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Maternal knowledge of acute respiratory infections in children under five at tay nguyen regional general hospital

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Abstract
This study aimed to evaluate maternal knowledge of acute respiratory infections (ARI) in children under five years old and identify associated factors at Tay Nguyen Regional General Hospital. A cross-sectional study was conducted in 2023 among 206 mothers using a structured, validated questionnaire. Results showed that only 30.6% of mothers had correct overall knowledge. While understanding of symptom recognition (78.2%), feeding practices (96.1%), and prevention (88.4%) was relatively high, knowledge of severe symptoms (20.4%), need for medical attention (25.2%), and nasal hygiene (24.3%) remained poor. Logistic regression revealed that younger mothers and those with lower education levels were significantly less likely to possess accurate knowledge ($p < 0.05$). These findings underscore the need for targeted educational interventions, especially for vulnerable groups, to improve ARI-related knowledge and reduce disease burden among children.

Keywords: Acute respiratory infections, ARI, maternal knowledge, children under five

Introduction

Acute respiratory infections (ARI) remain a leading cause of illness and death in children under five years of age globally, particularly in low- and middle-income countries (World Health Organization, 2022) [9]. In Vietnam, ARI is the third most common cause of child mortality, accounting for 21% of all deaths in this age group, with bronchopneumonia alone responsible for 75% of respiratory-related deaths (Nguyen *et al*., 2023) [10]; (Nguyen Ngoc Toan *et al*., 2021) [4]. Despite the availability of treatment, late recognition and poor caregiving practices contribute significantly to the high burden of ARI in children. Maternal knowledge plays a pivotal role in the early recognition, prevention, and management of ARI.

Mothers are typically the primary caregivers, and their awareness directly influences care-seeking behaviors, adherence to treatment, and home-based care strategies (Kajungu *et al*., 2023) [7]. However, knowledge levels remain uneven, especially in rural and underserved areas where access to healthcare and health information is limited (Pham & Tran, 2022) [11]. Studies have shown that low maternal education, young age, and socioeconomic factors are significantly associated with inadequate knowledge of ARI (Do Thi Phuong, 2021) [2]; (Ha Thi Hong Thanh *et al*., 2023) [3]. Research conducted in various contexts demonstrates variable levels of maternal understanding. For instance, Al-Noban *et al*. (2022) [6] found that 87.9% of mothers had adequate knowledge in urban and rural settings of Yemen, while Rauf *et al*. (2024) [8] reported that nearly two-thirds of mothers in Indonesia demonstrated good knowledge. In contrast, Adibah Salma *et al*. (2024) [5] found that only 28.6% of mothers in their study had sufficient knowledge of ARI prevention and management.

At Tay Nguyen Regional General Hospital, ARI is the most common reason for pediatric admission. However, there is a lack of data assessing maternal knowledge of ARI in this region. Understanding the current knowledge levels and the factors influencing them is essential for developing effective public health interventions. This study aims to assess the knowledge of mothers with children under five years old regarding ARI and to identify demographic and social factors associated with their understanding. The findings will contribute to evidence-based planning of targeted educational programs to improve child health outcomes in the Central Highlands of Vietnam.

Materials and methods

Study design

This descriptive cross-sectional study was conducted to assess the knowledge of mothers with children under five years old regarding acute respiratory infections (ARI) at Tay Nguyen Regional General Hospital, Vietnam. A structured questionnaire originally developed by Do Thi Phuong (2021) [2] was adapted and revised to reflect the cultural and regional context of the Central Highlands. The questionnaire comprised two main sections: 1) socio-demographic characteristics, including maternal age, ethnicity, place of residence, occupation, education level, and number of

children; and 2) knowledge of ARI, assessed through 10 multiple-choice questions. Data were collected via direct face-to-face interviews with each participant to ensure clarity and completeness of responses.

Sample size

The required sample size was calculated based on the World Health Organization's sample size formula for estimating a proportion with specified absolute precision.

$$n = Z^2_{1-\alpha/2} \frac{p \times q}{d^2}$$

With a 95% confidence level (α = 0.05), an estimated population proportion (p) of 0.5, and a desired margin of error (d) of 0.07, the minimum sample size was determined to be 187 participants. A total of 206 mothers meeting the inclusion criteria were recruited using a total population sampling method.

