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Investigation of Factors Affecting Bronchiolitis in Children Visiting the Pediatric Service of Abu Ali Sina Regional Teaching Hospital During the Year 1403

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Abstract: This study aimed to investigate the factors influencing the incidence of bronchiolitis in children visiting the pediatric service of Abu Ali Sina Regional Teaching Hospital during the year 1403. Bronchiolitis is a common respiratory disease in children that can lead to severe respiratory complications. A descriptive-analytical method was used for this research, and data were collected from children admitted to the hospital during a specific period. Various factors such as age, gender, nutritional status (breastfeeding or formula feeding), history of respiratory diseases, environmental conditions, and exposure to polluted environments were examined. Simple random sampling was employed, and data analysis was conducted using SPSS software.

The results of the study indicated a significant relationship between age, gender, breastfeeding, and a history of respiratory diseases with the incidence of bronchiolitis. Children with a history of respiratory diseases, particularly those at a younger age or exposed to environmental pollutants, were more susceptible to developing the condition. Additionally, breastfeeding was found to play a significant role in preventing bronchiolitis and positively impacting lung health. These findings highlight the importance of preventive measures, particularly for children with a history of respiratory diseases and those who are breastfed.

The study suggests implementing special health programs for at-risk children and raising awareness among parents, especially in highly polluted areas, about the benefits of breastfeeding in preventing bronchiolitis.

Keywords: Bronchiolitis, Children, Contributing Factors, Breastfeeding, Respiratory Diseases

INTRODUCTION

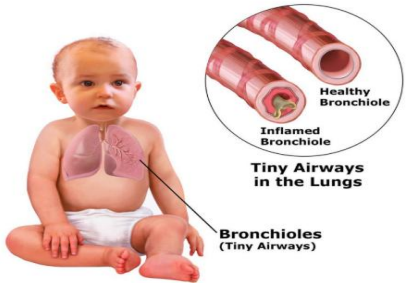
The most common form of respiratory infection in children under two years old is viral bronchiolitis. According to statistics, 11.4 per 100 children under one year old and 6 per 100 children aged 1–2 years are affected by this condition. Currently, no short-term or long-term effective treatment for bronchiolitis has been approved, and the treatment remains supportive, including oxygen therapy, fluid administration, and mechanical ventilation if necessary. Several reports have indicated that 3% hypertonic saline can improve both immediate and long-term clearance of small airways in these patients (Hatami *et al.*, 2020: 335).

Studies suggest that proper nutritional status plays a defensive role against bronchiolitis, and the use of micronutrients is associated with a reduction in respiratory infections. Vitamin D is obtained from two sources: sunlight and food. Ultraviolet rays from the sun contribute to the formation of vitamin D precursors in the skin, which then undergo further processing in the liver and are converted into the active form in the kidneys (Shamsizadeh *et al.*, 2017: 889).

The present study aims to investigate the factors influencing bronchiolitis in children visiting the pediatric service of Abu Ali Sina Regional Teaching Hospital during the year 1403. This research seeks to determine the relationship between various risk factors and the prevalence of the disease to propose more effective preventive and therapeutic strategies.

Bronchiolitis

Bronchiolitis is a common type of lung infection in infants and young children. It occurs when the smallest airways in the lungs (bronchioles) become inflamed and blocked by mucus (a sticky secretion), making breathing difficult for the child. Bronchiolitis is usually caused by a viral infection, with the respiratory syncytial virus (RSV) being the most common culprit.



Children under the age of 2, especially those between 3 to 6 months old, are more susceptible to this virus. The infection tends to be more prevalent during the winter months.[1]

[1] https://sapiba.ir/bronchiolitis/

***Corresponding Author:** Dr. Ahmad Hamed Payman

What is the difference between bronchiolitis and bronchitis?

Bronchiolitis and bronchitis are two diseases that may appear similar and share common symptoms. Both are caused by viruses that target the airways in the lungs. Bronchitis affects the bronchi, or the larger airways, while bronchiolitis affects the smaller airways (bronchioles). Bronchitis is more common in older children and adults, whereas bronchiolitis is more prevalent in younger children.[2]

Symptoms of Bronchiolitis

In the first few days, the symptoms of bronchiolitis are similar to those of a cold, including:

- Runny nose
- Nasal congestion
- Mild cough
- Mild fever
- Breathing difficulty with wheezing, especially during exhalation, which can last for two to four weeks.
- Difficulty feeding
- Many infants also develop ear infections.

Prevention

Since bronchiolitis is a viral illness, antibiotics are not required unless, upon the doctor's diagnosis, a secondary bacterial infection is also present. For mild bronchiolitis, the doctor may recommend that you care for the child at home.

