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RESEARCH

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Contribution of Household Sanitation to Acute Respiratory Infection Symptoms Among Children: Analysis of the 2017 Indonesian Demographic Health Survey

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Abstract

Acute Respiratory Infections (ARI) remain one of the primary causes of mortality among children under 5 in Indonesia, and poor inadequate drinking water, sanitation, and hygiene (WASH) conditions can exacerbate the transmission of respiratory pathogens. However, their association with ARIs in Indonesia remains underreported. This study aimed to analyze the contribution of these sanitation conditions to ARI symptoms in children under five in Indonesia. This research method was cross-sectional quantitative design study based on secondary data from the 2017 Indonesian Demographic and Health Survey (IDHS), based on secondary data from the 2017 Indonesian Demographic and Health Survey (IDHS), which was the most recent available at the time of the study. The determined sample consisted all toddlers aged 0-59 months, from women aged 15-49 years. The weighted sample that met the inclusion criteria (children aged 0-59 months, living with their parents, willing to answer questions) and exclusion criteria (missing data and "don't know" answers) consisted of 16,681 observations. Independent variables included sanitation infrastructure, mother's education, wealth index, and residential location. The dependent variable was reported ARI symptoms in 2 weeks prior to the interview by their mother. Data were analyzed using CI 95% logistic regression to determine associations, and pathway analysis was conducted to explore the direct and indirect relationships among variables. Poor toilet facilities [OR: 1.80, CI: 1.46-2,27] increased the risk of ARI symptom, meanwhile treated water before consumption reduce the risk [OR:0.63, CI:0.51-0.77]. Long travel distances to clean water also were found as factor that increased the risk of ARI symptoms [OR:2.31, CI:0.65-3.02]. Indirect factors such as low mother's education, low wealth index, and rural residency, also contributed to ARI symptoms in children. In conclusion, inadequate household sanitation significantly contribute to ARI symptoms in children under five in Indonesia. These findings underscore the need for improved sanitation infrastructure and targeted health interventions in vulnerable communities.

Keywords: Household Sanitation, Acute Respiratory Infection, Children, Indonesia.

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1. INTRODUCTION

Acute respiratory infections (ARIs) are a leading cause of morbidity and mortality among children worldwide, particularly in Low-Middle Income Countries (LMICs) (Ashraf et al., 2020). The WHO 2021 reported that ARIs contributed for approximately 15% of all deaths in children under five years worldwide, with the majority occurring in developing countries in Asia and Africa, where Indonesia bears 38% of the global burden (Merera, 2021). In Indonesia, ARIs remain one of the primary causes of mortality among children under five (Riyanto & Herlina, 2021). Indonesia's national data further indicate a significant increase in ARI prevalence among children, rising from 25% in 2013 to 47.17% in 2018 (Seda et al., 2021; Setiawati et al., 2021).

Inadequate Water, Sanitation, and Hygiene (WASH) are determinants of the global disease burden, especially among children (Prüss-Ustün et al., 2019). Poor WASH conditions can support the transmission of respiratory pathogens and worsen child morbidity. An observational study highlighted by Ashraf (2020) noted a decrease in child mortality from pneumonia after improvements in drinking water quality (Ashraf et al., 2020). In the context of child health, poor WASH conditions have been shown to increase the risk of several health problems, such as stunting (Headey & Palloni, 2019), recurrent diarrhea (Kanda et al., 2021), anemia (Larsen et al., 2017), and correlate with child mortality (Fink et al., 2011). Inappropriate sanitation contribute to malnutrition and affect child development, especially in developing countries.

The Sustainable Development Goals (SDGs) included "*Universal and equitable access to safe and affordable drinking water*" and "*adequate and equitable sanitation and hygiene*" (Kim et al., 2018). Despite global commitments, 2.3 billion people lack basic sanitation, and 892 million still practice open defecation (Triasari, 2021). This evidence underscores the need to monitor WASH-related child health outcomes, in line with SDG Targets 6.1 and 6.2 on safe water and adequate sanitation (United Nations, 2023). Health risks associated with poor sanitation are also directly linked to SDG Target 3.9, which seeks to reduce deaths and illnesses caused by hazardous air, water, and soil pollution (World Health Organization & UNICEF, 2025). Despite progress, Indonesia still faces challenges in reaching these targets, as reflected in the 2023 national SDG indicators report showing persistent inequalities in access to improved sanitation, particularly in rural areas (Badan Pusat Statistik Indonesia, 2023).

