



THE RELATIONSHIP BETWEEN STRESS LEVELS AND SUGAR AND SODIUM INTAKE AMONG HYPERTENSIVE PATIENTS AT BONTOMARANNU HEALTH CENTER

HUBUNGAN ANTARA TINGKAT STRES SERTA ASUPAN GULA DAN NATRIUM PADA PASIEN HIPERTENSI DI PUSKESMAS BONTOMARANNU

Fauziah Rizni Aprilia Rizal^{1*}, M. Rachmat Kasmad², Yade K. Yasin³

^{1*,2,3}Universitas Negeri Makasar, Email: fauziahrizniaprilizarizal@gmail.com

*email koresponden: fauziahrizniaprilizarizal@gmail.com

DOI: <https://doi.org/10.62567/micjo.v3i3.3394>

Abstract

This study aimed to determine the relationship between stress levels and sugar and sodium intake among hypertensive patients at Bontomarannu Health Center. This quantitative study used an analytical observational design with a cross-sectional approach. The study involved 40 hypertensive patients selected using accidental sampling. Stress levels were measured using the Perceived Stress Scale (PSS-10), while sugar and sodium intake were assessed using three non-consecutive 24-hour food recalls. Blood pressure was measured using a tensimeter. Data were analyzed using univariate and bivariate analyses, with Fisher's Exact Test applied to examine the relationships between stress level and sugar intake and between stress level and sodium intake at a 95% confidence level ($\alpha = 0.05$). The results showed that 72.5% of respondents had moderate stress, 82.5% had adequate sugar intake, and 65.0% had excessive sodium intake. Fisher's Exact Test showed a significant relationship between stress level and sugar intake ($p = 0.026$), whereas no significant relationship was found between stress level and sodium intake ($p = 0.759$). These findings indicate that stress level was associated with sugar intake, but not with sodium intake, among hypertensive patients at Bontomarannu Health Center.

Keywords : Hypertension, Stress Levels, Sugar Intake, Sodium Intake.

Abstrak

Penelitian ini bertujuan untuk mengetahui hubungan antara tingkat stres dengan asupan gula dan natrium pada pasien hipertensi di Puskesmas Bontomarannu. Penelitian kuantitatif ini menggunakan desain observasional analitik dengan pendekatan cross-sectional. Penelitian melibatkan 40 pasien hipertensi yang dipilih menggunakan teknik accidental sampling. Tingkat stres diukur menggunakan Perceived Stress Scale (PSS-10), sedangkan asupan gula dan natrium dinilai menggunakan metode recall makanan 24 jam yang dilakukan sebanyak tiga kali secara tidak berturut-turut. Tekanan darah diukur menggunakan tensimeter. Data dianalisis menggunakan analisis univariat dan bivariat, dengan



uji Fisher's Exact untuk menguji hubungan antara tingkat stres dengan asupan gula serta antara tingkat stres dengan asupan natrium pada tingkat kepercayaan 95% ($\alpha = 0,05$). Hasil penelitian menunjukkan bahwa 72,5% responden mengalami stres tingkat sedang, 82,5% memiliki asupan gula yang cukup, dan 65,0% memiliki asupan natrium yang berlebih. Uji Fisher's Exact menunjukkan adanya hubungan yang signifikan antara tingkat stres dan asupan gula ($p = 0,026$), sedangkan tidak ditemukan hubungan yang signifikan antara tingkat stres dan asupan natrium ($p = 0,759$). Temuan ini mengindikasikan bahwa tingkat stres berhubungan dengan asupan gula, namun tidak dengan asupan natrium, pada pasien hipertensi di Puskesmas Bontomarannu.

Kata Kunci : Hipertensi, Tingkat Stres, Asupan Gula, Asupan Natrium.

1. INTRODUCTION

Hypertension is a major noncommunicable disease and an important public health problem. The condition is influenced by both non-modifiable and modifiable factors, including age, sex, family history, diet, physical activity, obesity, smoking, and psychological stress. In Indonesia, the 2023 Indonesian Health Survey (SKI) reported a high prevalence of hypertension, indicating the continuing need for risk-factor control (Kemenkes, 2023). At Bontomarannu Health Center, hypertension was among the ten leading conditions recorded in 2024, with 419 cases.

Stress is relevant to hypertension because psychological stress can activate the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system. The resulting release of cortisol and catecholamines can increase heart rate, vascular resistance, and blood pressure. Chronic stress may also influence eating behavior, including the tendency to consume foods or beverages perceived as comforting, particularly those high in sugar (O'Connor et al., 2021; Pebriyani et al., 2022).

