

ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE
DEPARTMENT OF PEDIATRICS



**PATTERN AND OUTCOME OF RESPIRATORY DISEASES
PRESENTING TO ST PAUL'S HOSPITAL PEDIATRICS
EMERGENCY UNIT, ADDIS ABABA, ETHIOPIA**

BY- SIMRET GEBRE (MEDICAL INTERN)

**A RESEARCH TO BE SUBMITTED TO ST. PAUL'S HOSPITAL
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ACRONYM AND ABBREVIATION

ARI: Acute respiratory infections;

BPD: Bronchopulmonary dysplasia

FMoH: Federal ministry of health

GAPP: Global Action Plan for Prevention and Control of Pneumonia

LRTI: Lower respiratory tract infection

SCD: Sarcoidosis

SEC: Socioeconomic class

SPHMMC: St Paul's hospital millennium medical college

SPSS: Statistical package for social sciences

UNICEF: United Nations Children Education Fund

URTI: Upper respiratory tract infection

US: United States

WHO: World Health Organization.

ABSTRACT

Background

Respiratory diseases are among the most common of causes of childhood morbidity and mortality as well as hospitalization globally. The patterns of specific respiratory illnesses in several parts of the world have been reported but there are few reports on the combined burden of the diseases. Determination of the pattern of respiratory diseases as a group will help in knowing their collective impact on the health systems in order to develop intervention measures.

Objectives of the study

This research is aimed at determining the patterns and outcome of respiratory disease in the pediatric emergency of St Paul's hospital millennium medical college.

Methods

A retrospective cross sectional study design is used to collect data from case notes of children with respiratory diseases admitted to the pediatric emergency of St Paul's hospital millennium medical college over the a one year period between January 1 2016- December 31, 2016. Age, gender, admission rates, types of respiratory illness, duration of admission and outcome is analyzed. Descriptive and inferential (Chi square) statistics is used to describe the various disease types and their outcome. The study was conducted from March 13 to June 30, 2017.

Result

Among 272 cases studied pneumonia accounting for 66.2% of the cases, asthma, tonsilopharengitis and CROUP accounts for (16.5%), 7.4 % and 3.7% respectively. More cases were recorded in the month of July and October. Majority, 81.3% of cases admitted were discharged home, 16.2% were transferred to inpatient wards while death was recorded in 2.6 % of the children.

Conclusion and Recommendation

Respiratory illnesses are commonest causes of visit to pediatrics emergency despite the interventions being taken particularly among those less than five years of age. Creating awareness among the community about predisposing factors is helpful to keep children healthy.

1. INTRODUCTION

1.1 Background of the study

Respiratory diseases remain a major cause of morbidity and mortality in children especially among children less than five years old. The respiratory system consists of structures from the nose up to the lung and serves to supply sufficient oxygen to meet metabolic demands and removes carbon dioxide. Abnormalities in any of these structures could lead to respiratory failure. [1]

The spectrum of respiratory illnesses is wide and includes diseases of upper and lower airways, communicable and non-communicable types. Communicable group of disorders are the commonest in underdeveloped countries especially pneumonia. Non-communicable diseases are not as common as communicable diseases in such countries and include asthma, disorders of sleep, acute lung injury, recurrent aspiration, BPD, chronic respiratory failure requiring long-term mechanical ventilation, neuromuscular diseases, apparent life-threatening episodes of infancy, chest complications of SCD, congenital anomalies of the respiratory tract, and others. [2]

Respiratory tract symptoms are particularly prevalent in young children and evidence for the relative contributions of potentially remediable environmental factors is emerging. The state of children's respiratory health is determined by the interaction of many factors including potential stressors from their environment, patterns of exposure, individual vulnerability and genetics. [3]

Identifiable risk factors include infection, air pollution (indoors and outdoors), diet, lifestyle, social condition, occupation, and provision of medical care. They produce a multi-causal effect that has both short- and longer-term manifestations with implications for lifelong respiratory health. This effect varies with gender, developmental age and ethnicity. [4]

Epidemiological studies have shown different estimates of the burden of respiratory diseases in different countries. In the US, respiratory diseases in children are responsible for 25% of hospital admissions. [5] while in the United Kingdom and continental Europe respiratory diseases contribute to 25% and 13% of hospital admissions among the pediatrics age groups respectively.