Environmental factors, including poor sanitation, have been identified as key determinants in the increased risk of ARI in vulnerable populations, particularly children (Islam et al., 2024). The impact of toilet hygiene on ARIs is still being studied to understand the underlying mechanisms of this relationship. Poorly managed waste disposal can produce harmful gas emissions, such as ammonia (NH₃), hydrogen sulfide (H₂S), and methane (CH₄), which contribute to respiratory tract irritation and reduce indoor and ambient air quality (Pham et al., 2022). Long-term exposure to these gases can cause chronic inflammation of the respiratory mucosa, increasing susceptibility to viral and bacterial infections (Mo et al., 2022). Poor drainage systems lead to water stagnation, which can become a habitat for pathogenic microorganisms, including *Streptococcus pneumoniae* and *Haemophilus influenzae*, major causes of pneumonia in children (Dean & Mitchell, 2022). Organic waste accumulation also supports the proliferation of disease vectors, such as flies and mosquitoes, which can play a role in the transmission of ARI-causing pathogens (Aldardasawi & Eren, 2021).

Epidemiological studies indicate that children living in areas with poor sanitation have a higher incidence of ARIs compared to those living in environments with better sanitation systems. Furthermore, inadequate sanitation practices can increase the density of pathogenic microbial populations in household environments (Contreras et al., 2022). Low socioeconomic conditions often correlate with limited access to adequate sanitation facilities, also increasing exposure to environmental risk factors that contribute to the occurrence of ARIs (Oskam et al., 2021). However, how these environmental factors contribute to ARIs in children in the

Indonesian context remain underreported. This study was conducted to address this gap, utilizing data from the 2017 Indonesia Demographic Health Survey (IDHS).

2. RESEARCH METHOD

This study is a cross-sectional quantitative study using data from the 2017 Indonesian Demographic and Health Survey (IDHS). Several variables (child's age, maternal education level, economic status, residential area type, presence of smoking family members, toilet facility type, drinking water source, travel time to access clean water, and drinking water quality) were included in the analysis to examine their relationship with Acute Respiratory Infection (ARI) symptoms in children in Indonesia in 2017. The study population was children aged 0-59 months, as subjects of the 2017 IDHS across all provinces in Indonesia. The determined sample was all the toddlers aged 0-59 months, from women aged 15-49 years. The weighted sample that met the inclusion criteria (children aged 0-59 months, living with their parents, willing to answer questions) and exclusion criteria (missing data and "don't know" answers) consisted of 16,681 observations. Symptoms of acute respiratory infection (ARI) among children were assessed as the dependent variable. Eligible mothers were asked about the respiratory condition of their children. They were asked whether the child had experienced a cough in the past two weeks; if so, follow-up questions addressed the presence of fever accompanied by shortness of breath or rapid breathing. The categorization of all the variables in this research follows the standard definitions used in the *Guide to DHS Statistics* (The DHS Program).

The first stage of data analysis was to identify and collect relevant variables related to ARI. Variables were extracted from two datasets: KR file (IDKR71FL, containing the Women of Reproductive Age questionnaire, child health section) and HR file (IDHR71FL, containing the Household questionnaire on housing characteristics and household members, including drinking water quality). The second stage of analysis was to merge the two datasets from the 2017 IDHS. The merging process was done by matching household IDs and child case IDs from both datasets. After the data was merged, we performed filtering to select appropriate variables, recoding, and addressing missing data. The data then weighted according to the IDHS guidelines until it was ready for further analysis. The third stage was to conduct hierarchical analysis in three steps: (1) descriptive and bivariable analysis using binary logistic regression to identify the relationship and contribution of each variable to ARIs; (2) pathway analysis to visualize direct and indirect relationships with ARI occurrence in children under 5, only for statistically significant variables in bivariable analysis. (3) statistical significance was set at $p < 0.05$ with 95% confidence intervals, and robustness checks were performed by sensitivity analysis excluding missing and extreme values. Pathway model fit was assessed using standard goodness of fit indices. Analyses were conducted in STATA 17.

