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(REVIEW ARTICLE)

Acute respiratory infections in children under-five years because of the smoking parents: Literature review

Shadila Risagita Putri [1,*], Fadiah Maharani [1] and Achmad Chusnu Romdhoni [2]

[1] *Midwife Education Study Program, Faculty of Medicine, Airlangga University, Surabaya, Indonesia.*
[2] *Department of Otolaryngology and Head and Neck Surgery, Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia.*

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Abstract

Introduction: Acute Respiratory Infection is an infection that occurs in the respiratory tract and is the main cause of death and mortality worldwide, especially in children aged 1-5 years. Air pollution from cigarette smoke is one of the substantial contributing factors to the incidence of ARI. It is estimated that 40-50% of children worldwide are regularly exposed to cigarette smoke, mainly from being around smoking parents. Toddlers who are exposed to cigarette smoke can get much higher substances of toxins and carcinogens than first-hand smoke. Children are more at risk for coughing, wheezing, excessive mucus production, and higher risk for various respiratory infections.

Methods: This study used a literature review. of three international databases, there is Pubmed, EBSCO, and Sciencedirect with the keywords "Acute respiratory infection", " children under-five years", and "smoking behavior" that published between 2018-2022. The type of journal is the original and full text, and the design of this research is case-control and cross-sectional research.

Result and discussion: There are 272 articles with the discovery of Pubmed 49 journals, EBSCO 72 journals, and Sciendirect is 151 journals. Then the researchers filtered through titles, research methods, and abstracts to find conformity with the relationship between smoke exposure from families of active smokers who have toddlers with the incidence of acute respiratory disease. A total of 17 articles can be employed in this study.

Conclusion: It can be concluded that a smoking family can increase the incidence of Acute Respiratory Infection in under-five children.

Keywords: Acute respiratory infection; Children under-five years; Smoking behavior

1. Introduction

Acute respiratory infection (ARI) is a life-threatening disease and a major cause of worldwide morbidity and mortality. The summary of World Health Statistics [1] states that in 2016, acute respiratory infections (ARI) in children under-five years became the main cause of death. This indicates that ARI has a higher percentage than diarrheal diseases and malaria. Southeast Asia has the highest incidence of ARI followed by sub-Saharan African countries, and combined, these countries will contribute more than 80% of the total ARI cases globally [2]. Until now, ARI is still a serious problem, especially in developing countries. Global and government action plans continue to be pursued in preventing deaths from ARI. One form of prevention that can be done is to understand the causative pathogens, symptomps, and factors that can increase the risk of being infected with ARI. This disease can attack the respiratory system until to the lungs

* Corresponding author: Shadila Risagita Putri

depending on the causative pathogen, as well as environmental and host factors. Usually the initial symptoms are cold, sore throat, and fever [3]. But sometimes these symptoms are still underestimated, and parents are not aware that coughing can become a serious illness.

This disease has 4 factors related to the occurrence of infection, including an environmental factors [4]. One example of environmental factors that can affect the occurrence of ARI in children under-five years is a cigarette smoke (SHS). It is estimated that 40-50% of children worldwide are regularly exposed to SHS, mainly from being around smoking parents and/or other household members. The results of the study of Maranatha, D., & Agung Krisdanti, D. P. [5] also showed that ARI are significantly associated with increased mortality with smoking habits in parents at home. Toddlers who are exposed to cigarette smoke will also be exposed to more than 4000 toxic chemicals and carcinogens contained in cigarettes. without parents knowing this, it causes irritation of the child's respiratory system. The results showed that toddlers living in homes with active smokers reported more severe respiratory diseases than toddlers living in homes without smokers, such as more frequent coughing, wheezing, producing a lot of mucus and an increased risk of various diseases including upper and bottom respiratory infections, and asthma [6, 7]. Smoke can enter under doors, windows, or through crevices, and smoke from a single cigarette can stay indoors for hours, even with the windows open [8]. Cigarette smoke can stick anywhere, also stick to clothes, hair, furniture, curtains, carpets, children's toys, and other surfaces [9] which will be very risky if there are toddlers around because toddlers often have hand-to-mouth contact.

2. Material and methods

In this study, the method used is a literature review. That is conducting a search of selected journals or articles according to the author's criteria and analyzing them to produce a conclusion. In this article, the authors search for articles using three international databases, namely Pubmed, EBSCO, and Sciencedirect with the keywords "acute respiratory infection", "children under five years", and "smoking behavior". The analysis used is according to the time span of publication for the last 5 years (2018-2022). The type of original journal and full text, the design of this study was taken on a case- control and cross-sectional scientific inquiry.

