ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2019; 5(9): 78-81
www.allresearchjournal.com
Received: 04-07-2019
Accepted: 06-08-2019

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Evaluation of effect of age, weight and antibiotic therapy of acute respiratory infection-pneumonia on mortality of under five years children

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Abstract
Introduction: The world health organization (WHO) and united nations international children's emergency fund (UNICEF) investigations are concentrated on the mortality rate of the fewer than five years children. According to WHO researches' the main causes of mortality of those children is pneumonia. The half causes of mortality less than five years of age children from the last 3 decades apparent in the developing countries and from this finding the cause of mortality was 16% due to pneumonia. Although Afghanistan has not been included in those five countries in which the half causes of mortality is pneumonia but besides of this, this problem is more essential to focus on and attention on.
Objective: This study aimed to determine the effect of age, weight and antibiotic therapy of acute respiratory infection-pneumonia (ARI-pneumonia) on mortality of under five years children that was hospitalized at Khost Civil Provincial Hospital (KCPH).
Material and Methods: This retrospective study was conducted during December 2017 and January, February 2018 on 233ARI-pneumonia patients that were hospitalized in KCPH of Khost *wilayat* of Afghanistan. All ≤5-year-old ARI-pneumonia hospitalized patients during the study period were included. Electronic medical records were reviewed to determine which medical treatment had been conducted and the patient's age and weight had been declared.
Results: This study has been conducted in during abovementioned 3 months ARI-pneumonia patients that admitted to KCPH. The number of patients was in January129 (47.25%), in December 81 (29.67%), and finally was in February 63 (23.07%). From 273 patients 233 were hospitalized whose ages were under five years old. In hospitalized patients 152 (65.24%) were male and 81 (34.76%) were female. Mild underweight were 80 (34.33%), moderate underweight were 44 (18.88%), and severe underweight were 11 (4.72%), and 98 (42.06%) had normal weight. Total mortality rate were 13 (5.58%), 12 (5.15%) were males and one (0.43%) was female. Cefotaxime + Amikacin were used in 122 (52.36%) patients. Cefotaxime + Amikacin + Vancomycin were used in 39 (16.73%) and Cefotaxime+Ampicilline was used in 28 (12.01%) patients.
Conclusion: Overall, the findings indicated that age and underweighted have had a positive impact on mortality of under five years ARI-Pneumonia children.

Keywords: WHO, UNICEF, ARI-pneumonia, mortality rate, Khost, underweight

1. Introduction
The WHO and UNICEF investigations are concentrated on the mortality rate of the fewer than five years children. According to WHO researches' the main causes of mortality of those children is pneumonia. The half causes of mortality less than five years of age children from the last 3 decades apparent in the developing countries and from this finding the cause of mortality was 16% due to pneumonia. Although Afghanistan has not been included in those five countries in which the half causes of mortality is pneumonia but besides of this, this problem is more essential to focus on and attention on. Therefore, department of pharmacology and physiology of medical faculty of Sheikh Zayed University Khost conducted this study. According to WHO 2000 year's report globally 1.9 million mortality were due to pneumonia in under five years children, but in recent 38 analytic studies from 1.9 million only 1.8 million (95%) deaths were in Sub-Saharan Africa and West Asia. The report declared that the globally deaths from the pneumonia 90% were in 40 countries that two third of this number only in 10 countries [India (408 000 deaths), Nigeria (204 000) the

Democratic Republic of the Congo (126 000), Ethiopia (112 000), Pakistan (91 000), Afghanistan (87 000), China (74 000), Bangladesh (50 000), Angola (47 000) and Niger (46 000)] that the Afghanistan was in sixth position [1].

WHO for the decrease of mortality rate due to pneumonia in 1980 provided a case-management strategy known as the Acute Respiratory Infection (ARI) program in an attempt to reduce pneumonia-related deaths. Thereafter, in 1995, this strategy was incorporated into the guidelines of the Integrated Management of Childhood Illness (IMCI) for primary care and hospital-based case management. In 2005, the IMCI guidelines were incorporated in the WHO Pocket Book for pediatric hospital care with some amendments, especially for physicians. The impact of these guidelines has been enormous. Over the decades, death from pneumonia in children under five years dropped from 2.3 million in 1990 to 0.9 million in 2015 [2].