Sugar intake is also important in hypertension management. The Indonesian Ministry of Health recommends limiting daily sugar intake to 50 g or approximately four tablespoons per person per day (Kemenkes, 2024). Stress-related changes in appetite and emotional eating may increase the consumption of sweet foods and beverages in some individuals. Previous research has reported an association between perceived stress and consumption of sugar-sweetened beverages, while systematic evidence also links higher sugar intake with hypertension risk (Campos-Ramírez et al., 2023; Zhao et al., 2024).

Sodium intake is another important dietary factor. Excessive sodium consumption can promote fluid retention and increase blood volume, contributing to elevated blood pressure. For individuals with hypertension, sodium intake is recommended to be restricted to approximately 1.5 g per day in the thesis reference used for this study (Zubaidah, 2022). Sodium may be obtained from table salt as well as processed foods, seasonings, instant foods, sauces, and other packaged products (Istiqomah et al., 2021). Although stress may affect eating behavior, sodium intake may also be strongly influenced by established dietary habits, food availability, economic considerations, and family or cultural practices.

Previous studies have examined stress and dietary behavior, but evidence regarding the specific relationship between stress levels and sugar and sodium intake among hypertensive patients in the Bontomarannu Health Center setting remains limited. Therefore, this study aimed to determine the relationship between stress levels and sugar intake and between stress levels and sodium intake among hypertensive patients at Bontomarannu Health Center.

2. RESEARCH METHOD

This study used a quantitative analytical observational method with a cross-sectional design. The research was conducted at Bontomarannu Health Center during January–March 2026. The population consisted of 50 hypertensive patients recorded at the health center in October 2025. The study sample comprised 40 respondents who met the study criteria and were selected using accidental sampling.



Respondents were hypertensive patients aged more than 18 to 59 years who could be interviewed. Stress level was measured using the Perceived Stress Scale (PSS-10) and categorized as mild (0–14), moderate (15–26), or severe (>26). Sugar intake was assessed using 24-hour food recall and categorized as adequate (≤ 50 g/day) or excessive (>50 g/day), following the Ministry of Health recommendation. Sodium intake was categorized as adequate (≤ 1.5 g/day) or excessive (>1.5 g/day). Blood pressure was measured using a tensimeter and categorized according to the 2025 AHA classification used in the research.

Data collection included informed consent and respondent identification, blood-pressure measurement, administration of the PSS-10 questionnaire, and interviews concerning food and beverage consumption. Three non-consecutive 24-hour recalls were used to obtain a better representation of usual intake. The collected data were edited, coded, entered into IBM SPSS Statistics version 27, checked, and tabulated.

Univariate analysis was used to describe the frequency and percentage distributions of the study variables. Bivariate analysis was conducted to examine the relationship between stress level and sugar intake and between stress level and sodium intake. Fisher's Exact Test was used with a significance level of 95% ($\alpha = 0.05$).

3. RESULT AND DISCUSSION

A total of 40 hypertensive patients participated in the study. The descriptive results showed that most respondents were women, were in the older adult age groups, had moderate stress, had adequate sugar intake, and had excessive sodium intake.

Table 1. Characteristics of respondents

Variable	Category	n	%
Hypertension	High	10	25.0
	Stage 1	13	32.5
	Stage 2	17	42.5
Age (years)	25–30	1	2.5
	31–36	1	2.5
	37–42	5	12.5
	43–48	7	17.5
	49–54	12	30.0
	55–60	14	35.0
Sex	Male	6	15.0
	Female	34	85.0

Source: Primary data, 2026.

Table 2. Distribution of stress level, sugar intake, and sodium intake

Variable	Category	n	%
Stress level	Mild	6	15.0
	Moderate	29	72.5
	Severe	5	12.5
Sugar intake	Adequate	33	82.5
	Excessive	7	17.5
Sodium intake	Adequate	14	35.0
	Excessive	26	65.0

Source: Primary data, 2026.

The majority of respondents had moderate stress (72.5%). This finding is consistent with the discussion in the research report that patients with hypertension may experience psychological pressure related to chronic disease management, medication, monitoring, lifestyle changes, family responsibilities, and economic concerns. A previous study cited in the research also reported that moderate stress was common among hypertensive patients (Widyarni et al., 2023).



Most respondents had adequate sugar intake (82.5%), although 17.5% had excessive intake. The study report notes that sugar intake may come from sweetened tea or coffee, packaged beverages, sweet snacks, and processed foods. The use of three non-consecutive 24-hour recalls was intended to capture variation in food consumption across different days (Gibson, 2005).

