Clinical profile of admitted children with bronchiolitis at Al-Sadaka teaching hospital, Aden (January-December 2014)

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Abstract

This is a cross-sectional study involving all patients diagnosed with bronchiolitis up to two years of age, admitted in Al-Sadaka Teaching Hospital in Aden governorate, from 1st January– 31th December 2014. The purpose of this study was to describe the status and characteristics of admitted children with bronchiolitis. Of the 77 patients, there were 74.0% males and 26.0% females, giving a ratio of 2.85:1. The age ranged from 2 - 18 months, with a mean age of (5.4± 3.5) months. The majority of patients were under six months of age (80.5%). A seasonal variation of bronchiolitis was found with a peak incidence in winter, especially in October. We found that 64.9% of the children were exposed to smokers. The most common clinical symptoms were dyspnea, cough and fever (100%, 87.0%, 75.3% respectively). Clinical signs were fine wheezing and rhonchi (68.8%, 55.8% respectively). The median of respiratory rate was 65 breaths/minute. Treatment with antibiotics was given to all patients (100.0%), supplement of oxygen, bronchodilators and corticosteroids (92.2%, 87%, 84.4% respectively). Most of the patients discharged well (83.1%) and with no deaths. The mean duration of inpatient stay was 5.4±3.5 days ranging from 1 - 24 days. Nine per cent of patients were repeatedly admitted with recurrent bronchiolitis after discharge. We concluded that children of less than six months of age and those who have been exposed to smokers after birth have the highest risk of bronchiolitis. There was inappropriate use of antibiotics which can be prevented by the presence of unified guidelines. The results may lead to the desired improvement of health care for children.

Keywords: Bronchiolitis, children, respiratory syncytial virus.

Introduction

Bronchiolitis is a distressing, potentially life-threatening respiratory disease that affects infants and young children, characterized by rhinorrhea and sometimes low-grade fever that gradually progress as to cough, respiratory distress ensues with tachypnoea, hyperinflation, chest retraction, and widespread crackles, wheezes, or both [19,20]. Many viruses can cause bronchiolitis: respiratory syncytial virus (RSV) is responsible for > 50% of the cases, other viruses include: influenza, para-influenza, adenovirus and lately human metapneumovirus. [27]. Reinfections are common and may be experienced throughout life [6,19]. The morbidity and mortality are attributable to infection with RSV appears greatest in infants younger than three months of age, and in those who have known as risk factors [21] . Certain risk factors for having a severe case of bronchiolitis include congenital heart disease, chronic lung diseases, passive exposure to cigarette smoke, and family history of atopy [1,13].

RSV infection is occurring in seasonal pattern with highest incidence in the winter in temperate climates, [24,25] and in the rainy season in warmer countries [17,19]. However, the exact reason for the seasonality for RSV infection is still unknown [5].

Management of bronchiolitis remains considerable controversy. Historically, it is self-limited illness, and supportive care is the mainstay of treatment for RSV bronchiolitis [15,21]. Those who are ill appearing, dehydrated, has poor feeding, apnea, develop respiratory distress or require supplemental oxygen should be considered for hospitalization [9,10].

Although overall mortality rates are low, the impact of viral bronchiolitis in health expenditures in most places is quite high. Even worst, recent data suggest that the rates of hospitalization seem to

have increased significantly in the past decades [23]. In Yemen, there is noticeable scarcity of studies addressing bronchiolitis in children. In this respect, the only study available in the area, by Al-Hag , addressed the acute lower respiratory tract infection in children [3]. Therefore, this study was conducted with the main objective of describe the status and characteristics of admitted children with bronchiolitis**.** It is expected that the results of this study will provide a comprehensive information about the different clinical aspects of the disease, that will help the health care providers to improve care for children with bronchiolitis.

Patients and methods

Study design

This cross-sectional study was conducted from 1st Jan - 31st December 2014.

Study population and setting

The study site was Al-Sadaka Teaching Hospital which is considered a major paediatric public hospital in Yemen providing paediatrics medical care (not surgical). There are 500 beds in the hospital, including 200 beds for children aged ≤ 14 years.

Inclusion / Exclusion criteria

Patients with clinical diagnosis of acute bronchiolitis documented by a physician in a child up to two years of age of both gender, admitted to the hospital within the study period, were included. Patients with other causes of wheezy chest, e.g. foreign body, history of asthma, severe cardiopulmonary disease were excluded.

