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Evaluation of Risk Factors of Pneumonia in Children under Five Years Old at Mnazi Mmoja Hospital- Zanzibar

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ABSTRACT

Pneumonia remains the leading cause of death among under-five children, killing approximately 2,400 children a day. The purpose of this research is to evaluate some associated risk factors of Pneumonia among under-five children admitted at MnaziMmojaHospital (MMH). The study was a cross-sectional descriptive hospital-based carried out in the pediatric ward of MMH from April 2020 to July 2020 after approval by the hospital's health and ethics committee.The research instrument used was a questionnaire (open and close) and interview. A sample size of 400 under-five children and also 400 parents were employed. The children were made up of 161 males and 239 females within 0-1, 2-3, and 4-5 age brackets. The parents' age brackets were less than 18 and above 18. The research findings were analyzed using SPSS software version 15 and Epin info. The interpretation was on the basis of certain predictive factors, including malnutrition, breastfeeding, birth weight, pneumococcal vaccine, and HIV, on how they relate to the development of Pneumonia. Pearson Chi-Square was used to compare the levels of significances. Probability values of less or equal to 0.05 were accepted to be significant.Our study recorded a high prevalence (above 60%) for some major risk factors, including malnutrition, low birth weight, and breastfeeding below six months duration. The study showed that a more significant percentage of parents (55%) had no knowledge of Pneumonia and also recorded a significant association between gender and risk factors such as malnutrition, breastfeeding, and underweight children as girls were more affected. The findings showed a significant association between some major risk factors like malnutrition, low birth weight, lower duration of breastfeeding activities, and parents' educational status ($p<0.05$).The uneducated, 69.8%, 68.5%, and 67.2% have children with significant malnutrition levels, did not breastfeed for up to 6 months, and had children with low birthweight, respectively. The children's age group had no associationwith the risk factors, while most of the subjects under study had two risk factors.Pneumonia and malnutrition are two of the biggest killers in childhood. Education of the parents and guidelines for the care of children with Pneumonia and malnutrition needs to consider this strong and often lethal association to contribute to the United nations' sustainable development Goal 3, aiming for substantial reductions in childhood mortality.

***Keywords**: Risk factors, Pneumonia, Malnutrition, Children under five years old*

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INTRODUCTION

Pneumonia contributes to major disease-associated mortality and morbidity among children under 5 years,mainly in developing countries [1]. Pneumonia affects children and families everywhere but is most prevalent in South Asia and sub-Saharan Africa. According to the World Health Organization, Children can be protected from Pneumonia, and it can be prevented with simple interventions and treated with low-cost, low-tech medication and care [2]. Pneumonia kills more children under five than AIDS, malaria, and measles combined, yet increased attention in recent years have been on the latter diseases [3]. This case definition of childhood pneumonia is widely used in poor-resource settings to guide the management of Pneumonia. The intention is also commonly used as an entry criterion or endpoint in different intervention and disease burden studies [4]. Pneumonia is a severe form of an acute lower respiratory

infection that affects the lungs, particularly the alveoli. These tiny air sacs contain capillaries, where oxygen is added to the blood and carbon dioxide removed from the blood. With Pneumonia, pus and fluid fill the alveoli in the segment of one or both lungs, and this interferes with oxygen absorption, making breathing difficult [5]. As a result of the buildup of fluid, the lungs have to work harder to satisfy the body's oxygen needs. In Pneumonia, the body gets the symptoms such as cough, fever, and difficulty in breathing. Still, with severe Pneumonia, the patient presents with convulsion, lethargy, central cyanosis, and any general danger sign [6]. Pneumonia can result from various causes; viruses being one of the two major causes of Pneumonia; the other is bacteria [2]. Less common causes are other microorganisms such as fungi and parasites, certain drugs, and other conditions such as autoimmune diseases[7]. In 2011, there were an estimated 120 million episodes of childhood pneumonia globally, of which 14 million progressed severe diseases, with 1.3 million deaths, most deaths (81%) occurred in children under 5 years of age [8]. The most significant proportions of severe Pneumonia episodes were Southeast Asian (39%) and African regions (30%). The highest numbers of childhood deaths were in sub-Saharan Africa, where 43% of deaths were recorded from Pneumonia in 2011 [9]. Pneumonia has remained a real burden and the leading infectious cause of death among children under five, killing 922,000 children under five years in 2015 and 880,000 in 2016 [10]. Mortality due to childhood pneumonia is strongly linked to poverty-related factors such as undernutrition, lack of safe water and sanitation, indoor air pollution, and inadequate access to health care and H.IV [11]. Kenya is currently ranked among the 15 countries with the highest estimated number of deaths due to clinical Pneumonia, the mortality rate being 50.3 per 10, 000 under-fives per year [12]. In Tanzania, Pneumonia is the leading cause of death among under-five children and contributesto over 20% of deaths [13]. Only about 22% receive antibiotics, while people seeking Pneumonia care have increased to 71% [14]. In Zanzibar, there is no available data on pneumonia prevalence at all. Therefore there is a need for a detailed study among children under fiveand the preventable risk factors since they are the major group with highest possible prevalence and intensity of infection.