The visualized SEM analysis deliver as a diagram. Prior to the interview process in the 2017 IDHS survey, interviewers obtained consent from participants through an informed consent process. This study received ethical approval from the National Ethics Committee of the Indonesian Ministry of Health and the ICF Macro ethical review board with reference number 45 CFR 46. The 2017 IDHS survey data is publicly available and accessible through the official DHS website, after obtaining permission from the DHS Program.

3. RESULTS AND DISCUSSION

Table 1. Characteristic distribution and logistic regression (*unadjusted*) among sociodemographic and sanitation towards symptom of ARI on children under 5.

Variables	Reported ARI Symptom				OR	95% CI	
	Yes		No			Lower	Upper
	N	%	N	%			
Age Group (Months)							
< 6	41	6.03	1.453	9.43	Ref.	1	1
6 -11	55	8.17	1.525	9.89	1.80**	1.20	2.69
12 - 23	156	23.06	3.150	20.44	2.14***	1.50	3.06
24 - 35	161	23.84	3.021	19.60	2.36***	1.65	3.37
36 - 47	128	19.00	3.101	20.12	2.03***	1.42	2.91
48 - 59	135	19.89	3.162	20.51	1.64**	1.18	2.36
Mother's Education							
No Education	10	1.46	166	1.08	Ref	1	1
Elementary-Middle School	216	32.00	3.927	25.48	0.86	0.50	1.48
High School	359	53.03	8.955	58.10	0.65	0.38	1.10
Diploma +	91	13.51	2.365	15.34	0.64	0.37	1.11
Wealth Index							
Poorest	201	29.68	3.048	19.77	Ref	1	1
Poor	159	23.54	3.087	20.03	0.76***	0.62	0.93
Middle	111	16.47	3.171	20.57	0.58***	0.46	0.72
Rich	114	16.79	3.127	20.29	0.58***	0.46	0.72
Richest	91	13.51	2.980	19.33	0.49***	0.39	0.63
Type of Residential							
Urban	298	44.01	7.538	48.91	Ref	1	1
Rural	379	55.99	7.874	51.09	1.33***	1,15	1,55
Having Family Members with Smoking Habits							
No	666	98.53	15.161	98.40	Ref	1	1
Yes	10	1.47	246	1.60	0.77	0.41	1.46
Toilet Facility							
Private with septic tank	394	58.20	11.035	71.60	Ref	1	1
Private without septic tank	72	10.64	1.355	8.79	1.31*	1.01	1.70
Public Toilet	71	10.52	1.065	6.91	1.66***	1.31	2.10
Other Facilities	36	5.29	514	3.33	1.92***	1.39	2.67
No Facilities (open defecation in bushes, fields, rivers, beaches)	104	15.35	1.442	9.36	1.80***	1.46	2.27
Source Of Drinking Water							
Inappropriate	82	12.17	1.376	8.93	Ref	1	1
Appropriate	594	87.83	14.036	91.07	0.97	0.83	1.13
Time To Access Safe Water							
Available on property	493	72.98	11.923	77.44	Ref	1	1
30 minutes or less	164	24.31	3.272	21.25	1.34***	1.14	1.57
More than 30 minutes	9	1.37	94	0.61	2.31**	1.41	3.78
Don't know	9	1.34	108	0.70	1.40	0.65	3.02
Water Consumption Status							
Untreated before consumption	470	69.46	10.596	68.76	Ref	1	1
Treated before consumption	206	30.54	4.807	31.19	0.63***	0.51	0.77

*significant at $p < 0,05$, **significant at $p < 0,01$, ***significant at $p < 0,001$, Ref: Reference

