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RESEARCH ARTICLE

Dietary patterns and hypertension among daily laborers at Belawan Community Health Center

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ABSTRACT

Background: Occupational health problems in the informal sector, particularly among daily laborers in coastal areas such as the working area of Belawan Community Health Center, require special attention. Heavy physical activity, environmental exposure, and individual characteristics are strongly suspected to be associated with fluctuations in blood pressure (systolic and diastolic) that may increase hypertension risk. This study aimed to determine the relationship between dietary patterns and hypertension among daily laborers in the working area of Belawan Community Health Center.
Method: This quantitative study used a correlational analysis with a cross-sectional design. A sample of 92 daily laborers was selected using purposive sampling. Data were collected through interviews using a questionnaire and direct blood pressure measurement using a sphygmomanometer. Data were analyzed using the Chi-square test ($\alpha = 0.05$) with SPSS.
Results: Univariate analysis showed that most respondents had poor dietary patterns (64.1%) and were classified as having hypertension (44.6%) or prehypertension (28.3%). The Chi-square test yielded a p-value of less than 0.001, indicating a significant relationship between dietary pattern and hypertension among daily laborers in this population. Respondents with poor dietary patterns predominantly had elevated blood pressure, while those with good dietary patterns were more likely to have normal blood pressure.
Conclusion: There is a significant relationship between dietary pattern and hypertension among daily laborers at Belawan Community Health Center. Regular health screening programs for informal sector workers in this area are recommended.

Keywords: daily laborers, dietary pattern, blood pressure

Introduction

Hypertension, or high blood pressure, is a non-communicable disease that poses a global health threat and is known as a silent killer.[1] According to WHO data, this disease, which is a primary trigger for cardiovascular complications such as heart disease and stroke, has affected more than 1.28 billion people worldwide, with the majority of cases in low- and middle-income countries. One of the major modifiable risk factors is dietary pattern.[2–4] Various studies have shown that high consumption of sodium, saturated fats, salt, fast food, and ultra-processed foods consistently increases hypertension risk.[5,6] Conversely, a healthy diet rich in fruits and vegetables has been proven to reduce this risk.[7,8]

At the national level, Indonesia faces a major challenge with a hypertension prevalence of 34.1% among adults aged 18 years and above based on the 2018 Basic Health Research (Riskesdas).[9] Vulnerability is higher among informal sector workers, with a prevalence reaching 37.5% due to stress factors and unhealthy lifestyles.[10] Daily laborers, as part of the informal sector, are the most at-risk group because of

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economic limitations and irregular working hours.[11] These conditions force them to choose ready-to-eat foods or street snacks high in sodium and fat, combined with low awareness of balanced nutrition.[12] The strong relationship between poor dietary patterns and hypertension has been reinforced by research in various regions, such as at Prambanan Community Health Center, Klaten[13] and Semanding Community Health Center, Tuban[14].

A similar phenomenon occurs at the regional level in North Sumatra, particularly in Medan City. Based on the 2022 Medan City Health Profile, hypertension is among the top ten diseases, with a total of 65,904 cases. More specifically, the working area of Belawan Community Health Center recorded 1,225 active hypertension patients in 2025. Local research by Siregar et al.[15] in this area confirmed that the high number of hypertension cases in Belawan is closely related to the community's habit of excessive salt consumption and low intake of fruits and vegetables. This study aimed to analyze the relationship between dietary patterns and the incidence of hypertension among daily laborers at Belawan Community Health Center.

Method

This analytical study used a quantitative approach with a cross-sectional design to assess the relationship between dietary pattern and hypertension through data collected at a single time point. The study was conducted at Belawan Community Health Center, located on Jl. Stasiun No. 1 Komplek P. JKA, starting in April 2026 until completion.

The population comprised all daily laborers aged 18–49 years registered at Belawan Community Health Center, totaling 1,225 individuals based on medical records for the 2025 period. The sample size of 92 respondents was calculated using the Slovin formula with a 10% margin of error. Purposive sampling was used based on specific criteria aligned with the research objectives. Inclusion criteria were: daily laborers in the working area of Belawan Community Health Center, aged at least 18 years, willing to be respondents, and able to communicate effectively.