After applied of abovemention strategy the situation is changed and in 2015 report declared that the globally, pneumonia is one of the leading causes of morbidity and mortality and accounted for 16% of the estimated 5.9 million deaths among children aged ,5 years in 2015.In 2010, there were 120 million episodes of pneumonia in children younger than 5 years, and 14 million pneumonia cases progressed to severe and life-threatening conditions requiring urgent hospital care. In 2011, about 1.3 million estimated pneumonia cases led to death worldwide [2].

Fortunately, in UNICEF 2016 report declared that the mortality rate significant decreased globally in 2015 and Afghanistan was not included in those five countries, that the mortality rate is so high.

WHO and UNICEF confirmed as that biggest cause of mortality was pneumonia in less than 5 years of age children happened in 2015 - 2016. Reports says that events of pneumonia more than 150 million only in 2015 year. In this year, the mortality was more than 5.9 million. Approximately 0.9 million children have been died due to pneumonia. It makes the 16% of total mortality rate, but these events were less than 1.3 million compare to 2011. Most of the events expressed recently in the developing countries like Nigeria, China, Pakistan, India and Bangladesh. In the above-mentioned five countries makes the pneumonia the half events. Mortality rate due to pneumonia is about 5% in developing countries. In the Sub Saharan Africa, the mortality rate due to pneumonia is 16% [3].

2. Objective

This study aimed to determine the effect of age, weight and antibiotic therapy of acute respiratory infection-pneumonia (ARI-pneumonia) on mortality of under five years children that was hospitalized at Khost Civil Provincial Hospital of Khost province of Afghanistan.

3. Materials and Methods

This is a retrospective study was conducted during December 2017 and January, February 2018 on 233 ARI-pneumonia patients that were hospitalized in KCPH of Khost province of Afghanistan. All ≤5-year-old ARI-pneumonia hospitalized patients during the study period were included. Electronic medical records were reviewed to determine which medical treatment had been conducted and the patient's age and weight had been declared**.**

4. Results

Table 1: Total and hospitalized numbers of patients with ARI-Pneumonia that admitted to the KCPH (N = 273), (N = 233)

Month	Health center	ARI-Pneumonia		
		U5F	U5M	Total
December, 2017	KCPH	41	40	81
January, 2018	KCPH	58	71	129
February, 2018	KCPH	36	27	63
Total Admitted Patients	KCPH	135	138	273
Total Hospitalized Patients	KCPH	81	152	233

ARI=Acute Respiratory Infection; U5M = Under five male; U5F = Under five female; KCPH = Khost Civil Provincial Hospital.

Table 2: Gender, age, weight, underweighted degree, severity of Pneumonia, and antibiotic treatment in died children (N = 13)

Serial number	Gender	Age (months)	Weight (Kg)	Underweighted Degree (%)	Severity of Pneumonia	Antibiotic Treatment
1	M	7	5	Moderate Underweighted (62.5)	Sever Pneumonia	Cefotaxime*+ Amikacin**
2	M	9	5.5	Moderate Underweighted (61.11)	Very Sever Pneumonia	Cefotaxime* + Amikacin**
3	M	5	6.4	Normal Weight (91.42)	Sever Pneumonia	Cefotaxime* + Amikacin**
4	M	2	5.9	Normal Weight (107.27)	Sever Pneumonia	Cefotaxime*+ Amikacin**+ Vancomycin
5	M	5	6	Mild Underweighted (85.71)	Sever Pneumonia	Cefotaxime* + Amikacin**
6	M	5	5.8	Mild Underweighted (82.85)	Sever Pneumonia	Cefotaxime* + Amikacin**
7	F	9	5.8	Moderate Underweighted (64.44)	Very Sever Pneumonia	Cefotaxime*+Ampicillin+Vancomycin
8	M	5	7	Normal Weight (100)	Sever Pneumonia	Cefotaxime*+Amikacin**+ Vancomycin
9	M	2	2.6	Sever Underweighted (47.27)	Sever Pneumonia	Cefotaxime*+Amikacin**+ Vancomycin
10	M	7	7	Mild Underweighted (87.5)	Sever Pneumonia	Ceftriaxon(Rocephin)
11	M	24	10	Mild Underweighted (83.33)	Sever Pneumonia	Cefotaxime***+Amikacin**+ Vancomycin
12	M	6	6.5	Mild Underweighted (86.66)	Sever Pneumonia	Cefotaxime***+Amikacin**+ Vancomycin
13	M	3	8.5	Overweighed (141.66)	Sever Pneumonia	Cefotaxime*+Ampicillin+ Vancomycin

