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Parental Knowledge of Cigarette Smoke Exposure in Children with Acute Respiratory Infection: The Role of Education and Occupation in Yogyakarta

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ABSTRACT

Background: *Acute Respiratory Infection (ARI) affects both the upper and lower respiratory tracts. Parents with less knowledge about cigarette smoke have a negative impact on family members, especially toddlers, which can trigger the incidence of Acute Respiratory Infection in children. This study aims to analyze the relationship between education and employment levels and the level of parental knowledge about the dangers of cigarette smoke in toddlers aged 0-5 years with Acute Respiratory Infection at Yogyakarta Hospital.*

Methods: *This study employs a quantitative descriptive cross-sectional design. The sampling technique was accidental sampling with 35 respondents. In analyzing the data, this study used Spearman's rank correlation test.*

Results: *The test showed a significant relationship between parents' education level and their knowledge of ARI in children, indicated by a p-value of 0.010 (<0.05). In contrast, there was no significant relationship between parents' occupational status and their knowledge of ARI in children, with a p-value of 0.266 (>0.05). While education level is associated with knowledge, parental occupation is not. These findings suggest that factors beyond education and work may also influence parents' knowledge. The data also indicates that most parents are aware of the dangers of cigarette smoke; however, family members who smoke may contribute to the risk of ARI in children.*

Conclusion: *Higher educational attainment is strongly associated with increased knowledge about the dangers of cigarette smoke, particularly in the context of preventing ARI in children and managing ARI cases.*

INTRODUCTION

Acute Respiratory Tract Infection is an infection affecting the upper and lower respiratory tract, causing symptoms such as coughing, runny nose, fever, and wheezing [1]. It is a complex disease caused by various pathogens, including viruses such as Rotavirus and Influenza, and bacteria such as Streptococcus pneumoniae and Staphylococcus aureus [2]. Acute Respiratory

Tract Infection is a leading cause of high mortality rates in toddlers and infants in Indonesia. Data from the World Health Organization (WHO) states that Acute Respiratory Tract Infection significantly contributes to infant mortality in Indonesia, with an incidence rate of around 41 per 1,000 infants. In 2016, about 526,000 infants died from Acute Respiratory Tract Infection, equating to 1,400 every day or 60 every hour, according to UNICEF [3].

According to the 2018 Basic Health Research (Riskesdas) data, the infant mortality rate due to acute respiratory infections (ARI) was 0.16%, and the rate among children aged 1-4 years was 0.05%. In the Yogyakarta region, the incidence of acute respiratory infections (ARI) among toddlers was 6.0%, with the highest prevalence in the 24-35-month age group at 8.5%, corresponding to approximately 19,112 toddlers [4]. In Sleman, Yogyakarta, approximately 7.64% of toddlers experienced ARI, with the highest incidence in the 48-59-month age group. Environmental factors, such as exposure to cigarette smoke, have been shown to play a significant role in increasing the incidence of ARI in toddlers. Smoking within the family can increase the risk of Acute Respiratory Tract Infection in toddlers. Cigarette smoke contains harmful substances such as nicotine, tar, toxic chemicals, and carcinogens, which have negative health effects, especially for passive smokers, such as toddlers [5].

The developing immune systems of toddlers make them more susceptible to various diseases caused by exposure to toxic substances in cigarette smoke. [6]. Therefore, smoking around toddlers can increase their risk of developing acute respiratory infections. Treating acute respiratory infections in toddlers depends heavily on parents' understanding of the disease. Parents with good knowledge of ARI can take appropriate steps to prevent and treat this disease. This necessary knowledge includes understanding the symptoms, causes, and treatment of Acute Respiratory Tract Infection [7]. Good parental knowledge can help reduce the risk of Acute Respiratory Tract Infection in children and enable prompt, appropriate treatment when symptoms first appear [8].