Data collection

Data were collected using predesigned open-ended structured questionnaire. The questionnaire included the following demographic and clinical data: age on admission, gender, residence, infant nutrition, seasonality, previous history of bronchiolitis; and predisposing factors included: nutritional history (breast feeding), family history of allergy (bronchial asthma, allergic rhinitis, and atopic dermatitis) exposure history, chronic lung disease and congenital heart disease (CHD). The respiratory rate, auscultation findings, and treatment were also noted.

Patient's diagnosis was based on clinical details and laboratory tests such as complete blood counts, chest X-rays and other investigations wherever indicated and previous history, and clinical findings at the diagnosis, complementary exams, and follow-up data were evaluated.

Statistical analysis

Data from the questionnaire were analyzed, using the SPSS, version 17 (SPSS Inc., Chicago, IL, USA). Data analysis consisted of descriptive statistics, including, frequency distribution; means and standard deviation**.** The data which are not normally distributed, we used median with interquartile range, P-value < 0.05, at 95% CI was taken as cut off point for statistical significance.

Ethical consideration

Permission was taken from the director of the hospital and was confirmed by the Research Ethics Committee, after explaining the purpose of the study. Verbal consent was taken from parents prior to enrolment, after explaining the purpose of the study, anonymity, and confidentiality of collected data were assured.

Results

Characteristics of patients

A total of 77 patients were included in the study. The patient's characteristics are listed in Table 1. There was 74.0% males and 26.0% females (male to female ratio 2.85:1), this difference was highly significant $p < 0.001$. The age ranged from 2-18 months , with the mean age of 5.4± 3.5 months and 80.5% of patients were less than six months; this difference was highly significant $p < 0.001$. The majority of the patients were from Aden Governorate (71.4%), followed by Lahej and Abyan (11.7% each) while few patients were from neighboring governorates; this difference was highly significant $p < 0.001$.

Figure 1 shows the distribution of admitted patients residency regarding the districts of Aden governorate. The majority of patients come from the nearest area to the hospital, Darsaad (n=13),

followed by Shiek Othman (n=12) and Mansoura (13, 12, 8 respectively), while the lowest number were from the other districts.

Seasonality of the infections

Figures 2 and 3 show the seasonal variation regarding the onset of the disease. A significant higher percentage of patients were admitted during winter (64.9%) which is than in summer (35.1%), p=0.03. The highest monthly incidence was estimated from October to April and the highest peak was in October (n=13), while no single patient was admitted during the month of June.

Predisposing factors

The majority of patients were on breast feeding (87.0%). Co-morbid and the social conditions were reported at the time of admission. Family history of asthma was found in 10.5% of the patients and 7.3% had history of allergic rhinitis. The majority of patients (64.9%) were exposed to smokers and two patients h ad underlying cardiac abnormalities. About nine per cent of patients were repeatedly admitted to the hospital with recurrent bronchiolitis after discharge, as shown in Table 2 .

Clinical presentations

Symptoms and signs of studied patients are shown in Table 3. At the time of diagnosis, the most common symptoms detected were dyspnea, cough and fever (100%, 87.0%, 75.3% respectively). and the majority of patients (53.2%) had respiratory rate more than 60 breaths/minute, and the median of respiratory rate was (65 breaths/minute) ranging from 44 - 100 breaths/minute. Wheezing and rhonchi (68.8%, 55.8% respectively) were the prominent clinical findings.

Treatment and outcome

Regarding treatment, antibiotics were used in all patients (100.0%), supplemental oxygen was given to 92.2% of the patients; bronchodilators and corticosteroids were used in (87%, 84.4% respectively), as shown in Table 4. Most of the patients were discharged well (83.1%) and there was no deaths. The mean duration of inpatient stay in hospital was 5.4±3.5 days ranging (1-24) days. (Table 5)**.**

Table 1: Characteristics of patients

Characteristic	No.	%	P value
Gender			
Male	57	74.0	<0.001
Female	20	26.0	
Age group (month)			
< 6	62	80.5	
6-11	11	14.3	<0.001
>12	4	5.2	
Residence			
Aden	55	71.4	
Lahej	9	11.7	
Abyan	9	11.7	<0.001
Al-Daleh	2	2.6	
Shabawh	2	2.6	

Table 2: Distribution of patients by predisposing factors

Variable	No.	%
Nutrition		
Breast feeding	67	87.0
Non breast feeding	10	13.0
Family history of allergy		
Bronchial asthma	8	10.4
Allergic rhinitis	6	7.8
No history of allergy	63	81.8
Exposed to cigarette smoke		
Yes	50	64.9
No	27	35.1
Pre-existing disease		
Congenital heart disease	2	2.6
No existing diseases	75	97.4
Previous history of bronchiolitis		
Yes	7	9.1
No	70	90.9

