



Prevalence and Pattern of Non-communicable Diseases in Children in Jos, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author ESY conceived and designed the study, performed the statistical analyses and wrote the first draft. Author HOA managed the analyses and literature search. Authors IAA, AODO and EUE collected the data and managed the analyses. Author ESO contributed to the design of the study and managed statistical analyses. All authors read and approved the final manuscript.

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ABSTRACT

Aims: In most developing countries there is limited information on the burden of Non Communicable Diseases (NCD); even though recent findings in the developed world are predicting rapid transitions in these NCDs. This study was carried out to determine the prevalence and patterns of NCDs in children in Jos, Nigeria.

Study Design: This is a retrospective review of children admitted with NCDs.

Place and Duration of Study: Emergency Pediatric Unit (EPU) of Jos University Teaching Hospital (JUTH), Jos Nigeria between January 2012 and December 2012.

Methodology: The study included 258 (150 males; 108 females; age ranged 1 month – 17 years) that were admitted with NCD (out of a total of 655 patients admitted from January to December 2012). Neonates and patients with inconclusive diagnoses were excluded. The bio-data and diagnosis of each patient was obtained and entered into Epi Info version 7.2. The categorical data

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were analyzed using student t-test while continuous variables were analyzed with the chi-square test. *P* value of < 0.05 was regarded as statistically significant.

Results: Two hundred and fifty eight children of the 655 patients admitted during the period under review had NCDs giving a ratio of 0.7:1 compared to Communicable Diseases (CDs). The age group most affected was the 1 month - 5 years with the commonest NCDs being sickle cell disease (37%), severe protein energy malnutrition (8.5%), seizure disorders (7.8%), congenital heart diseases (6.6%) and malignancies (6.6%).

Conclusion: The burden of NCDs is great and on the rise even in the developing world and urgent measures need to be put in place if these trends are to be averted and children are to grow into healthy and productive adults.

Keywords: Non-communicable diseases; prevalence; pattern; children.

DEFINITIONS

Non communicable diseases (NCDs): They are medical conditions or diseases that are non-transmissible and non-infectious.

Communicable diseases (CDs): They are medical conditions that are infective and transmissible.

Neonate: A newborn child under 28 days of life.

ABBREVIATIONS

CDs : Communicable Diseases.
EPU : Emergency Pediatric Unit.
HREC : Health Research Ethical Committee.
JUTH : Jos University Teaching Hospital.
NCDs : Non Communicable Diseases.
PEM : Protein Energy Malnutrition.
POPD : Paediatrics Out-Patient Department
SCD : Sickle Cell Disease.
WHO : World Health Organization.

1. INTRODUCTION

Non-communicable diseases (NCDs) are medical conditions or diseases that are non-transmissible and non-infectious. These conditions are known to affect children, although there is a common misconception that NCDs affect only adults [1]. Children and adolescents are heavily impacted by NCDs with reports of 1.2 million children and youth under the age of 20 years dying of NCDs in 2002 [2,3] alone, and more than 25% of obese adolescents having signs of diabetes by age 15 years [3,4,5]. In cancer management, despite improvements in survival for some childhood cancers in the developed countries [1], survival is much lower in resource-poor countries. Ninety percent of the 1 million children born each year with congenital heart diseases live in areas without adequate

medical care [6]. The prevalence of sickle cell anemia in Nigeria is about 2% with over 3 million Nigerians, mostly children being affected [7]. The WHO recently tagged Nigeria as 'the world headquarters of sickle cell anemia' [7].

Despite all these findings above, over the years more emphasis has been on infectious diseases, with little attention being paid to NCDs in this sub-region. However the long-term effect of these NCDs might become evident in adulthood. Therefore, recently global attention is being focused on NCDs and their impact on global morbidity and mortality. In September 2011, the United Nations General Assembly made a declaration on the need to prevent and control NCDs because of the increasing impact of NCDs on children and adolescents whilst recognizing the need to protect them from these diseases [8]. Therefore, systematic efforts to prevent NCDs and ameliorate their burden are now part of global health strategy. WHO is encouraging health systems to respond to the needs of people with NCDs to reduce mortality by 50%. Therefore, research is needed to estimate the burden of these diseases in our environment. Not much literature on the prevalence of NCDs in children is available in Nigeria, and so research is pertinent in estimating the burden of these diseases.

In Jos University Teaching Hospital (JUTH), clinicians see many patients with NCDs but the prevalence and pattern of these diseases are yet to be documented. Therefore, in order to key into the preventive and control measures of these diseases, this study was conducted to determine the prevalence and pattern of NCDs seen between January and December 2012. The findings will help to understand the magnitude of the problem and also to help plan for the care and treatment of these children in our environment through capacity building of

professionals and provision of relevant equipment and diagnostic tools to cater for their needs.