3. Material and methods

Based on the results of a literature search on three databases, in total there are 272 articles according to keywords and time spans. With the discovery of Pubmed 49 journals, EBSCO 72 journals, and on Sciendirect 151 journals. Then the researchers filtered through titles, research methods, and abstracts to find conformity with the relationship of smoke exposure from families of active smokers who have toddlers with the incidence of acute respiratory disease. A total of 17 articles that can be used in this study. Further explanation in the figure below

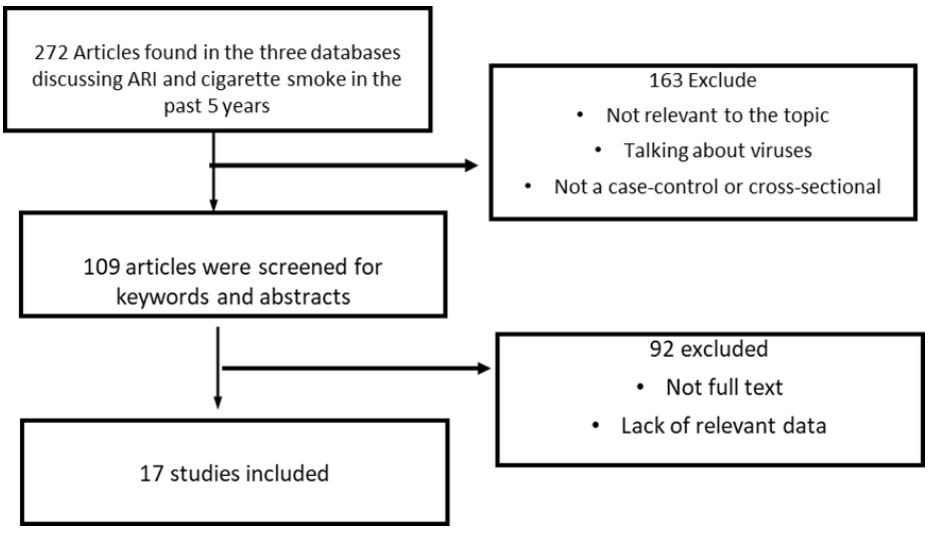

Figure 1 Journal Screening

After doing the final screening, totality there are 17 literatures that match the author's criteria. The selected article is a research article that doing intervenes to determine whether there is a cigarette smoke factor in the occurrence of acute respiratory tract infections suffered by children under five years. The articles obtained conducted research on subjects with 4 studies located in rural areas and 13 studies in hospitals. The journals obtained also come from various countries

in the last 5 years and produce 17 articles that prove that cigarette smoke influences the incidence of acute tract infections (ARI) experienced by children under-five years. Two were not significantly related with p = 0.002 and p > 0.05 because children under five in rural Ethiopia, the population of parents of non-smokers is more than that of parents of smokers and research find out that the fuel factor is the main trigger for the occurrence of ARI in children under-five years [10]. Likewise with the results of research conducted in Indonesia in 2021 where almost all respondents (98.58%) are smoke-free, thus making demographic aspects such as family wealth index and area of residence significantly related to the incidence of ARI [11]. ARI itself does have many trigger factors, and environmental factors are one of these factors. ISPA can attack one or more of the upper respiratory tracts (nose, vocal cords, larynx, parasanal sinuses, to the middle ear) and lower respiratory tract (trachea, bronchi, bronchioles, and alveoli), including tissue sinuses, middle ear cavity, and pleura that lasts approximately 14 days [12].

3.1. Air Pollution

Air pollution is a global health threat and causes millions of human deaths every year. None other than, its effect can facilitate the transmission of diseases that are airborne diseases or diseases that are transmitted through the air and ARI is one of them [13]. Most of the indicators that cause ARI from air pollution are household air pollution (HAP) including smoking indoors which shows a significant positive bivariate relationship with the incidence of persistent cough in children [14]. Smoking habits that are close to children under five years, have a significant effect on their health and respiratory system. Cigarette smoke from family members who smoke in homes with toddlers causes air pollution and can damage lung mechanisms such as respiratory tract cells and alveolar lung tissue cells [15]. This is due to the toddler's respiratory tract which is still in the developmental stage and is very vulnerable. Air pollution may affect children's health directly through the neurodevelopmental, immune, and cardiometabolic pathways [16]. The results of a review of research journals from Kahar, F., Dirawan, G., et al [17] stated that the population who are often exposed to cigarette smoke are toddlers and children because they breathe air more often than adults. The closer the distance of exposure to cigarette smoke in children, the more levels of tar (tobacco residue) are inhaled, resulting in disturbances in the child's respiratory system. Supported by 3 other journals that discuss exposure to cigarette smoke, cigarette smoke is an air pollutant that reduces local defense mechanisms and makes children vulnerable to invasive infections, making it a definite risk factor for the occurrence of ARI [18]. The results of measuring urinary cotinine levels in children hospitalized due to ARI showed lower O2 saturation in children and higher clinical severity scores than in children without exposure to cigarette smoke [19]. Then 63.4% of the 393 children under five in the city of Nairobi indicated that the air quality in their homes was poor while only 4.8% indicated that the air quality was very good. The results of the chi square test showed that there was a statistically significant difference between acute respiratory infections in children under five years of age and exposure to cigarette smoke (P<0.001) [20]. Air pollution in the house caused by cigarette smoke, more or less is comes from one family member who smoke, especially the parents.

