

The Relationship of the Physical Condition of the House to The Occurrence of Acute Respiratory Infectious Disease in the Community in Cumo-Oli Village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality, Year 2025

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Abstract: Introduction: Acute Respiratory Infection (ARI) remains a major public health problem in many communities, particularly affecting children and other vulnerable groups. In Cumo-Oli Village, poor housing conditions may increase exposure to indoor pollutants, dust, and inadequate ventilation, thereby elevating the risk of ARI. Objective of Research: This study aims to determine the relationship between the physical condition of houses and the occurrence of ARI disease among residents of Cumo-Oli Village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality, in 2025. Research Method: A quantitative study using a cross-sectional, retrospective design was employed. The study population consisted of 83 heads of household, and the sample comprised 45 respondents selected using a sampling determination formula. Data were collected through interviews, questionnaires, documentation, and direct observation. Data analysis used Pearson Product-Moment (PPM) correlation to assess the strength and direction of association between housing physical condition (X) and ARI occurrence (Y). Significance was tested using a t-test. Results and Discussion: The analysis showed a strong positive correlation between the house's physical condition and ARI occurrence ($r = 0.890$). The coefficient of determination (r^2) indicated that the physical conditions of housing explained approximately 79.21% of the variation in ARI occurrence. The calculated t-value (12.799) exceeded the critical value (1.681), indicating that the relationship was statistically significant. Conclusion: Substandard housing physical conditions—such as inadequate ventilation, high humidity, dust infiltration, and exposure to smoke—are strongly associated with a higher incidence of ARI in Cumo-Oli Village in 2025.

Keywords: Acute Respiratory Infection (ARI); Physical Condition of House; Ventilation; Humidity; Dust and Smoke Exposure.

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I. INTRODUCTION

Acute respiratory infection (ARI) is a disease that affects the respiratory organs and presents with a range of symptoms (Syndrome). It is caused by various factors (multifactorial). Such as respiratory organs, including the nose, larynx, throat, bronchi, trachea, and lungs (Dessy et al., 2017). Acute Respiratory Infection (ARI) is a disease caused by bacteria or

viruses that attack the respiratory organs and affect children under five years of age.

Viruses that consistently infect children and cause acute respiratory infections include influenza A, adenovirus, and parainfluenza virus. An ARI is a group of airborne diseases. The pathogen enters and infects the respiratory organs, causing inflammation (Dessy et al., 2017).

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The occurrence of Acute Respiratory Infections in children begins with fever accompanied by one or more symptoms, such as sore throat, runny nose, dry cough, and cough (Kemenkes RI, 2015). Children aged 1-5 are more susceptible to ARI than adults. The cause of the child's immune system is an infectious disease that often occurs in children (Hayati, 2014)

According to the World Health Organization (WHO, 2010), acute respiratory infections (ARIs) are among the leading causes of disease and mortality globally. Each year, approximately 4 million individuals lose their lives due to ARI. This health crisis is particularly severe among vulnerable populations, including infants, children, and the elderly, especially in low-income countries where access to healthcare and preventive measures may be limited. The high mortality rates associated with ARI underscore the critical need for coordinated public health interventions.

Several risk factors contribute to the occurrence of ARI. Environmental factors at home include air pollution due to family members smoking indoors, smoke from kitchen fires, inadequate ventilation, and overcrowding. Child-specific factors also play a role, such as the child's sex, nutritional status, and lack of immunization. Furthermore, many parents neglect to take their children for regular check-ups to receive essential vitamins and vaccinations, and breastfeeding often lasts less than two years (Sofia, 2017).

Environmental factors that can contribute to Acute Respiratory Infections (ARI) include air quality, which is affected by air pollution. Air pollution can originate from both indoor and outdoor sources and involves chemical, physical, or biological agents that alter the natural characteristics of the atmosphere. In homes with families already affected by ARI, factors such as smoking and cooking fumes can exacerbate the problem (Layuk, 2012). Homes should serve as places of comfort and protection against environmental influences and disturbances (Bagus, 2015).