2. METHODOLOGY

2.1 Study Area

The study was conducted in the Department of Paediatrics of the Jos University Teaching Hospital, Jos, Nigeria. The hospital has a bed capacity of about 500 and it receives referrals from neighboring States like Benue, Nassarawa, Kogi, Kaduna, Taraba, Gombe, Bauchi, Niger and the Federal Capital Territory. The Paediatrics unit has a capacity of about 90 beds excluding the special care baby unit. Paediatric emergencies are seen in the Emergency Paediatric Unit (EPU) while patients who have been discharged from admissions and those with chronic diseases or referrals of non-emergency cases are seen/ followed up in the Paediatric Outpatient Department (POPD). There is also a General Outpatient Department where non-emergency cases are seen daily.

2.2 Study Design

The study was a retrospective descriptive study where all records of children admitted into the Emergency Paediatric unit (EPU) of Jos University Teaching Hospital in 2012 were retrieved and reviewed. The bio-data and diagnoses for the children was obtained from the hospital register and entered into Epi Info version 7.2. The categorical data were analyzed using student t-test while continuous variables were analyzed with the chi-square test. *P* value of <0.05 was regarded as statistically significant. Patients whose diagnoses were inconclusive and neonates were excluded from the study.

3. RESULTS AND DISCUSSION

A total of six hundred and fifty five (655) patients were admitted into the Emergency Paediatric Unit (EPU) of JUTH in 2012: 649 had definitive diagnosis, while 6 had an inconclusive diagnosis and were excluded from the study. There were 258 patients with NCDs and 391 with CDs given a ratio of 0.7:1. There were more males (150) than females (108) that were treated with NCDs with a ratio of 1.5:1. More children within 1 month – 5 years age group (51.9%) had NCDs followed by 6 – 10 years (21.7%) and 11–15 years (17.1%) as shown in Table 1. Sickle Cell Disease (SCD) was the commonest NCD (37%) followed by severe Protein Energy Malnutrition (PEM)

(8.5%) and Seizure Disorders (7.8%) as shown in Table 2.

Table 1. Frequency of non communicable diseases based on age group

Age group	Frequency (%)
1 month-5 years	132(51.2)
6-10 years	58(22.5)
11-15 years	45(17.4)
16-17 years	23(8.9)
Total	258(100.0)

4. DISCUSSION

The results of this study showed that about 40% of children that were managed within the period under review had NCDs. This supports the fact that the burden of NCDs is high and may soon surpass the communicable diseases if steps are not taken to address them urgently. This rate is higher than what was previously reported by Otaigbe et al. [9] in Port Harcourt, and Emodi et al. [10] in Enugu whose studies documented NCDs accounting for 19.8% and 24% respectively of all admissions in their children's ward. On the other hand there was similarity in the gender ratio of male to female of 1.5:1 in Enugu in keeping with findings in our study. The reason for the higher prevalence observed in our study could be due to the fact that the other two studies were carried out in 2008 while our study was done four years later, possibly due to the fact that the incidence of NCDs is rising even in the developing countries. This is in line with the projection [11,12,13] that by 2020 the prevalence of NCDs in individuals aged 15-59 years would rise to between 37% and 42%.

The peak age of occurrence of NCDs in this study was in the 1 month-5 years age group. This was unlike what was observed in the Enugu study [10] where the peak age of occurrence was in the 6-11 years age group. This suggests that NCDs are becoming a significant cause of morbidity even in the under-fives, worsening the disease burden of those already over-burdened by infectious diseases.

The commonest NCDs were sickle cell disease (37%), severe protein energy malnutrition (PEM) (8.5%), seizure disorder (7.8%), congenital heart diseases (6.6%), and malignancies (6.6%). This is similar to the pattern of NCDs reported in the Port Harcourt study [9]. In the Enugu study [10] the diseases were grouped based on systems affected, though the similarities could still be

observed. However these findings were at variance with reports in the adult population where hypertension, diabetes, obesity, chronic respiratory conditions, and cancers were the leading NCDs [14,15]. Therefore geographical and age group-specific NCD patterns need to be established in order for efforts for their control to be directed in a meaningful manner. This is especially relevant in resource-poor communities, where treatment modalities may not be readily available.

The contribution of sickle cell disease and its complications to the burden of NCDs is worth noting; emphasizing the need for pre-marital and prenatal screening protocols, counselling and early diagnosis of this disease as facilities for bone marrow transplant are not readily available and out of the reach of the average Nigerian.

Severe PEM was the second commonest NCD documented in this study and this contribution is quite significant considering recent findings to support the hypothesis that infant and young child under-nutrition increases the risk of developing nutrition-related NCDs [16,17]. Recent empirical studies have demonstrated that

many common manifestations of under-nutrition, such as intra-uterine growth restriction (IUGR), low birth weight, and stunting are all significantly associated with later development of hypertension, insulin resistance, and obesity [16,17]. Suffice it to say; addressing infant and young child under-nutrition is therefore not only important to preventing the immediate threats of child morbidity and mortality but also to reducing the risk of NCDs later in life [17].

