Evaluating Predisposition Factors of Infants Presenting with Recurrent Bronchiolitis Episodes in İstanbul Bağcılar

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ABSTRACT

Objective: Bronchiolitis is the most common lower respiratory tract disease in infants. This study aimed to evaluate the relationship between predisposing factors and the number of applications to a hospital because of recurrent episodes of bronchiolitis.

Methods: A questionnaire was administered to 0–2-year-olds infants of 220 families who applied to the pediatrics emergency department because of recurrent bronchiolitis episodes. Data were obtained from a questionnaire that was administered by the researcher. In these forms, the number of rooms in their house, number of individuals living in the house, parents' age, smoking status, education and occupation, and average income of the family were recorded. Duration of breastfeeding and history of recurrent episodes of bronchiolitis were questioned. Children's height and weight were also measured.

Results: In the study, 123 (55.9%) children were male and 97 (44.1%) were female. The mean age was 9.53±5.97 months. The mean number of admission to the hospital was 4.34±6.55, and the beginning of wheezing was 4.87±4.20 months. The mean number of individuals living in the house were 5.52±2.75, and the mean number of room in the house were 3.14±0.63.The mean age of mothers was 28.12±4.89 years, and the mean age of fathers was 31.86±5.25 years. It was observed that in infants with breastfeeding time <4 months, hospitalization episodes were more than others. There was a significant relationship between children's height and weight percentiles, mother's and father's education, child's breastfeeding duration, season and number of previous hospitalization between the number of hospitalization episodes.

Conclusion: The mortality rate was 0.5% in infants with bronchiolitis, but in some infants who had risk factors, this rate increased over 3%. Knowing the risk factors for acute bronchiolitis and raising awareness in families regarding this issue are important. *(JAREM 2016; 6: 40-4)*

Keywords: Bronchiolitis, infant, predisposition factors

INTRODUCTION

The American Academy of Pediatrics defines bronchiolitis as respiratory distress and wheezing that develops following the diagnosis of lower respiratory tract infection in children under two years of age. It is an inflammatory disease of the small airways that develops due to viral factors (1). Bronchiolitis is the most frequent cause of admissions to child emergency services and hospitalizations in the winter and spring months (2). While premature labor, underlying chronic pulmonary diseases such as bronchopulmonary dysplasia and cystic fibrosis or reactive airway disease, congenital heart disease, immunodeficiency and immunosuppression cases, and Down syndrome constitute the main risk factors, age of infants below six months, smoking exposure, atopy history, malnutrition, low birth weight, male gender, lower socioeconomic status, and crowded living conditions constitute additional risk factors (3, 4). Although the duration of the disease is short and patients recover on their own in most cases, it requires hospitalization, especially in young children with high risk and patients with suppressed immunity, and it causes significant morbidity and mortality. While the mortality rate in bronchiolitis was found to be 0.5% in conducted studies, it was reported that this ratio exceeds 3% in patients with risk factors (5). Knowing the risk factors in acute bronchiolitis and taking steps in this direction bear great importance in terms of the health and development of infants. This study has been conducted to evaluate the predisposing factors in our patients who were treated for bronchiolitis.

METHODS

In the study, face to face surveys were applied to parents of 220 children admitted to the emergency service and diagnosed with bronchiolitis between the dates of September 1, 2012 and December 31, 2012. It is a descriptive and cross-sectional study. The mothers and fathers participating in the application were given enlightening information about the purpose and importance of the study; thus, the study was based on their voluntary participation. The data were obtained from questionnaires applied by the researcher. The survey form contained questions regarding the number of rooms in the house the patient lives in and the number of people living at home, the ages of the parents, the smoking status, education, and occupations of the parents, and the average income of the family. The duration of the child's breastfeeding, whether or not the child had seizures, and the seasons in which the children were admitted to the hospital due to seizures were questioned. The height and weight of the children were measured.

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Statistical Analysis

The obtained data were transferred to the computer and digitalized, and necessary error checks and corrections have been made. Based on the answers given by the respondents, subdimensions and descriptive statistical methods (mean, standard deviation, and frequency) were calculated for each question. In addition to the number (n) and percentage (%), mean±standard deviation was used in the display of descriptive statistics. A normality test was conducted for the variable of the number of emergency admissions and it was observed to not be distributed normally (p=0.000, <0.05). Therefore, non-parametric tests were used.

