Clinical Classification of Acute Respiratory Symptoms in a Sample of Under Five Years Children in Erbil City

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Abstract

Background: Pneumonia is an important cause of morbidity and mortality in developing countries. They are responsible for the death of more than two million children under five year of age every year10, 11.

Objective: To find out the proportions of clinical types of respiratory tract infections, also to find out the factors that might be associated with severity of pneumonia and to compare the proportions of pneumonia between the hospital and primary health care centers attendees.

Patients and Methods: Case series study conducted among 300 children aged two months to five years in the outpatient clinic of Raperin Teaching Hospital / Erbil and six primary health care centers(PHCCs)from the first of march 2017 to thirty of march 2018. The questioner was completed through direct interview. A chi square test of association was used to compare proportions. A p value equal or less than 0.05 was considered as statistically significant.

Results: The majority of cases 42% of the patients were infant and 59% were male. Sever pneumonia was diagnosed in 7%, pneumonia 5% and no pneumonia 88%. all of the patients presented with the cough, wheeze 100% in sever pneumonia 86% in pneumonia, and 35% in other group, fever are high in all groups, lethargy was higher among sever pneumonia patients (81%), chest indrawing also high among those with sever pneumonia 76.2% and those with pneumonia was 73.3% while only 1.5% among other groups. also unable to drink in sever pneumonia was 81%. No association between the diagnosis of pneumonia and sever pneumonia with age, gender and residence. The prevalence of sever pneumonia was 12.5% among low socioeconomic status (SES), 2.2% among those of moderate socioeconomic status and 0% among high socioeconomic status.The prevalence of pneumonia and sever pneumonia were higher among those with family history of asthma and higher among those whose father was smoker. Also 13.3% of the hospital cases had severe pneumonia compared with 0.7% of the cases of the PHCCs. Regarding pneumonia, 4% of the hospital cases had pneumonia compared with 6% of the cases of PHCCs.

Conclusion: This study showed significant association with wheezes, immunization, history of chronic illness, SES, family history of asthma and smoking in father. The majority of cases with sever pneumonia was higher among hospital cases compared with PHCC. and pneumonia cases were lesser in hospital compared with PHCC.

Key words: Sever pneumonia, Pneumonia, No pneumonia, Outpatient clinic of raperin Tteaching Hospital.

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Introduction

Acute infections of the lower respiratory tract are an important cause of morbidity and mortality in developing countries. They are responsible for the death of more than two million children under five year of age every year4, 11, 13. Acute respiratory infections are considered the leading cause of acute illness which if untreated often lead to pneumonia .Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, difficulty breathing, fast breathing and chest indrawing. A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia[1].

Diagnostic tools include x-rays culture of the sputum and CBC (leukocytosis and neutrophilia). Vaccines to prevent certain types of pneumonia are available. Treatment depends on the underlying cause. Pneumonia presumed to be bacterial is treated with antibiotics. If the pneumonia is severe, the affected person is generally hospitalized[1, 2].

Pneumonia remains the leading cause of death in children under 5 years in low and middle income countries despite the introduction of case management guidelines and the development of new preventative strategies including effective vaccines. It currently accounts for 18% of annual deaths in children under five worldwide, 20% in low income countries compared to only 4.3% in high income countries 1, 3. In children, many of these deaths occur in the newborn period. The World Health Organization estimates that one in three newborn infant deaths is due to pneumonia3, 4. Pneumonia continues to be the biggest killer worldwide of children under five years of age. Although the implementation of safe, effective and affordable interventions has reduced pneumonia mortality from 4 million in 19811. To just over one million in 2013, pneumonia still accounts for nearly one-fifth of childhood deaths worldwide, and over 90% of these deaths take place in developing countries5. After the neonatal period, the main causes of death in sub-Saharan African are pneumonia and malaria, both manifesting as acute febrile illness[6, 7]. Severe pneumonia requiring hospitalization makes up a significant proportion of these pneumonia episodes, accounting for 7-13% of cases 5. Childhood pneumonia is caused by a combination of host and environmental factors. In low and middle income countries pneumonia is frequently caused by bacterial pathogens, in contrast to high income countries where viral pathogens predominate 6,8.Pneumococcal disease is the most common cause of vaccine preventable deaths [9].

