compliance and Body Mass Index (BMI)

Variable	**Body Mass Indeks (BMI)**						***P-Value***
Medication	Normal		Underweight		Obesity/Overweight		
Compliance	N	%	N	%	N	%	
Poor	3	3.9	13	17.1	24	31.6	
Good	19	25.0	17	22.4	0	0.00	0.000

DISCUSSION

In analyzing the relationship between Body Mass Index (BMI) and medication compliance, the data reveals important trends that reflect the complexity of how physical health indicators influence health behaviors. First, the data shows a significant proportion of participants, particularly those with obesity or overweight (31.6% of the sample), exhibit poor medication compliance. This group accounts for over half of the poor compliance cases (52.6%), highlighting a potential challenge in managing medication regimens effectively in individuals with higher body mass. One possible explanation for this finding could be the impact of obesity on overall health, which may lead to challenges in managing multiple health conditions, possibly contributing to the reduced motivation or ability to adhere to prescribed medication regimens. Such observations are consistent with existing literature, which indicates that individuals with higher BMI often face additional health complications, making medication compliance more difficult (Lingvay et al., 2024; Schulz et al., 2020).

Conversely, individuals with a normal BMI (28.9%) tend to show better medication compliance, with 25.0% demonstrating good compliance to their prescribed treatments. Although this group also includes some who struggle with compliance, the lower prevalence of poor compliance suggests that individuals with normal BMI may have fewer health-related challenges, potentially making it easier for them to follow prescribed medical regimens. These findings resonate with studies that have shown that individuals with normal weight often experience fewer chronic health conditions, which could translate to a lower burden of medication management (Al Ahmadi et al., 2022; Ling & Rönn, 2019). The relatively higher compliance rates among this group highlight the potential benefits of maintaining a healthy weight for better medication compliance.

On the other hand, the underweight group (39.5%) showed a relatively high percentage of individuals with poor medication compliance (31.6%), despite a larger proportion demonstrating good compliance (17.1%). This pattern raises interesting questions about the role of nutritional status in health behavior. Underweight individuals may face different challenges compared to those in the normal or overweight categories, such as limited access to healthcare or difficulties in managing underlying health issues that may influence both their nutritional status and compliance to medication (Al Ahmadi et al., 2022). Further investigation into the specific causes of poor compliance in underweight individuals could

provide valuable insights for improving medication compliance strategies tailored to different nutritional statuses.

The statistical significance (P = 0.000) between BMI and medication compliance suggests a strong relationship between these two factors. This finding indicates that BMI may be an important variable to consider when developing strategies to improve medication compliance (Burnier, 2024). Healthcare providers might consider incorporating BMI as a screening tool for identifying individuals who may be at higher risk of non-compliance, especially in those who are overweight or underweight. Understanding the broader context of health behaviors, including BMI, could help in the design of more targeted interventions aimed at improving compliance in specific BMI categories. The relationship between BMI and medication compliance highlights the complexity of managing chronic health conditions and the importance of considering multiple factors when assessing patient behavior (Kvarnström et al., 2021). While individuals with normal BMI appear to have better medication compliance, both the underweight and obesity/overweight groups show significant challenges in following their prescribed treatments (Gabel et al., 2022). Future research should focus on exploring the underlying factors that contribute to these patterns, including socio-economic conditions, healthcare access, and psychological factors, to develop more effective strategies for improving medication compliance across different BMI categories. Additionally, healthcare providers should consider personalized approaches that account for an individual's BMI and overall health status to enhance compliance and improve health outcomes.

CONCLUSION

In conclusion, this study shows a significant relationship between Body Mass Index (BMI) and medication compliance. That individuals with obesity or overweight have the highest rates of poor medication compliance, suggesting that managing multiple health conditions in this group may present challenges to compliance. Conversely, individuals with normal BMI demonstrate better compliance, which may be attributed to fewer health-related complications. Interestingly, the underweight group also exhibits a considerable proportion of poor compliance, indicating that factors beyond BMI, such as access to healthcare or underlying health issues, may contribute to non-compliance in this category. The statistical significance of the relationship between BMI and medication compliance emphasizes the need for healthcare providers to consider BMI as a potential risk factor when addressing medication compliance. Overall, these findings underscore the importance of tailored interventions that take into account BMI and other socio-economic and health-related factors to improve medication compliance and enhance health outcomes across diverse populations

CONFLICTS OF INTEREST

The authors declare that this study is free from any conflicts of interest

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