KESANS: International Journal of Health and Science
2808-7178 / 2808-7380
http://kesans.rifainstitute.com/index.php/kesans/index

Factors Associated with Tuberculosis Among Patients in HoREX Baucau, Timor-Leste, 2025

[1]Maximiano Oqui*, [2]Elisa de Deus, [3]Judélia Carme Mendonça Coelho, [4]Adriano Freitas Moreira, [5]Remígia Auxiliadora de Jesus Ximenes, [6]Olandino Evaristo Obeno, [7]Saturnina Julieta Geri de Sena Amaral

[1] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste*; email: maximiano120888@gmail.com
[2] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: joyelina@gmail.com
[3] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: judeliacoelho12@gmail.com
[4] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: adino.nelina@gmail.com
[5] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: remigiaximenes@gmail.com
[6] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: landyojunior@gmail.com
[7] Faculty of Medicine and Health Sciences of the National University Timor- Lorosa'e, Timor-Leste; email: amaraletta@gmail.com
*Correspondence

Article Information
Submitted: **10 December 2025**
Accepted: **21 December 2025**
Publish: **30 December 2025**

Keyword: Tuberculosis; Nutritional Status; Alcohol Consumption; Risk Factors; Timor-Leste;

Year: 2025

Abstract

Introduction: *According to the World Health Organization (2023), an estimated 10.6 million people worldwide were affected by pulmonary tuberculosis (TB) in 2022, an increase from 10.3 million in 2021 and 10.0 million in 2020. The global incidence rate in 2022 reached 133 new cases per 100,000 population. In Timor-Leste, although a slight decrease in TB incidence was reported in 2021—from 498 to 486 per 100,000 population—the burden of the disease remains high. National TB surveillance recorded 6,171 cases in 2023 and 1,570 cases in 2022, indicating ongoing transmission.* ***Objective:*** *This study aimed to identify the factors associated with the occurrence of tuberculosis among patients in HoREX Baucau in 2025.* ***Methods:*** *An analytical quantitative study with a cross-sectional design was conducted involving 89 respondents selected through purposive sampling from a population of 115 patients. Data were collected using questionnaires and checklists. Univariate analysis employed frequency distribution, bivariate analysis used the Chi-square test, and multivariable analysis applied multinomial logistic regression.* ***Results:*** *Nutritional status showed a significant influence on TB occurrence ($p < 0.001$), as did alcohol consumption ($p < 0.001$). Simultaneously, both factors demonstrated a significant combined effect on the incidence of tuberculosis ($p < 0.001$).* ***Conclusion:*** *Nutritional status and alcohol consumption are significant predictors of tuberculosis among patients in Hospital Referal Eduardo Ximenes (HoREX) Baucau. These findings highlight the need for strengthened nutritional support, alcohol-reduction interventions, and community-based prevention strategies.*

How to Cite: **Maximiano Oqui, Elisa de Deus, Judélia Carme Mendonça Coelho, Adriano Freitas Moreira, Remígia Auxiliadora de Jesus Ximenes, Olandino Evaristo Obeno, Saturnina Julieta Geri de Sena Amaral/Factors Associated with Tuberculosis Among Patients in HoREX Baucau, Timor-Leste, 2025, Vol. 5, No. 3, 2025**
DOI: https://doi.org/10.54543/kesans.v5i3.521
e-ISSN/p-ISSN: **2808-7178 / 2808-7380**
Published by: **CV Rifainstitut/KESANS: International Journal of Health and Science**

Introduction

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*, responsible for approximately 10 million cases and 1.5 million deaths worldwide each year. The incidence of TB varies considerably across regions, with high-income countries reporting about 10 cases per 100,000 population, while low- and middle-income countries report rates as high as 500 per 100,000 population. These disparities highlight the importance of strengthening TB control efforts, particularly in countries with limited resources where transmission remains high (Malik et al., 2020); (Oqui et al., 2024); (Kitu & Rebuwula, 2024); (I. Handayani, 2021); (Septiani et al., 2025)

According to the World Health Organization (2023), an estimated 10.6 million people were affected by pulmonary TB in 2022, increasing from 10.3 million in 2021 and 10.0 million in 2020 (Eka, 2025). The global incidence in 2022 reached 133 new cases per 100,000 population. TB affects all age groups and genders; however, men aged ≥15 years bear the greatest burden, accounting for 55% of cases, followed by women (33%) and children aged 0–14 years (12%). These patterns emphasize the need for targeted TB prevention and case-finding strategies within communities, especially among high-risk populations (Saraswati et al., 2022)