[6] Within the African sub-region, the burden of the diseases is not well defined due to paucity of data. In Malawi, 298/1000 cases of admission were due to respiratory diseases in children[7]

The variations in pattern of morbidity and mortality of respiratory illnesses may be affected by different home/environmental and climatic variations in different parts of the world · The World Health Organization (WHO) estimates that approximately 10.6 million children under five years of age die each year due to acute respiratory infection (ARI), especially pneumonia, contributing for about 19% of the total number of deaths.[8]

Among the respiratory disease, Acute respiratory infections (ARI) are a major burden to child health in developing countries [9]· ARI, mainly of lower respiratory tract, are the leading cause of death among children under five years of age in such countries [10] , resulting in nearly 1.9 million childhood deaths per year [11]. Worldwide, about 85–88 % of ARI episodes are Acute Upper Respiratory Infections (AURI) while the remaining is Acute Lower Respiratory Infections (ALRI).[12]

In the most recent estimate of ALRI associated mortality in Ethiopia, pneumonia was held responsible for 940000 deaths (15 % of all deaths) among those 1–59 months, making it the single most important killer in this age group· ARIs also impose a significant economic burden on health systems and individual families in developing countries. [13]

This burden of respiratory infections, both globally and in Ethiopia, can be reduced by many proven effective strategies. The Global Action Plan for Prevention and Control of Pneumonia (GAPP) prioritizes them as case management, vaccination, prevention and management of HIV infection, improvement of nutrition and breastfeeding, reduction of low birth weight, and control of indoor air pollution. Identification of risk factors and etiological agents of pneumonia were among the top ten research priorities by an Expert Group on Childhood Pneumonia in 2011. [14]

This research was carried out to study the pattern of respiratory diseases and their outcome in children needing inpatient care. The study also evaluated the causes of mortality due to childhood respiratory diseases, especially in children less than 5 years of age.

1.2 STATEMENT OF THE PROBLEM

Respiratory disease is the most common cause of mortality in children in underdeveloped economies and the commonest cause of morbidity in developed economies. Worldwide, 20% mortality among children aged less than 5 years is attributed to respiratory tract infections predominantly pneumonia and its associated complications. Southeast Asia stands first in number for acute respiratory diseases incidence, accounting for more than 80% of all incidences together with sub-Saharan African countries.[15] Although there is no specific prevalence of such diseases done, Ethiopia is also one of the countries with significant burden with such diseases.

Recent estimates suggest 3.5% of the global burden of disease is caused by respiratory diseases. In developing countries, on an average every child has five episodes of acute respiratory infection per year accounting for 30%-50% of the total pediatric outpatient visits and 20%-30% of the pediatric admissions.[16]

It recently is estimated that among children aged < 5 years, the median direct cost of ARI was US\$135 in private and US\$54 in public institutions. It was also estimated that 75 % of the families spent more than half of their total monthly expenditure on hospitalization. [17]

Identification of risk factors and etiological agent's respiratory diseases and their prevalence is of high value for reducing the morbidity and mortality from such diseases. Most researches done regarding respiratory diseases both in our country and abroad are about specific respiratory diseases. Data is scarce with published works on the combined burden of respiratory diseases in Ethiopia as well as other developing countries. So the combined burden of such diseases is not well studied. Lack of clear evidence on the epidemiology and etiologies of respiratory diseases will create barrier to effective planning and implementation of preventive measures.

Therefore, this study will try to fill this gap and describe the combined pattern of respiratory disease and will form an epidemiological database for further studies on respiratory diseases and help in allocation of scarce resources towards those respiratory diseases with significant morbidity and mortality.

1.3 JUSTIFICATION OF THE STUDY

The value of data on respiratory diseases is that it enhances knowledge on the types and burden of the categories of diseases that affect the respiratory system. Knowledge on the pattern of respiratory diseases in children and their outcome would help to identify the common diseases contributing to morbidity and mortality of children.

Identification of diseases, which cause mortality, will also help to decide on allocation and distribution of health resources. Besides morbidity and mortality, respiratory diseases have a major impact on the psychological aspects of the patient and the family. Furthermore, respiratory diseases are an economic burden on the family. This will help in developing intervention measures both at the institutional and national levels.

This study will also lay the base for further studies that will be done on respiratory diseases, as there is paucity of publications on the burden of respiratory diseases in children. Moreover, data is few on the combined burden of respiratory diseases in Ethiopia as well as other developing countries, which makes this study important.

2. LITERATURE REVIEW

2.1 Definition and classification

The respiratory system is one of the major systems in our body which starts from the nose and ends in the alveoli in the lung. The upper airway consists of the nose, Para nasal sinus pharynx Eustachian tube and larynx whereas the lower airway is made of trachea, bronchus and lung. The respiratory system serves to supply sufficient oxygen to meet metabolic demands and remove carbon dioxide. Abnormalities in any of the multiple processes (including ventilation, perfusion, and diffusion) that are involved in tissue oxygenation and carbon dioxide removal can lead to respiratory failure. The pathophysiologic manifestations of respiratory disease processes are profoundly influenced by age- and growth-dependent changes in the physiology and anatomy of the respiratory control mechanisms, airway dynamics, and lung parenchymal characteristics. Smaller airways, a more compliant chest wall, and poor hypoxic drive render a younger infant more vulnerable compared to an older child with similar severity of disease. Diseases of respiratory system can be divided as upper airway disease and lower airway disease based on the structures affected. It can also be classified as communicable and non-communicable disease. [18]