* Calforan; ** Grasil; *** Fortum.

Table 3: Sociodemographic characteristic of hospitalized pneumonia children in KCPH

Characteristic	Inpatients N (%)	Mortality N (%)
Mean age in months	11.49 ∓ 10.58	6.84 ∓ 5.62
Gender		
Male	152 (65.24)	12 (5.15)
Female	81 (34.76)	1 (0.42)
Weight		
Severe Underweighted	11 (4.72%)	1 (0.42)
Moderate Underweighted	44 (18.88%)	3 (1.28)
Mild Underweighted	80 (34.33%)	5 (2.14)
Normal Weighted	98 (42.06)	4 (1.71)
Severity of Pneumonia		
Very Severe Pneumonia	25 (10.73%)	2 (0.85)
Severe Pneumonia	208 (89.27%)	11 (4.72%)
Hospital Treatment		
Cefotaxime (Calforan) + Amikacin (Grasil)	122 (52.36)	6 (2.57)
Cefotaxime + Amikacin + Vancomycin	39 (16.73)	6 (2.57)
Cefotaxime + Ampicillin	28 (12.01)	0 (0)
Cefotaxime + Ampicillin + Vancomycin	17 (7.29)	0 (0)
Ceftriaxon (Rocephin) + Amikacin	6 (2.57)	0 (0)
Ceftriaxon (Rocephin) + Ampicillin	5 (2.14)	0 (0)
Ceftriaxon (Rocephin)	4 (1.71)	1 (0.42)
Cefotaxime (Calforan) + Amikacin (Grasil) + Ampicillin	4 (1.71)	0 (0)
Cefotaxime + Vancomycin	3 (1.28)	0 (0)
Ceftriaxon (Rocephin) + Amikacin+ Vancomycin	2 (0.85)	0 (0)
Ceftriaxon (Rocephin); Ampicillin + Cefotaxime + Vancomycin	1 (0.42)	0 (0)
Ceftriaxon (Rocephin); Cefotaxime (Calforan) + Amikacin (Grasil)	1 (0.42)	0 (0)
Cefotaxime + Ampicillin; Amikacin + Vancomycin	1 (0.42)	0 (0)

Table 4: According to places (districts) exploration of mortality rate, patient's number and percentage compare with gender in hospitalized patients that admitted to the Khost Civil Provincial Hospital

Serial Number	Districts	Hospitalized Patients N (%)	Male N (%)	Female N (%)	Total Mortality N (%)
1	Capital Of Khost	90 (38.63)	6 (1.58)	0 (0)	6 (1.58)
2	Tani	18 (7.73)	1 (0.43)	0 (0)	1 (0.43)
3	Gurbaz	9 (3.86)	1 (0.43)	0 (0)	1 (0.43)
4	Mangle	10 (4.29)	0 (0)	1 (0.43)	1 (0.43)
5	Yaqoobi, Bak, Sabari	17 (7.30)	0 (0)	0 (0)	0 (0)
6	Ali Shir,Tereze	9 (3.86)	1 (0.43)	0 (0)	1 (0.43)
7	DwaMoonda Zadran	15 (6.44)	0 (0)	0 (0)	0 (0)
8	Moosakhil	5 (2.15)	0 (0)	0 (0)	0 (0)
9	Mandozi Ismaeelkhil	47 (20.17)	3 (1.29)	0 (0)	3 (1.29)
10	Nader Shah Koot, Zenikhil	6 (2.58)	0 (0)	0 (0)	0 (0)
11	Zazi Maidan	7 (3.00)	0 (0)	0 (0)	0 (0)
Total		233 (100)	12 (5.15)	1 (0.43)	13 (5.58)