The bivariable logistic regression analysis results (Table 1) showed that several factors were significantly associated with ARI occurrence in children in Indonesia. The increase of wealth economic status decreased the risk of ARI in children in all categories (i.e: the poor wealth index has lower OR=0.76 than the poorest, with CI range of 0.62-0.93, significant at $p < 0.001$). The increase of mother's education also aligns with the decrease risk of ARI (OR=0.64 for Diploma education, with no education as the reference), but not statistically significant at any level. Children living in rural areas had a higher risk of ARI compared to urban areas (OR=1.33 compared to urban, CI: 1.15-1.550, and most of inadequate toilet facilities increased the risk of ARI (no toilet facilities have OR=1.80 compared to private septic tank, CI: 1.46-2.27).

For those variables which statistically significant, we then move forward to pathway analysis (Table 2) and conduct the visualized diagram (Figure 1). We only show the best decision model to predict pathway, through filtering the best relationship between sanitation and ARI in children.

Table 2. Pathway Analysis to Visualized Direct and Indirect Factors Associated with Child ARI in Indonesia Based on 2017 Indonesian Demographic and Health Survey (IDHS) Data.

Pathway Source Of Drinking Water	Coef. (β)	Standard Error	CI Range (95%)		Z	p-Value
Wealth Index	0.831	0.033052	0.767	0.895	25.13	0.000
Level of Mothers' Education	1.638	0.041628	0.082	0.245	3.93	0.000
Type of Residential	-1.188	0.078028	-1.341	-1.035	-15.23	0.000
Cons.	2.147	0.176494	1.	2.492	12.16	0.000
Pathway ARI in Children						
Source of Drinking Water	-0.268	0.111387	-0.486	-0.049	-2.41	0.016
Time to access safe water	0.178	0.067852	0.0373	0.303	2.51	0.012
Toilet Facility	0.214	0.005222	0.011	0.031	4.09	0.000
Cons.	-3.394	0.17704	-3.741	-3.047	-19.1	0.000

The household sanitation variables predicting ARI in children are shown in the pathway analysis table, as presented in Table 2. The visual diagram of the pathway analysis results (Figure 1) shows that wealth indeks and maternal education can also increase access to adequate drinking water sources.