It is surprising to note that unlike the previous studies carried out in Nigerian children [9,10], where seizure disorder was not significant, seizure disorder was the 3rd commonest NCD noted in this study. The peak prevalence was noted in children under the age of five years. This would lend credence to previous studies [18,19] that described birth asphyxia as the commonest etiology of epilepsy in Nigeria. However, the prevalence of cerebral palsy (CP) was however low in this study. This is because children with CP usually present at the outpatient department and are only seen at EPU when they have serious illnesses. The patients used for this study were admissions into the emergency paediatric unit.

Table 2. Common NCDs stratified by age group

NCDs	1 month – 5 years	6-10 years	11-15 years	16-17 years	Total (%)
Sickle cell disease	48	25	16	7	96 (37)
Severe PEM	22	0	0	0	22 (8.5)
Down syndrome	5	0	0	0	5 (1.9)
Congenital heart disease	14	1	2	0	17 (6.6)
Seizure disorders	10	1	6	3	20 (7.8)
Malignancies	6	6	4	1	17 (6.6)
Congenital pyloric stenosis	4	0	0	0	4 (1.6)
Chronic kidney disease	3	3	1	4	11 (4.3)
Acute rheumatic fever	0	2	1	0	3 (1.2)
Rheumatic heart disease	0	6	3	2	11 (4.3)
Acute glomerulonephritis	0	5	2	2	9 (3.4)
Poisoning	1	0	1	0	2 (0.8)
Spina bifida	2	0	0	0	2 (0.8)
Nephrotic syndrome	1	1	0	0	2 (0.8)
Diabetic ketoacidosis	0	1	2	1	4 (1.6)
Dilated cardio-myopathy	1	0	1	0	2 (0.8)
Acute severe asthma	1	1	1	0	3 (1.2)
Cerebral palsy	2	0	0	0	2 (0.8)
Others*	12	6	5	3	26 (10.0)
Total	132 (51.2%)	58(22.5%)	45 (17.4%)	23 (8.9%)	258 (100)

Others means uncommon NCDs like Intestinal obstructions, conversion disorder, urolithiasis, dystonic reactions etc.*

Malignancies –these were Burkitts lymphoma 6 cases, acute leukemia 4 cases, Non- Hodgkin's lymphoma 2 cases, Wilms tumor 2 cases. One case each of bilateral retinoblastoma, liver carcinoma and an intracranial tumor
PEM = Protein Energy Malnutrition

A significant number of women in Nigeria still deliver at home unsupervised or attended to by unskilled birth attendants thereby increasing the risk for birth asphyxia [20,21]. Nigeria therefore must implement intervention measures aimed at ensuring that every woman has timely access to skilled care during pregnancy and at delivery to reduce this preventable cause of NCDs in children.

Congenital heart diseases and malignancies were found to have a prevalence of 6.6% each in this study and the peak incidences were also in under five children. This goes to show that the health problems of children under the age of five is definitely more than just the communicable diseases and that preventive measures for both communicable diseases and non-communicable diseases need to be directed specially to this age group in order to reduce the incidence and prevalence of NCDs and in the long run the morbidity and mortality of children in general.

Previous studies in healthy Nigerian school children in South Western and Northern Nigeria showed the prevalence of overweight/obesity to be 17.4%, 3.1%, and 4.7% respectively [22,23,24]. A review by Wang showed that there are higher prevalence of obesity in developed countries like USA (25.4%), Russia (16%) and China (7%). [25] However, the prevalence of obesity, diabetes mellitus and hypertension was low in this study. This is likely due to the fact that many patients seek care outside the health facilities such as spiritual homes and traditional healing centres. This might have been worsened by the perceived higher cost of seeking for care in health facilities. In addition, the nutritional problem in our environment still remains under-nutrition rather than obesity because of poverty, ignorance and illiteracy. Also, hypertension in children is usually secondary, therefore, they would have been grouped under their primary diagnosis and that would have also accounted for the low prevalence in this study.

According to WHO, NCDs accounted for 24% of the total mortality in Nigeria in 2012 [26], therefore the contribution of NCDs to morbidity and mortality requires special attention. Cost-effective interventions provided and delivered through basic health services during childhood, can prevent death and disability; enabling children live long, healthy, productive and fulfilling lives [27].

5. CONCLUSION

The burden of NCDs is great and on the rise even in the developing world and urgent measures need to be put in place if these trends are to be averted and if children are to grow into healthy and productive adults.

We recommend the following measures to help reduce the prevalence of NCDs in children: Routine premarital screening and counseling to help reduce the incidence of individuals that are carriers of the sickle cell gene getting married to each other; routine screening for SCD at 6 months of age be incorporated into the immunization programme in Nigeria for early diagnosis and treatment; reinforcing child survival through emphasis and re-emphasis on child survival strategies.

Given the rising trend of NCDs in our hospital there is need for provision of equipment and training and re-training of healthcare workers to be able to provide appropriate care and treatment for affected children.

The limitation of this study was that it was a retrospective study, and some aspects of the socio-demographic data that would have enriched the study were not captured.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval for this study was obtained from the Health Research Ethical Committee (HREC) of Jos University Teaching Hospital (JUTH).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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