Open Access

Journal of Scientific Insights
E-ISSN: 3062-8571
DOI: https://doi.org/10.69930/jsi.v2i6.570
Research Article

ScienceTech Group

Vol. 2 (6), 2025
Page: 677-691

Factors Associated with Hypertension in Lautem Municipality, Timor Leste in 2025

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Abstract. *Hypertension is a leading global health problem and a major cause of cardiovascular and renal complications. In low- and middle-income countries, including Timor-Leste, its prevalence continues to rise despite ongoing prevention programs. This study examines the factors influencing hypertension in Lautem Madya City, Timor-Leste, focusing on behavioral, cultural, and socio-demographic determinants. This study uses a qualitative approach with a cross-sectional was applied using data from the Lautem Health Office. Associations between lifestyle behaviors, cultural practices, and structural barriers with hypertension prevalence were analyzed. Using a cross-sectional analytic design and Structural Equation Modeling–Partial Least Squares (SEM-PLS), 340 adult respondents (170 with hypertension and 170 without) were surveyed between January and April 2025. Data were analyzed revealed that age, gender, family history, education, diet (high salt and meat intake), smoking, alcohol consumption, limited healthcare access, and poor family support were significantly associated with hypertension ($p < 0.05$). Cultural practices emerged as a central factor, directly increasing hypertension risk and mediating the effects of lifestyle behaviors such as diet, smoking, and alcohol use. These findings indicate that hypertension prevention in Lautem Municipality requires culturally tailored and family-centered interventions supported by improved primary healthcare systems. This study contributes empirical evidence on the interaction of lifestyle, social, and cultural determinants of hypertension in a low- and middle-income country context.*

Keywords: *Hypertension, risk factors, lifestyle, cultural practices, timor-leste, lautem municipality*

1. Introduction

Hypertension remains a major global public health challenge, contributing significantly to the burden of cardiovascular, cerebrovascular, renal, and other chronic diseases, as well as premature mortality (Mills et al., 2020). It is often referred to as a "silent killer" because it presents with no symptoms but can lead to severe complications such as myocardial infarction and kidney failure (Antza et al., 2021). According to the Ministry of Health (2018), hypertension is defined as a systolic blood pressure ≥140 mmHg or a diastolic pressure ≥90 mmHg.

One of the Sustainable Development Goals (SDGs) is to reduce the prevalence of hypertension by 25% by 2025 (WHO, 2025). However, recent data show that this target has not been met. Globally, the prevalence increased from 26.4% in 2018 to 29.2% in 2021, leaving a 4.2% gap (WHO, 2023a). Low- and middle-income countries (LMICs) are disproportionately affected, with a prevalence of around 31% compared to 28% in high-income countries (Mills et al., 2020). It is projected that by 2025, 1.5 billion people will be affected by hypertension, contributing to an estimated 10.8 million deaths annually (Abbafati et al., 2020). In Southeast Asia, cases have risen dramatically, and Timor-Leste is ranked 60th globally for hypertension prevalence (WHO, 2020).

In Timor-Leste, hypertension has emerged as a pressing non-communicable disease (NCD). Among adults aged 30–70 years, prevalence increased from 26% in 2015 to 37% in 2023, equivalent to approximately 141,000 cases (WHO, 2023b). This rate is higher than in

Received: 31 October 2025 / Accepted: 4 December 2025 / Available online: 5 December 2025

neighboring Southeast Asian countries such as Malaysia (30.3%) and Singapore (23.5%), and it exceeds the national target of reducing hypertension by 25% by 2025 (Chauhan et al., 2023). In response, the Ministry of Health developed the Multisectoral Action Plan for the Prevention and Control of NCDs (2018–2021), focusing on health promotion and primary prevention, particularly targeting risk factors such as smoking, alcohol consumption, poor diet, and physical inactivity (MDS-TL, 2015).