Indonesia is among the countries with the highest TB burden globally, ranking second in 2023, with an estimated 809,000 TB cases reported (L. Handayani, 2024) . Despite 724,309 cases being recorded in 2022, approximately 25% of cases remained undetected. TB-related mortality also increased significantly, reaching 150,000 deaths in 2023—equivalent to one death every four minutes (Ministry of Health RI, 2023); (Minggarwati et al., 2023); (Bakri et al., 2021). In response, the Indonesian National TB Program prioritizes early case detection, treatment adherence, and community-based interventions such as contact investigation and household TB prevention to reduce transmission and mortality (Adam, 2020); (Hasina et al., 2023)

In Timor-Leste, TB continues to be a major public health concern. The Ministry of Health recorded 6,171 TB cases in 2023 and 1,570 cases in 2022. Dili Municipality reported the highest number of cases, followed by Ermera, Oé-Cusse, and Baucau. The national TB program also conducted preventive household interventions for more than 10,049 families to minimize household transmission. These activities reflect the growing emphasis on community- and household-based TB prevention as a core component of national TB control strategies in high-burden settings.

Despite the implementation of national TB programs, evidence linking epidemiological trends with the effectiveness of community-based prevention efforts remains limited. Understanding how TB prevention activities at the household and community levels contribute to reducing transmission is essential for strengthening program implementation and achieving national and global TB targets. Therefore, this study aims to analyze TB incidence patterns and examine their implications for community-based TB prevention programs within the framework of the national TB control strategy. Specifically, the study seeks to: (1) describe the epidemiological profile of TB cases; (2) assess the burden of TB at the community level; and (3) identify how existing community-based and household TB prevention interventions can be optimized to support national TB program objectives

Methods

This study employed an analytical quantitative design with a cross-sectional approach. The research was conducted in the Internal Medicine Unit of HoREX Baucau in September 2025. The study population consisted of 115 patients, from which 89 respondents were selected using a non-probability purposive sampling technique.

The independent variables in this study were age, education level, nutritional status, and alcohol consumption, while the dependent variable was the incidence of tuberculosis. Data were collected using structured questionnaires and observation checklists.

Data analysis was conducted using SPSS. Univariate analysis was performed using frequency distributions. Bivariate analysis employed the Chi-square test to examine associations between variables. Multivariable analysis was conducted using multinomial logistic regression to identify the combined and individual effects of the independent variables on tuberculosis incidence.

Result and Discussion

1. Results

Characteristic Respondent

Table 1
Frequency distribution of respondents based on gender

		Frequency	Percentage (%)
Valid	Man	51	57.3
	Women	38	42.7
	Total	89	100.0

Based on table 1. shows that the characteristics of respondents based on gender in the Internal Medicine unit, total 89 people, composed of 51 man (57.3%) and 38 women (42.7%). From table 1 shows that the gender of respondents with the highest percentage is man with total percentage (57.3%), and the least women with total percentage (42.7%).

Table 2
Frequency distribution of respondents based on age, in the Internal Medicine Unit, HoREX Baucau, Year 2025.

		Frequency	Percentage %
Valid	Children (0-14 year)	9	10.1%
	Young Adolecents (15-24 years)	6	6.7%
	Young Adults (25-44 years)	26	29.2%
	Adults (45-64 years)	32	36%
	Ederly (>65 years)	16	18%
	Total	89	100%

Based on table 2. shows that the characteristics of respondents based on age in the Internal Medicine Unit, shows that the age of Children (0-14 years) 9 (10.1%), Young Adolescents (15-24 years) 6 (6.7%), Young Adults (25-44 years) 26 people (29-44 years), Adults (245%) (36.%), Idiotic (>65 years) 16 (18%) From table 2. shows that the age of respondents with the highest percentage is Adult (45-64 years) with total percentage (36%), and the minimum Young Adolescent (15-24 years) with total percentage (6.7%).

Education Level

Table 3
Distribution of frequency of children of respondents based on level of education, in the Internal Medicine Unit, HoREX Baucau, Year 2025.

		Frequency	Percentage %
Valid	Illiterate	34	38.2%
	Primary	15	16.9%
	Pre-Secondary	7	7.9%
	Secodary	12	13.5%
	University	6	6.7%
	Pos-Graduation	15	16.9%
	Total	**89**	**100%**

Based on table 3. shows that the characteristics of respondents based on the level of education in the Internal Medicine Unit, shows that 34 (38.2%) did not go to school, 15 (16.9%), Pre-Secondary 12 (7.9%), Secondary 12 (13.5%), 6 (6%), University Graduation (7%). and 15 (16.9%)

From table 3 shows that the level of education of the respondents with the highest percentage is No School with total percentage (38.2%), and the minimum University with total percentage (6.7%).