RESULTS

Of the 220 children who were included in the study, 123 (55.9%) were male and 97 (44.1%) were female. The average age was 9.53±5.97 months. The average birth weight was 3081.25±566.09 kg. Children with chronic diseases and premature birth stories were excluded from the study. The average number of children brought to emergency was 4.34±6.55, the average time when wheezing first began was 4.87±4.20 months, the average number of people living at home was 5.52±2.75, and the average number of rooms in the house was 3.14±0.63. The average family income was TL 1153.32±491.18. Of the families, 40.0% (88 people) were living in their own houses, and 60.0% (132 people) were living in a rental house. The average age of the mothers was 28.12±4.89 years, and the average age of the fathers was 31.86±5.25 years. Forty (18%) mothers had chronic diseases such as diabetes and high blood pressure, and 203 (92.3%) mothers were housewives and did not work. Of the fathers, 116 (52.72%) were workers (textiles, construction) and 104 (47.28%) were self-employed. The characteristics of the mothers and fathers are given in Table 1. The growth and development of the children were evaluated. Percentile values are shown in Table 2 and Table 3. Of the mothers, 3.2% (7 mothers) were active smokers during pregnancy, 12.7% (28 mothers) were both active and passive smokers, 48.2% (106 mothers) were passive smokers, and 35.9% (79 mothers) were non-smokers. Of the children, 51.8% (114 children) were born by cesarean section and 48.2% (106 children) were born by normal spontaneous delivery (NSD). While 27.3% (60) of the children had a history of recurrent hospitalizations, 72.7% (160) had no history of hospitalization. When the number of emergency applications of the children and the seasons in which the attacks occurred are evaluated, the average number of children applying to the emergency service every season is higher (Table 4). When the nutrition of the patients was questioned, the number of applications to the emergency service of those who were breastfed less than four months was observed to be greater (application number 14). A significant relationship was found between the height, weight percentile, previous hospitalization history, breastfeeding duration, episode season, educational level of the parents, and applications to the emergency service (Table 5) (p<0.005).

DISCUSSION

In children younger than two years, acute bronchiolitis often begins with flu and sometimes begins with a slight fever, which are caused by viral agents; it is an acute respiratory disease that is characterized by cough, tachypnea, retractions, diffuse wheezing and crackles, and hyperinflation within a few days and continues with inflammation of the bronchioles (1, 6). Acute bronchiolitis constitutes 1% of all cases of hospitalization in the first year of life. The male-female ratio is 1.5:1 (7, 8). Based on the results obtained in this study, 55.9% of the children included are male. Bronchitis has been reported to be observed more frequently and with greater severity in boys. The ratio of the

Table 1. Characteristics of the parents

Characteristic	Mother (n)	%	Father (n)	%
Educational status				
Not educated	47	21.4	21	9.6
Primary school	117	53.1	105	47.7
High school	53	24.1	86	62.2
University	3	1.4	8	3.6
Smoker	41	18.6	143	65.0
Non-smoker	179	81.4	77	35.0

Table 2. Height percentile of the children

Height percentile	Number	%	Number of bronchiolitis attacks
3 percentile and below	65	29.4	10
3–10 percentile	5	2.3	21
10–50 percentile	66	30	12
50 percentile	46	20.9	4
50–75 percentile	1	0.5	1
75–97 percentile	30	13.7	6
97 percentile and over	7	3.2	4

Table 3. Weight percentile chart

Weight percentile	Number	%	Number of bronchiolitis attacks
3 percentile and below	15	6.8	7
3–10 percentile	8	3.6	15
10–50 percentile	54	24.6	8
50 percentile	59	26.8	4
50–75 percentile	63	28.7	9
75–97 percentile	14	6.3	7
97 percentile and over	7	3.2	7