Data collection and analysis

Data collection involved a three-step process: identifying eligible participants from the pediatric outpatient department, conducting interviews based on the standardized questionnaire, and validating data entries for completeness. Responses were coded and entered into Epidata 3.1 and subsequently analyzed using STATA version 16. Descriptive statistics were used to summarize participant characteristics and knowledge levels. Correct knowledge was defined as achieving at least 70% correct answers on the knowledge section of the questionnaire. Multivariable logistic regression analysis was performed to identify factors associated with correct knowledge.

Ethical approval

Ethical approval was obtained from Tay Nguyen University and the hospital's Board of Directors. Participants were informed about the study's purpose and procedures and provided written informed consent. Data confidentiality was maintained throughout.

Result and Conclusion

Distribution of the participants

Table 1 presents the demographic characteristics of 206 mothers with children under five years of age at Tay Nguyen Regional General Hospital. The majority (67%) were aged 26–45 years, and 70.4% belonged to the Kinh ethnic group. Most participants (59.7%) had two or more children. In terms of residence, 40.3% lived in urban areas, while 59.7% resided in rural settings. Educational attainment was relatively low, with 74.8% having completed high school or less. Regarding occupation, 89.3% were employed outside the public sector, and only 10.8% were government employees. Overall, the sample was largely composed of young, multiparous mothers with lower education levels and informal or non-government employment.

Table 3.1: Demographic characteristics of mothers with children under five

Baseline characteristic		Frequency (n)	Percentage (%)
Age	< 26 years old	68	33
	≥ 26 years old	138	67
Ethnicity	Kinh	145	70.4
	Minority	61	29.6
Place of residence	Urban	83	40.3
	Rural	123	59.7
Occupation	Government employees	22	10.7
	Other	184	89.3
Education level	College/University/ Graduate	52	25.2
	≤ high school	154	74.8
Number of children	1 child	83	40.3
	≥ 2 children	123	59.7

Mothers' knowledge of acute respiratory infections in children under five

The study results indicate that the knowledge of 206 mothers with children under five years old regarding ARI-related diseases, signs requiring medical attention, severe illness symptoms, and nasal hygiene during illness was below 40% (Table 2). Our findings were lower than those reported by Ha Thi Hong Thanh *et al*. (2023) [3], where 49.3% of mothers recognized signs requiring medical attention, and 44.1% identified severe illness symptoms. Additionally, 51.7% of mothers in the study by Tang Thi Hao *et al*. (2021) [1] correctly answered questions about nasal hygiene. In addition, the proportion of mothers with correct knowledge about recognizing ARI symptoms was 78.2%, which is similar to the findings of Ha Thi Hong Thanh *et al*., (2023) [3], with a rate of 76.2%. Notably, 96.1% of mothers had correct knowledge about feeding during ARI. In contrast, Tang Thi Hao *et al*. (2021) [1] reported lower rates in Thai Binh: 61.7% knew to ensure adequate nutrition, 51.7% to give small frequent meals, and only 36.7% knew dietary restrictions were unnecessary. Regarding transmission routes and prevention methods, 88.4% of mothers had correct knowledge of ARI prevention, and 85.6% understood its transmission routes. The results of our study are higher than those of Ha Thi Hong Thanh *et al*. (2023) [3], who reported a correct knowledge rate of 61.6%, Tang Thi Hao *et al*. (2021) [1], with a rate of 76.7% of mothers knew ARI is transmissible and 65.2% identified airborne transmission as the main route.