Univariable Analysis

1) Nutrition

Table 1
Frequency distribution of respondents based on Nutrition in the Internal Medicine Unit, HoREX Baucau, Year 2025.

		Frequency	Percentage %
Valid	Unusual	56	62.9%
	Normal	33	37.1%
	Total	89	100%

Based on table 1. Frequency distribution based on nutrition showed that Abnormal with a frequency of 56 (62.9%), and Normal with a frequency of 33 (37.1%).

From table 4. shows that the nutrition of the respondents with the most frequency is Abnormal with a frequency of 56 (62.9%), and the minority is normal with its frequency of 33 (37.1%).

2) Alcohol

Table 2
Frequency distribution of respondents based on alcohol, in the Internal Medicine Unit, HoREX Baucau, Year 2025.

		Frequency	Percentage %
Valid	Does not Consume	45	50.6 %
	Consume	44	49.4 %
	Total	**89**	**100 %**

Based on Table 2. Frequency distribution based on alcohol showed that No Consumption with its frequency of 45 (50.6%) and Consumption with its frequency of 44 (49.4%).

Table 2. shows that Alcohol respondents with the highest frequency is not Consumed with its frequency of 45 (50.6%).

3) Tuberculosis

Table 3

Distribution of frequency of Response based on Tuberculosis in the Internal Medicine Unit, HoREX Baucau, Year 2025.

		Frequency	Percentage%
Valid	Negative	36	40.4%
	Positive	53	59.6%
	Total	89	100%

Based on Table 3. Frequency distribution based on Tuberculosis showed that Tuberculosis Negative with its frequency 36 (40.4%), Positive with its frequency 53 (59.6%).

Multivariable Hypothesis Testing Results

1) Influence of Nutritional Factors and Alcohol on Tuberculosis

Table 1

Influence of Nutritional Factors and Alcohol on Tuberculosis in the Internal Medicine Unit, HoREX Baucau, Year 2025.

Parameter Estimates						
Tuberculosis		B	Df	Sig.	Exp(B)	**Pseud R-Square** Nagelcerce
Negative	Intercept	11.326	1	.000		0.726
	Nutrition	-4.523	1	.000	0.011	
	Alcohol	-4.101	1	.000	0.017	

2) Influence of Nutritional Factors on Tuberculosis

Based on table 1. from the results of multinomial regression logistic analysis showed that the significance value (P-value) 0.00 < 0.05, means that nutrition has a partial and significant influence on tuberculosis. Thus, the conclusion of hypothesis H1 is accepted and H0 is rejected. The estimated value showed negative -4.523 and the exp (B)/oods ratio value of 0.011 means that nutrition has a positive influence risk of 0.011 times towards tuberculosis.

3) Influence of Alcohol Factors on Tuberculosis

Based on Table 2, the results of the multinomial logistic regression analysis show that the significance value (p = 0.000) is less than 0.05, indicating that alcohol consumption has a partial and significant influence on tuberculosis. Therefore, the alternative hypothesis (H1) is accepted and the null hypothesis (H0) is rejected.

The regression coefficient for alcohol consumption was −4.101, and the odds ratio [Exp(B)] was 0.017. This means that individuals who consume alcohol have a 0.017-times higher likelihood of developing tuberculosis compared to those who do not consume alcohol, indicating a strong association between alcohol consumption and increased TB risk.

4) Simultaneous Influence of Nutritional Factors, Alcohol on Tuberculosis, in the Internal Medicine Unit, HoREX Baucau, Year 2025

Based on Table 3, the results of the multinomial logistic regression analysis for the simultaneous hypothesis test showed that the significance value (p = 0.000) was less than 0.05. This indicates that the combined effect of nutritional status and alcohol consumption has a significant influence on the occurrence of tuberculosis.

The Pseudo R-Square value (Nagelkerke) was 0.726, meaning that the model explains 72.6% of the variation in tuberculosis incidence, while the remaining 27.4% is influenced by other factors not included in this study.

2. Discussion

Nutritional Factors

Based on Table 1, the frequency distribution shows that 56 respondents (62.9%) had abnormal nutritional status, while 33 respondents (37.1%) had normal nutritional status. Nutritional status reflects the balance between the body's nutritional needs and the intake of essential nutrients required to support life, maintain normal physiological functions, and produce energy (Brown & Rosari, 2013). It represents the interaction between energy, protein, and other vital nutrients with the physiological health of the body. According to Hidayati et al. (2018), nutritional status is an indicator of the adequacy of nutrient absorption and is expressed in various measurable parameters.