Poorly ventilated homes can contribute to the occurrence and severity of Acute Respiratory Infections (ARI). High humidity in a room can promote bacterial growth, a known cause of ARI (Notoadmodjo, 2012). Additionally, exposure to cigarette smoke poses significant health risks and can lead to various illnesses. Babies and children exposed to cigarette smoke face a higher risk of developing ear infections, allergies, asthma, bronchitis, pneumonia, meningitis, and sudden infant death syndrome (SIDS) (Adrian, 2018).

The house's physical condition prevents dust from entering. To achieve this, the roof must be sealed to stop dust from entering directly. Additionally, the roof can help direct airflow, ensuring effective air exchange within the house.

Home ventilation serves several important functions, primarily to keep the incoming air fresh. Insufficient ventilation

can reduce indoor oxygen levels, which in turn can increase toxic carbon dioxide levels. Effective ventilation helps remove bacteria from the room, particularly pathogenic ones, by providing a continuous airflow. It also helps maintain optimal humidity levels at all times.

Cigarette smoke can accumulate on the ground, ceramics, and other objects nearby. This poses a threat to children, as they often play on the ground and tend to touch nearby objects. One of the causes of Acute Respiratory Infections (ARI) is the home environment. To improve this environment, it's essential to maintain cleanliness in the house, enhance air circulation, and ensure the outdoor area is hygienic. Allowing sunlight into the home during hot weather helps reduce bacteria and minimize health risks, particularly the likelihood of ARI diseases (Eva, 2013).

Acute Respiratory Infection (ARI) has become a pressing health challenge in developing countries, contributing to a marked rise in both the incidence of cases and the number of fatalities associated with these conditions (WHO, 2021). Among the various forms of ARI, pneumonia stands out as a particularly critical concern, especially for vulnerable populations such as infants and young children (Liu et al., 2019). This age group is at an elevated risk due to their still-developing immune systems and the environmental factors that often exacerbate respiratory illnesses in low-resource settings, such as poor air quality, malnutrition, and limited access to healthcare services (McAllister et al., 2020). The implications of ARI extend beyond immediate health impacts, affecting individual livelihoods and placing a significant burden on already strained healthcare systems, thereby highlighting the urgent need for effective prevention and treatment strategies (Gavi, 2021).

Acute Respiratory Infections (ARIs) in Timor-Leste are a leading cause of morbidity, particularly among children, with a high burden of upper and lower respiratory diseases reported in both surveillance data and clinical. Surveillance indicates that in 2024–2025, ARI visits to general practitioners were highest among children aged 0–4 years. ARI pathogens are frequently detected in infants (72.5% positivity rate) and older adults (Ministry of Health, Timor-Leste, 2025)

According to data from the Timor-Leste Ministry of Health, the Department of Health Information Statistics (EIS) reported the following prevalence of Acute Respiratory Infections (ARI) across all 13 municipalities: in 2016, there were 585,096 cases, in 2017, the number decreased to 562,336 cases, and in 2018, it rose again to 582,150 cases. By 2025, the cases had increased significantly to 716,525.

According to secondary data from the Venilale Community Health Center, the number of cases of Acute Respiratory Infection (ARI) was as follows: in 2023, 497 cases; in 2024, 234 cases; and in 2025, 448 cases. This data pertains to the Venilale Administrative Post in Baucau Municipality.

This research aims to investigate the relationship between the physical condition of houses and the occurrence of ARI diseases in the community of Cumo-Oli village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality, in 2025.

The specific objectives are as follows;

- To analyze the problem of the physical condition of houses in Cumo-Oli Village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality in 2025.
- To know about the relationship between the physical condition of the house and the occurrence of ARI diseases in Cumo-Oli Village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality, in 2025.

II. RESEARCH METHOD

A. Research Design

The method used for this research is quantitative, using a cross-sectional approach to compare risk and causal factors and a retrospective study design (Notoatmodjo, 2010). Use this research method to determine the relationship between the physical condition of the house and the occurrence of IRA disease in the community in Cumo-Oli Village, Bahamori Suco, Venilale Administrative Post, Baucau Municipality, in 2025.”

