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Research Article

Risk Factors Associated with Respiratory Tract Infection among Children Less than 2 Years Old in Tikrit City

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I N F O

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A B S T R A C T

Background: Numerous factors may contribute to recurrent respiratory infection. These appeared to be unavoidable during the first few months of life and are common throughout childhood. However, there is a paucity of literature on this aspect of respiratory infections in Tikrit city.

Objective: To determine the risk factors for respiratory tract infections in children under 2-year-old.

Methods: The present cross-sectional research was conducted at Tikrit Hospital and enrolled 180 children with respiratory infections less than two years of age. The questionnaire was used for data collection and was administered by the interviewers to the reliable informants.

Results: The total sample size was 180, most of whom (169, 93.8%) exhibited recurrence of respiratory infection. 42.6% of children in urban areas and 57.4% of children in rural areas experienced recurrence.

Among the mothers of children with infections, 38% were educated up to the primary level, 36% up to the secondary level, and 26% up to the college level. Amoxicillin (46%) was more commonly used for the treatment of respiratory infections, followed by azithromycin (22%) and amoxicillin-clavulanic acid (17%).

Conclusions: The study showed that the recurrence of respiratory infection in rural areas with low- educated mothers was more than that in urban areas. Breast-fed children had the lowest percentage of recurrence as compared to mixed- and bottle fed children.

Keywords: Acute Respiratory Infections, Maternal Risk Factors, Antibiotic Resistance, Recurrent Infection

Introduction

According to estimates from the World Health Organisation (WHO), respiratory infections make up 6% of the world's overall disease burden, which is greater than the burden of ischaemic heart disease, malaria, cancer, diarrhoeal illness, or HIV infection.[1] Children under the age of five years are at risk for respiratory tract infections (RTIs) due to a variety of socio-cultural, socio-economic, and environmental risk factors, despite the fact that many of these risk factors may be avoided.[2]

Numerous factors may contribute to recurrent respiratory infections. Due to immunity learning, they seem to be unavoidable during the first few months of life and are common throughout childhood.

To distinguish between pathological (immune deficit) and physiological (immunity learning) scenarios, one must have a deep understanding of these factors.[3]

About 80–90% of respiratory illnesses in children are caused by viruses. These include rhinoviruses, influenza, adenovirus, and parainfluenza. A single virus can cause a variety of illnesses, such as bronchiolitis, croup, pneumonia, or a common cold. The most significant bacterial respiratory pathogens are Bordetella pertussis, which causes whooping cough, Mycoplasma pneumonia, and Streptococcus pneumoniae and other Streptococci. Mycobacterium tuberculosis is still a significant disease. While certain infections, like RSV bronchiolitis, create predicted outbreaks every winter, others, like pneumococcus, exhibit minimal seasonal change.[4]

Children infected with respiratory tract severe infectious bacteria have been afflicted due to several risk factors; among them are environmental and host variables such as low socio-economic status (including living in cramped, wet dwellings and consuming a low nutrition diet), passive smoking, larger families, prematurity (particularly in babies who needed mechanical breathing) and birth defects involving the heart or lungs. Rarely, immunological deficiencies may be acquired, such as HIV infection or malignant illness, or congenital, such as agammaglobulinemia.[5] The aim of the study is to identify the risk factors associated with respiratory tract infections among children less than 2 years old in Tikrit city and to identify the common types of antibiotics that are used for treating respiratory infections in children less than 2 years of age.

Subjects and Methods

Study Design

This cross-sectional study was carried out in Tikrit City from November 15, 2022, to February 27, 2023.

Study Population

The study was performed among patients with respiratory infections less than two years of age in Tikrit city, Salah Al-Deen. A total of 180 children were enrolled in the present study, the inclusion criteria based on diagnosed respiratory tract infection in children less than 2 years old. Exclusion criteria include children with any associated chronic diseases.

Questionnaire and Interview

The questionnaire used for data collection was administered by the interviewers. It was designed in the Arabic language and mainly included close-ended questions.

Ethical and Approval Consideration

Permission was taken from mothers and grandmothers to fill in the information required. They were assured of the confidentiality of their responses. The aim of the study was explained, and only those who agreed to participate were included in the study. The study was approved by the College of Medicine-Tikrit University (approval number 12 on 23.10.2022).

Statistical Analysis

Descriptive statistics based on frequency and percentages were used to analyses the results.

Results

The total sample size for the study was 180. Most of the participants (169, 93.8%) suffered from recurrent respiratory infection. The number of participants with recurrent respiratory infections according to their residence. Up to 38% of mothers of children with infections were educated up to the primary level, 36% up to the secondary level and 26% up to the college level. It was also observed that the highest percentage of participants with infections occurring two times or more had mothers educated up to the primary level (41.0% and 42.6%, respectively). Up to 90.0% of breastfed, 97.3% of bottle-fed, and 96.7% of mixed-fed children showed recurrence (Table 1).

Figure 1 A indicates the most common risk factors associated with respiratory infection in children less than two years of age. Low levels of maternal education, exposure to smoke and crowded families were the most common factors associated with respiratory infections (72.7%, 65.0% and 61%, respectively). Figure 1B shows the most common types of infections in children less than 2 years of age. Viral infections were found to be the most common (81%), followed by bacterial infections (19%). Figure 1C shows the most common antibiotics used to treat respiratory infections in children less than 2 years of age. Amoxicillin (46%) was found to be the most widely used for respiratory infections, followed by azithromycin (22%) and amoxicillin-clavulanic acid (17%).