2.2 Prevalence of respiratory diseases

On a survey done by UNICEF in 2014 in Ethiopia, pneumonia is a leading single disease killing under-five children. It is estimated that 3,370,000 children encounter pneumonia annually which contributes to 20 per cent of all causes of deaths killing over 40,000 under-five children every year. These deaths are easily preventable and treatable through simple and cost effective interventions. [19]

Immunization, good nutrition, exclusive breast feeding, appropriate complementary feeding and hand washing are among the preventive while administration of amoxicillin dispersible tablets and other antibiotics are among the curative methods, which can save lives. Deaths from pneumonia are highest in poor rural communities. Household air pollution is a major cause of pneumonia, so children from households which rely on solid fuels such as wood, dung or charcoal for cooking or heating, are at high risk. Overcrowded homes also contribute to higher pneumonia levels. In addition, poor children are less likely to be immunized against measles and whooping cough, which are also among major causes of the disease. [20]

In one study done in Rio Grande, Brazil on Acute lower respiratory illness in under-five children, Acute respiratory infections were found to be the main cause of utilization of health services by children under five in poor countries . In terms of casefatality this represents 4 million deaths per year .In Latin America, respiratory infections kill more than 80 thousand children per year, with 40% of these deaths occurring in Brazil 4. In the State of Rio Grande do Sul, Brazil, respiratory infections account for one-fourth of all deaths in children under five. In the extreme South of Brazil, where this study was performed, acute respiratory infections account for half of the medical consultations and hospitalizations in children under five. [21]

2.3 Patterns and outcome of respiratory diseases in pediatrics age group

On a hospital based cross sectional study done in sri lanka to determine causes of morbidity and mortality from a total admissions of 13356 in 2 year, 2,651 (19.8%) were admitted with respiratory diseases. Fifty four percent were males. The age groups of children were birth to 28 days (4.4%), 29 days to 2 years (41%), 2 to 5 years (30.5%) and 5 to 12 years (24.1%). Out of all admissions, the most frequent diseases were lower respiratory tract infections (LRTI) (44.1 %), upper respiratory tract infections (URTI) (25.2 %), bronchial asthma (11.5 %) and bronchiolitis (7.0 %). Overall incidence of bacterial pneumonia was 0.5 % in 2010 and 1.4 % in 2011 in all age groups. Admissions due to respiratory diseases peaked in June. Nearly 9% of total admissions needed prior stabilization at the Emergency Department. These include nebulization and supplementation of oxygen. Median duration of hospital stay was 3 days (range 1 – 60 days). The majority (82.5%) were discharged home without requiring clinic follow up. considering mortality 24 (0.9%) children died due to respiratory illnesses. 21 (87.5%) of these deaths were among neonates and 78% were early neonatal deaths. More than 75% of the mortality occurred in the neonatal age group, although the total admissions in the above age group were less than 5% and the common morbidity was due to URTI and LRTI. The major contributors for mortality were due to surfactant deficient lung disease, meconium aspiration syndrome and severe hypoxic ischaemic encephalopathy. This may indicate that antenatal care and perinatal care given to these babies may not have been the best and hence there is a need for improvement. [22]

In a similar, study done in Nigeria there was a total of 8974 children admissions to the emergency unit during the period of review: January 2007 and December 2012. Of these

admissions, 2214 (24.7%) were due to respiratory illnesses. The mean age of all the children with respiratory diseases was 3.3 years, with a maximum age 20 years and minimum of one day. Sixty one percent of study participants were male. Their age distribution showed that 75.2% were less than five years old, 13.7% were between 5 and 9.9 years old, while 9.8% were 10 years and above. There were 22 types/categories of respiratory disease among those admitted comprising of 67.6% and 32.4% due to communicable and non-communicable causes respectively, The three common respiratory illnesses admitted during the period were pneumonia (34.0%), acute bronchial asthma (27.7%) and rhinosinusitis (14.6%), these were more prevalent among the under-five age group . Of the subjects that had socioeconomic class specified pneumonia, coryza, and acute chest syndrome were more among the low-income group, while asthma and hydrocarbon poisoning were more prevalent among children of the middle class. Collectively there was a near equal presentation of cases in the rainy and dry seasons: 51.9% and 48.1% respectively, the highest admissions were in July (11.2%) and October (10.9%). The median duration of admission was two days [range 1 to 8 days, mid-quartile: 1 to 3 days], 12.7% of the children were admitted for more than four days. Children less than five years were about three times more likely to stay more than four days than the other age groups. Regarding the outcome Majority, 91.9% of cases admitted were discharged home, 7.6% were transferred to inpatient wards while death was recorded in 0.5% (11/2214) of the children. Most of the deaths 72.7% (8/11) occurred in children less than 5 years old. The patients from the low socio-economic class had the least proportion of discharged cases and contributed disproportionately to the number of deaths, eight out of eleven cases. Nine of the eleven-recorded deaths were those diagnosed with pneumonia. [23]