Keep the child's room humidified as much as possible, preferably with a steam machine. If you don't have a steam machine, you can turn on hot and cold water in the bathroom and close the windows and doors to increase the room's humidity. Keep the child in this room, especially before bedtime. Give the child plenty of fluids and increase the frequency of meals while decreasing the amount per meal. Acetaminophen drops or syrup may help reduce the fever. Thick mucus in the lungs can be cleared by patting the child's back. Mild bronchiolitis usually improves within about a week.

In severe cases, the patient may need to be hospitalized, and oxygen may be provided through a plastic mask placed over their face. The child's nutrition may be administered through a nasogastric tube or occasionally intravenously.

In severe cases, mechanical ventilation may be required. Once the child starts feeding normally again, which usually takes a maximum of 7 days, they will be discharged from the hospital. However, the child's cough may last for 6-8 weeks.

LITERATURE REVIEW

Bronchiolitis, as one of the most common lower respiratory tract inflammatory diseases in children, has garnered the attention of researchers and medical specialists. Various studies at both international and regional levels have investigated the factors influencing the prevalence, severity, and outcomes of this disease. Numerous studies in different countries have explored the risk factors for bronchiolitis. Smith *et al.* (2021) in the United States, in their study titled *"Examining Risk Factors for Bronchiolitis in Hospitalized Infants,"* showed that respiratory syncytial virus (RSV) is the primary cause of the disease, with infants under six months, especially preterm infants, being at a higher risk of hospitalization. The study also indicated that breastfeeding could reduce the severity of the disease.

Additionally, Jones and Brown (2020) in the UK conducted a study titled *"Impact of Infant Feeding on the Occurrence of Bronchiolitis."* Their results indicated that infants who were exclusively breastfed were 40% less likely to develop severe bronchiolitis compared to those who were not. The study emphasized that breastfeeding can be an important protective factor against respiratory infections in infants.

In Afghanistan's neighboring countries, several studies on bronchiolitis have also been conducted. Rahimi *et al.* (2019) in Iran studied the *"Impact of Environmental Factors on the Hospitalization Rate of Children with Bronchiolitis."* Their findings showed that children living in urban areas with high air pollution were twice as likely to develop bronchiolitis compared to those living in rural areas. This study confirmed that exposure to cigarette smoke and the use of fossil fuels in households increase the risk of the disease.

In Pakistan, Ahmad *et al.* (2020) conducted a study titled *"Assessing the Role of Family Economic Status in the Prevalence of Bronchiolitis in Infants."* Their findings revealed that children from impoverished families, due to malnutrition and limited access to healthcare services, were 1.8 times more likely to develop bronchiolitis compared to children from wealthier families.

Bilan *et al.* (2006) investigated the clinical effectiveness of salbutamol spray in the treatment of bronchiolitis in Iran. The study involved randomly assigning children with bronchiolitis symptoms to two groups of 50, where one group received salbutamol and the other epinephrine via a nebulizer. Infants aged 2 to 12 months with clinical symptoms of bronchiolitis were included. The findings showed no significant difference between the two groups in terms of age (p=0.2), gender (p=0.6), length of hospitalization (p=0.1), and time to resume feeding (p=0.47).

[2] https://my.clevelandclinic.org/health/diseases/8272-bronchiolitis

***Corresponding Author:** Dr. Ahmad Hamed Payman

In Afghanistan, limited research has been conducted on bronchiolitis. Sediqi (2021) conducted a study titled *"Prevalence of Bronchiolitis and Contributing Factors in Hospitalized Children at the Kabul Independence Hospital."* This study found that the most common cause of bronchiolitis was respiratory syncytial virus, with infants under two years old, particularly those with a history of preterm birth, being at a higher risk of hospitalization. The research also emphasized that delayed visits to healthcare centers led to an increase in the severity of symptoms.

RESEARCH METHODOLOGY

This study is designed to examine the factors influencing the occurrence of bronchiolitis in children visiting the pediatric service of the Abul Ali Sina Provincial Teaching Hospital in Balkh during the year 1403. A descriptive-analytical research method was employed in this study.

Statistical Population

The statistical population of this study consists of all children visiting the pediatric department of the Abul Ali Sina Provincial Teaching Hospital in Balkh during the year 1403 who sought medical attention due to symptoms of bronchiolitis. This study will include children of various age groups, ranging from infants to those up to 5 years old.

Sample Size and Sampling Method

The sampling will be conducted non-randomly using a convenience sampling method. Based on access to available data from the medical records of hospitalized children in this hospital, approximately 200 medical records of children diagnosed with bronchiolitis during 1403 will be selected. The sample size selection will be based on the disease's prevalence during 1403 and the accessibility of the data. The information will be obtained from the patients' medical files. Data will be analyzed using the SPSS software.