This study has been conducted during three months December (2017), January (2018), and February (2018) admitted to the Khost Civil Provincial Hospital. This study has been conducted in during abovementioned 3 months ARI-pneumonia patients that admitted to Khost Civil Provincial Hospital. The number of patients was in January129 (47.25%), in December 81 (29.67%), and finally was in February 63 (23.07%). From 273 patients 233 were hospitalized whose ages were under five years old. In hospitalized patients 152 (65.24%) were male and 81 (34.76%) were female. In sever pneumonia 208(89.27%) the mortality rate was higher 11 (4.72%) than very sever pneumonia 2 (0.85).12 (92.30%) of died children were under 12 months ages and one (7.70%) was 2 years old. Mild underweight were 80 (34.33%), moderate underweight were 44 (18.88%), and severe underweight were 11 (4.72%), and 98 (42.06%) had normal weight. Total mortality rate were 13 (5.58%), 12 (5.15%) were males and 1 (0.43%) was female. Cefotaxime + Amikacin were used in 122 (52.36%) patients. Cefotaxime + Amikacin + Vancomycin were used in 39 (16.73%) and Cefotaxime + Ampicilline was used in 28 (12.01%) patients.

5. Discussion

This retrospective descriptive study is conducted at Khost Civil Provincial Hospital in Khost province of Afghanistan on 233 hospitalized under five years children whose diagnosed by ARI-Pneumonia. According to the WHO and UNICEF numerous reports in last three decades in Afghanistan the mortality rate of ARI-Pneumonia under five children is gradually decreased. The basic aims of this study were to declare those factors that affected the mortality rate that was gradually decreased in the last three decades.

Our study results declared that the mortality rate gradually decreased [13 (5.58%)] in 2017-2018 in under five year children compare to last three decades. 12 (92.30%) of died children were under 12 months ages and one (7.70%) was 2 years old. Mild underweight were 80 (34.33%), and mortality was 3 (1.28). Moderate underweight were 44 (18.88%), and mortality was 3 (1.28). Severe underweight

were 11 (4.72%), and mortality was 1 (0.42). Normal weight were 98 (42.06%), and mortality was 4 (1.71).

In India one study projected the collected data for the whole country and estimated that 13·5% (99% CI 13·0-14·1) of under five mortality is attributable to pneumonia; accounting for 369000 annual deaths. It also reported that the mortality due to pneumonia among girls was higher than boys (16.0% *vs* 11.2%) [4, 5].

Nigeria is one of the five countries with more than half of the world's annual incident cases of pneumonia. It is estimated that every single day, 2,300 under-fives die in Nigeria (UNICEF 2015). Of these, about 328 die of pneumonia (Liu *et al*. 2015) [3].

Globally, pneumonia is one of the leading causes of morbidity and mortality and accounted for 16% of the estimated 5.9 million deaths among children aged, 5 years in 2015. In 2010, there were 120 million episodes of pneumonia in children younger than 5 years, and 14 million pneumonia cases progressed to severe and life-threatening conditions requiring urgent hospital care. In 2011, about 1.3 million estimated pneumonia cases led to death worldwide. Pneumonia is one of the leading causes for hospital admission among children under 5 years of age in pediatric hospitals in Bangladesh. Among the estimated 119,000 under-five deaths in Bangladesh, 15% were due to pneumonia [2, 6-8].

Our study results declared that the ages fewer than 5 years old and underweighted children are more prone to the ARI-Pneumonia compared to ages higher than 5 years old and normal

weighted children. The findings of this study indicate that age and underweighted have had a positive impact on mortality of under five years ARI-Pneumonia children.

6. Conclusion

Overall, the findings indicated that age and underweighted have had a positive impact on mortality of under five years ARI-Pneumonia children.

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