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The Pattern of Respiratory Diseases among Children Admitted in the Children Emergency Ward, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Aim: Respiratory diseases are common causes of childhood morbidity and mortality worldwide. Variations in the pattern of respiratory diseases exist globally, due to environmental conditions, poverty, hygiene and so on. This study sought to determine the pattern of respiratory diseases among children admitted into the emergency ward of the University of Port Harcourt Teaching Hospital.
Study Design: Retrospective cross-sectional study.
Setting and Duration of Study: Children Emergency Ward of the University of Port Harcourt Teaching Hospital, between January 2019 and January 2021.
Methodology: This was a retrospective cross-sectional study. Data were collected from case notes of 3,851 children, aged two months to 18 years, admitted to the University of Port Harcourt

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Teaching Hospital, over three years.
Results: Respiratory diseases accounted for 500 (13%) of the total admissions, and was more common among males than females (M: F = 1.3:1). The mean age of children with respiratory illnesses was 2.27±4.6 years. Infectious causes {443 (88.6%)} were significantly higher than non-infectious causes {57 (11.4%)}, p<0.001. Bronchopneumonia, bronchial asthma and bronchiolitis were the commonest morbidities seen, accounting for 394 (78.8%), 34 (6.8%) and 22 (4.4%) of cases respectively.
Conclusion: The prevalence of respiratory diseases is high. Infectious causes are still prevalent with cases presenting more during the dry season. Measures to reduce environmental pollution and enhance immunization can greatly reduce respiratory diseases among children.

Keywords: Pattern; respiratory; diseases; children.

1. INTRODUCTION

A wide range of diseases affect the respiratory system. These may include non-life-threatening conditions like common cold, tonsillitis, bronchiolitis to severe disorders such as tuberculosis, pneumonia, asthma and foreign body aspiration [1]. These disorders can affect any part of the airway, whether upper or lower and may be of infectious or non-infectious origin [2].

Infections of the respiratory system are a major cause of hospital admissions [3], illnesses, and death globally [4] · A systematic analysis of the global burden of diseases reported that lower respiratory tract infections alone are responsible for 2.74 million fatalities and 103 million disability-adjusted life years among children and adults [5]. Furthermore, the World Health Organization (WHO) had documented that about 10.6 million children less than five years die each year as a result of acute respiratory infections (ARI), with pneumonia accounting for about 19% of all deaths [6] and contributing significantly to hospital admissions [7,8]. In a study done in Tanzania, pneumonia and pulmonary tuberculosis accounted for 82.1% mortality among the study population [9]. In Nigeria, pneumonia was responsible for about 20% of mortalities in children less than five years[3] and has been reported to be a leading cause of hospital admissions [3,10-13]. In a study carried out among children in Port Harcourt, the prevalence of pneumonia was 13.2% and was observed to be a leading cause of morbidity and mortality in the region [13]. Asthma, on the other hand, is a leading cause of non-infectious respiratory disorder among children and adults and has been projected to be responsible for ≤0.7 per 100 000 death rates in children [14].

The direct and indirect costs of diagnosis and treatment for respiratory disorders place a major financial burden on the healthcare system and individual families [15]. This is particularly true for low-middle-income countries, where infectious causes of respiratory diseases predominate and the cost of care is largely out of pocket. In Nigeria, studies have been done in different locations, to determine the pattern of respiratory diseases [11,16]. However, due to different climatic and environmental factors, results differ from region to regions [16]. In addition, illegal oil exploration activities in Port Harcourt, which have been responsible for the outbreak of black soot contribute to environmental pollution and may have an impact on the state's respiratory disease pattern [15]. Therefore, regular health facility-based assessments of child health is necessary to provide information needed for evidence-based decisions and policy making that will reduce morbidity and mortality in childhood [17]. The aim of this study was to determine the pattern of respiratory diseases among children admitted in the emergency ward of the University of Port Harcourt Teaching Hospital, Rivers State.

2. MATERIALS AND METHODS

2.1 Study Design/Setting

This was a retrospective cross sectional descriptive study carried out over three months (June – August 2022), among children who presented to the children emergency ward (CHEW) of the University of Port-Harcourt Teaching Hospital (UPTH). The University of Port Harcourt Teaching Hospital is a tertiary hospital located at the Southern part of Nigeria. The hospital accepts referrals from both public and private hospitals within and outside the state. Patients are also seen on self-referral.

The Paediatric department has several wards including the CHEW. The CHEW is where all children aged 1 month to 17 years, who present

with emergencies are first stabilized and managed.