Research conducted at the Samudera Aceh Utara Community Health Center with 60 respondents showed that most parents who have a smoking habit only have a sufficient level of knowledge regarding Acute Respiratory Tract Infection. From this study, it was found that 44 parents are active smokers, and the level of knowledge of most parents is classified as sufficient. [1]. Another study conducted in Langkat Regency, with 55 respondents, showed that the majority of parents had good knowledge about Acute Respiratory Tract Infection, although some had less knowledge[9]. The level of parental knowledge greatly influences children's health, whether by avoiding factors that can cause Acute Respiratory Tract Infection or by treating it when it occurs. This study aimed to analyze the relationship between parental education and occupation levels and the level of knowledge about the dangers of cigarette smoke in children with ARI.

METHODS

This study used a quantitative descriptive cross-sectional design. The sample size in this study refers to the reference developed by Sugiyono in Roscoe, a minimum of 30 to 500 respondents. The sampling technique used was accidental sampling with 35 respondents who were parents of children aged 0-5 years with ARI for 1 month at the Yogyakarta Hospital Polyclinic in December 2024. The instrument used was a questionnaire on the dangers of cigarette smoke to measure respondents' level of knowledge. The analysis in this study used the Spearman test to determine the relationships among education and occupational level, and respondents' level of knowledge about the dangers of cigarette smoke.

RESULTS

The research results in this section were obtained from questionnaires administered by respondents. Based on Table 1, the majority of respondents were highly educated (25 respondents, 71.4%), and the majority were also employed (23 respondents, 65.7%). Furthermore, 30 respondents (85.7%) also had good knowledge.

Table 2 shows that a p-value <0.05 indicates a significant relationship between education and the respondent's level of knowledge, whereas a p-value >0.05 suggests no significant relationship between occupation and the respondent's level of knowledge. The relationship between education and level of knowledge is quite strong (0.26-0.50) and negative, as indicated by the Correlation Coefficient.

Table 1. Frequency distribution of respondents' education level, occupation, and knowledge level (n=53)

Variable	Frequency	Percentage (%)
Education		
Elementary/Middle School	4	11,4
Secondary Education	6	17,1
College	25	71,4
Work		
working	23	65,7
not working	12	34,3
Knowledge		
good	30	85,7
sufficient	5	14,3
poor	0	0

Table 2. Relationship between education, occupation levels, and respondents' knowledge levels (n=35)

Variable	level of knowledge	
	Correlation Coefficient	*P value*
education	-.428	0.010
work	0.193	0.266

DISCUSSION

The results of the study showed a significant association between education and respondents' knowledge level ($p=0.010 < 0.05$) and a negative correlation coefficient, indicating an inverse relationship. Education provides broader opportunities for individuals to acquire, understand, and process information, thereby increasing their understanding of important health-related issues, including children's health and disease prevention. According to the theory, knowledge is strongly influenced by educational attainment and age. Individuals with higher educational levels tend to absorb information more easily, update their knowledge more effectively, and develop stronger cognitive abilities to understand health information [9]. Furthermore, health literacy has been recognized as an important mechanism through which education influences health knowledge and health-related decision-making. Individuals with higher educational attainment generally possess better health literacy skills, enabling them to evaluate health information critically and apply it appropriately in daily life.

The findings of this study are consistent with recent studies reporting that parental educational attainment is an important determinant of knowledge regarding environmental tobacco smoke exposure and child health. A study by Yaylaoglu and Dundar reported that parents with higher educational backgrounds demonstrated significantly greater awareness of the adverse health effects of secondhand smoke exposure in children [9]. Similarly, a systematic review by Vitória et al. highlighted that parental education is positively associated with knowledge and preventive practices related to children's exposure to tobacco smoke. These findings suggest that educational interventions remain essential in improving parental awareness and promoting child health protection [10].

The results also showed that the majority of respondents had good knowledge; however, their children still experienced ARI. The researchers assume that although respondents possessed adequate knowledge, behavioral changes to prevent ARI in children were not optimally implemented. This finding is supported by Saldi et al, who reported that knowledge significantly influences behavioral change, but knowledge alone does not necessarily lead to the

adoption of preventive practices [11]. According to the Knowledge, Attitude, and Practice (KAP) framework, behavior is influenced not only by knowledge but also by attitudes, beliefs, social norms, environmental conditions, and enabling factors [12]. Therefore, parents may understand the dangers of cigarette smoke yet still face challenges in implementing smoke-free home environments due to smoking habits among family members, social acceptance of smoking, or limited control over household behaviors.