In another community based study done in India to determine the causative organisms for respiratory infections, it was found that respiratory diseases are the major cause of mortality among children aged less than 5 years especially in developing countries. In India deaths from pneumonia every year accounts for 13%-16% of all deaths in the pediatric hospital admissions. Million deaths study based on the register general of India mortality statistics had reported 369,000 deaths due to pneumonia among children 1-59 months at the rate of 13.5/1000 live births. More number of deaths due to pneumonia was reported from central India.[24]

Recent estimates suggest 3.5% of the global burden of disease is caused by ARI. In developing countries, on an average every child has five episodes of ARI/year accounting for 30%-50% of the total pediatric outpatient visits and 20%-30% of the pediatric admissions. Recent community-based estimates from prospective study report 70% of the childhood morbidities among children aged less than 5 years are due to ARI. While in developing country, a child is likely to have around 0.3 episodes of pneumonia/year, in developed countries it is 0.03 episodes per child/year. On this basis, India is predicted to have over 700 million episodes of ARI and over 52 million episodes of pneumonia every year. [25]

3. OBJECTIVES OF THE STUDY

3.1 General objectives

- To determine the pattern and outcome of respiratory diseases amongst children admitted to St Paul's hospital millennium medical college pediatrics emergency department.

3.2 Specific objectives

- To find out the patterns of respiratory disease admissions at to St Paul's hospital millennium medical college pediatrics emergency unit.

- To describe the commonest respiratory diseases in children admitted to the emergency unit
- To compare the occurrence of specific respiratory diseases among children admitted to the hospital in relation to the different seasons of the year.
- To determine the outcome associated with the respiratory disease in these children.

4. METHODS AND MATERIALS

4.1. STUDY AREA

This study was carried out in St Paul's hospital millennium medical college pediatrics emergency department. St. Paul's Hospital Millennium Medical College is a referral hospital in Addis Ababa under the Ethiopian Federal Ministry of Health (FMOH). It is the second largest public hospital in the nation, built by the Emperor Haile Selassie in 1961 with the help of the German Evangelical Church. The hospital was established to serve the economically under privileged population, providing services free of charge to about 75% of its patients. In 2007, it became a medical college and its core services include the provision of medical care, teaching and research. 275 medical students attend the college, and its new and integrated curriculum stands

out in comparison to the country's other medical schools. The pediatrics department is one of the older departments in the hospital which is involved in curative services including emergency services. The department has regular OPD, EOPD, follow up clinics, ward with 36 beds and ICU which are run by pediatricians, residents and interns. The department also has 14 specialists with 4 subspecialists.

4.2 STUDY DESIGN AND PERIOD

A retrospective hospital based descriptive cross sectional study was carried out to determine pattern and outcome of respiratory diseases at SPHMMC emergency department.

Information from medical records of children that presented at the Children Emergency unit of SPHMMC over the one-year period between January 1, 2016- December 31, 2016 was reviewed.

4.3. SOURCE POPULATION

Records of patients seen at pediatrics emergency of SPHMMC over the one-year period from January 1, 2015- December 31, 2015.

4.4. STUDY POPULATION

Records of patients diagnosed to have respiratory disease at pediatrics emergency of SPHMMC over the one-year period from January 1, 2016- December 31, 2016 were selected from the HMIS of the emergency department and studied.

INCLUSION CRITERIA

- Children with a diagnoses of respiratory diseases using the clinical features and available laboratory results by the clinician and seen at the hospital were recruited into the study.

EXCLUSION CRITERIA

- Cards which lack more than three variables.

4.5. VARIABLES

Dependent variables

- Duration of hospitalization
- Admission outcome
- Patients diagnosis

Independent variables

- Age
- Sex
- Parent's occupation
- Educational qualifications
- Place of residency
- Month of presentation
- Vaccination status
- Nutritional status

4.6 Sample size determination and Sampling

Prevalence of respiratory diseases in Ethiopia from prior research done on acute respiratory diseases was 48.3 %. Confidence level chosen for this study is 95%. The initial sample size for the study will be computed from the following formula:

$$n = \frac{Z_{\alpha/2}^2 p(1 - p)}{d^2}$$

Where; Z = Confidence level

d = Margin of error

P = Prevalence of respiratory diseases in Ethiopia

Therefore, taking the prevalence of 48.3 , the sample size become

$$N = (1.96)^2 * 0.483(0.517)/0.05^2 = 384$$

Because the number of respiratory diseases in the hospital is less than 10,000 the final sample size (n_f) is calculated as

$$n_f = \frac{n_i}{1 + (n_i/N)}$$

Where; n_f = final sample size

n = initially calculated sample size

N = total no. of respiratory diseases in the study period

$$\text{Therefore } N_f = 384/1 + 384/919$$

$$N_f = 272$$

Sampling technique

Systemic sampling was used to select 272 cards from 919 cards seen in the study period ($919/272 = 3.3$). every third card with respiratory illness was selected from the HMIS and studied. The first card in the HMIS with a respiratory diagnosis was taken as the first sample.