B. Population, sample, and technique define the sample

➤ Population and Sample

According to Sugiyono (2015), a population is a territory of generalization derived from objects with their own qualities and characteristics that the researcher studies to draw conclusions about the population. Therefore, the population used by the researcher in this study comprises 83 heads of household.

➤ Sample Defining Technique

The technique for defining the sample is as follows;

$$\text{Formula n: } \frac{n}{N.d^2+1}$$

Annotation:

- n = Total sample
 N = Total population
 d² = level of precision (10%)

$$\text{Formula} = \frac{83}{83(0.10)^2+1} = \frac{83}{1.83} = 45 \text{ Sample}$$

➤ Sample

A research sample is a smaller group selected from a larger population, meant to accurately reflect the characteristics of that population. For this study, the sample comprises 45 individuals, carefully selected to represent the broader dataset. Researchers employed a simple random sampling technique to select interview respondents.

C. Data collection techniques

➤ Interview

An interview is a vital data collection method in which the researcher begins by identifying a specific issue or problem for investigation (Creswell, 2014). Once the problem is clearly defined, the researcher engages with respondents to explore their perspectives and experiences (Kvale & Brinkmann, 2015). This interaction aims to uncover how individuals relate to and navigate the phenomenon under study, providing valuable insights that deepen understanding of the topic at hand (Patton, 2015).

➤ Questionnaire

A questionnaire is a systematic method of collecting data, wherein a set of written questions is crafted and disseminated to individuals, known as respondents, for their responses (Dillman, Smyth, & Christian, 2014). This technique is widely used in various fields, including research, surveys, and market analysis, to gather insights on specific topics (Fowler, 2014). The questions can vary in format, including multiple-choice, open-ended, or scaled-response formats, allowing researchers to tailor the questionnaire to their objectives (Bryman, 2016). Once completed, the responses can be compiled and analyzed to draw conclusions or inform decision-making processes (Creswell, 2014). The effectiveness of a questionnaire often depends on the clarity of the questions and the appropriateness of the target audience (Litwin, 1995).

➤ Documentation

Documentation refers to the comprehensive collection of evidence gathered by the researcher during their time at the research site. This documentation can take various forms, including vivid research images that capture the essence of the subject (Smith, 2020), detailed portraits that offer insights into the individuals involved (Jones & Lee, 2019), and documentary films that provide a narrative context (Davis, 2018). Additionally, it includes relevant books that contribute to an understanding of the research topic (Thompson, 2021), along with meticulous data annotations highlighting key findings and observations (Roberts, 2022). Together, these elements create a rich tapestry of information that supports the research endeavors.

4. Observations

A direct observation was conducted in the heart of Cumo-Oli Village, situated in the Bahamori District of the Venilale Administrative Post within the Municipality. This investigation aimed to uncover the true circumstances that unfolded there in 2025.

D. Data Analysis Technique

The data analysis technique employed to examine the research findings is the Pearson Product-Moment (PPM) correlation analysis. This analytical method plays a vital role in uncovering both the strength and direction of the relationship between two variables. In this context, the independent variable is the physical condition of the house (denoted as X), while the dependent variable is denoted as Y. By conducting this correlation analysis, researchers can gain valuable insights into how housing attributes influence the outcome under study.

III. RESEARCH RESULTS

Table 1: Frequency distribution of the population by Cumo-Oli Village, Baha-Mori District, Venilale Administrative Post, Baucau Municipality, Year 2025.

Gender	Frequency	Percentage (%)
Male	184	49%
Female	183	51%
Total	366	100%

Source: Secondary data from Cumo-Oli Village, 2025

The frequency distribution table provides insights into the demographics of Cumo-Oli Village in the Baha-Mori District for the year 2025. The total population of the village is 366 individuals, composed of 184 males and 183 females. This breakdown indicates a nearly equal representation of genders, with males constituting 49% of the population and females slightly surpassing them at 51%.

This balanced gender ratio is noteworthy, suggesting a stable community dynamic. The close numbers suggest that both genders contribute significantly to the village's social structure, fostering a more collaborative community environment. The slight predominance of females, while minimal, can have implications for local services and support systems, particularly in areas such as healthcare and education.