These individuals are also more likely to have repeated episodes of pneumonia. People who are hospitalized for any reason are also at high risk for pneumonia. Pneumonia is common in malnourished children and frequently associated with fatal outcome6, 10. Of children with malnutrition requiring hospital admission, up to two-thirds are diagnosed with pneumonia [5, 11]. Mortality from pneumonia generally decreases with

age until late adulthood with increased mortality in the elderly. More cases of pneumonia occur during the winter months than during other times of the year10, 11. Individuals with underlying illnesses such as Alzheimer's disease, cystic fibrosis, emphysema, tobacco smoking, alcoholism, or immune system problems are at increased risk for pneumonia[8, 12]. WHO guidelines for the case management of acute lower respiratory tract infections recommend that children with no danger signs, be treated at home with oral antibiotics[6, 8, 14, 19]. So any patient with such a presentation coming to the outpatient pediatric units is prescribed oral antibiotic and sent home with advice for follow-up after 72 hours.

Patients and Methods

This study involved all children aged 2 months to 5 years of age they were classified using the standard IMCI guidelines.

Assessment and classification of respiratory symptoms19.

Assessment (history and examination)	Classification
No signs of pneumonia* or very severe disease+	No Pneumonia (Cough & cold)
Chest indrawing or Fast breathing	Pneumonia
Any general danger sign or stridor in calm child	Severe Pneumonia OR Very Severe Disease

*signs of pneumonia: Chest indrawing or fast breathing.
** very severe disease: Stridor in calm child

A-Study design : Crosssectional study**.**

B-Study setting and duration:

This study was conducted in the outpatient clinic of Raperin Teaching Hospital / Erbil and six primary health care centers according to division of Erbil city into six municipalities (shadi, brayati, nawroz, Kurdistan, enkawa and shaheedan centers). The study period of one year starting from the1st of March 2017 to thirty of March 2018.

C-Sampling technique:

A convenience sample of 300 patients was taken, 150 patients was taken from the outpatient clinic of Raperin Teaching Hospital and 150 patients from six primary health care centers (shadi, brayati, nawroz, Kurdistan, enkawa and shaheedan centers).

Ethical consideration

The study proposal was submitted to the ethics committee of the college of medicine at Hawler Medical University and a facilitation letter from Erbil Directorate of Health (DOH) was obtained. The parents of children were informed about the study before giving consent to participate. The information was kept confidential and would not be used for other purposes.

Data collection

One to two visits per week was performed to the outpatient clinic. In each visit, five to ten patients were taken. The interview was

done with parents or any one accompanies the child, it may last for 10 minutes.

Questionnaire

The data was collected by designing an appropriate questionnaire constructed for this purpose. The questionnaire includes

Sociodemographic data including (age, gender, socioeconomic status and educational level of parents).

Patient factors that affect the incidence of pneumonia such as immunization status, day care attendance, history of respiratory tract infection, diarrhea, and nutritional status).

Family factors that increase the incidence of pneumonia such as smoking and asthma.

Assessment for general danger signs and fast breathing, stridor, wheeze, fever and chest indrawing.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 22). Chi square test of association was used to compare proportions. Fisher's exact test was used when the expected count of more than 20% of the cells of the table was less than 5. A p value of ≤ 0.05 was considered statistically significant.

Results

Three hundred under five years old children were included in the study. Their age + SD was 21.94 + 18.81 months. The median was 14 months. Table 1 shows that 42% of the patients were infants and 59% were males.

Table (1): Age and gender distribution.

	No.	(%)
Age (months)		
< 12	126	(42.0)
12-23	65	(21.7)
≥ 24	109	(36.3)
Gender		
Male	177	(59.0)
Female	123	(41.0)
Total	300	(100.0)

Almost all the patients presented with cough. The prevalence of wheeze was 100% in severe pneumonia, 86.7% in pneumonia, and 35.2% in patients who don't have pneumonia ($p < 0.001$). The majority of patients had fever irrespective of the category ($p = 0.664$). Lethargy or loss of consciousness was significantly ($p < 0.001$) higher among those with severe pneumonia [81%], and chest indrawing was also high among those with severe pneumonia [76.2%] and those with pneumonia [73.3%], while only 1.5% of those with no pneumonia had chest indrawing ($p < 0.001$) as presented in Table 2. The table shows also that 81% of patients with severe pneumonia were unable to drink, and had stridor, while none of the other groups had such symptoms ($p < 0.001$). The other symptoms that were significantly high in severe pneumonia and

pneumonia were vomiting ($p < 0.001$), history of convulsions during thisillness ($p < 0.001$), and convulsions at present ($p = 0.020$).

Table (2): Prevalence of symptoms according to the clinical categories of patients.