In addition, ARI is a multifactorial disease influenced by numerous environmental and biological determinants. Recent evidence indicates that exposure to environmental tobacco smoke remains a major risk factor for respiratory infections among children because it impairs mucociliary clearance, increases airway inflammation, and reduces immune defense mechanisms [13]. However, other factors, such as household crowding, poor ventilation, indoor air pollution, nutritional status, socioeconomic conditions, and immunization status, may also contribute to ARI [14]. Consequently, the incidence of ARI among children in this study cannot be explained solely by parental knowledge regarding cigarette smoke exposure.

The study also showed that occupation had a p-value >0.05, indicating no significant relationship between occupation and knowledge level, although the majority of respondents were employed. This finding is inconsistent with the study by Saldi et al., which reported that most respondents were housewives or unemployed. It is generally assumed that individuals who work and frequently interact with others have greater opportunities to obtain information and knowledge than those with limited social interaction [11]. Through interactions with coworkers, supervisors, and clients, employed individuals may gain broader perspectives and opportunities to exchange experiences and health-related information. Furthermore, occupation may influence an individual's ability to access and seek information regarding specific issues. Easier access to information may increase the amount of knowledge acquired and broaden one's understanding of health topics [15].

However, the absence of a significant relationship in the present study suggests that occupational status alone may not determine parental knowledge. In the digital era, health information is widely accessible through social media, online platforms, healthcare facilities, and public health campaigns, enabling both employed and unemployed individuals to obtain similar information. Recent studies have reported that educational attainment often exerts a stronger influence on health literacy and health knowledge than occupational status, particularly in populations with widespread access to digital information sources [16,17]. Therefore, educational background may be a more important determinant of knowledge regarding the dangers of cigarette smoke exposure than employment status.

These findings highlight the importance of strengthening health education programs targeting parents and family members, particularly regarding the harmful effects of cigarette

smoke exposure on children's respiratory health. Educational interventions should focus not only on increasing knowledge but also on promoting behavioral change, encouraging smoke-free home environments, and involving all household members in preventive efforts. Such approaches may contribute to reducing children's exposure to secondhand smoke and ultimately decrease the burden of ARI among young children.

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between educational level, occupational status, and parental knowledge because all variables were measured simultaneously. Second, the relatively small sample size and the use of accidental sampling from a single hospital setting may limit the generalizability of the findings to broader populations. Third, the use of self-reported questionnaires may introduce recall bias and social desirability bias. Finally, several factors potentially associated with parental knowledge and ARI occurrence, such as household income, smoking intensity among family members, environmental tobacco smoke exposure, housing ventilation, and other environmental determinants, were not assessed in this study. Therefore, future studies involving larger and more representative samples, as well as additional explanatory variables, are recommended to provide a more comprehensive understanding of the factors influencing parental knowledge and ARI among children.

CONCLUSION

The findings of this study indicate that parental educational level is significantly associated with knowledge regarding the dangers of cigarette smoke exposure among children aged 0–5 years with Acute Respiratory Infection (ARI), whereas occupational status is not. Parents with higher educational attainment tend to have better knowledge about the harmful effects of cigarette smoke on children's respiratory health. Although most respondents demonstrated good knowledge, ARI still occurred among their children, suggesting that knowledge alone may not be sufficient to prevent ARI. Therefore, efforts to reduce ARI in children should focus not only on improving parental knowledge through health education but also on promoting behavioral changes and creating smoke-free home environments to protect children's respiratory health and support optimal growth and development.

DECLARATIONS

Ethics approval

This research has been approved by the Research Ethics Committee at Panti Rapih Hospital, Yogyakarta (No. 129/SKEPK-KKE/XI/2024).

Conflict of interest.

The authors declare no conflict of interest.

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