

Original Research

A Case Study of Nursing Care for Patients with Uterine Myoma in the Midwifery Ward

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Background: Hypertension remains a major global health problem contributing significantly to morbidity and mortality. High sodium intake, excess body weight, and low physical activity are recognized as key modifiable risk factors. These factors influence blood pressure through increased vascular resistance and metabolic imbalance. Understanding their relationship is essential to support effective prevention strategies and promote healthy lifestyles in the community, particularly in reducing the burden of hypertension.

Methods : A quantitative cross-sectional study was conducted among 94 respondents selected through simple random sampling. Sodium intake was assessed using a semi-quantitative Food Frequency Questionnaire (SQ-FFQ). Physical activity was measured using the Physical Activity Level (PAL), while nutritional status was determined using Body Mass Index (BMI). Blood pressure was measured with a digital monitor. Data were analyzed using the chi-square test.

Results: The prevalence of hypertension was 66.0%. High sodium intake was observed in 63.8% of respondents, 62.8% were overweight, and 48.9% had low physical activity. Significant associations were found between hypertension and sodium intake, nutritional status, and physical activity ($p < 0.05$).

Conclusion: High sodium intake, overweight status, and low physical activity are significantly associated with hypertension, highlighting the importance of lifestyle modification for prevention and control.

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INTRODUCTION

Hypertension remains one of the leading global public health challenges, contributing significantly to morbidity and mortality worldwide. Cardiovascular diseases are the primary cause of death globally, with hypertension as a major contributing factor. Excessive sodium intake is widely recognized as a key determinant of elevated blood pressure, as it increases blood volume and vascular resistance. Globally, sodium consumption levels exceed recommended thresholds, with average intake more than double the World Health Organization recommendation of less than 2 grams per day (World Health Organization [WHO], 2023a). High sodium intake has been associated with increased risk of

cardiovascular diseases and contributes to millions of deaths annually, highlighting the urgent need for preventive interventions (WHO, 2023b).

Previous studies have consistently demonstrated that sodium intake plays a significant role in the development of hypertension. Evidence from systematic reviews and meta-analyses shows a clear dose-response relationship between sodium intake and blood pressure, indicating that higher sodium consumption is associated with increased risk of hypertension (Filippini et al., 2021; Filippini et al., 2022). Furthermore, reducing sodium intake has been proven to significantly lower both systolic and diastolic blood pressure across different populations (WHO, 2023b). In addition to dietary factors, nutritional status, particularly overweight and obesity, has been identified as an important determinant of hypertension. Individuals with excess body weight tend to experience increased sodium retention and higher cardiovascular workload, thereby elevating blood pressure levels (Zhang et al., 2021). Physical activity is another crucial factor influencing blood pressure regulation. Lifestyle modification, including regular physical activity, is considered a cornerstone in the prevention and management of hypertension. Evidence suggests that increased physical activity improves cardiovascular function, enhances metabolic efficiency, and reduces the risk of hypertension, while physical inactivity contributes to the development of non-communicable diseases (He et al., 2020). Therefore, hypertension is not only influenced by a single factor but rather by a combination of dietary, physiological, and behavioral determinants.

Despite extensive research on individual risk factors, previous studies have often examined sodium intake, nutritional status, and physical activity separately rather than in an integrated manner. Many studies focus solely on dietary patterns, while others emphasize anthropometric measurements or behavioral factors. This fragmented approach limits the understanding of how these variables interact collectively in influencing hypertension risk. Moreover, variations in demographic and environmental contexts may affect the magnitude of these relationships, emphasizing the importance of conducting context-specific studies (Wang et al., 2022; Novitasari et al., 2024).

The gap in the existing literature lies in the limited number of studies that simultaneously analyze the combined effects of sodium intake, nutritional status, and physical activity on hypertension using a comprehensive approach. This study addresses this gap by integrating these three key modifiable risk factors within a single analytical framework. The novelty of this research lies in its holistic approach, combining dietary assessment using a semi-quantitative Food Frequency Questionnaire (SQ-FFQ), evaluation of nutritional status through Body Mass Index (BMI), and measurement of physical activity using the Physical Activity Level (PAL). By examining these variables together, this study provides a more comprehensive understanding of hypertension determinants (Sari et al., 2024; Rumjani et al., 2026).

Furthermore, this study contributes empirical evidence from a community-based population, which may differ from findings obtained in hospital-based or large-scale national surveys. The results are expected to provide valuable insights for the development of targeted public health interventions aimed at reducing hypertension prevalence through lifestyle modification strategies. Although no explicit hypothesis is stated, this study is based on the assumption that high sodium intake, poor nutritional status, and low levels of physical activity are significantly associated with hypertension.

MATERIALS AND METHOD

A quantitative study with a cross-sectional design was conducted to examine the association between sodium intake, nutritional status, and physical activity with hypertension. The study was carried out in the service area of Pasar Ikan Public Health Center, Bengkulu

City, Indonesia, involving 94 respondents selected using a simple random sampling technique to ensure representativeness. The main instruments included a semi-quantitative Food Frequency Questionnaire (SQ-FFQ) to assess sodium intake, a digital weighing scale (accuracy ± 0.1 kg) and microtoise (accuracy ± 0.1 cm) to measure body weight and height for Body Mass Index (BMI) calculation, and a validated Physical Activity Level (PAL) questionnaire to determine physical activity levels. Blood pressure was measured using an automatic digital sphygmomanometer (Omron, Japan).