MATERIAL AND METHODS

Study setting

The study was conducted at MMH from September 2019 to March 2020 in the pediatric department. A total of 400 records were extracted from children under five years of age admitted to the Pediatric ward at MMH from September 2019 to March 2020. MMH is a government referral hospital is located in Urban West in Zanzibar. The MMH has four central departments: surgery, internal medicine, Gynecology and Obstetrics, and Pediatric. In pediatric department has two sections, the first section deals with the disease of children under three years, and the second section deals with the illness of children above three years to twelve years

Study design

The study used a retrospective-based cross-sectional design to study the risk factors of Pneumonia in children under five years. In this study, we used the questionnaire and were filled by our respondents with some health care workers' help.

Study population

All children under five year admitted to the Pediatric ward at MMH diagnosed with Pneumonia enrolled in the study from September 2019 to March 2020

Data collection technique

The source of data was the primary source of information since the data will be collected directly from the patients through a questionnaire by using open questions

Data processing and analysis

The collected data obtained was introduced, processed

Data analysis

The data were scrutinized to identify any duplication of patients and analyzed using SPSS Version 20 software p-value was calculated as the proportion of observation units that ever exhibited the state of interest during the period of study. Data were analyzed using descriptive statistics, including proportions and percentages

Inclusion and exclusion criteria

Inclusion criteria

All patients under five years admitted to the pediatric department at MMH from September 2019 to March 2020 were included in the study.

Exclusion criteria

The following subjects were excluded:

Patients above five years were admitted in the same period.

Patients who were below five years but were not admitted in the specified period of the research or were admitted for other diagnoses rather than Pneumonia.

Ethical Consideration

Approval was obtained from the Zanzibar Health Research Institute with No; ZAHREC/03/ST/MARCH/2020/41.

RESULTS

Table 1:Socio demographic characteristics of the children and parents (Age group 0-1,2-3, 4-5; Sex Male and female)

Variable	Frequency	Percentage (%)
Child Sex		
Boy	161	40.2
Girl	239	59.8
Total	400	100.0
Age		
0 – 1	190	47.5
2 – 3	191	47.8
4 – 5	19	4.7
Total	400	100.0
Parentage		
Above 18	129	32.25
Below 18	271	67.75
Total	400	100.0
Parent sex		
Female	400	100.0
Educational status		
Educated	153	38.25
Uneducated	247	61.75
Total	400	100.0

Table 2: Assessment of knowledge of parents for Pneumonia. A greater percentage of parents showed no understanding of Pneumonia

Knowledge of Pneumonia	Frequency	Percentage (%)
0	220	55.0
1	124	31.0
2	56	14.0
Total	400	100.0

Table 3: Prevalence of Major risk factors (Malnutrition, Breastfeeding, Birthweight, Pneumococcal Vaccine, HIV). Malnutrition, under six months of breastfeeding and low birth weight, showed high prevalence rates, with malnutrition having the highest prevalence

Prevalence of Major risk factors	Frequency	Percentage (%)
Malnutrition		
Yes	259	64.8
No	141	35.2
Duration of breastfeeding		
<6month	251	62.8
>6month	149	37.3
Birth weight		
<2.5	257	64.3
>2.5	143	35.8
The child receive pneumococcal vaccination		
Yes	202	50.5
No	198	49.5
Child has HIV		
Yes	32	8.0
No	368	92.0