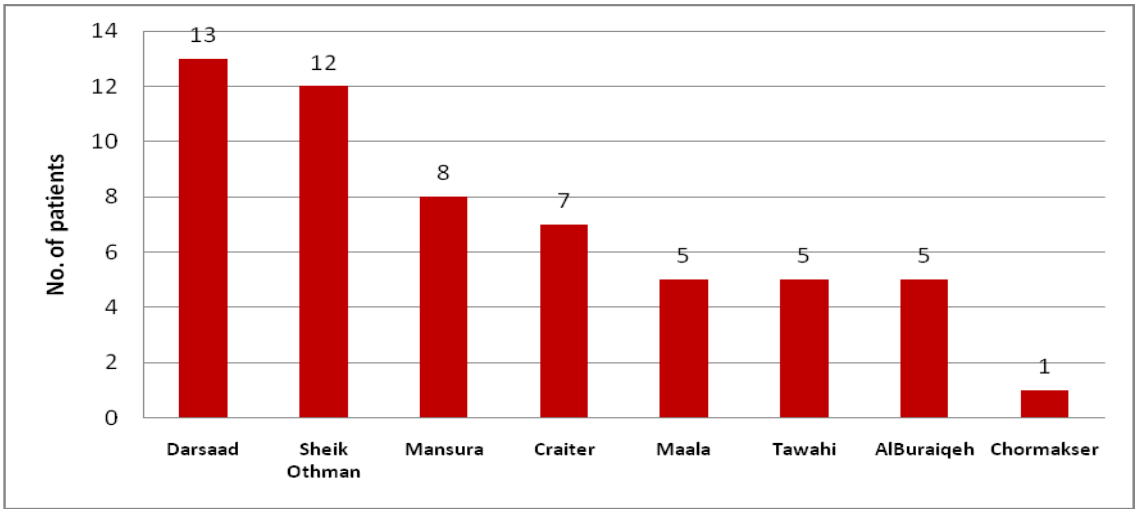

Figure 1: Distribution of admitted patients by districts of Aden Governorate

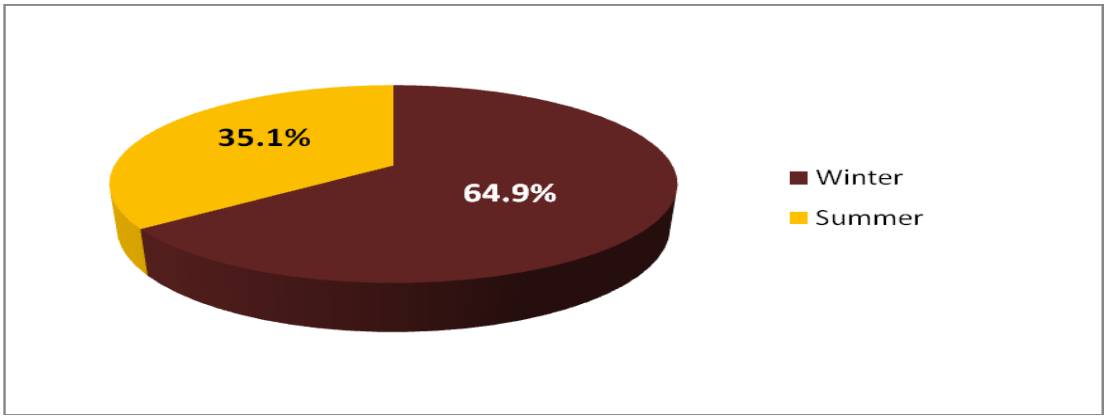

Figure 2: Distribution of patients by seasonality of admission

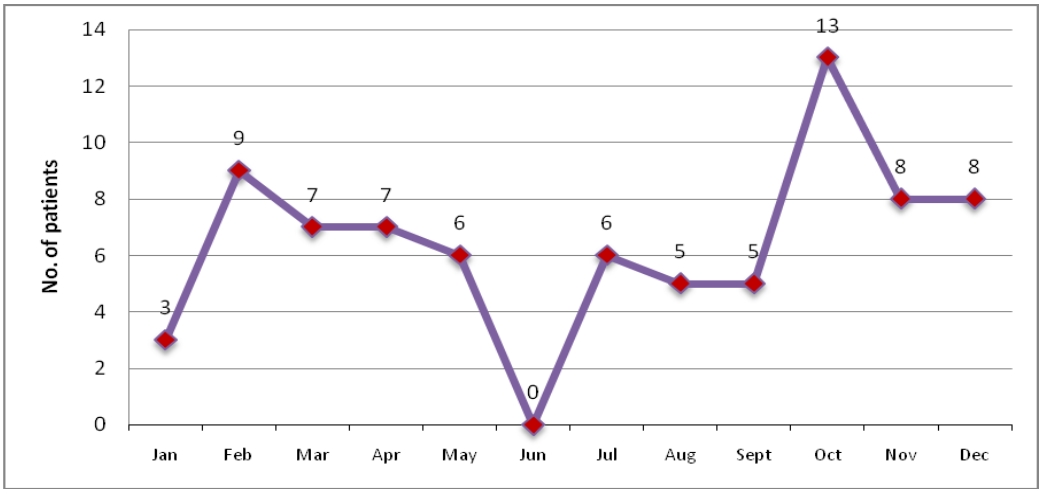

Figure 3: Distribution of patients by month of admission

Table 3: Symptoms and signs in studied patients

Symptoms/ Signs	No.	%
Symptoms		
Fever	58	75.3
Cough	67	87.0
Rhinorrhea	40	51.9
Dyspnea	77	100.0
Poor feeding	36	46.8
Vomiting	9	11.7
Cyanosis	8	10.4
Diarrhea	6	7.8
Convulsion	4	5.2
Signs		
Respiratory rate (cycle/minute)		
40-60	36	46.8
> 60	41	53.2
Auscultation		
Wheezing	53	68.8
Rhonchi	43	55.8
Fine crackles	38	49.4

Table 4: Medications used for study patients

Drug	No.	%
Oxygen therapy	71	92.2
Bronchodialator	67	87.0
Intravenous fluids	65	84.4
Corticosteroids	65	84.4
Antibiotics	77	100.0

Table 5: Distribution of patients by outcome

Outcome	No.	%
Discharged	71	83.1
DAMA*	13	16.9

*Discharged Against Medical Advice

Discussion

Bronchiolitis is an acute inflammatory obstruction of small airways (bronchioles and alveoli) that occurs in first two years of life [12,14,26]. This study showed that male children outnumbered the females, as was globally reported [1,3,5,28]. This finding could be attributed to the biological vulnerability of males to infection, but a more likely reason and is most likely linked to the extra X chromosome that a female child has, which provide extra protection, so a female child survives critical illnesses more than a male child [18]. The majority of patients in this study were under 6 months of age, with a mean age of (5.4± 3.5) month. This finding is in consistence with findings of other studies conducted by Soleimani et al. [22] in Iran, While another study, by Iqbal et al. [14] in Myalazia, reported a relatively older age groups (11.3±5 month).

A significant number of admitted patients were from Aden governorate (89.7%), followed by the nearest governorates, such as Lahej, Abyan, Al-Dhale, with scattered patients from other governorates, since the inhabitants of the different districts are dependent on this central referral hospitals.