In this study, most respondents demonstrated abnormal nutritional status. This finding aligns with existing theory, which indicates that poor nutrition contributes to increased susceptibility to tuberculosis. Malnutrition weakens the immune system, particularly cell-mediated immunity, reducing the body's ability to resist *Mycobacterium tuberculosis* infection. Individuals with inadequate nutritional status are therefore at higher risk of developing TB due to compromised immune defenses.

Alcohol Factor

Based on Table 2, the frequency distribution shows that 45 respondents (50.6%) did not consume alcohol, while 44 respondents (49.4%) reported alcohol consumption. Alcohol consumption is recognized as one of the most significant risk factors for pulmonary tuberculosis. Excessive alcohol intake impairs the immune system, particularly cell-mediated immunity, thereby increasing an individual's susceptibility to infections, including pulmonary tuberculosis (Novera et al., 2023).

A study by Ria Resti Dewi et al. (2022) found that 59.8% of respondents consumed alcohol, while 40.2% did not. The study reported a significant association between alcohol consumption and pulmonary tuberculosis (p = 0.000), suggesting that alcohol acts as a contributing factor to TB infection due to its detrimental effects on immune function.

In the present study, although the majority of respondents reported no alcohol consumption, alcohol consumption still demonstrated a significant influence on TB incidence. Most respondents were adults aged 45–64 years (36%), a group commonly exposed to behavioral and occupational risks. The findings support existing evidence that alcohol consumption increases vulnerability to pulmonary tuberculosis by weakening the body's defense mechanisms and facilitating infection.

Occurrence of Tuberculosis

Based on Table 3, the frequency distribution shows that 36 respondents (40.4%) tested negative for tuberculosis, while 53 respondents (59.6%) were positive.

Tuberculosis (TB) is a contagious infectious disease transmitted through airborne droplets and caused by *Mycobacterium tuberculosis*. This bacterium has a high lipid content in its cell wall, making it acid-fast and able to survive for long periods. *M. tuberculosis* is an aerobic organism that prefers oxygen-rich tissues, particularly the lungs. Although TB bacteria die quickly when exposed to direct sunlight, they can survive for several hours in dark and humid environments. Within body tissues, the bacteria may remain dormant for years before becoming active (Kemenkes, 2014).

Pulmonary TB is often found among individuals who spend more time indoors and in crowded environments, as these conditions increase exposure to infectious droplets, environmental dust, and pollutants. Occupational exposure also plays a role, especially in settings with poor ventilation. Therefore, individuals with high indoor exposure or certain occupations should take preventive measures to minimize the risk of contact with *Mycobacterium tuberculosis*.

In this study, the majority of respondents with TB were adults in their productive years, particularly those aged 45–64 years (36%). This aligns with previous findings by Fitrianti et al. (2022) in Palembang, which reported that the highest proportion of pulmonary TB cases occurred among employed individuals (59.7%) and unemployed individuals (40.3%). The study also found a significant association between occupational exposure and pulmonary TB incidence ($p = 0.024$).

Influence of Nutrition on the Occurrence of Tuberculosis

Based on the results of multinomial regression logistic analysis showed that the significance value (P-value) $0.00 < 0.05$, means that nutrition has a partial and significant influence on tuberculosis. Thus, the conclusion of hypothesis H1 is accepted and H0 is rejected. The estimated value showed negative -4.523 and the exp (B)/oods ratio value of 0.011 means that nutrition has a positive influence risk of 0.011 times towards tuberculosis.

The results of this research are similar to the results of previous researchers by the author According to Hidayati et al., 2018, nutritional status is the status of the body resulting from the interaction between energy, protein and other essential nutrients, and the status of body health. Nutritional status is the condition of the body resulting from the absorption of essential nutrients. Nutritional status is an expression of the balance of nutrition with body needs, which is shown in the form of several variables.

The Influence of Alcohol on the Occurrence of Tuberculosis

Based on table 2. of the results of multinomial logistic regression analysis showed that the significance value (P-value) 0.000 <0.05, means that alcohol has a partial and significant influence on tuberculosis. Thus, the conclusion of hypothesis H1 is accepted and H0 is rejected. The estimated value showed negative -4.101 and the exp (B)/oods ratio value of 0.017 means that alcohol has a positive influence risk of 0.017 times on Tuberculosis

Alcohol consumption is one of the most significant risk factors for pulmonary tuberculosis. The prevalence of alcohol consumption disorder is the most common indicator of pulmonary tuberculosis. Alcohol consumption can weaken a person's immune system, thus increasing the risk of contracted infections such as pulmonary tuberculosis (Novera et al., 2023).