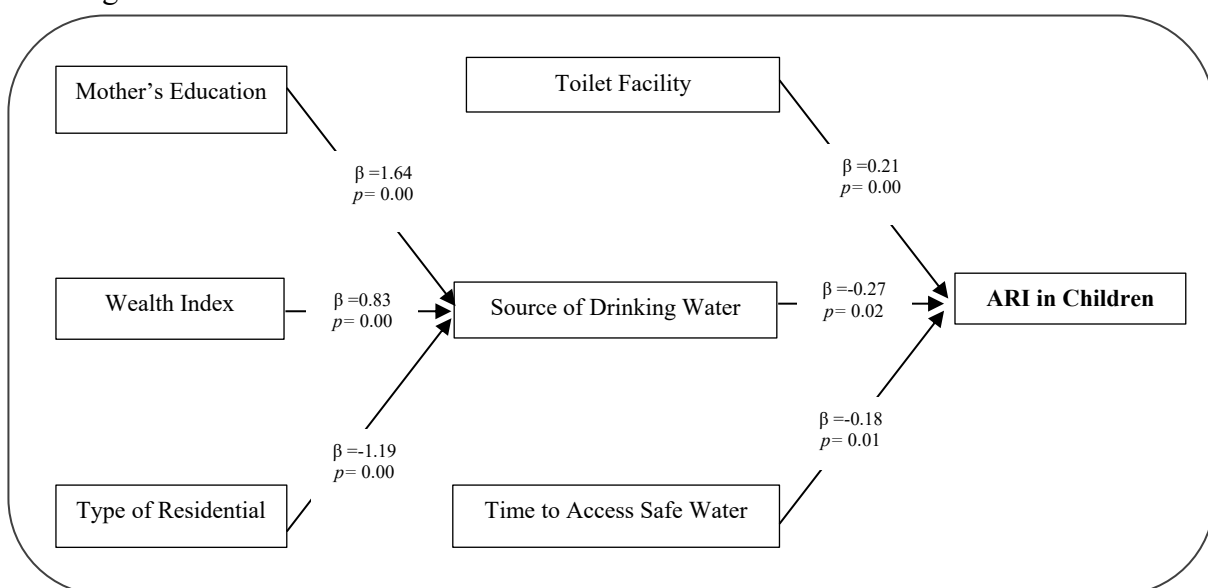


Figure 1. Pathway Analysis of Household Sanitation and ARI in Children Under Five in Indonesia Based on 2017 Indonesian Demographic and Health Survey (IDHS) Data.

ARIs in children is directly influenced by access to adequate source of drinking water drinking water ($\beta = -0.27$, $p = 0.02$), time to access safe water ($\beta = -0.18$, $p = 0.01$), and appropriate toilet facility ($\beta = 0.21$, $p = 0.00$). Access to adequate source of drinking water can decrease the risk of child ARI with a negative coefficient value, while longer travel time to access safe water and inadequate toilet facilities potentially increase the risk of child ARI in Indonesia, based on the 2017 Indonesian Demographic and Health Survey (IDHS) data. These findings indicate that improving basic WASH infrastructure is not only essential for reducing ARI risk in children but also for lowering preventable child morbidity and mortality. For public health practice in Indonesia, this highlights the urgency of strengthening interventions that ensure safe water supply, shorten access time, and expand sanitation coverage, particularly in underserved rural areas.

DISCUSSION

Our findings demonstrated that household environmental conditions were significantly associated with the incidence of ARI symptoms among children in Indonesia. In particular, sanitation-related factors such as limited access to clean water, long travel times to water sources, and inadequate toilet facilities increased children's vulnerability. These conditions can weaken the immune system through recurrent enteric infections and create overcrowded or unhygienic living environments that facilitate respiratory pathogen transmission (Pica & Bouvier, 2012; Qiu et al., 2022). Moreover, based on the pathway analysis, both direct and indirect factors were identified in the Indonesian context.

Direct Sanitation-Related Factors of ARI in Children Under Five

1. Toilet Facility

Interestingly, despite widespread attention to indoor air pollution, our findings highlight public toilet use as a more significant predictor of ARI symptoms, which may indicate critical role of infrastructure in respiratory health. In this study, public toilet facilities ranked as the leading contributor to ARI in children. This may be attributed to poor maintenance and inadequate urban planning, often influenced by political or financial constraints. As a result, many public toilets become unsuitable for long-term use (Abney et al., 2021). Among the primary environmental factors facilitating bacterial proliferation and transmission, high humidity and poor ventilation are particularly concerning (Chawla et al., 2023; Onmek et al., 2020). Public toilets tend to have persistently high humidity due to frequent water usage and inadequate ventilation, creating an ideal environment for microbial growth, including *Staphylococcus aureus* and other pathogenic bacteria (Paddy et al., 2024; Suen et al., 2019). Our findings corroborate Purnama's proposition that inadequate household sanitation constitutes a significant risk factor for acute respiratory infections (ARI) in Indonesia, thereby providing empirical evidence that poor sanitation may extend its detrimental effects beyond enteric diseases to encompass respiratory outcomes as well (Purnama et al., 2025). Poor sanitary design has been documented to allow bacteria and viruses from sewage treatment systems or sewer lines to spread into toilet environments (Islam et al., 2024). Moreover, public toilet users are frequently exposed to contaminated surfaces, and bacterial aerosols generated by various activities, including flushing and the use of sanitary fixtures, serve as additional pathways for pathogen transmission (Lee & Tham, 2021). As a result, individuals who rely on public toilets regularly are at a higher risk of disease exposure (Lin et al., 2021). The findings of this study reinforce the link between public toilet use and the increased of potential pathogen transmission due to ARI in children, emphasizing the urgent need for better sanitation infrastructure and hygiene interventions.