Data were collected through interviews using a structured questionnaire to assess dietary patterns and through direct blood pressure measurement using a calibrated sphygmomanometer. Univariate analysis described the frequency distribution of respondent characteristics (age, sex, education, occupation, address), dietary pattern, and blood pressure category. Bivariate analysis used the Chi-square test ($\alpha = 0.05$) with SPSS to examine the relationship between dietary pattern and hypertension.

Results

Table 1 presents the sociodemographic characteristics of the 92 respondents. The majority were male (59 respondents, 64.1%), while female respondents numbered 33 (35.9%). Regarding age, the largest group was aged 30–35 years (40 respondents, 43.5%), followed by those aged 35–49 years (25, 27.2%), 25–30 years (17, 18.5%), and 18–25 years (10, 10.9%). In terms of education, most respondents had completed senior high school (49, 53.3%), followed by junior high school (22, 23.9%) and elementary school (21, 22.8%). All respondents (100.0%) worked as daily laborers. Regarding residential distribution, the largest group lived in Belawan I Village (38, 41.3%), with equal numbers from Belawan II Village (27, 29.3%) and Bagan Deli Village (27, 29.3%).

Table 1. Distribution of respondent characteristics (N=92)

Characteristic	Category	Frequency (n)	Percentage (%)
Sex	Male	59	64.1
	Female	33	35.9
Age	18-25 years	10	10.9
	25-30 years	17	18.5
	30-35 years	40	43.5
	35-49 years	25	27.2
Education	Elementary school	21	22.8
	Junior high school	22	23.9
	Senior high school	49	53.3
Occupation	Daily laborer	92	100.0
Village	Belawan I	38	41.3
	Belawan II	27	29.3
	Bagan Deli	27	29.3

Table 2 combines the frequency distributions for dietary pattern and blood pressure status. Regarding dietary pattern, the majority of respondents (59, 64.1%) had poor dietary patterns, characterized by frequent consumption of high-sodium foods, instant or processed foods, and fried foods. Only 33 respondents (35.9%) had good dietary patterns. Regarding blood pressure, the largest group was classified as hypertensive (41, 44.6%), followed by prehypertensive (26, 28.3%), and normal (25, 27.2%). More than two-thirds of respondents had elevated blood pressure (prehypertension or hypertension combined), indicating a substantial burden of blood pressure abnormalities in this population.

Table 2. Distribution of dietary pattern and blood pressure status (N=92)

Variable	Category	Frequency (n)	Percentage (%)
Dietary pattern	Good	33	35.9
	Poor	59	64.1
Blood pressure	Normal	25	27.2
	Prehypertension	26	28.3
	Hypertension	41	44.6

Table 3 presents the cross-tabulation between dietary pattern and blood pressure category. Among the 33 respondents with good dietary patterns, the majority had normal blood pressure (25, 27.2% of total respondents), followed by prehypertension (6, 6.5%), and only 2 (2.2%) had hypertension. In contrast, among the 59 respondents with poor dietary patterns, none had normal blood pressure. The largest group among those with poor dietary patterns had hypertension (39, 42.4%), followed by prehypertension (26, 28.3%). The Chi-square test yielded a p-value of less than 0.001, which is below the significance threshold of 0.05. Therefore, the null hypothesis is rejected, and it is concluded that there is a statistically significant relationship between dietary pattern and hypertension among daily laborers in the working area of Belawan Community Health Center. Notably, every respondent with a poor dietary pattern had elevated blood pressure (prehypertension or hypertension), while the majority of those with good dietary patterns maintained normal blood pressure.