Table 4: Risk factors according to the sex of children. The table showed a significant association between sex and risk factors such as malnutrition, breastfeeding, and underweight children. The girls in this study accounted for more impact on these major risk factors than the boys

Major risk factors	Sex of child		X^2	P-value
	Male (n=161)	Female (n=239)		
Malnutrition				
Yes	90(34.7)	169(65.3)	9.2452	0.0023
No	71(50.5)	70(49.5)		
Duration of breastfeeding				
<6months	80(32)	170(68)	19.004	0.00001
>6months	81(54)	69(46)		
Birth weight				
<2.5	99(36.5)	172(63.5)	9.42	0.0001
>2.5	69(53.5)	60(46.5)		
The child receive pneumococcal vaccination				
Yes	77(38.1)	125(61.9)	0.771	0.380
No	84(42.4)	114(57.6)		
Child has HIV				
Yes	12(37.5)	20(62.5)	0.109	0.741
No	149(40.5)	219(59.5)		

Figure 1: Number of Risk factors and percentages. The majority of the subjects under study had two risk factors.

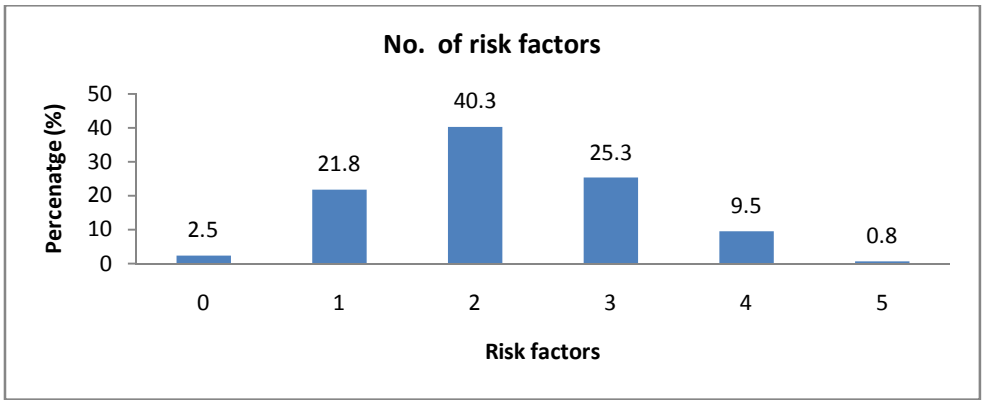

Table 5: Association between Age group of children and risk factors. There was no statistically significant difference between the age group of children and risk factors

Major risk factors	Age of child			X^2	P-value
	0 – 1 (n=190)	2 – 3 (n=191)	4 – 5 (n=19)		
Malnutrition					
Yes	123(47.5)	123(47.7)	13(5.0)	0.123	0.941
No	67(47.5)	68(48.2)	6(4.5)		
Duration of breastfeeding					
<6month	117(46.3)	121(48.4)	12(4.8)	0.216	0.898
>6month	73(48.6)	69(46.0)	8(5.3)		
Birth weight					
<2.5	129(47.6)	125(46.1)	17(0.06)	0.479	0.787
>2.5	61(47.3)	66(51.2)	2(0.015)		
The child receive pneumococcal vaccination					
Yes	95(47.0)	100(49.5)	7(3.5)	1.700	0.427
No	95(48.0)	91(46.0)	12(6.1)		
Child has HIV					
Yes	14(43.8)	17(53.1)	1(3.1)	0.507	0.776
No	176(47.8)	174(47.3)	18(4.9)		

Table 6: Association between Educational Status of parents and risk factors

Major risk factors	Education Status		X^2	P-value
	Educated	Uneducated		
Malnutrition				
Yes	78(30.1)	181(69.8)	20.58	0.0001
No	75(53.19)	66(46.8)		
Duration of breastfeeding				
<6month	79(31.5)	172(68.5)	18.748	**0.0001**
>6month	74(49.7)	75(50.3)		
Birth weight				
<2.5	89(32.8)	182(67.2)	24.517	0.0001
>2.5	64(49.6)	65(50.4)		