There is a significant variation in the rates of admission, regarding seasons, where the majority of patients in this study their incidence was in winter which was compatible with many other studies [1,13,22]. This study finding revealed the highest monthly incidence estimated from October to April which was compatible with many other studies conducted in Saudi Arabia, Hong Kong, and Italy [5, 20, 25], while in Qatar it was between November and February [1].

Overall, two-thirds of the patients in this study were passively smokers, and this exposure was one of the risk factors that more prone children to hospitalized. Several studies have reported that environmental tobacco smoke exposure is associated with the highest risk of bronchiolitis [7,8,16]. Cigarette smoke may be contributed to an exuberant immune response to RSV by stimulating overlapping signal transduction pathways [7,8,16]. Our mission is directed to Public health towards smoking cessation to protect burden of diseases and, among them, is bronchiolitis.

On the other hand, the cardio-vascular abnormalities were found only in 2.6% of the patients. In contrary to what has been reported in other study in Intensive Care Unit at a tertiary care hospital in the Kingdom of Saudi Arabia (22.8%) [5], this could explain the highest difference in this presentation.

It was observed that the diagnosis was based on the common symptoms and sign detected by the physical exam. In the present study, among the total of 77 patients, all patients had dyspnea at the time of presentation, 70% wheezing. These findings of the clinical features are in consistence with what has been reported from Malaysia [14].

Typical bronchiolitis in infants is a self-limited viral disease [12,16]. For hospitalized ill appearing patients, dehydrated, poor feeding, apnea, developed respiratory distress or required supplemental oxygen should be considered [10]. Bronchodilators should not be routinely used; it may be tried in patients if the patient has bronchospasms, there is little modified by aggressive evaluations, use of antibiotics or other therapies [10,16].

This study revealed that all patients received supplemental oxygen. This finding is consistent with what has been reported in Saudi Arabia [5].