2.2 Study Population

All children aged 1 month to 17 year who were admitted into the CHEW between January 2019 – January 2021 with a diagnosis of a respiratory disease.

2.3 Methods

The records of patients admitted into the emergency ward between January 2019 - January2021 were obtained from the emergency record. Their folder numbers and the diagnosis made were obtained. Hospital records of patients with a diagnosis of respiratory disorder were retrieved from the hospital record office. The diagnosis of respiratory diseases was made following a detailed medical history, clinical examination and relevant laboratory and radiologic investigations. Information obtained from the case notes retrieved were: Age of patient, sex, month in which patient was admitted and the diagnosis that was made. The months in which patients were admitted was further divided into dry or rainy season. Dry season is between the months of November to March while rainy season is between April to October.

Data was entered into excel; was exported to SPSS after data cleaning was done.

2.4 Data Analysis

A descriptive analysis was done using IBM statistical product and service solution (SPSS) version 25. Results were presented as frequency tables, percentages and charts. Student t-test was used to determine age differences while Chi square test was done to compare subgroups. A p value of ≤ 0.05 was considered significant.

3. RESULTS

A total of 3,857 patients were seen in the CHEW. Two thousand and seventy-two (53.8%) were males while 1779 (46.2%) were females. Five hundred (13%) had respiratory diseases. Males were 1.2 times more likely than their female counterpart to have respiratory diseases (OR 1.2, 95% CI 097-1.49). There was no significant sex difference in the distribution of respiratory diseases, p 0.08 (Table 1).

Table 2 shows the distribution of respiratory diseases among study participants based on their ages, sex, aetiology and season of presentation.

Of the 500 participants who had respiratory diseases, 262 (52.4%) of them were males, giving a male to female ratio of 1.5:1. Their ages ranged from 4 months to 10 years with a mean age of 2.27±4.6 years, the mean age for the males was 2.5±4.7 years while that of females was 1.9±4.9 years. This was not significant; t=1.30, p=.20.

Concerning the proportion of respiratory disease by age group, 262 (52.4%) of the participants were less than a year old, this was followed by 174 (34.8%) children aged 1-5 years. Four hundred and forty-three (88.6%) of the cases were of infectious origin. Three hundred and twenty-two (64.4%) of the cases occurred during the dry season.

Table 3 shows the types of respiratory diseases the children presented with. Bronchopneumonia was the highest and was seen in 394 (78.8%) participants, while the least diagnosed was pertussis as seen in 3(0.6%) participants.

Concerning the age distribution of the various types of respiratory diseases, 368(93.4%) participants under 5 years of age had pneumonia. Of the 34 participants that had bronchial asthma, 24(70.6%) of them were five years and above (Table 4).

Of the 500 participants with respiratory diseases 322(64.4%) presented during the dry season, while 178 (35.6%) presented during the rainy season. The seasonal variation in the prevalence of respiratory diseases was statistically significant p = 0.0005 (Table 5).

Table 1. Prevalence of respiratory diseases and sex distribution in the study population

Variables	Respiratory	Diseases	
Sex	**Yes**	**No**	**Total**
Male	287 (13.9%)	1,785 (86.1%)	2,072 (100.0%)
Female	213 (12.0%)	1,566 (88.0%)	1,779 (100.0%)
Total	500 (13%)	3,351 (87.0%)	3,851 (100.0%)

X^2 = 2.98, DF = 1, P = .08. OR = 1.2, 95% CI = .97-1.49

Table 2. Distribution of respiratory diseases by age, sex, aetiology and seasonal variation

Variable	Frequency (n)	Percentage (%)
Distribution of Respiratory Diseases by:		
Sex		
Male	287	57.4
Female	213	42.6
Total	500	100.0
Age		
< 1 year	262	52.4
1-<5 years	174	34.8
5-10 years	35	7.0
10 years	29	5.8
Total	500	100.0
Aetiology		
Infectious	443	88.6
Non-infectious	57	11.4
Total	100	100.0
Seasonal Variation		
Rainy season	178	35.6
Dry season	322	64.4
Total	500	100.0

Mean age 4.6±4.2 years; Males 4.7.5±2.3 years; Females 4.9± 1.9 years; t=1.30, p=.20

Tabe 3. Types of respiratory diseases admitted in the children emergency ward

Respiratory Diseases	Frequency (n)	Percentage (%)
Bronchopneumonia	394	78.8
Bronchial Asthma	34	6.8
Bronchiolitis	22	4.4
Adenotonsillitis	12	2.4
Foreign body aspiration	11	2.2
Aspiration Pneumonitis	9	1.8
Croup	4	0.8
Pulmonary Tuberculosis	4	0.8
Lobar Pneumonia	4	0.8
Laryngomalacia	3	0.6
Pertussis	3	0.6
Total	500	100.0