The table showed a statistically significant association between some major risk factors like malnutrition, birth weight, breastfeeding duration, and the educational status of parents ($p<0.05$). The uneducated (69.8%, 68.5%, and 67.2% has children with significant levels of malnutrition, did not breastfeed for up to 6 months, and had children with low birthweight, respectively)

DISCUSSION

In this study, we evaluated certain risk factors of Pneumonia in under five children and socio-demographic characteristics of both the children and their parents. These risk factors considered include Malnutrition, HIV, birthweight, breastfeeding, and Pneumococcal vaccine. Our study recorded a high prevalence of some major risk factors, including malnutrition, low birth weight, and breastfeeding below six months duration, all of which recorded above 60% prevalence rate. The study showed that a more significant percentage of parents (55%) showed no knowledge of Pneumonia. Other workers had equally identified poor knowledge on the part of the mothers as being responsible[15]. This result indicates that inadequate knowledge of pneumonia on the part of the parents, particularly the mothers, may affect their awareness to seek adequate healthcare facilities that may impede appropriate medical care and, therefore, contribute to the deterioration of acute respiratory infection. The study also recorded a significant association between sex and risk factors such as malnutrition, breastfeeding, and underweight children.Malnutrition has long been associated with poverty, poor diet, and inadequate access to health care. It remains a key global health issue that both stems from and contributes to ill-health, with 50 % of childhood deaths due to underlying under nutrition. [16]. The girls in this study accounted for more impact on these major risk factors than the boys. This may be connected with the boy child's age-long societal attention at the expense of the girl child. Some workers, however, observed that Boys were significantly more stunted, underweight, and wasted than girls[16].

Malnutrition, which is a consequence of poor nutrition and repeated infections, is the underlying cause of death in around one-third of all deaths among these children, of which one-half can be averted by optimal breastfeeding practices [17]. These include exclusive breastfeeding for six months and continued breastfeeding for two years. They are especially critical to preventing diarrhea and Pneumonia, which are the two major causes of death in infants and young children [17][18]. Promoting, protecting, and supporting breastfeeding through the Baby-friendly Hospital Initiative (BFHI) is a global initiative lead by UNICEF and WHO in 1991 [19] and updated in 2009 [20] and again in 2017 [21] and aims at improving exclusive breastfeeding rates by implementing the Ten steps to successful initiation and continuation of breastfeeding.Breast milk contains a lot of immune protective substances besides nutritious substances. They protect the baby since its immune system is yet to be formed perfectly [22]. Also, nutrition factors may have played an important role in the development of low birth weight since a low birth weight baby will be born to a generation with nutrition deficiency [22].

The study also showed no statistically significant association between the sex of the child and no. of risk factors. However, females recorded more risk factors than males. Also, there was no statistically significant difference between the age group of children and risk factors.

The study equally highlighted the importance of education in childhood pneumonia. Our findings showed a statistically significant association between some major risk factors like malnutrition, low birth weight, lower duration of breastfeeding activities, and parents' educational status ($p<0.05$). Also, the results showed that those that were uneducated failed to maintain breastfeeding of their children for more than six months. Some mothers' level of knowledge is very vital in controlling the incidence of Pneumonia in under five children. This can be done as a health promotion measure during antennal visits of the mothers before childbirth. Health education can equally be taken inside rural communities advocating for

an increase in awareness and health-seeking behaviors among pregnant mothers and women of childbearing age.

Pneumonia and malnutrition are two of the biggest killers in childhood. Guidelines for the care of children with Pneumonia and malnutrition need to consider this strong and often lethal association if they are to contribute to the UN Sustainable Development Goal 3, aiming for substantial reductions in childhood mortality.

CONCLUSION

Pneumonia in children under five years of age is a leading cause of morbidity and mortality in Tanzania and other developing countries. Malnutrition, inadequate breastfeeding, and low birth weight are the most typical risk factors that lead to childhood pneumonia. Also, knowledge of the mother on Pneumonia and their educational status could equally contribute to childhood pneumonia. There is a need to take actions directed against the above risk factors that may help prevent the primary cause of death of children younger than 5 years old.

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