The results of this research are similar to the results of previous researchers conducted by Ria Resti Dewi et al., 2022 showed that 59.8% of respondents consumed alcohol and 40.2% did not consume alcohol with a value of p=0.000 indicating a significant correlation between alcohol consumption and pulmonary tuberculosis. This result is due to the harmful effects of alcohol that can weaken the immune system.

Simultaneous Influence of Nutritional Factors, Alcohol on the Occurrence of Tuberculosis

Based on table 1. from the results of multinominal logistic regression analysis for simultaneous hypothesis testing showed that the significance value (P-value) reached 0.000 < 0.05, meaning that the conjunction of nutrition variables, alcohol has a simultaneous and significant influence on tuberculosis. And the Pseudo R-Square value showed 0.726 means that the percentage of conjunctive influence of the variable on the occurrence of diarrhea reached 72.6% while 27.4% was influenced by other variables that are not involved in this research.

Conclusion

From the results of this research that nutritional factors have a partial and significant influence on tuberculosis, alcohol consumption factors have a positive influence of 0.017 times on tuberculosis. and the Pseud R-Square value showed 0.726 means that the percentage of conjunctural influence of the variable on the occurrence reached 72.6% while 27.4% was influenced by other variables.

ACKNOWLEDGEMENT

The author would like to thank the academic institution of the School of Nursing, the head of the unit, the head of the department and the respondents who collaborated with the researcher. Finally, thank you to everyone who gave support and suggestions for this research to be completed successfully.

References

Adam, L. (2020). Pengetahuan penderita tuberkulosis paru terhadap kepatuhan minum obat anti tuberkulosis. *Jambura Health and Sport Journal*, *2*(1), 12–18.

Bakri, F. … Umar, F. (2021). Pemetaan faktor risiko kejadian tuberkulosis di Kota Parepare. *Jurnal Ilmiah Manusia Dan Kesehatan*, *4*(2), 266–278.

Eka, P. I. (2025). *Hubungan Kepatuhan Minum Obat dengan Kualitas Hidup Penderita Tuberkulosis di Ruang Edelweis Barat RSUD Budhi Asih Jakarta Timur*. Universitas Mohammad Husni Thamrin.

Handayani, I. (2021). *Tuberkulosis*. Penerbit Nem.

Handayani, L. (2024). Studi Epidemiologi Tuberkulosis Paru (TB) di Indonesia: Temuan Survey Kesehatan Indonesia (SKI) 2023. *Jurnal Kendari Kesehatan Masyarakat*, *4*(1), 59–67.

Hasina, S. N., Rahmawati, A., Faizah, I., Sari, R. Y., & Rohmawati, R. (2023). Hubungan tingkat pengetahuan dengan kepatuhan minum obat anti tuberkulosis (OAT) pada pasien tuberkulosis paru. *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, *13*(2), 453-462.

Kitu, I. F. M., & Rebuwula, Y. N. (2024). PERILAKU PENDERITA TB TERHADAP PENCEGAHAN TB PARU. *Journal of Innovation Research and Knowledge*, *4*(5), 3079–3084.

Malik, A. A. … Salahuddin, N. (2020). Tuberculosis preventive therapy for individuals exposed to drug-resistant tuberculosis: feasibility and safety of a community-based delivery of fluoroquinolone-containing preventive regimen. *Clinical Infectious Diseases*, *70*(9), 1958–1965.

Minggarwati, R. … Haroen, H. (2023). Intervensi pada pasien tuberkulosis untuk meningkatkan kepatuhan dan manajemen diri. *Jurnal Keperawatan Silampari*, *6*(2), 1630–1643.

Oqui, M. … de Jesus Amaral, I. (2024). Factors That Influence The Occurrence of The Disease Tuberculosis in The Clinic of Tubercolosis. *KESANS: International Journal of Health and Science*, *3*(5), 379–389.

Saraswati, F. … Latief, R. (2022). Karakteristik penderita tuberkulosis paru yang relaps di RS Ibnu Sina Makassar. *Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran*, *2*(5), 319–328.

Septiani, F. … Pangaribuan, W. K. (2025). Analisis Faktor Risiko Yang Berkontribusi Terhadap Kejadian Tuberkulosis Paru di Masyarakat: Studi Epidemiologis Dan Implikasinya Dalam Pencegahan. *Polygon: Jurnal Ilmu Komputer Dan Ilmu Pengetahuan Alam*, *3*(2), 32–43.