Table 4. Age distribution of respiratory diseases admitted in the children emergency ward

Variables	Age groups				
Respiratory Diseases	**< 1 year**	**1 - <5 year**	**5 - 10 years**	**>10 years**	**Total (%)**
Bronchopneumonia	234 (59.4)	134 (34.0)	15 (3.8)	11 (2.8)	394 (100.0)
Bronchial Asthma	0 (0.0)	10 (29.4)	12 (35.3)	12 (35.3)	34 (100.0)
Bronchiolitis	14 (63.6)	8 (36.4)	0 (0.0)	0 (0.0)	22 (100.0)
Adenotonsillitis	1 (8.3)	7 (58.3)	2 (16.7)	2 (16.7)	12 (100.0)
Foreign body aspiration	2 (18.2)	8 (72.7)	1 (9.1)	0 (0.0)	11 (100.0)
Aspiration Pneumonitis	5 (55.6)	3 (33.3)	1 (11.1)	0 (0.0)	9 (100.0)
Croup	1 (25.0)	2 (50.0)	1 (25.0)	0 (0.0)	4 (100.0)
Pulmonary Tuberculosis	1 (25.0)	0 (0.0)	1 (25.0)	2 (50.0)	4 (100.0)
Lobar Pneumonia	0 (0.0)	0 (0.0)	2 (50.0)	2 (50.0)	4 (100.0)
Laryngomalacia	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)
Pertussis	1 (33.3)	2 (66.7)	0 (0.0)	0 (0.0)	3 (100.0)
Total (%)	262 (52.4)	174 (34.8)	35 (7.0)	29 (5.8)	500 (100.0)

Table 5. Relationship between the seasons of the year and the proportion of respiratory diseases by aetiology

Variables	Season of the Year		
Respiratory Disease Category	**Raining**	**Dry**	**Total**
Infectious	146 (33.0)	297 (67.0)	443 (100.0%)
Non-Infectious	32 (56.1)	25 (43.9)	57 (100.0%)
Total	178 (35.6)	322 (64.4)	500 (100.0%)

X^2 = 11.82, DF = 1, p = .0005, OR = 2.60, CI= 1.49 – 4.56

Fig. 1 shows the trend of respiratory diseases according to the various month of the year. The peak period of presentation was between October /November while the lowest was between April and June.

4. DISCUSSION

This study shows that respiratory diseases This study shows that respiratory diseases contribute significantly to admissions in the Children Emergency Ward (CHEW), accounting for 13.9% of all admissions during this period. This finding is lower than the 25.7% recorded by George and Tabansi in 2010 [17,18], though both studies were conducted in the same location. Although, the proportion of children who received their immunization was not part of this study, the lower prevalence observed of respiratory diseases in this study may be attributed to Nigeria's incorporation of the Haemophilus influenza (type b) and Pneumococcal Conjugate Vaccines into the National Programme for Immunisation (NPI) schedule, thereby making these vaccines readily available to eligible children at no financial cost and hence, reducing the incidence of respiratory diseases among children. Other studies carried out in Southern Nigeria [2,11] also recorded higher prevalences of respiratory diseases compared to the index study. This may be because these studies reviewed patient's records over a longer period with a much larger sample size when compared to present study. Since the aetiology of respiratory diseases among children in Nigeria are mostly due to infections [2,13], scaling up immunization coverage to target preventable causes can significantly reduce its prevalence.

The majority of the subjects with respiratory diseases were under five years, similar to findings by Ibraheem et al [16] and Yiltok et al [12] The reason for this observation may be due to smaller airway diameters in this age group that can increase the risk of blockage by secretions, less compliant lungs and immature immune systems [19,20], This further buttresses the need to advocate for favorable health policies in children, particularly in this vulnerable age group, as a key to reducing childhood morbidity and mortality.