respiratory tract diameter to the lung volume is smaller in boys than in girls, which may explain why the disease is mostly seen in boys. In a study that Benigno et al. (9) conducted, it was reported that 22 of 39 children with bronchiolitis were male and 17 were female. The results of our study were consistent with previously reported results. Crowded environments and smoking parents are other important risk factors in the development of acute bronchitis. Especially if the mother smokes cigarettes, it has been demonstrated that exposure of breastfeeding children to passive smoking may be a risk factor in the development of acute bronchiolitis and in continued attacks (9). In our study, no significant relationship could be determined between the number of hospital admissions and smoking parents and passive smoke exposure; however, it was observed that 65% of the fathers were smokers. In a study in which children whose mothers smoked were compared with children whose mothers did not smoke, it was observed that other respiratory illnesses, in particular acute bronchiolitis, pneumonia, and croup, occurred more frequently in children whose mothers smoked (10). In a study conducted in Australia, 253 children with bronchiolitis were investigated, and it was determined that 29% of the mothers of those children were smokers. Children of mothers who smoke have been shown to be at risk for acute bronchiolitis (11). The lung capacity is reported to be lower in babies of mothers who smoke, especially during pregnancy (12, 13). In a study conducted in Denmark, babies of mothers who smoked during pregnancy were reported to have more frequent episodes of bronchiolitis before the age of 2 (14). In this study, there was no correlation between smoking of the mothers during pregnancy and exposure to cigarette smoke and the frequency of emergency visits. A high number of people living at home was found to be associated with episodes of acute bronchiolitis (11, 15). A crowded family environment is also an important risk factor. Especially, the presence of elder siblings studying at school is risky in terms of carrying viruses and infecting small children. While elder children recover from viral infections in the form of upper respiratory tract infections, these infections may lead to bronchiolitis in infants (15). In homes where more than five family members live, the development of bronchiolitis is reported to be more common after viral upper respiratory tract infections (16). In a study conducted by Albargish and Hasony (17) that included 516 children, lower respiratory tract infections were shown to be more common in children of families with low socioeconomic status and socio-cultural level and especially in children living in a crowded family environment. The average number of people living in the home ranged from three to seven in the study; however, no significant correlation was detected between the number of individuals living with the families and the number of emergency applications. Breastfeeding in the first six months is very important to prevent the development of many viral diseases in addition to acute bronchiolitis (2, 15). In studies conducted by Balfour-Lynn et al. (18) and Albernaz et al. (19), acute bronchiolitis was reported to be more common in children who were not breastfed. The number of bronchiolitis cases and hospitalizations was higher in infants who were fed with breast milk for less than two months (20, 21). It was seen in this study that the number of applications to the emergency service is higher in children being fed with breast milk for less than four months. It was found that the majority of parents of the children participating in the study lived in rental houses with three rooms on average. The average income of the families is TL 1153. These results suggest that the socioeconomic status of these families is low. In a study that Choudhuri et al. (22) conducted, the relationship between socioeconomic status and lower respiratory disease, especially due to respiratory syncytial virus (RSV), was examined, and it was emphasized that there was an important bond between bronchiolitis and socioeconomic status. Our study is consistent with this study. In temperate regions, outbreaks due to viruses begin in the months of October and November and last until the end of March. Infections are frequent at the end of autumn and at the beginning of winter and spring; although bronchiolitis peaks in the winter months (December and January), it can be seen in all seasons (23, 24). Although it was found in the study that more than half of the children had episodes in the fall, when the number of applications to the emergency service and the seasons when the attacks occurred were evaluated, the average number of children applying to the emergency service in every season was higher, and a particular season was not in question. The majority of mothers of the children who participated in the survey were found to be elementary school graduates, and the educational

Table 4. Relationship between season and attacks

Frequency of attacks	Number	%	Number of bronchiolitis attacks
Every season	39	17.7	13
Winter	24	10.9	10
Autumn	128	58.2	2
Spring	11	5.0	3
Summer	28	8.2	6

Table 5. Relationships between the number of bronchiolitis attacks and predisposing factors

Predisposing factors	Number of bronchiolitis attacks	p
Height percentile (3-10 p)	21	0.000
Weight percentile (3-10 p)	15	0.001
Previous hospitalization	10	0.000
Breastfeeding less than four months	14	0.000
Attack season (all seasons)	13	0.000
Educational status of mother	15	0.001
Educational status of father	14	0.000

level of the mothers was low. The average age of the mothers was 28.1 years, and the majority of them were housewives. The majority of fathers of the children who participated in the study were found to be primary school graduates, and the education level of the fathers was low. The average age of the fathers was 31.9 years, and the majority of them were found to work in the textile and ready-made clothing sectors. The level of education of the mothers and fathers was observed to be associated with the number of hospital admissions. The educational level of parents is a risk factor for the increase of the development of bronchiolitis and the number of applications to hospital (25).

The number of applications to the emergency service was found to be higher in patients whose height and weight percentiles were between 3 and 10. It is known that the socio-economic and cultural levels of families are risk factors in the development of bronchiolitis (25, 26). The mother's level of education is important in infant nutrition. A higher number of attacks in children whose height and weight percentiles were between 3 and 10 leads to the consideration that it is related to insufficient nutrition of the children and to the family structure. In addition, nutritional deficiency can lead to immune system disorders and can cause recurrent episodes of infection. Considering the relationship between the number of emergency visits and the hospitalization history of the children, it was determined that children who were previously hospitalized applied to the emergency service more often. Bronchitis is known to require more frequent hospitalizations in children who were previously hospitalized and in some others (27).

CONCLUSION

Although it is seen in all seasons, bronchiolitis constitutes an important number of visits to child emergency services and hospitalizations, especially in the winter season. Attempts should be made to inform the parents of patients who have frequent attacks and who apply to hospitals about not smoking in the presence of children, being careful about contact with siblings who attend school or nursery, and the risks of early cessation of breastfeeding.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bağcılar Training and Research Hospital.

Informed Consent: Written informed consent wa sobtained from the parents of the patients who participated in this study.

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