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Table 1. Distribution of participants with recurrence of respiratory infections with associated conditions

Associated Conditions		No recurrence	Recurrence	Total
Residence	Urban	4 (36.4%)	72 (42.6%)	76
	Rural	7 (63.6%)	97(57.4%)	104
	Total	11	169	180
type of feeding	Breast feeding	8(10%)	74 (90%)	82
	Bottle	1(2.7%)	37 (97.3%)	38
	Mixed	2(3.3%)	58 (96.7%)	60

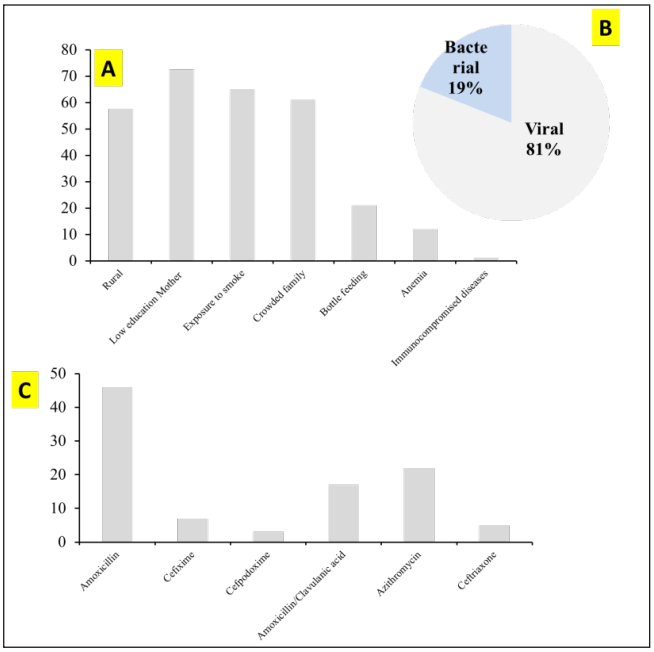

Figure 1. Risk factors associated with the resistance to antibiotics (A) Risk factors associated with respiratory infection. (B) Most common types of respiratory infections in children less than 2 years of age. (C) Most common antibiotics used to treat respiratory infections in children less than 2 years of age

Discussion

In this study, about 42.6% of children in urban and 57.4% of children in rural areas showed recurrence of respiratory infection. These percentages are similar to a study done in Alexandria, in which 40% of children in urban and 60% of children in rural areas showed recurrence of respiratory infection.[6] In a study done in Seville, Spain, about 48% and 52% of children showed recurrence in urban and rural areas, respectively.[7] This variation in difference compared to the present study is perhaps due to healthcare provided in rural areas and urban area being similar. In this study, the highest percentage of recurrence (twice and more than twice) was found in children whose mothers were educated up to the primary level (41.0% and 42.6%, respectively). This result is in agreement with that of a study done in Jeddah, Saudi Arabia, which showed that the highest percentages of recurrence of respiratory infections in children were associated with their mother's educational level (primary: 46%, secondary: 34%, and college: 20%).[8] According to the present study, 90.0% of breastfed, 97.3% of bottle-fed, and 96.7% of mixed-fed children showed recurrence.

In this study, approximately 42.6% of children in urban areas experienced recurrent respiratory infections, compared to 57.4% in rural areas. This finding aligns with a 2023 study conducted in Yiwu (China), which reported higher rates of recurrent respiratory infections in rural preschool children compared to their urban counterparts.[9] Similarly, research presented at the European Respiratory Society International Congress in 2023 indicated that urban living is an independent risk factor for developing infections in early childhood.[10] The study also found that the highest percentages of recurrent respiratory infections were among children whose mothers had a primary education level, accounting for 41% and 42.6% of cases. This is consistent with findings from a 2023 study in Kochi, India, where children of mothers with no formal education had a higher incidence of acute respiratory infections.[11]

Regarding feeding practices, 90% of breastfed children, 97.3% of bottle-fed children, and 96.7% of mixed-fed children experienced recurrent respiratory infections. These figures are comparable to those reported in a study in 2023, which found that breastfeeding for six months or longer was associated with a reduced risk of lower respiratory tract infections up to four years of age.[12]

In this study, factors such as low maternal education, exposure to tobacco smoke, and crowded living conditions were identified as the most significant contributors to recurrent respiratory infections, with prevalence rates of 72.7%, 65%, and 61%, respectively. These findings are consistent with a 2023 study in Nepal, which found that low maternal education was significantly associated with an increased risk of respiratory viral infections in infants.[13]

Like these countries, the increased utilisation of amoxicillin could be related to the malpractice in amoxicillin dispensing, deliberating therapeutic strategy, increasing the prevalence of bacterial resistance.

Conclusion

The study showed that among the various factors associated with respiratory infections and their recurrence among children less than 2 years of age, the educational level of mothers, exposure to smoke and crowded families were the most common. It was also observed that viral

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respiratory infections were more common than bacterial respiratory infections in the children of these age groups, and amoxicillin was more commonly used for the treatment of respiratory infections as compared to azithromycin.

Conflict of Interest: None

Source of Funding: None

Authors' Contribution: RSA and AZRA: designed and performed the study and derived the models. III: Interpreted the data and statistical analysis. RSA, AZRA, and III: wrote the manuscript and approved the final version.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process: None

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