Such a demographic balance typically reflects healthy societal trends, as significant gender-ratio disparities can lead to various social challenges. In Cumo-Oli Village, the information suggests that resources and opportunities may need to be allocated fairly to ensure the continued well-being and development of both genders.

Overall, with a total population of 366 individuals, the data from Cumo-Oli Village indicate a demographically balanced community, fostering an environment conducive to stability and growth. Understanding this distribution can assist

local leaders in making informed decisions regarding future initiatives and resource allocations, ensuring that the needs of both males and females are adequately met.

Table 2: Frequency Distribution of Respondents by Age, Cumo-Oli Village, Baha-Mori Suco, Venilale Administrative Post, Baucau Municipality, Year 2025.

Age Group	Frequency	Percentage (%)
20-29	8	17%
30-39	20	49%
40-49	9	22%
50-59	5	7%
60-69	3	5%
Total	45	100%

Source: Primary data, Cumo -Oli Village, 2025

The frequency distribution presented in Table 2 highlights the age demographics of respondents from Baha-Mori Suco in the Venilele Administrative Post of Baucau Municipality for the year 2025. A total of 45 individuals participated in this survey, and their ages are grouped into five distinct categories.

The most prevalent age group is 30-39, comprising 20 respondents and accounting for 49% of the total sample. This indicates that nearly half of the respondents are in their thirties, suggesting that this age demographic may be more engaged or represented in the community's activities.

The second-largest group is those aged 40-49, with 9 respondents accounting for 22% of the total. This group is relatively significant, as it reflects a transitional age bracket in which many individuals are often experiencing career advancement and family development.

The 20-29 age group follows with 8 respondents, making up 17%. This younger cohort shows some participation among younger adults, but they constitute a smaller share of the overall demographic.

In comparison, the older age groups (50-59 and 60-69) show much lower representation, with 5 respondents (7%) and 3 respondents (5%), respectively. This could suggest either that fewer older individuals are actively participating in the surveyed activities or that the community's population is younger.

Overall, the data show a community predominantly composed of individuals in their thirties, highlighting opportunities for initiatives and services for this age group while also noting the lower involvement of older residents.

Table 3: Frequency Distribution of Head of Household Respondents according to sex, Cumo-Oli Village, Baha-Mori Suco, Venilale Administrative Post, Baucau Municipality, Year 2025.

Gender	Frequency	Percentage (%)
Male	35	68%
Female	10	32%

Source: Primary data, Cumo -Oli Village, 2025

The data presented in Table 3 show the frequency distribution of heads-of-household respondents in Baha-Mori Suco, within the Venilale Administrative Post of Baucau Municipality, for the year 2025. The table indicates that 35 respondents are male, accounting for 68% of the surveyed households.

This suggests a significant male predominance among the heads of household in this area. In contrast, while the percentage for female heads of household is not provided within the text, it can be inferred that they represent the remaining percentage (32%) of the respondents.

Overall, the data highlights the need for further exploration into the implications of this gender distribution in household leadership and its potential impact on community development and resource allocation

Table 4: Distribution of Frequency of Respondents Based on Level of Education in Cumo-Oli Village, Baha-Mori District, Venilale Administrative Post, Baucau Municipality, Year 2025

Level of Education	Frequency	Percentage %
Not attending school or Illiterate	15	33.3
Not completed Primary School	7	15.6
Primary School	6	13.3
Pre-Secondary School	4	8.9
Secondary School	10	22.2
Tertiary Degree	3	6.7
Total	45	100

Source: Secondary data from Cumo-Oli Village, 2025

The data presented in Table 4 illustrate the distribution of respondents by education level in Cumo-Oli Village, Baha-Mori District, Venilale Administrative Post, Baucau Municipality, for the year 2025.

Out of the total 45 respondents, a significant portion, 33.3% (15 individuals), reported having either not attended school or being illiterate. This suggests that a considerable number of individuals in the community lack basic education, which could affect their access to opportunities and information.

Following this group, 15.6% (7 respondents) indicated that they had not completed primary school. This highlights an ongoing challenge in educational attainment, suggesting barriers that prevent individuals from finishing even basic education.