4.7. OPERATIONAL DEFINITIONS

- Overcrowding- presence of more than three individuals per a room.
- Clean water- boiled water or water obtained from tap water.
- Incomplete card record- cards lacking the variables listed in this paper.

4.8. DATA COLLECTION PROCEDURE

Data collection tool: Data was collected by retrospective chart review of records for all patients admitted to the pediatric emergency of SPHMMC with a respiratory disease diagnosis during the study period. A checklist was used to identify patient information. The checklist include the patient hospital record number, sociodemographic variables (of age, sex, religion, ethnicity, region), age at diagnosis, diagnosis, season of presentation, outcome and duration of hospitalization.

Methods of data collection: The data was collected by the researcher at the hospital record room using the checklist.

4.9 DATA QUALITY CONTROL

Care was taken on the checklist preparation. During the data collection, the researcher checked the checklist for completeness, accuracy, and clarity.

4.10 DATA MANAGEMENT PROCESSING AND ANALYSIS

Data collected was checked visually for completeness and entered into Microsoft Excel® 2010 and analysis subsequently was done with Statistical Package for Social Sciences (SPSS) version 20. The variables that were used are age, gender, month/year of presentation and socioeconomic status, type of respiratory illness, length of hospital stay and admission outcome. Considering that respiratory illnesses mainly affect under-fives age was further categorized to below 5 years, 5 to 10 years and above 10 years.

4.11 ETHICAL CONSIDERATION

Ethical clearance was obtained from the public health office of the college. Permission was obtained from the pediatric emergency team to go over the HMIS. Permission was also obtained to review the card records. Information from patient's document was not used for other purposes.

4.12 DISSEMINATION OF FINDINGS

The data obtained in this research is compiled and the result is written in to a research paper. Moreover, the research paper will be presented to the class and will be thoroughly discussed and defended. The results of the study will also be disseminated to the pediatric emergency department. In addition, other opportunity or media available will be used as a means to propagate the findings.

5. Result of the study

There were a total of 919 children seen at the pediatric emergency unit of SPHMMC due to respiratory diseases during the period of review: January 2016 to December 2016. Of these admissions 272 of the cases were selected and studied.

General characteristics

The age distribution of the participants showed predominance of the under five in which 93.8 % were less than five years old. 58.8 percent of study participants were male while 41.2 percent were females. Among the participants 51.1 % were from Addis Ababa while 43.8% of them were from oromia region and 5.1% from other regions. Coming to ethnicity of the participants

48.2% of the participants were Oromo, 27.9% from Amhara, 10.7 % from tigray and 13.2% from members of the south nations and nationalities. 53.2% participants were orthodox in religion, with 25.4% of them being Muslims and 20.2 Protestants. (See the details in Table 1 below)

Table 1: Sociodemographic characteristics of the patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

Variables		Frequency	Percent
Age of the child	0 - 5	255	93.8
	6 – 10	14	5.1
	11 - 15	3	1.1
	Total	272	100
Sex of the child	Male	160	58.8
	Female	112	41.2
	Total	272	100
Residency of the child	Addis Ababa	139	51.1
	Oromia	119	43.8
	Other	14	5.1
	Total	272	100
Ethnicity	\Oromo	131	48.2

	Amhara	76	27.9
	Tigre	29	10.7
	Qthers	36	13.2
	Total	272	100
Religion	Orthodox	148	54.4
	Protestant	55	20.2
	Muslim	69	25.4
	Total	272	100

Housing conditions

It was found that in the 33.8 % of the participants there were overcrowding. And in 24.6% of the houses there were no windows, 59.2 % has one window, 14 %has more than one window and in 2.2 % of the cards there was no record about window. 60.3 % has separate kitchen and 39.7% has no separate kitchen. (See table 2 below)

Table 2: Housing condition of the patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

variables		Frequency	Percent
Overcrowding	yes	92	33.8
	no	169	62.1
	unrecorded	11	4.1
	total	272	100
windows	0	67	24.6

	1	161	59.2
	>1	38	14
	unrecorded	6	2.2
	total	272	100
Separate kitchen	yes	164	60.3
	no	108	39.7
	total	272	100

General Child conditions

Majority of studied participants (64.3%)were delivered at health center while the rest were delivered at hospital and home. In 5.1 % of the cards there was no record about the birth place of the child. 61.8% of them were fully vaccinated according to the EPI schedule, whereas 27.9% were partially vaccinated and 10.3% not vaccinated. With regard to nutritional status of the children 83.1 percent have normal nutritional status while the other 16.9 % were malnourished. (See the detail in table 3 below)