	No pneumonia (n = 264)		Pneumonia (n = 15)		Severe pneumonia (n = 21)		
Symptoms	No.	(%)	No.	(%)	No.	(%)	p
Cough	262	(99.2)	15	(100.0)	21	(100.0)	1.00*
Wheeze	93	(35.2)	13	(86.7)	21	(100.0)	< 0.001
Fever	236	(89.4)	13	(86.7)	20	(95.2)	0.664*
Lethargy or loss of consciousness	0	(0.0)	1	(6.7)	17	(81.0)	< 0.001*
Chest indrawing	4	(1.5)	11	(73.3)	16	(76.2)	< 0.001*
Unable to drink	0	(0.0)	0	(0.0)	17	(81.0)	< 0.001*
Stridor in a calm child	0	(0.0)	0	(0.0)	17	(81.0)	< 0.001*
Vomiting everything	8	(3.0)	1	(6.7)	12	(57.1)	< 0.001*
Convulsions during this illness	10	(3.8)	1	(6.7)	8	(38.1)	< 0.001*
Diarrhea	72	(27.3)	2	(13.3)	3	(14.3)	0.226
Convulsion now	1	(0.4)	0	(0.0)	2	(9.5)	0.020*
Ear problem	13	(4.9)	0	(0.0)	0	(0.0)	0.802*

*By Fisher's exact test

Table (3) shows that the clinical diagnosis in the whole sample was as follows: Severe pneumonia (7%), pneumonia (5%), and no pneumonia (88%). No significant association was detected between the clinical diagnosis and age ($p = 0.792$), gender ($p = 0.167$), and residency ($p = 0.055$). The table shows that the prevalence of severe pneumonia was 12.4% among those of low SES, 2.2% among those of medium SES, and 0% among those of high SES ($p = 0.010$).

Table (3): Clinical diagnosis by socio-demographic factors.

	No pneumonia		Pneumonia		Severe pneumonia		
	No.	(%)	No.	(%)	No.	(%)	p
Age							
< 12	109	(86.5)	6	(4.8)	11	(8.7)	0.792*
12-23	57	(87.7)	3	(4.6)	5	(7.7)	
≥ 24	98	(89.9)	6	(5.5)	5	(4.6)	
Gender							
Male	156	(88.1)	6	(3.4)	15	(8.5)	0.167
Female	108	(87.8)	9	(7.3)	6	(4.9)	
Residency							
Urban	180	(90.9)	9	(4.5)	9	(4.5)	0.055
Rural	84	(82.4)	6	(5.9)	12	(11.8)	
SES							
Low	120	(82.8)	7	(4.8)	18	(12.4)	0.010*
Medium	126	(92.6)	7	(5.1)	3	(2.2)	
High	18	(94.7)	1	(5.3)	0	(0.0)	
Total	264	(88.0)	15	(5.0)	21	(7.0)	

*By Fisher's exact test

Table (4) shows that the prevalence of pneumonia was significantly higher among those who were not immunized (p = 0.001). No significant association was detected between the clinical diagnoses with type of feeding (p = 0.467), being in a day care center (p = 0.176), and history of contact with a patient affected with respiratory disease in the same family of the patient (p = 0.263). The prevalence of severe pneumonia [9.9%] and pneumonia [3.9%] was significantly higher among those with family history of asthma than among those with no such a history (p = 0.03). The prevalence of severe pneumonia [9.7%] and pneumonia [4.6%] among patients whose father was a smoker was significantly higher than the prevalence among those whose father was not a smoker (p = 0.012). No significant association was detected between smoking mother and the clinical diagnosis (0.791). Significant association was detected between pneumonia and chronic illnesses (p < 0.001).

Table (4): Clinical diagnosis by risk factors.

	No pneumonia		Pneumonia		Severe pneumonia		
	No.	(%)	No.	(%)	No.	(%)	p
Immunization							
No	94	(79.7)	9	(7.6)	15	(12.7)	0.001
Yes	170	(93.4)	6	(3.3)	6	(3.3)	
Types of feeding							
Breast	35	(85.4)	3	(7.3)	3	(7.3)	0.467*
Bottle	147	(86.5)	8	(4.7)	15	(8.8)	
)artially breast feed	82	(92.1)	4	(4.5)	3	(3.4)	
Day care center attendance							
No	214	(86.3)	14	(5.6)	20	(8.1)	0.176*
Yes	50	(96.2)	1	(1.9)	1	(1.9)	
Contact with a RTI patient							
No	101	(91.8)	3	(2.7)	6	(5.5)	0.263
Yes	163	(85.8)	12	(6.3)	15	(7.9)	
Family history of asthma							
No	108	(90.8)	8	(6.7)	3	(2.5)	0.03
Yes	156	(86.2)	7	(3.9)	18	(9.9)	
Smoker father							
No	78	(94.0)	5	(6.0)	0	(0.0)	0.012
Yes	185	(85.6)	10	(4.6)	21	(9.7)	
Smoker mother							
No	253	(87.8)	15	(5.2)	20	(6.9)	0.791*
Yes	11	(91.7)	0	(0.0)	1	(8.3)	
History of patient major chronic illness							
No	214	(93.4)	6	(2.6)	9	(3.9)	< 0.001*
Yes	50	(70.4)	9	(12.7)	12	(16.9)	
Total	264	(88.0)	15	(5.0)	21	(7.0)	