Interestingly, the data reveals that 13.3% (6 respondents) have completed primary school, while a smaller percentage, 8.9% (4 respondents), have attended pre-secondary school. These figures indicate that as individuals progress through the educational system, the number of those who continue their education tends to dwindle.

Secondary school education was achieved by 22.2% (10 respondents), which, while a positive indicator, still reflects that a large portion of the population does not progress to higher educational levels. Tertiary education was reported by only 6.7% (3 respondents), further demonstrating that advanced education is significantly less attainable within this community.

Overall, the data present a concerning picture of educational attainment in Cumo-Oli Village. A majority of the population does not advance beyond basic education, indicating a need for targeted educational initiatives and support to enhance literacy and encourage attendance at higher education. These findings underscore the importance of addressing barriers to education to foster greater opportunities for personal and community development.

Table 5: Characteristics of respondents based on the occupation of head of household in Cumo-Oli Village, Baha-Mori District, Venilale Administrative Post, Baucau Municipality, 2025

Occupation	Frequency	Percentage (%)
Housewife	20	45%
Farmer	20	45%
Civil Servant	5	10%
Total	45	100%

Source: Secondary data from Cumo-Oli village, 2025

The table presents the characteristics of respondents by the head of household's occupation in Cumo-Oli Village, Baha-Mori Suco, Venilale Administrative Post, Baucau Municipality, for the year 2025.

In this study, a total of 45 households were surveyed. The data indicate that 45% of respondents are housewives, the largest proportion in the sample. This significant percentage suggests that many households may rely on traditional family roles, in which women predominantly manage domestic responsibilities.

Another 45% of respondents identified as farmers, highlighting the agricultural basis of the community's economy. The equal distribution of roles between housewives and farmers underscores the integral role agriculture plays in

villagers' livelihoods, indicating a community deeply embedded in farming practices.

Finally, a smaller segment of the population, comprising just 10% of the respondents, is represented by civil servants. This relatively low percentage may reflect limited employment opportunities in the public sector or suggest that the majority of heads of household engage in agriculture and domestic roles.

Overall, the findings illustrate a community where traditional occupations, particularly homemaking and farming, dominate. This information could serve as a vital reference for policymakers and development programs aimed at enhancing the livelihoods of households in Cumo-Oli Village by addressing the needs of the predominant occupations.

➤ *Calculation of Correlation and Regression*

Table 6 Calculation of the Physical Condition of the House (X) for the Occurrence of ARI Diseases (Y)

Statistical Symbol	Statistical Value
N	45
ΣX	698
ΣY	683
ΣX ²	11444
ΣY ²	10831
ΣXY	11071

$$\begin{aligned}
 r_{xy} &= \frac{n(\sum x_1y) - (\sum x_1) \cdot (\sum Y)}{\sqrt{((n \cdot \sum x^2 - (\sum x)^2) \cdot (n \cdot \sum y^2 - (\sum y)^2))}} \\
 &= \frac{45 \cdot (11071) - (698) \cdot (683)}{\sqrt{((45 \cdot 11444 - (698)^2) \cdot (45 \cdot 10831 - (683)^2))}} \\
 &= \frac{498195 - 476734}{\sqrt{((514980 - 487204) \cdot (487395 - 466489)^2)}} \\
 &= \frac{21461}{\sqrt{(27776) \cdot (20906)^2}} \\
 &= \frac{21461}{\sqrt{580685056}} = \frac{21461}{24097,41} = 0.890
 \end{aligned}$$

The results of the rXY calculation indicate a very strong relationship between the house's physical condition (variable X) and the occurrence of ARI diseases (variable Y). This is evidenced by a correlation coefficient (r) of 0.890. Furthermore, the analysis reveals that 79.21% of the variation in ARI disease occurrence is explained by the physical condition of the house, as indicated by the coefficient of determination (r²). This indicates a significant influence of housing conditions on health outcomes, with the remaining 20.79% attributable to other variables not accounted for in this analysis.