2. Source of Drinking Water

This research found that source of drinking water in household setting can contribute significantly in children's health, particularly in relation to ARI. This finding suggests that

water-related factors, often overlooked in respiratory health studies, may play an underappreciated role in shaping ARI vulnerability. Comparable evidence has been reported elsewhere, where water contamination serves as a pathway for pathogen transmission, leading to diseases such as diarrhoea (Cabral, 2010). While diarrhoea and ARI may seem unrelated, the connection lies in how recurrent gastrointestinal infections weaken the immune system, making children more vulnerable to respiratory illnesses (Afrifa-Anane et al., 2022; Ullah et al., 2019). Poor sanitation and unclean drinking water further increase infection risks (Rahman & Hossain, 2022). Apart from microbial contamination, the process of treating drinking water can also contribute to ARI. In many rural and suburban areas, families still rely on boiling water using traditional stoves or wood-burning hearths. This practice generates indoor air pollution, exposing children to smoke and fine particulates, which can lead to chronic respiratory issues over time (Bede-Ojimadu & Orisakwe, 2020; Zhang et al., 2021). Other studies further confirm that chemical pollutants in drinking water can also contribute to ARI. Chronic exposure to heavy metals and arsenic has been shown to weaken lung function, making children more susceptible to respiratory infections (Olivas-Calderón et al., 2015; Parvez et al., 2013). Additionally, high levels of fluoride and chlorine in drinking water can irritate the airways, leading to respiratory inflammation (Ahmad et al., 2022; Hoyle & Svendsen, 2016).

3. Time to access safe water

The time to access safe water is significantly linked to the risk of ARI in children. This finding highlights how water accessibility, often considered primarily in relation to diarrheal disease, can also shape respiratory outcomes. Similar evidence has shown that when parents or caregivers spend extended periods collecting water, they often neglect proper hygiene practices, such as handwashing with soap and sanitizing household surfaces, which can become reservoirs for harmful pathogens (Hutton & Chase, 2017). This lack of hygiene increases the likelihood of infections, including respiratory illnesses. Longer time to access safe water also impact food safety and nutrition. Households that spend excessive time obtaining water tend to have less time for food preparation, which may lead to poor dietary intake and increased microbial contamination of food (Miller et al., 2021; Wani et al., 2024; Young et al., 2021). Chronic exposure to foodborne pathogens can result in gastrointestinal infections, weakening the immune system and making children more vulnerable to ARI (Rodríguez-Peña, 2023). Moreover, the source and quality of water play a crucial role in respiratory health. Water contaminated with heavy metals, chemical pollutants, or biological agents can impair lung function over time (Mishra et al., 2019; Singh et al., 2022). Additionally, prolonged exposure to environmental hazards and physical strain during water collection such as dust, smoke, and polluted surroundings can further increase the risk of respiratory illnesses in children (Holden et al., 2023; Manisalidis et al., 2020). In summary, limited access to safe drinking water contributes to ARI through poor hygiene, compromised nutrition, exposure to environmental pollutants, and weakened immunity (Elbehiry et al., 2023). Addressing water accessibility challenges is crucial for improving child health outcomes. To our knowledge, this is one of the few nationally representative studies in Southeast Asia to link specific sanitation infrastructure variables to ARI symptoms in children.

Indirect Factors of ARI in Children Under Five

1. Mother's Education

In addition to direct factors, several indirect factors can contribute to the occurrence of ARI in children under five, such as mother's education. Mothers with higher education might be more aware of ARI prevention behavior (Anggraini, Ambarika, & Katupu, 2024). Furthermore, higher education also increases the potential for seeking healthcare when a child shows ARI symptoms, thus preventing the disease from progressing to severe stage (Aragaw

et al., 2024). When mothers with high education have a child experiencing ARI symptoms, they would tend to seek healthcare before the symptoms worsen. Thus, in several studies, maternal education has consistently been a significant predictor of child healthcare utilization, including treatment for child ARI, and this is related to awareness of the importance of timely medical care (Aragaw et al., 2024; Khasanah et al., 2023).

