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The Relationship Between Housing Sanitation Factors and the Incidence of Acute Respiratory Infections (ARI) in the Batulappa Health Center Work Area

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Abstract. *Home and environmental sanitation are closely related to the incidence of infectious diseases, especially ARI (Taylor, 2002). Several things that can affect the incidence of ARI in toddlers are the physical condition of the house, cleanliness of the house, density of residents and air pollution in the house (Iswarini and Wahyu, 2006). This type of research is analytical survey research with a cross-sectional study approach. This research was conducted in the Batulappa Health Center Working Area, Batulappa District, Pinrang Regency for 1 (one) month, namely from October 11 to October 31, 2022 with a sample size of 95 respondents. The results of the study showed that there was a relationship between occupant density, building type, and house ventilation with the incidence of ARI in the working area of the Batulappa Health Center, Batulappa District, Pinrang Regency. Suggestions in this study It is hoped that all people, especially those in the Batulappa Health Center work area, will maintain personal and environmental hygiene and prevent children from coming into contact with ARI sufferers.*

Keywords: *Housing Sanitation, ISPA, Acute Respiratory Infections*

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INTRODUCTION

The realization of a healthy state is the will of all parties. not only individuals or families, but also by groups and even by all members of society. What is meant by health is a healthy state, both physically, mentally, spiritually, and socially that allows everyone to live productively socially and economically (Law of the Republic of Indonesia No. 36 of 2021). Health development is carried out based on humanity, balance, benefits, protection, respect for rights and obligations, justice, gender and non-discrimination and religious norms (Rodríguez et al., 2021). Health development aims to increase awareness, willingness, and ability to live healthily for everyone in order to realize the highest level of public health, as an investment for the development of human resources that are socially and economically productive (Law of the Republic of Indonesia No. 36 of 2021).

Health problems are very complex problems, which are interrelated with other problems outside of health itself (Guo et al., 2020). Likewise, solving public health problems is not only seen from the health aspect itself, but must be seen from all aspects that have an influence on the

problem of "health-illness" or health (Paakkari & Okan, 2020). Many factors affect health, both individual health and public health, for that Hendrik L Blum put forward four factors including heredity, environment, behavior, and health services (Pandey et al., 2024). Home and environmental sanitation are closely related to the incidence of infectious diseases, especially ARI (Hassen et al., 2020). Several things that can affect the incidence of ARI are the physical condition of the house, cleanliness of the house, density of residents and air pollution in the house (Fera & Sriwahyuni, 2020). In addition, there are also factors such as density of residents, ventilation, temperature and lighting (Peng & Maing, 2021).

Acute Respiratory Tract Infection (ARI) is a major health problem in Indonesia due to the high incidence of ARI, especially in toddlers (Windi et al., 2021). In developing countries, morbidity and mortality due to lower ARI reaches 25% - 50%. This morbidity rate is even higher than in densely populated areas. ARI is also one of the main causes of patient visits to health facilities. As many as 40% - 60% of visits for treatment at Puskesmas and 15% - 30% of visits for treatment in outpatient and inpatient departments at hospitals are caused by ARI. In addition, ARI is also often on the list of the 10 most common diseases in hospitals. Based on data from the P2 ISPA Program in 2005, the coverage of ARI sufferers exceeded the target of 13.4%, the results obtained were 18,749 cases while the target set was only 16,534 cases. The mortality survey conducted by the ISPA Sub-Directorate in 2021 placed ISPA Pneumonia as the biggest cause of infant mortality in Indonesia with a percentage of 22.30% of all toddler deaths (Ministry of Health of the Republic of Indonesia, 2006).

Based on data from the South Sulawesi Provincial Health Service, pneumonia in ISPA patients since 2019 until 2021, respectively, were 62,126 cases (31.45%), 72,537 cases (35.94), and 74,278 cases (32.26%). This shows that the incidence of ARI in South Sulawesi Province is increasing (South Sulawesi Health Office, 2021). Based on data from the Pinrang District Health Office, pneumonia due to ISPA in toddlers from 2019 to 2021, respectively, were 11,220 cases (34.14%), 13,840 cases (42.12%), and 7801 cases (23.74%), (Pinrang Health Office, 2021).