$$\begin{aligned}
 t_{\text{ calculation}} &= r \frac{\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0.890 \sqrt{45-2}}{\sqrt{1-0.890^2}} = \frac{0.890 \sqrt{43}}{\sqrt{1-0.7921}} = \\
 &= \frac{0.890 (6,557439)}{\sqrt{0,2079}} = \frac{5,83612}{0,455961} = 12.799
 \end{aligned}$$

The calculation yields a t-value of 12.799, which is then compared to a critical value from a t-distribution table, set at 1.681 for a significance level (alpha) of 0.05 and degrees of freedom equal to n-2 (where n is the sample size). In this case, the sample size (n) is 45, resulting in 43 degrees of freedom. Since the calculated t-value (12.799) is much greater than the critical value (1.681), the correlation between the physical condition of housing and the occurrence of ARI is statistically significant. This means there is strong evidence to suggest that improved housing conditions are associated with a lower incidence of respiratory infections.

In summary, the analysis demonstrates that there is a significant relationship between the physical conditions of houses and the risk of ARI disease, urging further consideration of housing quality as a crucial element in public health strategy.us, t ≥ t table (12.799 ≥) means there is a significant relationship between the physical condition of the house (X) and the occurrence of ARI disease (Y).

IV. DISCUSSION

Acute Respiratory Infection (ARI) is a significant public health concern, and various studies have highlighted the role of environmental factors in its prevalence and severity. Consistent with the findings of Dessy et al. (2017) and Depkes RI (2002), which point to indoor air quality and home-related exposures as critical influences on ARI risk, other research also substantiates these claims.

For instance, a study by Akinbami et al. (2016) found that poor indoor air quality—exacerbated by the use of solid fuels for cooking and heating—was strongly associated with respiratory illnesses in children. Exposure to indoor pollutants, particularly in homes with limited ventilation, has been shown to increase the incidence of respiratory infections, supporting the idea that airborne pathogens can significantly affect health outcomes.

Similarly, a comprehensive review by WHO (2020) discusses how factors such as humidity, temperature, and the presence of allergens play vital roles in the spread and severity of respiratory illnesses. The World Health Organization emphasizes that adequate ventilation and control of indoor air pollution are essential components in reducing ARI risks, reiterating that suboptimal air quality can elevate vulnerability to infections.

In contrast, some research, such as that conducted by Nascimento et al. (2018), shows that both indoor environmental factors and socioeconomic conditions significantly influence ARI susceptibility. This study found that lower socioeconomic

status is closely linked to higher levels of indoor air pollution and limited access to healthcare, which, in turn, worsen ARI outcomes.

The relationship between housing characteristics and respiratory health has been extensively studied, highlighting several critical factors that influence indoor air quality and, in turn, respiratory morbidity.

Ventilation inadequacy is a significant concern. As Nurhayati and Ina (2013) and Depkes RI (2002) noted, insufficient ventilation can lead to the concentration of pollutants and infectious particles indoors, complicating the composition of indoor air and potentially exacerbating respiratory issues. This aligns with findings by Angulo et al. (2018), who emphasized that adequate ventilation is crucial in reducing airborne contaminants. They suggest that homes should aim for a minimum ventilation rate of 15% of the total floor area, which further supports the idea that increased airflow can dilute indoor pollutants more effectively than the 10% suggested by previous studies.

High humidity levels have also been identified as a contributing factor to respiratory conditions. Notoadmodjo (2012) noted that elevated humidity promotes bacterial growth, a crucial consideration in the development of acute respiratory infections (ARIs). A systematic review by Zhang et al. (2020) corroborates this observation, showing that humidity levels above 60% are significantly associated with heightened respiratory symptoms and infection rates.

Furthermore, indoor smoke exposure, particularly from cigarettes and cooking, poses a notable risk factor for respiratory ailments. Adrian (2018) and Layuk (2012) highlighted how smoke exposure can lead to conditions such as pneumonia and bronchitis, exacerbating existing respiratory problems. This concern is echoed by a World Health Organization (2019) study, which found that exposure to indoor pollutants, including tobacco smoke and kitchen emissions, significantly increases the risk of respiratory illnesses, especially in vulnerable populations.