Table 3: General conditions of the patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

variable		Frequency	percent
Place of delivery	home	25	9.2
	Health center	175	64.3

	hospital	58	21.3
	unrecorded	14	5.1
	total	272	100
Vaccination status	Fully vaccinated	168	61.8
	Partially vaccinated	76	27.9
	Not vaccinated	28	10.3
	total	272	100
Nutritional status	normal	226	83.1
	malnourished	46	16.9
	total	272	100
Sun light exposure	exposed	194	71.3
	Not exposed	78	28.7
	total	272	100
Exclusive Breast feeding	yes	221	81.3
	no	51	18.8
	total	272	100

Illness types

There were around 10 categories of respiratory disease among the studied children comprising of 78.9 % communicable and 21.1 % non-communicable causes respectively. Among these the commonest respiratory illnesses admitted during the period were pneumonia accounting for 66.2% of the cases. (see the detail in table 4 below)

Table 4: types of respiratory illnesses among patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

Type of illness	Frequency	Percent
Tonsilopharengitis	20	7.4

Otitis media	5	1.8
pneumonia	180	66.2
CROUP	10	3.7
Asthma	45	16.5
other	12	4.4
total	272	100

Duration of illness and symptoms reported

Majority (82.4%) of patients present to the emergency within 0 to 3 days of illness, where as 14% present within 4 to 7 days and the rest 3.7 % after 7 days. Cough was the most frequently reported symptom. Fever, cough and fast breathing in combination were reported in 18.5% of the participants. Most 41.2% of the patients reported Cough and fever together. Cough and fast breathing were reported in 17.3% of studied participants. Cough only was reported in 11% of the children. Fever alone was reported in 5.1% of the children while shortness of breath reported in 7.4 %. Other symptoms like pain were reported in 2.2% of the studied cases (see table 5 below)

Table 5: Duration of illness and symptom reported among patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

variables		frequency	percent
Duration of illness	1 – 3 days	224	82.4
	4 – 7 days	38	14

	>7 days	10	3.7
	total	272	100
Symptoms reported	fever	14	5.1
	cough	30	11
	sob	20	7.4
	Fever and cough	112	41.2
	Cough and fast breathing	47	17.3
	other	6	2.2
	All symptoms	43	15.8
	total	272	100

Seasonal presentation

Generally there was over all equal presentation of cases in all seasons of the year: the highest admissions were in July (9.6%) and October (9.6 %). Of the two categories of diseases (communicable and non-communicable), admissions for communicable diseases were the main cause of admissions throughout the seasons especially during the dry season. However, there were seasonal variations in pattern of admissions for specific illnesses; children with asthma were seen more in July and October while pneumonia, were admitted more during May and December. (See the detail in table 6 below)

Table 6: seasonal presentation of the illnesses among patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

Season of presentation	Frequency	Percent
January	18	6.6
February	17	6.3
march	21	7.7
April	23	8.5
may	25	9.2
June	22	8.1
July	26	9.6
august	24	8.8
September	23	8.5
October	26	9.6
November	23	8.5
December	24	8.8
total	272	100

Duration of hospitalization and outcome

The median duration of hospitalization was two days [range 1 to 14 days,], Repeated admissions were noted among 21.2% of the children; 14.4% were those less than 5 years and 7.8% were older than 5 years. Majority, 81.3% of cases admitted were discharged home, 16.2% were transferred to inpatient wards while death was recorded in 2.6 % (7/272) of the children. (see the detail in table 7 below)

Table 7: Duration of hospitalization and outcome among patients admitted to SPHMMC Pediatrics emergency unit, Addis Ababa 2017.

Variable		frequency	percent
outcome	discharged	221	81.3
	admitted	44	16.2
	Died	7	2.6
Duration of hospitalization	<=3	185	68
	4 - 7	69	25.4
	>7	18	6.6
	total	272	100

6. Discussion

It is shown that respiratory diseases are common causes for admissions of children particularly among those less than five years of age. The acute illnesses and communicable diseases predominate more than the non-communicable illnesses. The yearly prevalence of the respiratory

diseases over the study period has been consistently high but it showed that some diseases like asthma have more incidences in some months than others.

Similar to the findings in this study, in other hospital-based and community based studies the communicable diseases of the respiratory system cause significant morbidity and mortality particularly in children less than five years old. A Hospital based study in children presenting to the pediatric emergency unit of the University of Nigeria Teaching Hospital, Enugu showed that there was a total of 8974 children admissions to the emergency unit during the period of review: January 2007 and December 2012. Of these admissions, 2214 (24.7%) were due to respiratory illnesses.

Other Hospital-based case series studies in Port Harcourt, and Benin [26], showed similar pattern of diseases and proportions. In a study of admissions in hospitals in Hong Kong [27], respiratory disorders constituted 37.5% of all diagnoses, with upper respiratory infections and pneumonia comprising 30.1% and 20.9% respectively.. From Bangladesh study it was also documented that ARI were a major cause of morbidity among rural children with prevalence rates of 35.4 per hundred days of observation.