At the local level, Lautem Municipality has shown fluctuating trends in hypertension cases. Data from the Lautem Health Office reported an increase from 389 cases in 2022 to 699 in 2023, followed by a decrease to 555 in 2024. Despite ongoing interventions, the burden remains significant, with contributing factors including obesity, sedentary behavior, high salt intake, smoking, alcohol consumption, chronic stress, and limited access to healthcare services (Leszczak et al., 2024; Mills et al., 2020). Cultural practices, such as the use of traditional alcoholic beverages during social events and the frequent consumption of fatty red meat prepared with coconut oil or lard, also exacerbate the problem. Moreover, smoking continues to be a socially accepted practice, especially among men, further compounding the risk of hypertension.

Beyond behavioral and cultural determinants, structural challenges—such as low awareness, limited knowledge, geographic barriers, and economic constraints—contribute to underdiagnosis and poor management of hypertension (Mahwati et al., 2022; Mali et al., 2023). Studies have shown that individuals with low knowledge about hypertension are at significantly greater risk compared to those with higher knowledge (Mohammed et al., 2022). These findings highlight the importance of public health interventions that strengthen awareness, promote healthy lifestyles, and improve access to regular blood pressure screening, particularly in rural and high-risk communities.

Despite global and national initiatives, gaps remain in understanding the specific local determinants of hypertension in Timor-Leste. In particular, Lautem Municipality requires context-specific evidence to guide effective interventions. Therefore, this study aims to identify the factors influencing the incidence of hypertension in Lautem Madya City, with a focus on behavioral, cultural, and socio-demographic determinants.

2. Methods

This study employed a cross-sectional analytic design using Structural Equation Modeling–Partial Least Squares (SEM-PLS) to assess lifestyle, cultural, and demographic determinants of hypertension. The research was conducted in Lautem Municipality, located in the eastern region of Timor-Leste, between January and April 2025. Lautem was selected as the study site because of its persistently high prevalence of hypertension and the observed fluctuations in cases despite existing public health interventions.

The study population included adults aged 18 years and above who resided permanently in Lautem Municipality. A total of 340 respondents participated, consisting of 170 individuals with hypertension and 170 without hypertension. Participants were recruited through community health posts, primary health centers, and the municipal hospital. *Consequetive* sampling was applied to ensure proportional representation across sub-districts. Inclusion criteria were: (1) permanent residency in Lautem Municipality, (2) age 18 years or older, (3) willingness to participate, and (4) ability to provide informed consent. Exclusion criteria included: (1) secondary hypertension due to other medical

conditions such as Cushing's syndrome or chronic renal failure, (2) pregnancy, and (3) inability to complete the questionnaire due to severe illness or cognitive impairment.

Data were collected through face-to-face structured interviews using a validated questionnaire administered by trained enumerators. The instrument covered socio-demographic characteristics, lifestyle behaviors, dietary habits, family history of hypertension, cultural practices, family support, and healthcare access. Blood pressure was measured with a calibrated digital sphygmomanometer by taking two measurements at five-minute intervals and calculating the average.

3. Results and Discussion

Table 1. Demographic Characteristics of Respondents

Variable	*Frequency*	*Percentage*
Gender		
Male	187	55%
Female	153	45%
Age		
Age >45 years	174	51.2%
Age 18–45 years	166	48.8%
History of Hypertension		
With	180	52.9%
Without	160	47,1%

More than half of the participants (51.2%) were older than 45 years, and this group was significantly associated with hypertension ($p < 0.05$). This finding is consistent with prior studies indicating that vascular aging and arterial stiffness increase susceptibility to hypertension in older adults (Ostchega et al., 2020).

Female respondents accounted for 55% of the sample, and gender was also significantly associated with hypertension, in line with evidence that sex hormones and post-menopausal changes contribute to elevated blood pressure in women (Niu et al., 2024).

Family history of hypertension was reported by 52.9% of respondents, and it showed a strong association with hypertension incidence ($p<0.01$). This finding corroborates previous evidence that genetic predisposition significantly elevates the risk of developing hypertension (Haider, 2020).