Issues related to dust, structural gaps, and roof sealing also contribute to respiratory health risks. Bagus (2015) argues that uncontrolled air exchange can lead to dust accumulation indoors, which may aggravate respiratory irritation and infections. This notion is supported by research from Mendez et al. (2021), indicating that homes with poor structural integrity, which allow dust and particulates to infiltrate, are associated with higher rates of respiratory conditions.

In examining the association between inadequate housing conditions and respiratory diseases, Kearney (2016) provides compelling evidence that poor ventilation, excess moisture, and overcrowding significantly increase the prevalence of respiratory illnesses. This finding aligns with the research presented in the current study, which shows that suboptimal

housing conditions create indoor environments conducive to pathogen survival, thereby increasing exposure to allergens and irritants and ultimately raising the risk of respiratory illnesses.

Similarly, a study by Baker et al. (2017) highlights that housing quality is directly associated with respiratory health, particularly among vulnerable populations such as children and the elderly. The authors emphasize that structural issues in homes, such as dampness and inadequate heating, exacerbate health problems like asthma and other respiratory ailments. This further reinforces Kearney's findings and underscores the significance of maintaining adequate housing standards to improve public health outcomes.

Furthermore, a meta-analysis by Thomson et al. (2018) supports the assertion that housing improvement measures can yield substantial public health benefits. The study highlights that targeted interventions focusing on ventilation, humidity control, and reduced exposure to indoor pollutants can reduce the incidence of respiratory disease. This aligns with the empirical findings of Ridwan (2013; 2015), which demonstrate a strong correlation between housing conditions and the incidence of acute respiratory infections (ARI), underscoring the importance of housing reforms in alleviating health burdens.

Despite these promising findings, it is crucial to consider the multifactorial nature of ARI. A report by the World Health Organization (2018) emphasizes that while environmental factors are significant, individual characteristics, including socio-economic status, caregiver education, and access to healthcare, play critical roles in determining health outcomes. This perspective is reflected in Sofia's (2017) framework, which suggests that a holistic approach is necessary to effectively address ARI risks. Integrating housing improvements with complementary interventions—such as enhanced caregiver education and healthcare access—is essential for promoting optimal respiratory health among residents.

Lastly, the evidence suggests a critical link between housing characteristics—specifically ventilation, humidity, smoke exposure, and structural integrity—and respiratory health outcomes. Addressing these factors is essential for mitigating the risks associated with respiratory illnesses.

In summary, the relationship between environmental factors and ARI is multifaceted, involving both indoor air quality and socioeconomic influences. As highlighted in various studies, improving ventilation, reducing indoor pollutants, and addressing socioeconomic disparities are vital steps in mitigating the risk of ARI (Akinbami et al., 2016; WHO, 2020; Nascimento et al., 2018).

V. CONCLUSION

According to the results of this research, the physical condition of the house is strongly and clearly linked to the incidence of Acute Respiratory Infection (ARI) in Cumo-Oli

Village, Bahamori Suco, within the Venilale Administrative Post of Baucau Municipality, in 2025. The correlation analysis yielded an initial r-value of 0.890, indicating a very strong association between housing conditions and ARI cases. Meanwhile, the t-test result for the initial equation was 12.799, which greatly exceeded the critical value of 1.681, reinforcing that the relationship is statistically significant.

This indicates that substandard housing conditions, including poor ventilation, elevated humidity, exposure to smoke, dust ingress, and insufficient structural safety, are likely to increase the risk of acute respiratory infections (ARI) among residents, particularly children and other at-risk populations. Practically speaking, the results imply that enhancing housing quality is not merely about comfort but also a significant public health measure.

The research indicates that the community possesses social traits that may heighten health vulnerability, such as a significant portion of the sample having limited educational backgrounds and a heavy dependence on farming and domestic labor. These factors may influence awareness of environmental health hazards and the capacity to sustain healthier living conditions. As a result, efforts to prevent acute respiratory infections (ARI) should emphasize not only treatment but also improvements in household sanitation, ventilation, smoke management, and community education.

In summary, the study suggests that prioritizing housing improvements is essential to reducing ARI rates in the area examined. Enhancing household physical conditions, coupled with health promotion and support from local authorities, can help reduce ARI incidence and improve community well-being.

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