Data were collected through structured interviews and direct measurements. Sodium intake was assessed by recording the frequency and portion size of sodium-rich food consumption using the SQ-FFQ. Nutritional status was determined by calculating BMI and classified according to standard criteria. Physical activity levels were categorized into light, moderate, and heavy based on PAL scores. Blood pressure measurements were performed under standardized conditions, with respondents in a seated position after a resting period. Each measurement was conducted twice, and the average value was used for analysis.

Data analysis was performed using statistical software. Descriptive statistics were used to present frequency and percentage distributions of respondent characteristics. The chi-square test was applied to determine the association between sodium intake, nutritional status, physical activity, and hypertension, with a significance level set at $p < 0.05$. This study obtained ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Padang, and all respondents provided informed consent prior to participation. Confidentiality of participant data was strictly maintained throughout the study.

RESULTS

The study involved 94 respondents with varied demographic and health characteristics. The prevalence of hypertension among respondents was 66.0%. Based on sodium intake assessment using the SQ-FFQ, 63.8% of respondents were categorized as having high sodium intake, while the remaining had normal intake levels. In terms of nutritional status, 62.8% of respondents were classified as overweight based on Body Mass Index (BMI) measurements. Regarding physical activity, 48.9% of respondents reported light levels of activity, indicating a relatively low level of physical engagement among the study population.

Bivariate analysis using the chi-square test revealed statistically significant associations between all independent variables and hypertension. Sodium intake showed a significant relationship with hypertension ($p = 0.001$), where respondents with higher sodium intake were more likely to experience hypertension. Nutritional status was also significantly associated with hypertension ($p = 0.000$), indicating that overweight individuals had a higher prevalence of elevated blood pressure. Similarly, physical activity demonstrated a significant association with hypertension ($p = 0.003$), with respondents engaging in lower levels of physical activity showing a higher likelihood of hypertension. These findings indicate that high sodium intake, overweight status, and low physical activity are important factors associated with the occurrence of hypertension in the study population.

DISCUSSION

The findings of this study demonstrate that sodium intake, nutritional status, and physical activity are significantly associated with hypertension, confirming that hypertension is a multifactorial condition influenced by lifestyle factors. These results are consistent with current scientific evidence showing that dietary, physiological, and behavioral determinants interact in regulating blood pressure (Mills et al., 2020; Zhou et al., 2021; NCD Risk Factor Collaboration, 2021).

The significant association between sodium intake and hypertension aligns with previous studies demonstrating that excessive sodium consumption increases blood pressure through mechanisms involving fluid retention and vascular resistance (Filippini et al., 2022; He et al., 2020). Recent evidence also shows that reducing sodium intake significantly lowers blood pressure and cardiovascular risk (Ma et al., 2022; Huang et al., 2020; Graudal et al., 2021). These findings support the theoretical concept that sodium intake is a key modifiable determinant of hypertension.

Nutritional status was also found to be significantly associated with hypertension. Overweight individuals tend to experience increased cardiac workload and sodium retention, leading to elevated blood pressure (Zhang et al., 2021; Hall et al., 2021). This finding is consistent with previous research indicating that obesity plays a crucial role in hypertension development and progression (Kotsis et al., 2020; Jiang et al., 2021). The interaction between sodium intake and body mass index further emphasizes the importance of maintaining a balanced nutritional status.

Physical activity demonstrated a significant relationship with hypertension, where lower levels of activity were associated with increased blood pressure. This result is supported by evidence showing that regular physical activity improves cardiovascular function and reduces hypertension risk (Wang et al., 2022; Bull et al., 2020). Conversely, physical inactivity contributes to metabolic imbalance and increased cardiovascular risk (He et al., 2020; Ekelund et al., 2019). Therefore, promoting physical activity is essential in hypertension prevention strategies.

Compared to previous studies, the results of this study are consistent with both international and national findings. However, the strength of this study lies in its integrated analysis of multiple risk factors simultaneously. This approach provides a more comprehensive understanding of hypertension determinants compared to studies that examine these factors individually (NCD Risk Factor Collaboration, 2021; Zhou et al., 2021).

From a theoretical perspective, this study supports the concept that hypertension results from the interaction of multiple modifiable risk factors. From a practical perspective, the findings highlight the importance of integrated interventions focusing on reducing sodium intake, maintaining healthy body weight, and promoting physical activity. These strategies are essential for reducing the burden of hypertension at the community level (WHO, 2023a; WHO, 2023b).

However, this study has several limitations. The cross-sectional design limits causal interpretation, and the use of self-reported data may introduce recall bias. In addition, the study was conducted in a specific population, which may limit generalizability. Future research should consider longitudinal designs and objective measurement tools to strengthen evidence.

CONCLUSION

This study concludes that sodium intake, nutritional status, and physical activity are significantly associated with hypertension, where high sodium intake, overweight status, and low levels of physical activity increase the likelihood of hypertension, indicating that these modifiable factors play an important role in blood pressure regulation; therefore, integrated lifestyle interventions focusing on reducing sodium consumption, maintaining a healthy body weight, and promoting regular physical activity are recommended to prevent and control hypertension in the community.

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