



PATTERN OF LOWER RESPIRATORY TRACT INFECTIONS IN CHILDREN BELOW 5 YEARS ADMITTED TO PRINCE RASHED BIN AL-HASSAN HOSPITAL

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ABSTRACT

Introduction: Acute lower respiratory tract infection is the leading cause of mortality and one of the common causes of morbidity in children under-five years of age, associated with around 20% of total deaths in children under five years old. In pediatric patients, respiratory infections can be life threatening if not treated. Including a heterogeneous group of diseases caused by different type of microorganisms including virus, bacteria, or fungi. The incidence of acute respiratory infection is higher in developing countries than in developed countries. **Objective:** To determine the incident pattern and associated factors of lower respiratory tract infections for admitted children in pediatric department at Prince Rashed bin Al-Hassan Hospital. **Results:** 224 children were admitted to pediatric department during the study period between June 2018 to September 2019. Male to female ratio was 1.3:1. The common age group was between (1 to 6) months and accounted for 46.8% of total cases. Fever, cough, and hurried breathing were the common symptoms for lower respiratory tract infections in group 2 and group 3. Bronchopneumonia and bronchiolitis were the most significant clinical diagnosis associated with 75% of total respiratory tract infections in our study. **Conclusion:** Lower respiratory tract infections is a global concern for children health. Well understanding of symptoms and indicators may significantly improve clinical outcomes. Maximum incident rate of lower respiratory tract infections was found in group1 (1 to 6) months.

INTRODUCTION

Globally, respiratory tract infections are still a common leading cause of mortality and morbidity among children below 5 years.^[1] Respiratory infections including heterogeneous and complex group of diseases caused by a wide range of pathogens such as: virus, bacteria or fungi.^[2] However, acute respiratory infections not only affect the respiratory system, but it has a significant systematic complications that may leading to spread of infection, inflammation, or microbial toxin.^[3] In developing countries, the prevalence of respiratory infections is higher compared with developing countries. High incident rate is associated with many environmental conditions such as low birth weight, shortage of breast feeding, malnutrition, poor maternal education, and environmental pollution. Also, public health factors such as lack of measles, zinc and vitamin A deficiency, and concomitant diseases are playing a major role in spread of respiratory infections-based community.^[4]

Respiratory tract infections are divided into upper and lower tract infections. Lower respiratory tract including the trachea, bronchi, bronchioles and alveoli. Pneumonia and Bronchiolitis are the most common infections. Pneumonia is an infection that causes inflammation in air sacs. While, Bronchiolitis is an inflammation of the

lining of the bronchioles.^[5] Causative pathogens of lower respiratory tract infections are viral or bacterial. Viral microorganisms are associated with most cases of bronchitis and bronchiolitis. While, *Streptococcus pneumoniae*, *Hemophilus influenzae* and *Staphylococcus aureus* are the most common bacterial agents causing pneumonia.^[6]

In pediatric patients, lower respiratory tract infections are considered as life threatening diseases if not correctly diagnosed and treated. Recently, World Health Organization (WHO) estimated that lower respiratory infections are responsible for 1.4 million deaths and accounted around 20% of total deaths among children below 5 years. Unfortunately, 95% of death cases occur in developing and under developing countries.^[7]

METHODOLOGY

Retrospective study was conducted in pediatric department at Prince Rashed bin Al-Hassan Hospital during the period between June 2018 to September 2019. The study included patients from one month till to five years who were admitted and diagnosed as a case of lower respiratory tract infections. Patients were categorized into three group based on age. Group 1 includes children from one to six months old. Children

from six months to two years were classified in group 2. While group 3 included children from two to five years old.

Ethical approval was obtained by Directorate of Technical Qualification and Manpower Development at Royal Medical Services (RMS).

RESULTS

A total of 224 children were admitted and diagnosed as a case of lower respiratory tract infections. Distribution based gender showed that slight male predominance was observed. 128 cases (57.2%) were males, compared to 96 cases (42.8%) were female. Table 1 summarizes demographic and clinical characteristics of the admitted children.

Table 1: Demographic and Clinical characteristics of total patients.