Tabel 2. Lifestyle and Behavioural Risk Factors

Variable	*Frequency*	*Percentage*
Education Level		
Senior High School (No – Junior High School)	160	47,1%
Elementary School (High School - University	180	52,9%
Salt Intake		
Low	163	47,1%
Tall	177	52,9%
Meat Intake		
Low	167	42,1%

Tall	173	57,9%
Smoking Habits		
Passive	140	41,2%
Active	200	58,8%
Alcohol Consumption		
Tall	176	50,3%
Low	164	49,7%
Access to Health Services		
Easy	166	48,8%
Difficult	174	51,2%
Family Support		
Bad	185	54,4%
Good	155	45,6%
Cultural Influence		
Has no effect	109	32,1%
Influential	231	66,8%

The presents lifestyle and behavioral risk factors. High salt intake (52.9%) was significantly associated with hypertension ($p<0.01$), confirming WHO reports that excessive sodium is a major dietary risk factor (WHO, 2022). Similarly, high meat consumption (47.1%) increased hypertension risk, consistent with Ba et al. (2022), who found that frequent intake of fatty red meat raises LDL cholesterol and arterial stiffness.

Smoking (53.2%) and alcohol consumption (55.9%) were also significant predictors. Smoking was strongly linked to hypertension ($p<0.001$), in line with Hu et al. (2024), while alcohol intake showed a positive association ($p<0.05$), supporting studies that excessive consumption contributes to secondary hypertension and organ damage (Di Federico et al., 2023; Vacca et al., 2023).

Socioeconomic and structural factors further influenced outcomes. Low education level (53.5%) and poor healthcare access (52.6%) were associated with higher risk, reflecting the role of limited health literacy and service barriers in delaying prevention and treatment (Wehrli et al., 2024). In addition, poor family support was reported by 58.8% of respondents and was significantly associated with hypertension, consistent with Lestari et al. (2022), who emphasized the importance of family encouragement in sustaining healthy behaviors.

Cultural influence, acknowledged by 47.4% of respondents, was confirmed through SEM-PLS analysis as a mediator between lifestyle factors and hypertension. In Lautem Municipality, cultural traditions often involve alcohol, smoking, and fatty foods, amplifying lifestyle risks. This highlights the importance of integrating cultural considerations into public health interventions, as cultural norms can both reinforce and hinder healthy practices (Sima, 2024).

Table 3. Result of Loading Factors

Variabel	*Indicator*	*Loading Factor*	*Desc.*
Meat Consumption	Frequency of red meat consumption (MC1)	0.888	Valid
	Frequency of processed food consumption (MC2)	0.916	Valid

Variabel	*Indicator*	*Loading Factor*	*Desc.*
	Frequency of consuming organ meats (intestine, liver, and brain) (MC3)	0.921	Valid
	Frequency of consuming chicken meat with skin (MC4)	0.892	Valid
	Frequency of consuming fried meat (MC5)	0.902	Valid
Salt Intake	Frequency of adding salt to meals (SI1)	0.934	Valid
	Frequency of consuming salty foods (salted fish, crackers, pickles) (SI2)	0.897	Valid
	Frequency of consuming processed foods (SI3)	0.903	Valid
	Frequency of consuming flavor enhancers (SI4)	0.911	Valid
Healthcare Access	Time taken to reach the nearest healthcare service (HA1)	0.922	Valid
	Accessibility of healthcare services (HA2)	0.886	Valid
	Availability of transportation (HA3)	0.886	Valid
	Condition of the road to healthcare facility (HA4)	0.902	Valid
	Geographical obstacles to health services access (HA5)	0.908	Valid
Family Support	Family attention to health complaints (FS1)	0.940	Valid
	Support for dietary habits (FS2)	0.941	Valid
	Family support for healthy eating patterns (FS3)	0.937	Valid
	Provision of information about prevention methods (FS4)	0.940	Valid
	Family assistance in avoiding unhealthy foods (FS5)	0.922	Valid