In studying the patients' socio-demographic characteristics the results obtained in this study are similar to findings by other studies in developing countries; most of the cases occur in under 5 children which is similar to the findings in other studies. The mean age of the children was 1 year for this study. In similar study in Chang in Australia [28] median age of the patients were 1.8 years which is close to ours 1 year. For Nigeria it was 3.3 years which was a bit higher than the findings in other studies. The Greenland study [29] also reported the highest prevalence of respiratory symptoms in the 6–11 months age group with a steep rise occurring from less than 5 months to 6–11 months and a decrease in incidence thereafter. In the Delhi study also the incidence of ARI was the highest in the 12–17-month age group,

Thus, the risk of ARI generally increases in children less than 5 years and then decline with increasing age. This shows the vulnerability of the under-five age group to respiratory illness that may be related to less mature immune systems as well as less compliant lungs which increase their susceptibility to infections and other airway diseases [30] resulting in relatively increased morbidity and hospital presentation and admissions.

In comparing the relation of the diseases with sex of the child, 58.8 % of males were affected and 41.2% of females in this study. There is also preponderance of male gender in most of the other studies. But female preponderance was noticed in the Delhi study. No difference in relation to gender was seen in the Greenland study except for pneumonia where there was male preponderance. but there was no explanation as to why males were affected more.

In this study Pneumonia, accounts for 66.2 % of the respiratory disease and the most common of all the respiratory diseases, closer to findings of other studies, it was found that 34% and 35.5% of all the illnesses account for pneumonia in Nigeria and Delhi study respectively. In another community based study done in India among under-five children it was reported that incidence of pneumonia was between 0.25 to 0.50 episodes per child per year in the South-Asia region The role of pneumonia as a major contributor to childhood respiratory disease burden has continued to be a public health concern, particularly in the developing parts of the world. [31] In contrast, the reports in Norway [32] showed a preponderance of communicable diseases affecting the upper airways than pneumonia.

According to the study in Delhi the reason for this high prevalence of acute respiratory illnesses especially pneumonia could be higher levels of air pollution, overcrowded and ill ventilated living conditions and lack of primary health care mechanism.

Next to pneumonia, Asthma was the top most case of non-communicable diseases in this study. 16.5 % of the cases were due to Asthma. Asthma cases were also a major cause of hospitalization of children responsible for a third of overall cases admitted in the study done in Nigeria. Next to asthma foreign body inhalation/poisoning and acute chest constitute the topmost cases of non-communicable diseases admitted in the study done in Nigeria. Foreign body was reported only in few cases in this study and there was no report of acute chest syndrome according to the findings in this study.

In this study incidence of pneumonia was higher though out the year with slight higher incidences in May and December . On the contrary incidence of asthma was higher in July and October. According to the study done in Delhi it was demonstrated that URI peaks in spring and

to lesser extent in autumn while pneumonia peaks a little later. The Bangladesh [33] study noted a higher incidence of URI as well as pneumonia (ALRI) in monsoon and autumn (before winter). In Greenland Surprisingly, we found no clear seasonal variation in the incidence of respiratory symptom episodes; Based on hospital contacts and drug prescriptions, the highest incidence of ARI in Greenland has been described in July and in the winter although other studies failed to demonstrate any seasonal pattern (35). On the other hand, [34] seasonal variations of respiratory diseases in Nigeria observed a preponderance of asthma admissions in the rainy season which is similar to our finding. The differences in the results are possibly due to differences in the climatic conditions as well as housing conditions of the areas of study.

According to the study done in Nigeria the observed seasonal variation in the incidence of the various respiratory diseases may be attributed to the environmental factors related to the diseases. Majority of cases of asthma admitted in the rainy season are probably due to the effect of cold weather as an etiological factor of the disease. The dissemination of pollen, the close indoor activities necessitated by the cold weather has been attributed to this prevalence. Dry seasons are associated with dusty environment which tend to promote sporulation and transmission of pathogen particles with resultant inhalation and infection of susceptible individuals. Thus the increased incidence of respiratory infections during the dry season is agreeable with this observation.. All the reports are case series studies which are prone to variations in definition/diagnosis as well as data retrieval which may be responsible for the differences observed. Seasonal variation as observed will enable our facility and probably others in the region to plan for both preventive and other intervention measures targeted at season specific incidence of the various diseases in order to reduce the morbidity and mortality rates.

The median duration of hospitalization in this study was two days [range 1 to 14 days,]. Most 68% of the children stayed in the hospital for less than 3 days, which is close to the reports in the Nigeria study. But in most of the other study duration of hospitalization is not discussed but duration of the diseases is explained. Since this study is a chart review it was difficult to show the total duration of the illnesses. Duration of illness was found to be 6.16 days for Delhi and 11.65 days for Nigeria, The Bangladesh study reported that 46 percent of URI and 65 percent of ALRI episodes lasted 15 days or more. Median duration of URI and LRI episodes has been

reported to be 14 days (range: 7–25 days) and 19 days (range: 9–39 days) in the Greenland study [36].