Variables	Number of cases	Percentage (%)
Gender		
Males	128	57.2%
Females	96	42.8%
Age		
Group 1 (From 1 month to 6 months)	105 40 Males 65 Females	46.8%
Group 2 (From 6 months to 2 years)	77 51 males 26 females	34.4%
Group 3 (From 2 years to 5 years)	42 24 Males 18 Females	18.8%

The majority of lower respiratory tract infections in our study were observed between the age of six months to two years (group 1), which is accounted around 46.8% of total cases. Group 2 and group 3 were associated with

34.4% and 18.8% of total patients, respectively. Figure 1 represent the distribution of lower respiratory tract infections-based age and gender.

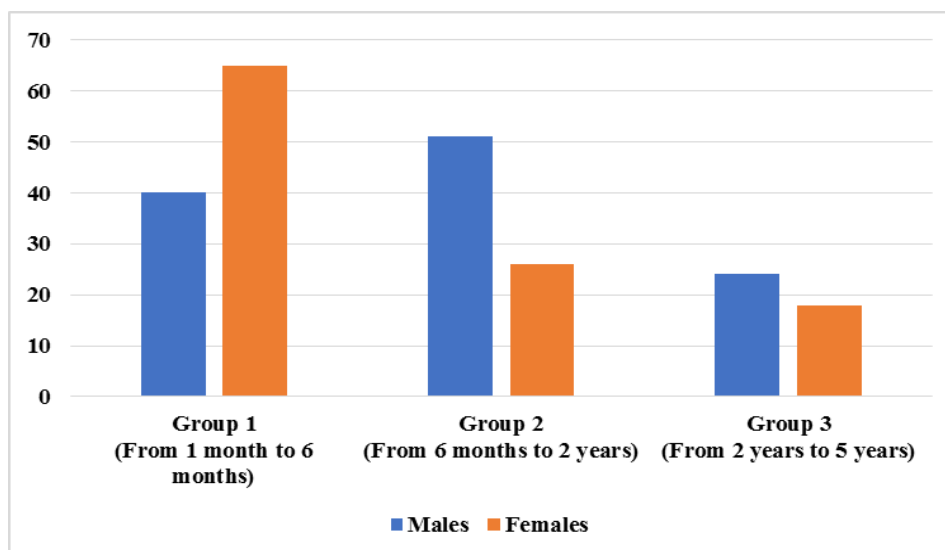


Figure 1: Age and Gender distribution of lower respiratory tract infections.

In addition to that, symptoms of lower respiratory tract infections were recorded and analyzed in corresponding to group categorization. The obtained results of symptoms are summarized in table 2. The most predominant symptoms in group1 below 6 months age were hurried breathing and not feeding, accounted 92% and 90% respectively. Fever was reported in 80% of

cases in group 1. For group 2, the major symptoms were fever 95% and hurried breathing 88%. Also, fever and cough were observed in all cases of children between 2 years to 5 years. As well as hurried breathing and chest indrawing were reported in 75% and 40% of cases in group 3.

Table 2: Symptoms distribution of lower respiratory tract infections.

Symptoms	Group 1 (From 1 month to 6 months)	Group 2 (From 6 months to 2 years)	Group 3 (From 2 years to 5 years)
Fever	84 80%	73 95%	42 100%
Cough	8 7%	52 67%	42 100%
Not Feeding	95 90%	27 35%	2 5%
Hurried Breathing	97 92%	68 88%	31 75%
Chest Indrawing	63 60%	42 55%	17 40%

Furthermore, the clinical distribution of lower respiratory tract infection was obtained based on final diagnosis of pediatrics specialists as shown in table 3. Pneumonia including lobar pneumonia and bronchopneumonia were

the most common clinical diagnosis of lower respiratory tract infections and it were associated with 63% of total cases. Bronchiolitis was diagnosed in 23.6% of cases, followed by bronchitis which was reported in 11.3%.

Table 3: Clinical distribution of lower respiratory tract infections.