Variabel	*Indicator*	*Loading Factor*	*Desc.*
Hypertension	Hypertension	1.000	Valid
Gender	Gender	1.000	Valid
Alcohol Consumption	Alcohol consumption routine (AC1)	0.917	Valid
	Frequency of alcohol consumption within two weeks (AC2)	0.891	Valid
	Frequency of alcohol consumption at one time (AC3)	0.882	Valid
	Difficulty in quitting or reducing alcohol consumption (AC4)	0.876	Valid
	Alcohol consumption when experiencing problems (AC5)	0.900	Valid
Smoking Habit	Frequency of Smoking (SH1)	0.875	Valid
	Frequency of cigarettes smoked (SH2)	0.851	Valid
	Duration of smoking period (SH3)	0.873	Valid
	Difficulty in quitting the smoking habit (SH4)	0.890	Valid
	Frequency of smoking when experiencing problems (SH5)	0.879	Valid
Culture Influence	Frequency of fatty food in cultural events (CI1)	0.888	Valid
	Frequency of cultural events in one week (CI2)	0.864	Valid
	Frequency of salt use in cultural events (CI3)	0.857	Valid
	Frequency of alcohol consumption in cultural events (CI4)	0.879	Valid
	Frequency of smoking in cultural events (CI5)	0.876	Valid
Family History	Family History of Hypertension	1.000	Valid
Education	Educational Level	1.000	Valid
Age	Age	1.000	Valid

Table 4. Results of Average Variance Extracted

Variabel	*AVE*	*Desc*
Meat Intake	0.817	Valid
Salt Intake	0.830	Valid
Healthcare Access	0.811	Valid
Family Support	0.876	Valid
Alcohol Consumption	0.798	Valid
Smoking	0.763	Valid
Culture Influence	0.762	Valid

Based on the validity testing, all constructs in this study demonstrated strong measurement properties. The indicators for Meat Consumption (MC1–MC5) showed loading factors ranging from 0.888 to 0.921, confirming their strong reflection of the construct. Similarly, Salt Intake (SI1–SI4) yielded high loading factors between 0.897 and 0.934, while Healthcare Access (HA1–HA5) demonstrated consistent validity with values from 0.886 to 0.922. Family Support (FS1–FS5) achieved the highest loadings (0.922–0.941), indicating particularly robust measurement reliability. Alcohol Consumption (AC1–AC5) and Smoking Habits (SH1–SH5) also showed acceptable validity, with loadings of 0.876–0.917 and 0.851–0.890, respectively. Cultural Influence (CI1–CI5) recorded loadings of 0.857–0.888, further supporting construct validity.

Single-item variables such as Hypertension, Gender, Family History, Education Level, and Age naturally produced perfect loadings (1.000) due to their direct measurement. Overall, all indicators exceeded the recommended cut-off value of 0.7, confirming that the measurement model was valid and reliable. Furthermore, the Average Variance Extracted (*AVE*) values for all constructs were above the threshold of 0.5, indicating that each construct met the criteria for convergent validity.

Table 5. Direct Effect Analysis

	original sample	*t-statistics*	*p-values*
Meat Consumption → Hypertensiom	0.028	2.464	0.014
Meat Consumption → Culture Influence	0.189	3.231	0.001
Salt Intake → Hypertension	0.046	3.392	0.001
Salt Intake → Culture Influence	0.231	4.025	<0.001
Healthcare Access → Hypertension	0.036	3.194	0.001
Family Support → Hypertension	0.043	3.284	0.001
Gender → Hypertension	0.162	4.303	<0.001
Alcohol Consumption → Hypertension	0.033	2.305	0.021
Alcohol Consumption → Culture Influence	0.215	3.693	<0.001
Smoking Habits → Hypertension	0.023	2.106	0.035
Smoking Habit → Culture Influence	0.237	4.169	<0.001
Culture Influence → Hypertension	0.078	3.149	0.002
Family History → Hypertension	0.139	5.112	<0.001
Educational Level → Hypertension	0.147	4.612	<0.001
Age → Hypertension	0.077	3.495	<0.001

The partial hypothesis testing showed that all proposed relationships were positive and statistically significant ($p<0.05$). Dietary factors had notable effects: meat intake was positively associated with hypertension ($\beta=0.028$, $p=0.014$) and cultural influence ($\beta=0.189$, $p=0.001$), while salt intake was strongly linked to both hypertension ($\beta=0.046$, $p=0.001$) and cultural influence ($\beta=0.231$, $p<0.001$). These results indicate that dietary habits not only directly increase hypertension risk but also shape cultural practices that reinforce unhealthy consumption patterns.

