

The Pattern and Trend of Non-Communicable Diseases in Children in Jos, North Central Nigeria: A Four-Year Review

ABSTRACT

Aims: Non-communicable diseases (NCDs) are becoming significant causes of morbidity and mortality. However very little information is available in our setting on the trend of NCDs in children. The aim is to determine the pattern and trend of NCDs in children in Jos, Nigeria.

Study design: This is a retrospective study of patients that were admitted and managed for NCDs. The relevant clinical information was extracted from the hospital records.

Place and Duration of Study: The Emergency Paediatric Unit (EPU) of the Jos University Teaching Hospital (JUTH), Jos Nigeria, between January 2012 and December 2015.

Methodology: The study was a retrospective descriptive study where all records of children admitted into the EPU of JUTH within the period under review were retrieved. The bio-data of all patients and diagnoses made during the course of admission were documented. Those with inconclusive and neonates were excluded. Data collected were entered into Epi Info version 7.2. The categorical data was analyzed using student t-test while continuous variables were analyzed with the chi-square test. P value < 0.05 was regarded as statistically significant.

Results: A total of 2273 children were seen during the study period of which 36.7% had NCDs with a prevalence ranging from 20.5% - 40.5%. The three commonest NCDs were sickle cell disease (SCD), seizure disorder and severe protein energy malnutrition (PEM). There was a steady increase in the prevalence of seizures and PEM over the period. The prevalence of the diseases fluctuated over the years under review.

Conclusion: The burden of diseases in children is shifting from communicable to non-communicable diseases as shown in the rising trend in our study. Therefore, there is an urgent need for relevant stakeholders to develop and ensure implementation of policies to curtail this menace which is also increasing the morbidity and mortality of children especially those under five years.

Keywords: Children, Non-communicable Diseases, Trend, admission

1. INTRODUCTION

Non communicable diseases (NCDs) are chronic non-transmissible medical conditions now occurring with alarming frequency in children capable of causing debilitation and disability.¹⁻⁴ Though common infectious and parasitic diseases such as malaria and the HIV/AIDS pandemic remain major unresolved health problems in many developing countries, emerging non-communicable diseases have been increasing over the last two decades, thus creating a double burden of disease and impacting negatively on already over-stretched health services in these countries.⁵ These NCDs include diseases like sickle cell disease, diabetes mellitus, neurological disorders (like seizure disorders, cerebral palsy, mental retardation), renal conditions (like nephrotic syndrome, chronic renal failure), cardiovascular disorders (like congenital heart diseases, valvular heart diseases), injuries etc. NCDs are the most frequent cause of death in

most countries and account for nearly two thirds of all deaths globally and 80% of NCD deaths occur in low and middle income countries.^{1,2,6,7} For example, in 2008 NCDs accounted for 36 million out of the 57 million deaths worldwide. These deaths were mainly due to cardiovascular diseases, cancers, diabetes, and chronic lung diseases and these deaths are more than all other causes combined.^{1,7}

The World Economic Forum identifies NCDs as top threat to the global economy and if current trends continue, NCD deaths will increase by 15 per cent over the next decade, reaching 44 million a year.¹ While infectious disease deaths are projected to decline by about 7 million over the next 20 years, cardiovascular diseases and cancer deaths are expected to increase by 10 million.¹ Death due infections have decreased but those due to NCDs are rising.⁸

The trend over the last decade is that the burden of NCD has increased⁹ even in Low and Middle income countries due to continuous change in lifestyle.^{3,10-16} The disease burden in developing countries is still high and because of the limited resources available, there is need to allocate resources to areas that are needed. This can be achieved when disease patterns are constantly reviewed by health institutions. Therefore, this study was undertaken in Jos University Teaching Hospital (JUTH) Jos, Nigeria, to determine the trend of NCDs in children admitted into the Emergency Paediatrics Unit of JUTH over a 4 year period. This will help to identify the pattern and trend of NCDs and determine if these problems are on the rise. The findings will also serve as a baseline for future research on identifying the risk factors for NCDs in our environment. It is hoped that the resultant conclusions would enable the government and health institutions to selectively allocate resources based on needs and healthcare professionals will also provide efficient interventions to reduce the burden of the diseases and provide counselling on life style modification to prevent these NCDs based on World Health Organization recommendations.¹⁰

2. METHODOLOGY

The study was a descriptive retrospective study where all records of children that were admitted into the Emergency Paediatric Unit (EPU) of Jos University Teaching Hospital between 2012 and 2015 were reviewed. The bio-data of all patients and diagnoses made during the course of admission or follow up were obtained. Those whose diagnoses were inconclusive as well neonates were excluded from the study.