Clinical Diagnosis	Group 1 (From 1 to 6 months)	Group 2 (From 6 months to 2 years)	Group 3 (From 2 to 5 years)	Percentage % (n / 224)
Bronchopneumonia	63	34	18	51.3%
Lobar pneumonia	1	13	12	11.6%
Bronchiolitis	31	16	6	23.6%
Bronchitis	9	12	4	11.3%
Tuberculosis	1	2	2	2.2%

DISCUSSION

Lower respiratory tract infections in children younger than 5 years old are one of the most major concern for public health in developing countries.^[8] Our study aimed to determine the incident pattern and associated factors of lower respiratory tract infections for admitted children in pediatric department at Prince Rashed bin Al-Hassan Hospital. Our results demonstrated male predominance, the obtained male to female ratio was 1.3:1. Distribution of lower respiratory tract infection based gender showed that males accounted for 57% of total children compared to female which accounted for 43%. Other previous studies reported slight incident rate of lower respiratory tract infections among male children, Srinivasa et al. investigated the pattern of respiratory tract infections in Minia University Children's Hospital - Egypt and reported that 58% of all admitted children were males.^[9] Also, Mirkarimi et al. observed that 59.4% of admitted children due to lower respiratory tract infections in Abuzar Hospital – Iran were males.^[10] Furthermore, higher incident rate of respiratory tract infections among male children was noted in the study of Savitha et al. and Broor et al. who found the incident rate 64.4% and 73.1% respectively.^[11,12] One of the explanations of higher incident rate of lower respiratory tract infections among males' patients was investigated and associated with sex steroid hormones, host immunity, genetics, anatomical variation, and lung physiology.^[13,14]

In addition, the distribution of lower respiratory tract infections in accordance with age was investigated in our study. The results showed that neonates at age between (1 to 6) months were the most susceptible with incident rate accounted 46.8%. The clinical explanation may associate with functional immaturity of neonate's immune system, and anatomic factors including narrow air way, short bronchial and under development of lungs.^[15] Our results are in agreement with Mohsen et al. and Ding et al. who reported that percentage of neonates at age between (1 to 6) months were the highest among infected children of lower respiratory tract infections with accounted ratio 48.5% and 80%.^[9,16] Also, 34.4% and 18.8% of admitted children below 5 years were associated with age interval between (6 to 24) months and (2 to 5) years, respectively. Our results were in agreement with Mohsen et al, EMA et al. and Vathanophas.^[9,17,18]

Furthermore, Clinical symptoms of lower respiratory tract infections among our study were illustrated in table 2. For group 1 including pediatrics from (1 to 6) months, the most common symptoms were hurried breathing 92%, non-feeding well 90% and fever 80%. While, in group 2 the most common indicators for lower respiratory tract infections were fever 95%, hurried breathing 88%, cough 67% and chest indrawing 60%. Finally, all cases in group 3 were suffer from fever and cough. Also, 75% of cases in group 3 were reported to suffer from hurried breathing. However, our findings

were comparable to results obtained by Kabra et al. and Ujunwa et al who found that fever and cough were the predominant indicators for lower respiratory tract infection in their study and were associated with 95% of their cases. compared to 38% of patients who were had difficulty in breathing.^[19,20]

Furthermore, bronchopneumonia and bronchiolitis were the most significant clinical diagnosis of lower respiratory tract infections and accounted for 51.3% and 23.6% of total cases in our study. Followed by lobar pneumonia and bronchitis which were diagnosed in 11% of cases. significantly, our results were in accordance with the findings obtained by Reddaiah et al. who reported that bronchopneumonia were diagnosed in 64% of cases.^[21] As well as Mohsen et al. reported that bronchopneumonia and bronchiolitis were the most major clinical diagnosis and were responsible for 21.5% and 20% of lower respiratory tract infections cases in their study.^[9]

CONCLUSION

Lower respiratory tract infections in children below five years old is a global concern for public health. Males' children were found to be at higher risk to acquired lower respiratory tract infections than females. The most common age groups associated with lower respiratory tract infections were from (1 to 6 months) and from (6 months to 2 years). Hurried Breathing was the most common symptoms in children below 6 months. While fever and cough were the most common indicators in children with age between 2 to 5 years. Bronchopneumonia and bronchiolitis were associated with 75% of total cases of respiratory tract infections.

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