METHODS

This type of research is analytical survey research with a *cross-sectional study approach* where the relationship between the independent variables and the dependent variables is studied at the same time with the aim of determining the relationship between housing sanitation and the incidence of ARI in the Batulappa Health Center Work Area, Batulappa District, Pinrang Regency in 2022. This research was conducted in the Batulappa Health Center Working Area, Batulappa District, Pinrang Regency for 1 (one) month, namely from October 11 to October 31, 2022. The Batulappa Health Center Working Area is one of the areas in Pinrang Regency that has experienced a significant increase for the last 2 (two) years. The population of this study was all Heads of Households (KRT) in the Working Area of Batulappa Health Center, Batulappa District, Pinrang Regency, totaling 1958 Heads of Households. The sample in this study was a portion of the number of heads of households in the Batulappa Health Center Working Area, Batulappa District, Pinrang Regency. The respondents used as samples were 95 out of 1958 heads of households who had families in the Batullapa Health Center Work Area, Batulappa District, Pinrang Regency. Respondents in this study were Heads of Households in the Working Area of Batullapa Health Center, Batulappa District, Pinrang Regency. Primary data was obtained from the results of direct interviews with patients using questionnaires and direct observation in the field. Secondary data was obtained from related agencies such as the Pinrang Regency Health Office and the Batulappa Health Center, Batulappa District, Pinrang Regency. The data obtained from the results of field research were processed with the help of a calculator and the SPSS *version* 16 computer program and presented in the form of tables accompanied by narration. Data analysis using the chi-square test with a significance level (α) = 0.05, 95% confidence level (α = 0.05) and degrees of freedom df = 1.

RESULT AND DISCUSSION

Data collection on the relationship between housing sanitation factors and the incidence of Acute Respiratory Tract Infections (ARI) in the working area of the Batulappa Health Center, Batulappa District, Pinrang Regency was carried out using a questionnaire as a research instrument distributed to 95 respondents which was carried out from October 11 to October 31, 2022. The results of the data collection were processed using computer assistance and then presented in the form of a table as follows:

Respondent Characteristics

Age

Table 5.1 shows that of the 95 respondents in the working area of Batulappa Health Center, Batulappa District, Pinrang Regency, they have varying age groups ranging from 21 years to 80 years. The highest frequency of age groups is in the 31–40-year age group, which is 29 people (30.53%) and the lowest is in the 71–80-year age group, which is 2 people (2.11%).

Table 1. Distribution of Respondents Based on Age Group of Respondents in the Working Area of Batulappa Health Center, Batulappa District, Pinrang Regency in 2022

Age	N	%
21 – 30	9	9.47
31 – 40	29	30.53
41 – 50	20	20.06
51 – 60	23	24.21
61 – 70	12	12.63
71 – 80	2	2.11
Total	95	100

Source: Primary Data

Level of Education

Table 2. Distribution of Respondents Based on Respondents' Education Level in the Batulappa Health Center Work Area, Batulappa District, Pinrang Regency in 2022

Level of education	N	%
No school	23	24.21
Primary School	41	43.16
Junior High School	17	17.89
Senior High School	10	10.53
D2 & S1	4	4.21
Total	95	100

Source: Primary Data

Table 5.2 shows that out of 95 respondents, they have varying levels of education. The highest frequency is Elementary School (SD) as many as 41 people (43.16%), those who did not attend school were 23 people (24.21%), Junior High School (SMP) as many as 17 people (17.89%) then Senior High School (SMA) as many as 10 people (10.53%) and the lowest is D2 and S1 as many as 4 people (4.21%).

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Univariate Analysis

ISPA incident

Table 3. Distribution of Respondents Based on ISPA Incidents in the Batulappa Health Center Work Area, Batulappa District Pinrang Regency 2022

ISPA incident	n	%
ISPA	82	86.32
No ARI	13	13.68
Total	95	100

Source: Primary Data

Table 5.3 shows that more respondents in the working area of Batulappa Health Center, Batulappa District, Pinrang Regency, suffered from ARI, as many as 82 people (86.32%), while those who did not suffer from ARI were 13 people (13.68%).