Healthcare access and family support also significantly influenced hypertension. Limited access to health services ($\beta=0.036$, $p=0.001$) and poor family support ($\beta=0.043$, $p=0.001$) were associated with higher hypertension risk, highlighting structural and social determinants in disease progression.

Demographic and behavioral variables further contributed to hypertension risk. Gender ($\beta=0.162$, $p<0.001$), family history ($\beta=0.139$, $p<0.001$), education level ($\beta=0.147$, $p<0.001$), and age ($\beta=0.077$, $p<0.001$) were all significant predictors. Lifestyle behaviors such as alcohol consumption ($\beta=0.033$, $p=0.021$), which also influenced cultural practices ($\beta=0.215$, $p<0.001$), and smoking ($\beta=0.023$, $p=0.035$), with a strong effect on cultural influence ($\beta=0.237$, $p<0.001$), were positively associated with hypertension.

Finally, cultural influence itself showed a significant positive relationship with hypertension ($\beta=0.078$, $p=0.002$), confirming its mediating role. Overall, these findings demonstrate that hypertension in Lautem Municipality is shaped by interconnected dietary, behavioral, cultural, structural, and demographic factors, with all hypotheses accepted.

Table 6. Result of Reliability Test

Variabel	*Cronbach's alpha*	*Composite reliability (rho_c)*	*Desc.*
Meat Consumption	0.944	0.957	Reliabel
Salt Intake	0.932	0.951	Reliabel
Healthcare Access	0.942	0.956	Reliabel
Family Support	0.965	0.973	Reliabel
Alcohol Consumption	0.937	0.952	Reliabel
Smoking Habits	0.922	0.942	Reliabel
Culture Influence	0.922	0.941	Reliabel

The reliability testing results indicate that all variables meet the required standards. Meat consumption recorded a cronbach's alpha of 0.944 and a composite reliability of 0.957, confirming strong internal consistency. Salt intake showed similarly high reliability values ($a = 0.932$, $\rho c = 0.951$). Healthcare access demonstrated excellent reliability with $a = 0.942$ and $\rho c = 0.956$. Family support achieved the highest reliability scores ($a = 0.965$; $\rho c = 0.973$), highlighting its particularly strong measurement stability. Alcohol consumption ($a = 0.937$; $\rho c = 0.952$), smoking habits ($a = 0.922$; $\rho c = 0.942$), and culture influence ($a = 0.922$; $\rho c = 0.941$) also showed robust reliability. Since all cronbach's alpha and composite reliability values exceeded the threshold of 0.70, it can be concluded that every construct in this study is reliable and consistent in measuring the intended variables.

Table 6. R-Square Analysis

	R-square	R-square adjusted
Hypertension	0.858	0.853
Culture Influence	0.609	0.605

In this study, the hypertension variable had an R-square value of 0.858. This means that 85.8% of the variance in hypertension can be explained by its predictors in the model, such as meat consumption, salt intake, smoking habits, alcohol consumption, healthcare access, family support, family history, gender, age, education, and cultural influence as a mediator. Meanwhile, the cultural influence variable had an R-square value of 0.609, indicating that 60.9% of the variance in cultural influence can be explained by variables such as meat consumption, salt intake, smoking habits, and alcohol consumption.

According to the criteria of Hair et al. (2022), an R-square value of 0.75 or higher is categorized as strong, values between 0.50 and 0.75 are considered moderate, and values below 0.50 are considered weak. Therefore, it can be concluded that both endogenous constructs in this model have high predictive power. The high R-square values also support that the research model developed has substantive relevance and is capable of explaining the variability of the observed variables effectively.