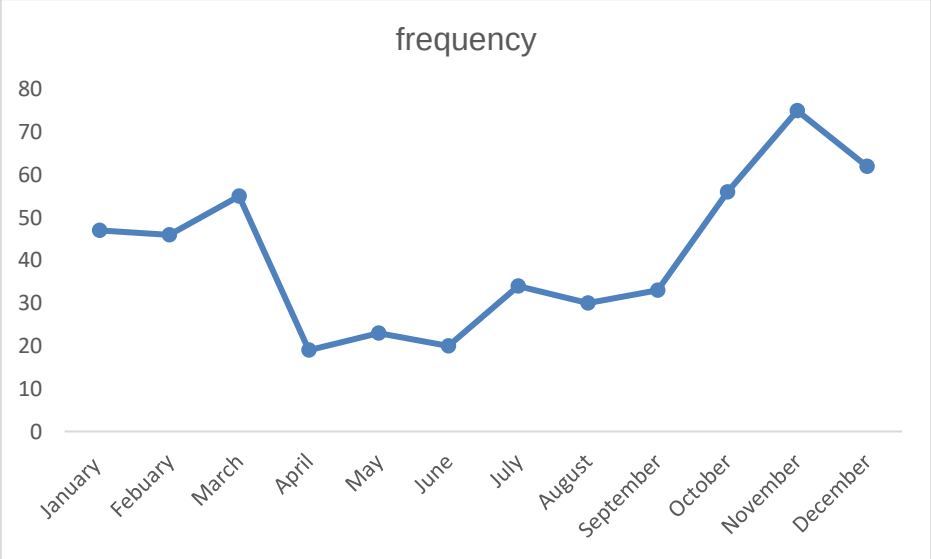

Fig. 1. Trend of respiratory diseases according to the various months

Although the proportion of respiratory disease was slightly higher in males than females, this difference was not significant. The reason for this is not immediately apparent. However, a plausible explanation may be because of the preference bestowed on the male child by our tradition/culture [21], thus, parents do not delay to bring them to the hospital once they are ill.

Respiratory diseases due to infectious causes were significantly higher than non-infectious causes, similar to what was reported in other studies. [2,3,11]. This may be due to poor hygienic conditions, fuelled by poverty and overcrowding that is still prevalent in our environment. Of the infectious causes, pneumonia was the commonest observed in this study and was higher than the 46.09% reported by Oloyede et al [11]. The reason for this difference may be due to the prevalent black soot pollution present in the state where the index study was done, even though both studies were carried out in locations with similar mangrove swamps and tropical rainforests with prolonged rainy seasons.

It is important to note the low number of tuberculosis case in this study compared to older studies. [2,3]. This may be due to devolvement of some aspects of tuberculosis care to primary health centres within the communities, thereby improving access to anti-TB drugs. Additionally, the use of HAART by HIV-infected mothers may have also resulted in a decrease in children infected with HIV, thereby reducing the risk of HIV-TB co-infection.

Bronchial asthma was the commonest non-infectious respiratory disorder, similar to what was obtained in other studies, [2,11] With the high level of soot in Port Harcourt [15] it was expected that the prevalence of asthma would have been higher in this study, we however had a low prevalence of 6.8% which is within the 1-18% reported by the Global Initiative for Asthma [22]. The low prevalence may be attributed to the age of the study participants as more than half of them were less than five years of age and it has been reported that asthma is more common among the older age group compared to children less than 5 years [14]. It could also be possible that the patients and caregivers have a better knowledge of managing Asthma at home making them to present less in the emergency room.

Contrary to other studies [4,5], this study showed significantly higher cases of respiratory diseases during dry seasons compared to the rainy seasons. Similarly, another study in Rivers State [14] reported an increase in acute respiratory infections among under-fives during dry season, although their finding was not statistically significant. This observation may be due to the absence of rainfall to wash away environmental/atmospheric black soot that is usually more marked during the dry season. Increased dust and sporulation of plants, resulting in the air being polluted by pathogens and pollens have also been proposed as plausible explanations [11,12,23].

5. CONCLUSION

The prevalence of respiratory disease is high and still prevalent among under- fives. There is a higher prevalence of infectious causes compared to the non-infectious causes. Environmental and climatic factor increases the odds of having respiratory diseases in this study. It is recommended that measures to reduce infections and environmental pollution be put in place to reduce the burden of respiratory diseases among children.

DISCLAIMER

Abstract of this manuscript was previously presented and published in the conference: 52nd – 53rd Annual General and Scientific Conference of the Paediatrics Association of Nigeria (PANCONF), dated from 18th - 22nd January, 2022 Nigeria, Web Link of the proceeding: https://medicalworldnigeria.com/post/Communique-Issued-at-the-End-of-52nd53rd-Scientific-Conference-and-Annual-General-Meeting-of-the-Paediatric-Association-of-Nigeria?pid=57287

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical clearance was obtained from the Ethical committee of the University of Port Harcourt Teaching Hospital

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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