In contrast, excessive sodium intake was found in 65.0% of respondents. The research report describes salt, seasoning, processed foods, instant noodles, salted fish, sauces, and packaged foods as potential contributors. The pattern is consistent with evidence that processed foods can make an important contribution to sodium intake (Istiqomah et al., 2021).

Table 3. Relationship between stress level and sugar intake

Stress level	Sugar adequate n (%)	Sugar excessive n (%)	Total n (%)	p-value
Mild	5 (12.5)	1 (2.5)	6 (15.0)	0.026
Moderate	26 (65.0)	3 (7.5)	29 (72.5)	
Severe	2 (5.0)	3 (7.5)	5 (12.5)	
Total	33 (82.5)	7 (17.5)	40 (100)	

Source: Primary data, 2026.

The Fisher's Exact Test produced $p = 0.026$, indicating a statistically significant relationship between stress level and sugar intake at $\alpha = 0.05$. The cross-tabulation also shows that excessive sugar intake was proportionally more common among respondents with severe stress (3 of 5 respondents) than among those with mild stress (1 of 6 respondents), although the study design does not establish causality.

The finding is biologically plausible because stress can activate the HPA axis and increase cortisol secretion, which may influence appetite and food reward processes. Stress-related emotional eating can lead some individuals to choose sweet foods or beverages as a short-term coping response. The research report also emphasizes that individual responses vary: some respondents with severe stress still had adequate sugar intake, while some respondents with lower stress had excessive intake because of established consumption habits. This interpretation is consistent with literature describing links between stress, eating behavior, and reward-related food choice (Hill et al., 2022; Kuckuck et al., 2022; Campos-Ramírez et al., 2023).

Table 4. Relationship between stress level and sodium intake

Stress level	Sodium adequate n (%)	Sodium excessive n (%)	Total n (%)	p-value
Mild	1 (2.5)	5 (12.5)	6 (15.0)	0.759
Moderate	11 (27.5)	18 (45.0)	29 (72.5)	
Severe	2 (5.0)	3 (7.5)	5 (12.5)	
Total	14 (35.0)	26 (65.0)	40 (100)	

Source: Primary data, 2026.

The Fisher's Exact Test yielded $p = 0.759$, indicating no statistically significant relationship between stress level and sodium intake in this sample. Although excessive sodium intake was common across stress categories, the pattern did not show a statistically significant association.

The research report suggests that sodium intake may be more strongly influenced by habitual dietary practices than by current stress level. Respondents reported consuming foods such as salted fish, instant noodles, and other foods commonly eaten in their daily environment. Economic considerations, food availability, established eating habits, nutrition knowledge, family support, and adherence to health-worker recommendations may also affect sodium intake. Thus, variation in stress level does not necessarily correspond to a change in sodium consumption.

The absence of a significant association should not be interpreted as evidence that sodium intake is unimportant for hypertension management. Excess sodium intake can increase fluid retention and blood volume and is associated with increased blood pressure. Sodium reduction therefore remains relevant for dietary management of hypertension (Filippini et al., 2021).



DISCUSSION

The main finding of this study is that stress level was significantly associated with sugar intake but was not significantly associated with sodium intake. These two findings suggest that the relationship between psychological stress and dietary intake may differ according to the nutrient and the food sources that predominantly contribute to intake.

The significant relationship between stress and sugar intake can be discussed through both physiological and behavioral pathways. Stress activates the HPA axis and sympathetic nervous system. Cortisol and other stress-related responses may alter appetite and food preference, while highly palatable foods may provide short-term emotional reward. However, the cross-sectional design only identifies an association at the time of measurement; it cannot determine whether stress caused increased sugar intake or whether other factors contributed to both variables.

The non-significant relationship between stress and sodium intake may reflect the more habitual nature of sodium consumption. Sodium is frequently obtained from foods and seasonings that are integrated into daily meals, including processed foods, instant foods, sauces, and salted foods. Such habits may persist regardless of short-term changes in psychological stress. The research findings also indicate that respondents' food choices were influenced by affordability and customary eating patterns.

The findings have practical implications for nutrition services at the health-center level. Counseling for hypertensive patients can address both dietary behavior and stress management, while continuing to emphasize restriction of excessive sugar and sodium intake. For sodium, interventions may need to focus on food selection, cooking practices, label awareness, and sustainable changes in established dietary habits. Because this study did not examine all potential determinants of intake, future research could include nutrition knowledge, physical activity, dietary adherence, family support, education, and economic status.