3.1 Data analysis

All data collected were entered into Epi Info version 7.2. The categorical data was analyzed using student t-test while continuous variables was analyzed with the chi-square test. *P* value of < 0.05 was regarded as statistically significant.

3. RESULTS

There were 2273 admissions during the period under review into the emergency Paediatric unit (EPU) of Jos University Teaching hospital (JUTH) from 2012-2015. Out of this, 835 (36.7%) had NCDs while 1438 (63.3%) had Communicable Diseases (CDs). The yearly distribution of the NCDs is shown on Table 1. The commonest NCDs were SCD 308 (36.9%), seizure disorder 92 (11.0%), Severe protein energy malnutrition (PEM) 55 (6.6%), congenital heart diseases (CHD) 46 (5.5%), Malignancies 45 (5.4%), Acquired heart diseases 41 (4.9%) and AKI/CKD 35 (4.2%) as shown on Table 2.

The highest frequency of NCDs was observed in 2015 and the least in 2013. The age group most affected is 1 month-5years followed by 6-10years and then 11-15years as shown in Table 3. The males 482 (57.7%) were more affected than the females 353 (42.3%) and the difference was not statistically significant.

Table 1. Distribution of communicable and non-communicable diseases from 2012-2015

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Diseases	YEAR				
	2012 (%)	2013 (%)	2014 (%)	2015 (%)	Total (%)
CD	391 (60.2)	518 (68.2)	93 (70.5)	436 (59.5)	1438 (63.3)
NCD	258 (39.8)	241 (31.8)	39 (29.5)	297 (40.5)	835 (36.7)
Total	649 (100.0)	759 (100.0)	132 (100.0)	733 (100.0)	2273 (100.0)

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Table 2. Trend of Non-Communicable diseases from 2012-2015

DISEASES (NCD)	Year				
	2012 (%)	2013 (%)	2014 (%)	2015 (%)	Total (%)
SCD	96 (37.2)	112 (46.5)	8 (20.5)	92 (31.0)	308 (36.9)
Seizure disorders	20 (7.7)	23 (9.5)	6 (15.4)	43 (14.6)	92 (11.0)
Severe PEM	22 (8.5)	2 (0.8)	2 (5.1)	29 (9.8)	55 (6.6)
Congenital heart disease (cyanotic & Acyanotic)	17 (6.6)	7 (2.9)	2 (5.1)	20 (6.7)	46 (5.5)
Malignancies	17 (6.6)	10 (4.1)	2 (5.1)	16 (5.4)	45 (5.4)
Acquired heart disease	16 (6.2)	7 (2.9)	3 (7.7)	15 (5.0)	41 (4.9)
AKI & CKD	11 (4.3)	7 (2.9)	5 (12.8)	12 (4.0)	35 (4.2)
AGN	9 (3.5)	5 (2.1)	0 (0.0)	7 (2.3)	21 (2.5)
Poisoning	2 (0.8)	5 (2.1)	1 (2.6)	9 (3.0)	17 (2.0)
Diabetic Keto-Acidosis	4 (1.5)	6 (2.5)	0 (0.0)	6 (2.0)	16 (1.9)
Cerebral Palsy	2 (0.8)	6 (2.5)	3 (7.7)	3 (1.0)	14 (1.7)
Nephrotic Syndrome	2 (0.8)	2 (0.8)	1 (2.6)	7 (2.3)	12 (1.4)
Acute Severe Asthma	3 (1.2)	3 (1.2)	1 (2.6)	3 (1.0)	10 (1.2)
Others	37 (14.3)	46 (19.2)	5 (12.8)	35 (11.9)	123 (14.8)
Total	258	241	39	297	835 (100.0)

78 *Others- Laryngomalacia, Myelomeningocele, Hysteria, Conversion disorder, Down's syndrome, Foreign body,*
79 *Chronic liver diseases, Peptic ulcer disease, Congenital pyloric stenosis, Adenotonsillar hypertrophy.*
80 *NB: Low admissions was recorded in 2014 because of industrial disharmony in the hospital*