Table 7. F-Square Analysis

	f-square	*Desc.*
Meat Consumption → Hypertension	0.006	*No Effect*
Meat Consumption → Cultural Influence	0.031	*Small*
Salt Intake → Hypertension	0.023	*Small*
Salt Intake → Cultural Influence	0.050	*Small*
Healthcare Access → Hypertension	0.023	*Small*
Family Support → Hypertension	0.044	*Small*
Gender → Hypertension	0.057	*Small*
Alcohol Consumption → Hypertension	0.008	*No Effect*
Alcohol Consumption → Cultural Influence	0.039	*Small*
Smoking Habits → Hypertension	0.005	*No Effect*
Smoking Habits → Cultural Influence	0.051	*Small*
Cultural Influence → Hypertension	0.063	*Small*
Family History → Hypertension	0.053	*Small*
Education Level → Hypertension	0.053	*Small*
Age → Hypertension	0.022	*Small*

The f-square analysis shows that most predictor variables have only a small effect size on the dependent variables. Meat Consumption had no effect on Hypertension ($f^2 = 0.006$) but showed a small effect on Cultural Influence ($f^2 = 0.031$). Salt Intake demonstrated small effects on both Hypertension ($f^2 = 0.023$) and Cultural Influence ($f^2 = 0.050$). Healthcare Access ($f^2 = 0.023$) and Family Support ($f^2 = 0.044$) also indicated small effects on Hypertension. Gender ($f^2 = 0.057$), Family History ($f^2 = 0.053$), and Education Level ($f^2 = 0.053$) exhibited small contributions to Hypertension as well. Alcohol Consumption showed

no effect on Hypertension ($f^2 = 0.008$) but a small effect on Cultural Influence ($f^2 = 0.039$). Similarly, Smoking Habits had no effect on Hypertension ($f^2 = 0.005$) but a small effect on Cultural Influence ($f^2 = 0.051$). Cultural Influence itself had a small effect on Hypertension ($f^2 = 0.063$). Finally, Age displayed a small effect on Hypertension ($f^2 = 0.022$). Overall, the findings suggest these results indicate that although X1, X2, X3, and X4 do not make a significant contribution to Y, these constructs remain important elements in the research model.

Tabel 8. Model Fit Analysis

Model Fit	*Saturated model*	*Estimated model*	**Desc.**
SRMR	0.031	0.055	*Acceptable*
NFI	0.904	0.887	*Acceptable*

The evaluation of model fit in the SEM-PLS approach is carried out using several fit indicators, including the standardized root mean square residual (SRMR) and the normed fit index (NFI). These indicators assess how well the constructed model corresponds to the observed data.

In this study, the SRMR value for the saturated model was 0.031 and for the estimated model 0.055. Both values are below the recommended threshold of 0.08, indicating that the model demonstrates a good fit with the data. According to Hair & Alamer (2022), an SRMR value less than 0.080 signifies that the model is statistically acceptable.

Additionally, the NFI values obtained also show favorable results: 0.904 for the saturated model and 0.887 for the estimated model. These values exceed the minimum threshold of 0.80, which suggests that the structural model has an adequate level of fit. NFI reflects how well the proposed model compares with the null model, with higher values indicating better model fit.

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Demographic and behavioral variables further contributed to hypertension risk. Gender ($\beta=0.162$, $p<0.001$), family history ($\beta=0.139$, $p<0.001$), education level ($\beta=0.147$, $p<0.001$), and age ($\beta=0.077$, $p<0.001$) were all significant predictors. Lifestyle behaviors such as alcohol consumption ($\beta=0.033$, $p=0.021$), which also influenced cultural practices ($\beta=0.215$, $p<0.001$), and smoking ($\beta=0.023$, $p=0.035$), with a strong effect on cultural influence ($\beta=0.237$, $p<0.001$), were positively associated with hypertension.

Finally, cultural influence itself showed a significant positive relationship with hypertension ($\beta=0.078$, $p=0.002$), confirming its mediating role. Overall, these findings demonstrate that hypertension in Lautem Municipality is shaped by interconnected dietary, behavioral, cultural, structural, and demographic factors, with all hypotheses accepted.