4. CONCLUSION

1. There was a significant relationship between stress level and sugar intake among hypertensive patients at Bontomarannu Health Center ($p = 0.026$).
2. There was no significant relationship between stress level and sodium intake among hypertensive patients at Bontomarannu Health Center ($p = 0.759$).
3. Most respondents had moderate stress (72.5%), adequate sugar intake (82.5%), and excessive sodium intake (65.0%).

5. REFERENCES

- Alfian, S. D., Annisa, N., Perwitasari, D. A., Coelho, A., & Abdulah, R. (2022). The role of illness perceptions on medication nonadherence among patients with hypertension: A multicenter study in Indonesia. *Frontiers in Pharmacology*, 13, 1–7. <https://doi.org/10.3389/fphar.2022.985293>
- Campos-Ramírez, C., Palacios-Delgado, J., Caamaño-Perez, M. del C., Camacho-Calderon, N., Villagrán-Herrera, M. E., Aguilar-Galarza, A., García-Gasca, T., & Anaya-Loyola, M. A. (2023). Perceived stress is directly associated with major consumption of sugar-sweetened beverages among public university students. *Behavioral Sciences*, 13(3). <https://doi.org/10.3390/bs13030232>
- Filippini, T., Malavolti, M., Whelton, P. K., Naska, A., Orsini, N., & Vinceti, M. (2021). Blood pressure effects of sodium reduction. *Circulation*, 143(16), 1542–1567. <https://doi.org/10.1161/CIRCULATIONAHA.120.050371>
- Gibson, R. S. (2005). *Principles of Nutritional Assessment* (2nd ed.). Oxford University Press.
- Hill, D., Conner, M., Clancy, F., Moss, R., Wilding, S., Bristow, M., & O'Connor, D. B. (2022). Stress and eating behaviours in healthy adults: A systematic review and meta-analysis. *Health Psychology Review*, 16(2), 280–304. <https://doi.org/10.1080/17437199.2021.1923406>



- Istiqomah, N., Astawan, M., & Palupi, N. S. (2021). Assessment of sodium content of processed food available in Indonesia. *Jurnal Gizi Pangan*, 16(3), 129–138. <https://doi.org/10.25182/jgp.2021.16.3.129-138>
- Kemenkes. (2023). Survei Kesehatan Indonesia (SKI). Kementerian Kesehatan, Badan Kebijakan Pembangunan Kesehatan.
- Kemenkes. (2024). Cegah meningkatnya diabetes, jangan berlebihan konsumsi gula, garam, lemak. Kementerian Kesehatan Republik Indonesia.
- Kuckuck, S., van der Valk, E. S., Scheurink, A. J. W., van der Voorn, B., Iyer, A. M., Visser, J. A., Delhanty, P. J. D., van den Berg, S. A. A., & van Rossum, E. F. C. (2022). Glucocorticoids, stress and eating: The mediating role of appetite-regulating hormones. *Obesity Reviews*, 24(3), 1–12. <https://doi.org/10.1111/obr.13539>
- Mancia, G., Kreutz, R., Brunström, M., Burnier, M., Grassi, G., Januszewicz, A., Muiesan, M. L., Tsioufis, K., Agabiti-Rosei, E., et al. (2023). 2023 ESH Guidelines for the management of arterial hypertension. *Journal of Hypertension*, 41(12). <https://doi.org/10.1097/HJH.0000000000003480>
- O'Connor, D. B., Thayer, J. F., & Vedhara, K. (2021). Stress and health: A review of psychobiological processes. *Annual Review of Psychology*, 72, 663–688. <https://doi.org/10.1146/annurev-psych-062520-122331>
- Pebriyani, U., Triswanti, N., Prawira, W. F., & Pramesti, W. (2022). Hubungan antara tingkat stres dengan angka kejadian hipertensi pada usia produktif di Puskesmas Kedaton Bandar Lampung. *Medula*, 12(2), 261–267.
- Sugiyono, P. (2020). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Alfabeta.
- WHO. (2023). Stress. World Health Organization.
- Widyarni, A., Irianty, H., & Maharani, N. (2023). Hubungan tingkat stres dengan penyakit hipertensi di wilayah kerja Puskesmas S. Parman Kota Banjarmasin. *The Indonesian Journal of Health Promotion*, 6(9), 1783–1788. <https://doi.org/10.56338/mppki.v6i9.3519>
- Zhao, Y., Feng, Y., Zeng, Y., et al. (2024). Sugar intake and risk of hypertension: A systematic review and dose-response meta-analysis of cohort and cross-sectional studies. *Critical Reviews in Food Science and Nutrition*, 64(26), 9483–9494.