*By Fisher's exact test

It is evident in Table 5 that 13.3% of the hospital cases had severe pneumonia compared with 0.7% of the cases of the PHCCs. Regarding pneumonia, 4% of the

hospital cases had pneumonia compared with 6% of the cases of PHCCs ($p < 0.001$).

Table (5): Distribution of patients to the diagnosis and setting of the study.

	Hospital		PHCC*		Total		
Diagnosis	No.	(%)	No.	(%)	No.	(%)	p
No pneumonia	124	(82.7)	140	(93.3)	264	(88.0)	
Pneumonia	6	(4.0)	9	(6.0)	15	(5.0)	p < 0.001
Severe pneumonia	20	(13.3)	1	(0.7)	21	(7.0)	
Total	150	(100.0)	150	(100.0)	300	(100.0)	

*PHCC: Primary Health Care Centers.

Table (6) shows that 15 cases had been diagnosed by the investigator as having pneumonia, two of them (13.3%) had been diagnosed as normal by the doctor in charge(general practitioner doctor). The table shows also that 21 cases had been diagnosed by the researcher as having severe pneumonia, but 20 out of the 21 (95.2%) had been diagnosed by the doctor in charge as having pneumonia, and one (4.8%) as having no pneumonia. The agreement between the two doctors was 92.3% (264 + 13 / 300).

Table (6): Diagnosis by the investigator and by the doctor in charge.

	Diagnosis by doctor in charge					
Diagnosis by the investigator	No pneumonia		Pneumonia		Total	
	No.	(%)	No.	(%)	No.	(%)
No pneumonia	264	(100)	0	(0.0)	264	(100)
Pneumonia	2	(13.3)	13	(86.7)	15	(100)
Severe pneumonia	1	(4.8)	20	(95.2)	21	(100)
Total	267	(89)	33	(11)	300	(100)

Discussion

The clinical diagnosis of acute respiratory symptoms in this study was as follow: No pneumonia 88%, pneumonia 5% and 7% in sever pneumonia. This result from outpatient centers. According to study done in Iraq 2009 (Data was collected by UNICEF) , the prevalence of pneumonia was 6.9 %which near the current study16. Another study by UNICEF in the north of Iraq stated that 25% of children under five years suffer from pneumonia[15].

In this study the median age for acute respiratory infection (ARI) is 14 months and 59% are male. According to study done in Iraq children between age 6 and 35 months more likely to ARI and male sex and this result is near our study result16. Another study carried out in Egypt, sever pneumonia are slightly higher in male children and those older than six months[17]. In this study, the total cases of ARI and those classified as sever disease are higher among those

received partially breast feeding and this is same the study done in Egypt.

The chest wall indrawing in this study represented 81% of cases as sever pneumonia and this same result done in Gambia depend that chest indrawing as the main for diagnosis, Also study done in Philippines and Switzerland stated chest indrawing as 79%18.

The prevalence of sever pneumonia was 12% among low socioeconomic status SES, 2.2 % among medium SES and 0% among high SES(By Fisher's exact test). So the same result in a study done in Egypt stated the higher percentage of sever pneumonia among children of low SES [18]. In this study if the child complete immunization according to the age considered as immunized and if the child is partially or non-immunized was considered as not immunized.in this study I found that pneumonia and sever pneumonia was higher among non-immunized children. In this study I compared distribution of patients to the diagnosis and setting of the study and the result was higher for sever pneumonia in hospitals than in PHCCs, while pneumonia was higher in PHCCs than hospitals. I do not found such comparisim in Iraq. Also in this study I were compare the diagnosis by the investigator and by the doctor in charge and the finding was they do not dependon the WHO classification of pneumonia .

Conclusion

This study showed significant association with wheezes, immunization, history of chronic illness, SES, family history of asthma and paternal smoking. The majority of cases with sever pneumonia was higher among hospital cases compared with PHCC. and pneumonia cases were less in hospital compared with PHCC.

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