Table 3. Relationship between dietary pattern and blood pressure (N=92)

Dietary Pattern	Normal n (%)	Prehypertension n (%)	Hypertension n (%)	Total	p-value
Good	25 (27.2)	6 (6.5)	2 (2.2)	33	<0.001
Poor	0 (0.0)	26 (28.3)	39 (42.4)	59	
Total	25 (27.2)	26 (28.3)	41 (44.6)	92	

Discussion

This study found a significant relationship between dietary pattern and hypertension among daily laborers at Belawan Community Health Center. The majority of respondents had poor dietary patterns and were in the hypertensive or prehypertensive categories. In contrast, respondents with good dietary patterns predominantly had normal blood pressure.

The high proportion of poor dietary patterns among daily laborers can be explained by their working conditions. Daily laborers typically have irregular working hours, high physical demands, and limited economic resources.[16] These factors push them toward convenient, inexpensive, and calorie-dense food options such as instant noodles, fried foods, salty snacks, and processed meats available near the port area.[17] Field observations and questionnaire responses indicated that respondents frequently consumed salted fish, salted eggs, dishes with excessive salt and seasoning, and instant foods.[18] The coastal geography of Belawan facilitates easy access to salted and preserved fish products, and the need for savory flavors to stimulate appetite after heavy physical work further reinforces these habits.[19]

Physiologically, the accumulation of sodium from these foods leads to fluid retention, increased blood volume, and elevated pressure on vessel walls. This condition is worsened by high saturated fat intake from fried foods and coconut milk, which promotes plaque formation in arteries (atherosclerosis), resulting in vasoconstriction and increased peripheral resistance.[20] Compounding this problem is the very low awareness of nutritional balance among workers. Most respondents reported never or only occasionally consuming fruits and vegetables daily, citing inconvenience and the perception that such foods do not provide instant energy. Consequently, their bodies experience a significant deficit of potassium, magnesium, and fiber—nutrients that help counteract sodium effects and promote blood vessel relaxation.[21] Over time, this poor

dietary pattern triggers chronic metabolic disorders such as obesity and dyslipidemia, which directly contribute to blood pressure elevation.[21,22]

These findings are consistent with local studies by Mardianto et al.[23] and Hasanuddin et al.[24], which also reported significant associations between poor dietary patterns (high salt/fat, low fiber) and hypertension. The results are further supported by international evidence from Jaques et al.[21] and a systematic review by Wang et al.[22], which identified excessive sodium intake as a major cardiovascular risk factor due to increased plasma volume and cardiac workload. Moreover, the Dietary Approaches to Stop Hypertension (DASH) trial by Sacks et al.[25] demonstrated clinically that reducing sodium intake while increasing consumption of fruits, vegetables, and fiber-rich foods rich in potassium and magnesium is highly effective in controlling blood pressure and reducing complication risk.

This study provides specific evidence on dietary patterns and hypertension among informal sector daily laborers, a group often underrepresented in research. Direct blood pressure measurement enhanced data accuracy. However, limitations include the cross-sectional design, which cannot establish causality; the relatively small sample size (n=92) from a single health center, limiting generalizability; and reliance on self-reported dietary patterns, which may be subject to recall bias. Future studies should use larger, multi-site samples and more objective dietary assessment methods (e.g., 24-hour dietary recalls).

Belawan Community Health Center should strengthen regular health screening programs for informal sector workers, particularly daily laborers. Nutrition education interventions should focus on practical, affordable strategies to reduce sodium intake and increase fruit and vegetable consumption within the constraints of workers' schedules and budgets. Workplace-based health promotion targeting port and coastal industries could also be explored. Policy makers should consider subsidizing healthy food options for low-income workers and improving access to nutrition counseling at primary health centers.

Conclusion

This study found a significant relationship between dietary pattern and hypertension among daily laborers in the working area of Belawan Community Health Center. The majority of respondents had poor dietary patterns and were classified as having hypertension or prehypertension. Respondents with poor dietary patterns consistently had elevated blood pressure, while those with good dietary patterns were more likely to have normal blood pressure. Regular health screenings and targeted nutrition education are recommended for this high-risk population.

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