2. Wealth Index

This study also found that wealth index status can also be an indirect predictor of ARI symptoms in children under five in Indonesia. Consistent with several other studies, children born into families with limited economic status are more susceptible to ARI due to limited access to healthcare facilities and healthy physical environments (Ekholuenetale et al., 2023; Hassen et al., 2020). Poor families are also more likely to live in densely populated areas, which can increase the risk of ARI due to its correlation with poor air quality (Balasubramani et al., 2022; Chiao & Deji-Abiodun, 2020). Although our analysis controlled for wealth index status, residual confounding may remain, particularly from unmeasured household behaviors such as indoor smoking or ventilation quality.

3. Type of Residential

In this study, type of residential also indirectly predicted ARI symptoms in children under five in Indonesia. Children living in rural areas had a 1.3 times greater likelihood of experiencing ARI symptoms than children living in urban areas. Living in rural areas may not directly cause a child to experience ARI, but environmental conditions can influence it, such as parental smoking habits. Paternal smoking habits are more commonly found in rural areas (Murarkar et al., 2021; Santri et al., 2023), and children in rural areas have limited access to healthcare services, which increases the potential for ARI and worsens it due to delays in receiving treatment (Mir et al., 2022). Therefore, it is important for the Indonesian government to ensure equitable access to healthcare facilities and family health promotion regarding ARI prevention in children, so that children in rural areas can still obtain a supportive environment to meet their health needs.

By identifying key environmental and socioeconomic determinants of ARI in Indonesian children, this study offers valuable insight for monitoring national progress toward achieving the Sustainable Development Goals (SDGs), particularly Target 3.9 related to the reduction of illness caused by environmental pollution, as well as Targets 6.1 and 6.2 concerning universal access to safe drinking water and adequate sanitation (Badan Pusat Statistik Indonesia, 2023; United Nations, 2023; World Health Organization & UNICEF, 2025). This study has several strengths in describing the predictors of ARI in children under five in Indonesia, as it is based on a large and nationally representative dataset. The sample selection in the 2017 IDHS data is supported by the Indonesian Central Bureau of Statistics, ensuring a proper process to obtain a reflection of the target population. However, the responses used in this study rely on maternal reports of ARI symptoms in children in the 2017 IDHS questionnaire, rather than formal doctor diagnoses, which may introduce potential information bias. Maternal self-reporting may lead to underreporting or misclassification of ARI symptoms, especially in populations with limited health literacy. Regarding the use of secondary data, researchers can only measure associations but cannot examine cause-and-effect relationships in the case of ARI symptoms in Indonesia.

These findings highlight the need to strengthen national WASH programs such as *Sanitasi Total Berbasis Masyarakat* (STBM) and accelerate efforts under the National Action Plan for Environmental Health. Prioritizing improved toilet facilities, safe water infrastructure, and equitable access in rural areas could reduce the risk of ARI in young children. In terms of monitoring, the indicators used in this study such as toilet facility type, drinking water source, and access time are already aligned with SDG monitoring frameworks. Integrating them into routine subnational reporting systems would allow local governments to track disparities and evaluate progress toward SDG Targets 6.1, 6.2, and 3.9 more systematically. We recommend actionable recommendation: (1) scaling up investments in safe water and sanitation

infrastructure in underserved area, (2) strengthening community-based education programs that address both hygiene practices and environmental health risks. Well-ventilated and properly maintained public sanitation facilities in low-income and rural areas may significantly reduce ARI incidence.

4. CONCLUSION

This study concludes that physical environmental factors contribute to acute respiratory infection (ARI) symptoms among children aged under five in Indonesia, based on 2017 IDHS data. Direct factors significantly associated with ARI symptoms were toilet facilities, sources of drinking water, and time to access safe water. Indirect factors influencing ARI risk included mother's education, wealth index, and type or residential. This research recommend that national governments ensure equitable access to health services and promote family health education to prevent ARI in children, particularly in rural areas, by fostering supportive environments for child health.

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