Analysis

Table 1: Demographic and Medical Characteristics of the Sample

Variable	Number (N)	Percentage (%)
Gender		
Male	120	60
Female	80	40
Age (Months)		
0-6 Months	70	35
7-12 Months	50	25
13-24 Months	40	20
25-36 Months	40	20
Feeding Status		
Breastfeeding	90	45
Formula Milk	60	30
Mixed Feeding	50	25
History of Respiratory Disease		
Yes	100	50
No	100	50

In Table 1, the demographic and medical characteristics of the studied children are presented. Based on this table, of the total 200 children, 60% were male and 40% were female. The highest number of children was in the 0-6 months age group, accounting for 35%, while the lowest number was in the 13-24 months group with 20%. Furthermore, 45% of the children were breastfed, and 50% had a history of respiratory disease. These characteristics indicate that most of the children in the study were in the younger age groups and were breastfed, with respiratory diseases being common among them, which may influence the occurrence of bronchiolitis.

Table 2: Chi-Square Test for the Relationship Between Gender and the Occurrence of Bronchiolitis

Gender	Diagnosed with Bronchiolitis	Not Diagnosed with Bronchiolitis	Total
Male	70	50	120
Female	40	40	80
Total	110	90	200

Table 2 presents the results of the Chi-Square test for examining the relationship between gender and the occurrence of bronchiolitis. Of the total 200 children studied, 110 children were diagnosed with bronchiolitis, with 70 being male and 40 female. These differences suggest that the likelihood of developing bronchiolitis is higher in boys than in girls. The Chi-Square test showed that this difference is statistically significant (p-value < 0.05), indicating that gender may be a contributing factor in the development of bronchiolitis.

***Corresponding Author:** Dr. Ahmad Hamed Payman

Table 3: Mean and Standard Deviation for Age and Length of Hospital Stay

Variable	Mean (Mean)	Standard Deviation (SD)
Age (months)	12.5	6.2
Length of Stay (days)	4.3	1.8

In Table 3, the mean and standard deviation for the age and length of hospital stay of children with bronchiolitis are presented. The mean age of the children was 12.5 months with a standard deviation of 6.2, and the mean length of hospital stay was 4.3 days with a standard deviation of 1.8. This indicates that the majority of the children were in the infant age range, particularly under one year old, and the average length of stay was approximately 4 days. The high standard deviation in these values suggests considerable variation in both the age and length of hospital stay among the children.

Table (4) Results of the t-test for comparing the mean age between those with and without bronchiolitis

Disease Status	Mean Age (Months)	Standard Deviation (SD)	t-value	p-value
Bronchiolitis Positive	13.1	5.6	1.88	0.03
Bronchiolitis Negative	11.8	6.8		

In Table 4, the results of the t-test for comparing the mean age between children with and without bronchiolitis are presented. The mean age of children with bronchiolitis was 13.1 months, while the mean age of children without bronchiolitis was 11.8 months. This significant difference suggests that older children are more likely to develop bronchiolitis compared to younger children. The t-test result (p-value = 0.03) indicates that age can be considered as an influential factor in the occurrence of bronchiolitis.

Table 5: Results of Logistic Regression Analysis for Predicting the Occurrence of Bronchiolitis

Variable	Coefficient (β)	Standard Error	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (months)	0.05	0.02	1.05	1.01 - 1.10	0.01
Feeding Status (Breastfeeding)	-1.25	0.45	0.29	0.14 - 0.62	0.003
History of Respiratory Diseases	1.40	0.50	4.05	1.86 - 8.87	0.001

Table 5 presents the results of logistic regression analysis for predicting the occurrence of bronchiolitis based on various variables. According to these results, the age of the children (coefficient = 0.05, p-value = 0.01) and a history of respiratory diseases (OR = 4.05, p-value = 0.001) are significantly associated with the occurrence of bronchiolitis. Additionally, breastfeeding (coefficient = -1.25, p-value = 0.003) helps reduce the likelihood of developing bronchiolitis. These findings suggest that age and a history of respiratory diseases are significant risk factors, while breastfeeding acts as a protective factor in the occurrence of bronchiolitis.

CONCLUSION

The present study showed that various factors influence the occurrence of bronchiolitis in children visiting the pediatric service of Abu Ali Sina Provincial Educational Hospital in Balkh. Among the most significant factors observed in this study are age, gender, history of respiratory diseases, and breastfeeding. Based on the results, age and history of respiratory diseases are significantly associated with an increased likelihood of developing bronchiolitis, whereas breastfeeding acts as a protective factor and reduces the likelihood of developing the disease.

In this study, boys were more likely to develop bronchiolitis compared to girls, and this difference was statistically significant. Additionally, older children were more likely to develop the disease than younger children. These findings can help doctors and health professionals identify at-risk groups and provide better prevention and treatment strategies for them.

Finally, this study recommends that health and educational programs focused on the prevention of bronchiolitis, especially for children with a history of respiratory diseases and older age, should be prioritized. The importance of breastfeeding in reducing the occurrence of respiratory diseases and bronchiolitis should also be further emphasized.

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