Table 2: Basic Knowledge of Acute Respiratory Infections (ARI) Among Mothers with Children Under Five

Knowledge Indicators	Frequency (n)	Percentage (%)
ARI-related diseases	64	31.1
Recognizing symptoms	161	78.2
Signs of severe illness	42	20.4
Signs requiring medical attention	52	25.2
Feeding children during ARI	198	96.1
Nasal cleaning when a child is sick	50	24.3
ARI prevention	182	88.4
ARI transmission routes	131	85.6

Based on the total number of correct answers regarding knowledge of ARI in children under five, 143 mothers had incorrect knowledge, accounting for 69.4%, while 63 mothers had correct knowledge about ARI, making up 30.6% (Figure 1). The results of our study are lower than those of Do Thi Phuong (2021) [2], who reported a correct knowledge rate of 60.8%, Al-Noban *et al*., (2022) [6], with a rate of 87,9%, and the study by Raldi Rauf *et al*., (2024) [8] reported that nearly two-thirds of mothers demonstrated good knowledge of ARI, However, these rates were notably higher than those found in the study by Adibah Salma *et al*., (2024) [5] where only 28.6% of mothers had good knowledge of ARI. The discrepancies among these studies may be attributed to differences in maternal education levels, healthcare access, exposure to health communication campaigns, and local healthcare infrastructure. Moreover, regional variations in public health priorities and cultural perceptions of child illness may also influence maternal knowledge.

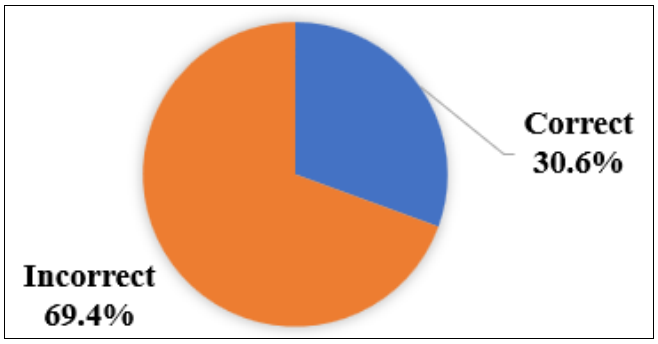

Fig 1: Classification of Mothers' Knowledge Levels on Acute Respiratory Infections

Identify factors associated with mothers' knowledge of acute respiratory infections

Multivariable logistic regression (Table 3) showed that mothers under 26 years old were 67% less likely to have correct knowledge of ARI than those aged 26 and above (p = 0.004). This aligns with Do Thi Phuong (2021) [2], who found better knowledge among older mothers, though the difference was not statistically significant (p = 0.272). In terms of education, mothers with at least a high school education were 5.34 times more likely to have correct knowledge than those with lower education levels (p = 0.003; 95% CI: 0.03–0.41). Similar results were reported by Do Thi Phuong (2021) [2] (p = 0.002; OR = 1.922) and Ha Thi Hong Thanh *et al*. (2023) [3] (p < 0.001; OR = 0.35). The study by Rauf *et al*. (2024) [8] also showed that mothers with lower education levels tended to have a higher rate of children with ARI. This finding is consistent with the previous study by Kajungu *et al*. (2023) [7], which emphasized the role of maternal knowledge in influencing child healthcare outcomes. Adequate knowledge of ARI enables mothers to recognize symptoms, seek timely medical care, and implement appropriate preventive measures, thereby reducing the risk of ARI in their children.

Table 3: Factors Associated with Correct Knowledge of Acute Respiratory Infections Among Mothers of Children Under Five: Multivariable Logistic Regression Analysis

Factors	p	OR	KTC 95%
Age	0.004	0.33	0.16 – 0.70
Ethnicity	0.068	2.25	0.94 – 5.38
Residence	0.889	0.95	0.47 – 1.92
Occupation	0.057	0.44	0.19 – 1.02
Education level	0.003	5.34	1.73 – 6.42

Conclusion

The study reveals significant gaps in knowledge about ARI among mothers of children under five at Tay Nguyen Regional General Hospital. Only 30.58% of mothers had correct knowledge of ARI in children under five, indicating limited awareness of this common illness. Multivariable logistic regression analysis showed that maternal age and education level significantly influenced ARI knowledge (p < 0.05). These findings highlight the need for educational intervention programs to improve awareness and care practices, particularly targeting younger mothers and those with lower education levels.

Conflict of Interest

Not available

Financial Support

Not available

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