3.2. ARI in children under-five years

Children whose parents smoke are more at risk of developing upper respiratory tract infections, bronchitis, and inner ear infections than children in the same age whose parents do not smoke [21]. In line with the results of the review, the researchers proved that children under-five years with smoking parents are a contributing factor to the increase in the prevalence of ARI because children tend to spend more time with their families at home and near them [22]. Likewise, according to Mondal, D., & Paul, P. [23] that the proportion of children under five who suffer from ARI is significantly higher if there is a family member who smokes in the house even after adjusting for the child's age, gender, birth order, maternal age, mother's education, caste, religion, wealth quintile, number of household members suffering from tuberculosis (TB), and household density. According to researchers, cigarette consumption in the family environment has been largely neglected in India, where most of the previous studies focused on burning biomass fuels in determining the risk of respiratory disease among children [23, 24]. Research results Barrezueta, L. B., Rodríguez, M. M., et al [25], who found a family member who smoked both before and after delivery to be an independent risk in the development of bronchiolitis which is one of the classifications of ARI. In fact, smoking in the family both before and after giving birth is a risk factor that can be prevented. Research from the last 2 years also shows a significantly increased frequency of ARI in the group whose family members are active smokers, and this shows that even though parents are aware of the harmful effects of smoking, their children cannot avoid being exposed to cigarette smoke [26]. While in the results of research Behrooz, L., Balekian, D. S., et al [27], maternal smoking before delivery was not a significant risk factor for ARI (OR = 1.02, 95% CI 0.56-1.84). In contrast, postnatal smoke exposure was associated with an increased chance of > 300%.

3.3. Risk of Smoking Parents

The dangers of cigarette smoke are found in the chemicals contained in it. The danger is increased if cigarette smoke is inhaled by the people around him, or in other words when smokers smoke in the same environment as non-smokers. Cigarette smoke will cause most of the vibrating hairs or cilia around the nasal cavity and trachea to be paralyzed, causing mucus or phlegm to come out and become a breeding ground for bacteria that will easily become infected. Supported by the results of research by Kiconco, G., et al [28] that smoking behavior in parent will be an environmental risk factor for ARI, only when smokers live in the same environment as children who suffer from the disease and can have a 3 times higher chance of getting ARI compared to children living in a smoke-free environment, because cigarette smoke can destruction the epithelial lining of the respiratory tract and weaken the innate immune system which allows easy colonization of microorganisms [28]. Cigarette smoke is a significant risk factor for increasing ARI because cigarette smoke damages the natural protective mechanisms of the respiratory tract, making it easier for pathogens to cripple the first-line defenses of the respiratory system [29].

Lack of knowledge and attitudes of parents in preventing and handling ARI's can cause children to experience recurrent ARI occurrences. This can be caused by a lack of parental attention to efforts to live a healthy life to prevent, maintain, and improve children's health. The presence of smokers in the house can cause recurrent ARI occurrences in toddlers. Supported by the results of research which states that cigarette smoke has a strong effect on the lungs of children under five, especially those who spend a lot of time indoors, causing an increased risk of recurrent ARI [30]. Research results Teijeiro, A., Cuello, M. N., et al [31] also showed that in the first 12 months 33% of 1062 children under five experienced a recurrence of cough. Keep in mind again that the toxins that come from cigarette smoke can also stick to the body, clothes, hair, and hands. In addition to its wide range and rapid spread, cigarette smoke can also stay in the air for a long time. Cigarette smoke can stay in the air for up to 2 - 3 hours, even when house ventilation or windows are open. In fact, the residue from cigarette smoke will last for 4-6 hours in the house and become a major cause of health problems. Cigarette smoke can also settle on the floor and objects around the smoking area. This is certainly dangerous for someone around, considering they often play on the floor and touch objects around them. Therefore, never come into direct contact with children or babies after smoking. It is better to wash hands and face, and change clothes, so that children are safe from cigarette toxins that stick around smokers [32].

4. Conclusion

From the discussion of the article above, it can be concluded that the presence of a smoking family can increase the incidence of ARI in toddlers. Cigarette smoke is made up of more than 4000 chemicals, including chemical irritants. Toddlers who are exposed will find concentrations of toxins and carcinogens which are often much higher and can be very harmful to the respiratory system. Most of the indicators that cause ARI from air pollution are household air pollution (HAP) including smoking indoors which shows a significant positive bivariate relationship with the incidence of ARI in toddlers. Toddlers with smoking parents are a contributing factor to the increase in the prevalence of ARI because they tend to spend more time with their families at home or around them. Behavior in preventing the spread of smoke when smoking needs to be considered. Someone who smokes and has a toddler should be careful in choosing a smoking location and pay attention to cleanliness after smoking before touching his child. The high exposure to SHS in the home environment has led to the importance of innovative measures for creating smoke-free homes and reducing tobacco use.

Compliance with ethical standards

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Disclosure of conflict of interest

The author has no potential conflict of interest as affiliations with or involvement in any organization or entity with any financial such as honoraria, membership, employment, other equity interest, or non-financial interest such as a personal or professional relationship, knowledge, or beliefs in the subject materials discussed in this manuscript.

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