The results of this study highlight a significant relationship between housing sanitation factors and the incidence of Acute Respiratory Infections (ARI) in the Batulappa Health Center work area (Shrestha et al., 2020; Ahmad et al., 2020; Muanda et al., 2020). Among the 95 respondents, 86.32% experienced ARI, underscoring the persistent public health challenge posed by respiratory infections in households with suboptimal sanitation. These findings align with previous research that emphasized the role of housing and environmental conditions in influencing respiratory health (Howden et al., 2023).

This study corroborates the established understanding that inadequate housing sanitation significantly contributes to the high prevalence of ARI (Gwenzi, 2021). Similar studies have identified poor ventilation, high population density, and indoor air pollution as critical determinants (Mannan & Al-Ghamdi, 2021). In the context of the Batulappa Health Center, the high frequency of ARI can be attributed to the environmental conditions of households, including inadequate ventilation and exposure to indoor pollutants such as smoke from cooking. This emphasizes the urgent need for targeted interventions, such as improving housing standards and promoting clean air practices, to mitigate ARI risks (Sims et al., 2020).

Interestingly, the study also highlights the influence of socioeconomic factors such as education levels on health outcomes (O'Neil et al., 2020). Most respondents had only elementary-level education (43.16%) or no formal education (24.21%), which could contribute to limited awareness of preventive measures against ARI (Raeiszadeh & Adeli, 2020). These findings are consistent with previous literature, which shows that lower educational attainment is often associated with poorer health outcomes due to limited health literacy and access to resources (Plohl & Musil, 2021). This underscores the need for community-based educational campaigns tailored to improve awareness and practices related to housing sanitation (Shafique et al., 2024).

This study fills a significant gap in the literature by providing localized data on the relationship between housing sanitation and ARI in the Batulappa region, which has not been extensively documented. While global studies have explored the link between environmental factors and respiratory infections, regional-specific data in Indonesia remain sparse. Previous studies primarily focused on urban settings or larger provinces, leaving smaller districts like Pinrang relatively unexplored (Cowie et al., 2020). By identifying specific local challenges, such as a high proportion of poorly educated households and inadequate housing conditions, this study contributes actionable insights for policymakers to design targeted interventions in rural settings (Penne & Goedemé, 2021).

Unlike broader studies that provide general insights into ARI prevalence, this research adopts a focused approach, examining specific housing sanitation variables in a cross-sectional design. The findings are comparable to the study by Woolley et al. (2022), which demonstrated that households with poor ventilation and high crowding had a 1.5–2 times higher risk of ARI.

However, this study diverges by emphasizing regional trends and incorporating proportional stratified random sampling, ensuring representativeness across multiple villages in Batulappa.

CONCLUSION

The research conducted in the Batulappa Health Center work area, Batulappa District, Pinrang Regency, revealed critical insights into the relationship between environmental sanitation factors and the incidence of Acute Respiratory Infections (ARI). The study found that population density significantly correlates with the incidence of ARI, suggesting that overcrowding increases the risk of disease transmission. Furthermore, the type of building material used for houses, such as tightly installed wood or brickwork, was associated with ARI incidence, indicating the importance of durable and secure housing structures in preventing respiratory infections. Adequate home ventilation also showed a significant relationship with ARI occurrence, emphasizing the need for proper airflow to reduce indoor air pollution and support air exchange. Based on these findings, several recommendations can be made. Firstly, residential building areas should be proportional to the number of occupants to minimize overcrowding and reduce disease transmission risks. Houses constructed with tightly fitted wood or brick materials are advised, as these structures can better prevent the spread of infectious diseases. Adequate ventilation should also be provided in every household, ensuring daily airflow for sufficient oxygen and air exchange to create a healthier living environment. Moreover, local governments should prioritize enhancing the economic welfare of their citizens, enabling them to construct homes that meet health standards, including proper ventilation, structural materials, and sufficient size. Lastly, it is crucial for the community, especially in the Batulappa Health Center work area, to maintain personal and environmental hygiene and to protect children from exposure to ARI sufferers. These measures are essential for mitigating ARI and improving public health outcomes in the region.

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