Most of the patients 81.3% were discharged home in the same day they visited hospital with the necessary medications, while 16.2% were transferred to inpatient wards and death was recorded in 2.6 % (7/272) of the children. Similarly in nigeria 91.9% of cases admitted were discharged home, 7.6% were transferred to inpatient wards while death was recorded in 0.5% (11/2214) of the children which is small in comparison to publishes mortality rates [37].

7. Strength of the study

Because this study is hospital based study is a good way of measuring the morbidity and mortality in the hospital setting as well as a means of showing the probable state of diseases in the general population. It will also serve as the basis for further similar studies.

8. Limitations of study

Since this study is chart review, it lacks the representation of the exact existence of the subject being studied. Another limitation is, the cards are recorded already so missing information's needed cannot be extracted from the records.

9. Conclusion

It can be concluded that respiratory diseases are commonest causes of visit to pediatrics emergency despite the interventions being taken particularly among those less than five years of age. Among the respiratory illnesses pneumonia is found to be the highest burden. Seasonal

variation in the occurrence of diseases are observed for asthma and RAD where as other illnesses have comparable occurrences in all seasons. Most children with respiratory illness are discharged on the same day they are seen. Among the deaths recorded almost all of them occurred in children less than 5 years old.

10. Recommendation

Since respiratory illnesses are the major cause of morbidity and mortality for children, we have to know the risk factors attributable to this disease and work to avoid those risk factors. We have to create awareness among the community to keep their children from the predisposing factors. We also need to teach the community about symptoms of pneumonia and that they should bring children early if they have symptoms.

Knowing the seasons where some of the diseases are higher will enable us to create plan for both preventive and other intervention measures in order to reduce the morbidity and mortality rates.

In addition there is an evident need to reduce socioeconomic risks like household crowding and childhood malnutrition, in order to reduce both the number and severity of cases of acute respiratory illnesses.

Finally attention should be paid to respiratory diseases in children to reduce the morbidity in the population. A comprehensive study in the community on the epidemiological factors associated with morbidity and mortality should be undertaken in order to determine the prevalence and plan interventions on management of the diseases.

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	PART I: SOCIODEMOGRAPHIC QUESTIONS	
1	Age Of The Child	1. 0-5 2. 6-10 3. 11-15
2	Sex	1. Male 2. Female
3	Place Of Residency	1. Addis Ababa

**APP
END**

ICES

Appendix 1- Data collection forms

Checklist form

**Pattern of Respiratory diseases in pediatrics emergency unit and its outcome, SPHMMC,
Addis Ababa, Ethiopia Medical record number_____**

		2. Oromia 3. Other
4	Ethnicity	1. Oromo 2. Amhara 3. Tigre 4. Somali 5. Afar 6. Others.....
5	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Others
6	Parent's Educational Qualifications	1. Illiterate 2. Primary 3. Secondary 4. Diploma 5. Degree and above
PART 2 : ENVIRONMENTAL AND HOUSING CONDITION		
7	Overcrowding	1. Yes 2. no
8	Open window	1. None 2. One 3. More than one
9	Separate kitchen	1. Yes 2. No
10	Clean water source	1. Yes 2. No
PART 3 : GENERAL PATIENT CONDITION		
11	Place of delivery	1. Home 2. Health center 3. hospital
12	vaccination status	1. Fully vaccinated 2. Partially vaccinated 3. unvaccinated
13	Nutritional status	1. Normal

		2. Malnourished 3. Overweight
14	Is the child exclusively breast feed?	1. Yes 2. no
15	Is the child exposed to sun light adequately?	1. Yes 2. no
PART 4 : PATIENT FACTORS		
16	Previous Admission	1. yes 2. no
17	If yes to question 16 specify	_____
18	Season Of Presentation	1. September - December 2. January- march 3. April- July 4. June- august
19	Any family history of respiratory illness	1. Yes, specify if recorded _____ 2. no
20	Duration of illness (in days)	_____
21	Where did the child first go for treatment?	1. Health center 2. Private center 3. Hospital 4. Traditional center
22	Symptom reported	1. Fever ☐ 2. Cough ☐ 3. Nasal discharge ☐ 4. Wheezing ☐ 5. Shortness of breath ☐ 6. Fast breathing ☐ 7. Audible breathing ☐ 8. Others, specify _____
23	Illness Type	1. communicable 2. non communicable
24	If The Answer For Question 23 Is Communicable	1. Tonsilopharyngitis 2. Otitis media 3. pneumonia 4. CROUP 5. tuberculosis 6. common cold

		7. others
25	If The Answer For Question 23 Is non-Communicable	1. asthma 2. other
26	Co morbidity	1. Yes 2. no
27	If the answer for 20 is yes	1. HIV 2. DM 3. Other, specify_____
28	Duration Of Hospitalization	1. less than 3 days 2. 4-7 days 3. more than 7 days
29	Outcome	1. Discharged improved 2. Transferred to inpatient management 3. Died
30	If the answer to question 29 is Died specify cause of death	_____