One of the important findings in this study is that, despite the viral etiology, It is observed that all patients received antibiotics either single or in combinations. This finding is in consistence with findings of other studies conducted by Al-Janabi et al. [4] in Iraq, and Al-Muhsen in Saudi Arabia [5]. These findings were far from That has been found by Abdul Wahab et al. [1] in Qatar, and in what had been reported in literature that, in bronchiolitis, the secondary bacterial infection is rare and antibiotics are seldom necessary [9].

Our results revealed that the majority of patients discharged well, and there were no deaths. This finding was similar to that in other study conducted in Qatar [1], in another study in Jordan, they found that most of the patients were discharged well, and there was only five patients were died due to respiratory failure [16].

With respect to inpatient stay, the finding in this study showed that the mean duration of stay in days for children with bronchiolitis was 5.4±3.5 days in hospital. Nine per cent of patients were repeatedly admitted to hospital with recurrent bronchiolitis after discharge. These findings were similar to what has been reported by Sung et al. [25] from Hong Kong.

Conclusions

The majority of children were less than six months of age, with male predominance. There was seasonality of the incidence of the disease and inappropriate use of antibiotics. and there is a real need for the presence of unified guidelines. Our data for admission are similar to those published from other studies in different countries.

Acknowledgments

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الصورة السريرية للأطفال المعانين من التهاب القصيبات الهوائية المرقدين في مستشفى الصداقة التعليمي، عدن في الفترة من يناير وحتى ديسمبر 2014م

وجيه عبدالله عزعزي، نهى عبدالملك أغبري وسهى عبدالملك أغبري
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الملخص

هذه دراسة مقطعية، شملت المرضى الأطفال الذين كانت أعمارهم سنتين ومادون و يعانون من التهاب القصيبات الهوائية وأدخلوا إلى مستشفى الصداقة التعليمي في محافظة عدن, في الفترة من 1 يناير- إلى 31ديسمبر 2014م. وكان الهدف الأساسي من هذه الدراسة هو وصف أوضاع المرضى الأطفال وخصائص الذين يعانون من تلك الالتهابات.

كان عدد المرضى (77) مريضاً، من بينهم (74.0%) من الذكور و (26.0%) من الإناث وكانت النسبة 2:2.85 تراوحت أعمار المرضى من شهرين– 18 شهراً وكان متوسط العمر للعينة (3.5±5.4) شهراً. وكان أغلبية أعمار المرضى أقل من ستة أشهر من العمر (80.5%). وقد لوحظ وجود تغير موسمي في حدوث التهابِ القصيبات الهوائية، إذ سجلت أعلى ارتفاع لظهور الحالات في فصل الشتاءِ وخصوصاً في شهرِ أكتوبر. وجد أنَّ (64.9%) من الأطفال قد عرضوا للمدخنين. وكانت الأعراض السريرية الأكثر شيوعاً بين المرضى هي ضيق التنفس والسعال والحمى (100.0%, 87.0%, 75.3% على التوالي). وكانت العلامات السريرية هي التنفس السريع والشاق (التنفس بصعوبة) إذ كان متوسط سرعة الجهاز التنفسي (65 نفس في الدقيقة)، وفي التسمع بواسطة المسماع سُمع الصفير والغطيط (68.8%, 55.8% على التوالي.). وبالنسبة لعلاج المرضى أُعطيت المضادات الحيوية لجميع المرضى (100%), وأعطي العلاج بالأكسجين و موسعات القصبات الهوائية و الاستيروئيدات في (92.0%, 87.0%, 84.4% على التوالي). وقد خرج معظم المرضى بحالة جيدة من المستشفى (83.1%)، ولم تسجل أي حالة وفاة بين المرضى. وكان متوسط مدة إقامة المرضى المرقدين في المستشفى (3.5±5.4) يوماً. وتراوحت بين يوم إلى 24 يوماً. وهناك (9%) من المرضى الذين عاودوا الدخول إلى المستشفى وهم يعانون من اتهاب القصيبات الهوائية بعد خروجهم منها.

وانّ ما توصل إليه من نتائج يبين أنَّ معظم الأطفال الذين كانت أعمارهم أقل من ستة أشهر وأولئك الذين تعرضوا لدخان السجائر بعد الولادة هم أكثر عرضة لاتهاب القصيبات الهوائية. واظهر أستخدام مفرط للمضادات الحيوية إذ بالإمكان تجنبه بوجود تعليمات محددة للعلاج. وهذه النتائج يمكن الاستفادة منها في تحسين الرعاية الصحية المرجوة للأطفال.

الكلمات المفتاحية: التهاب القصيبات الهوائية، الأطفال، فيروس المخلوي التنفسي.