Table 10. Indirect Effect Analysis

	original sample	*t statistics*	*p values*
Meat Consumption → Cultural Influence → Hypertension	0.015	2.111	0.035
Salt Intake → Cultural Influence → Hypertension	0.018	2.448	0.014
Alcohol Consumption → Cultural Influence → Hypertension	0.017	2.359	0.018
Smoking Habits → Cultural Influence → Hypertension	0.019	2.514	0.012

The indirect effect analysis revealed that meat consumption, salt intake, alcohol consumption, and smoking habits each had a positive and significant effect on hypertension through cultural influence. The hypothesis testing results showed that meat intake via cultural (H16) influence significantly affected hypertension ($p = 0.035$; $t = 2.111$). Salt intake via cultural (H17) influence also demonstrated a positive and significant effect on hypertension ($p = 0.014$; $t = 2.448$). Furthermore, alcohol consumption via cultural (H18) influence had a positive and significant effect on hypertension ($p = 0.018$; $t = 2.359$), while smoking habits via cultural (H19) influence likewise showed a positive and significant effect on hypertension ($p = 0.012$; $t = 2.514$). Thus, all four hypotheses were accepted as they met the criteria of $p < 0.05$ and $t > 1.96$.

The analysis of hypertension determinants in Lautem Municipality confirmed a complex and interconnected web of risk factors. Based on the results of the direct and indirect analyses presented in the appended table, it can be concluded that dietary factors such as meat and salt consumption, behavioral factors including smoking and alcohol use, and demographic factors (gender, age, family history, education), along with healthcare

access and family support, are all positively and significantly related to the incidence of hypertension.

Beyond diet, behavioral and structural factors further shape the disease burden. This finding aligns with extensive prior research, which consistently affirms that red meat consumption, high salt intake, alcohol use, and smoking are primary risk factors for hypertension across diverse populations (Van et. al, 2020; Riaz et. Al, 2021). Furthermore, social determinants such as limited healthcare access and lack of family support have also been identified as crucial factors in the development of hypertension, reinforcing the importance of structural and social approaches in the prevention of this disease (Abba et. Al, 2021; Iqbal et. Al, 2021.

Previous studies have similarly demonstrated that demographic variables, including age, gender, educational level, and family history, play a significant role in increasing the risk of hypertension (Ghosh and Khumar, 2019; Sharma et. al, 2021)). For instance, advanced age, male gender, lower education, and a family history of hypertension have been consistently identified as strong predictors of the condition across various countries and ethnic groups (Oyekanmi et. al, 2025). Additionally, lifestyle behaviors such as alcohol consumption and smoking not only have a direct impact on blood pressure but also shape cultural norms that reinforce unhealthy consumption patterns, as reflected in the results of the indirect effect analysis through cultural influence (Marques, at. al, 2020).

Finally, the results of the indirect effect analysis underscore the role of culture in the relationship between consumption behaviors (meat, salt, alcohol, smoking) and hypertension. The culture can amplify or mediate the influence of eating and lifestyle behaviors on hypertension risk, whether through social norms, dietary habits, or health perceptions. Thus, these findings support the hypothesis that hypertension prevention interventions should simultaneously consider cultural, social, and structural factors, focusing not only on individual behavioral change but also on broader changes in norms and environmental support.

Conclusions

This study concludes that hypertension in Lautem Municipality is influenced not only by individual clinical and lifestyle factors such as age, sex, family history, diet, smoking, and alcohol use, but also by structural determinants including education, healthcare access, and family support. Importantly, cultural practices were found to play a central role, both directly contributing to hypertension and mediating the effects of lifestyle behaviors, demonstrating that health outcomes are deeply embedded in social norms and traditions. These findings highlight that hypertension prevention and management require more than individual-level interventions; they must be culturally tailored, family-centered, and supported by stronger primary healthcare systems. Scientifically, this research contributes to the field of non-communicable disease epidemiology by providing empirical evidence on the interaction between lifestyle, social, and cultural determinants of hypertension in a low- and middle-income country context, offering insights that can guide both policy and further research.

Acknowledgments

The authors would like to thank the lautem municipality health office and local healthcare staff for their valuable assistance in facilitating data collection, as well as the

community members who generously participated in this study. We also acknowledge the support of timor-leste ministry of health for granting ethical clearance and providing access to relevant data. Special appreciation is extended to academic colleagues who provided constructive feedback during the development of this research. This study did not receive specific funding from public, commercial, or not-for-profit agencies.

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