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Table 3. Age Group

Disease	Age Group				Total
	1month-5y	6-10y	11-15y	16-<18y	
NCDs	436 (52.2%)	163 (19.5%)	157 (18.8%)	79 (9.5%)	835 (100.0%)

85 *Chi-square 87.16 P value 0.0000*

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4. DISCUSSION

90 This study showed a prevalence of NCD'S to be 36.7% with an increased preponderance in the male
91 gender. This prevalence is higher than the rates reported by Otaigbe et al⁷ (19.8%) and Emordi et al¹⁷
92 (24%) based on studies done earlier. The difference could be accounted for by the fact that those studies

were conducted in different set of populations and regions of the country. In the four year period the prevalence of NCD's ranged from 29.5% to 40.5%, these rates that are higher than the rates reported by previous studies.^{7,17} However, the trend did not show a clear increase over the five year period. The trend shows a fluctuation of the prevalence with a sharp drop in the third year, followed by a sharp rise in the fourth year. The sharp drop in the third year may be due to the sharp decline in the number admission for that year.

This study demonstrates that the commonest NCDs in children are SCD, Seizure disorders, severe PEM, Congenital heart diseases and malignancies. There was no statistically significant difference in NCDs between males and females however it is worthy to note that NCDs were commonest in the children under 5 years of age. The high prevalence of SCD in this study is probably due to the high prevalence of the disease in the country with a reported disease prevalence of 20-30 per 1000 live births¹⁸ and considering the fact that the country is the most populous nation in the region and has the largest population of patients with sickle cell disease in the world.¹⁹⁻²¹ The trend for SCD over the period under review is similar to the trend for all the other NCDs.

Seizure disorders, and PEM where high even though most of the causes of these conditions are preventable they remain a problem of the developing countries.^{22,23} Protein energy malnutrition (PEM) is still a major public health issue in many developing countries with the condition still being associated with as much as 50–60% of under-five mortality and a constellation of morbidities in developing nations.²⁵ In Nigeria there are various persisting social determinants of PEM, such as poverty, illiteracy, unemployment, corruption, inequalities, inequities and manmade conflicts.^{24,25} The trend for both Seizures and PEM show a rise in the prevalence. Generally most of the causes of both PEM and seizures in our environment are preventable.^{26,27}

The twentieth century saw the main cause of mortality transiting from acute to chronic illnesses. According to the WHO global watch in 2011, thirty-eight million deaths occur each year due to non-communicable diseases (NCDs), mainly cardiovascular diseases, cancers, respiratory diseases, and diabetes and when the injuries are taken into account NCDs are responsible for 70% of all deaths of which 80% occur in Low and middle income countries. The estimation made by WHO is that over the next 10 years deaths from NCDs will increase by 17% with the greatest increase in the African and Eastern Mediterranean Region.¹

In the developed world NCDs often result from modifiable lifestyle risk factors, such as tobacco use, problem alcohol use, unhealthy diet, and lack of physical activity, leading to overweight, raised blood pressure, and cholesterol which mainly occurs in adults.² However, in children in this study sickle cell disease, seizure disorder and severe malnutrition were the three commonest NCD's in our environment. With the burden of NCD's in this study ranging from 29.5% to 40 percent, which shows a rising trend when compared to previous studies and this supports the fact that the burden of NCDs is high and may soon surpass the communicable diseases if urgent and necessary steps are not taken to address them. Past studies carried out in Nigeria demonstrated lower rates of NCD's of ranging from 19.8-24%.^{7,17} However those studies^{7,29} were older than the present study and may further highlight the fact that the incidence of NCD's are indeed on the rise.²⁸

The peak age of NCD's in this study was in the 1month-5 year age group. This is bringing to the fore the fact that the under- fives are the vulnerable group of children for both communicable and non-communicable diseases. Sickle cell disease makes up almost 40% of the burden of NCD's in each of the year under review. This finding is similar to studies from South East Nigeria where sickle cell disease is also the commonest NCD in children.^{7,17}

This reflects WHO report that SCD is high in sub-Saharan Africa and about 150,000-200,000 children in Nigeria are born with sickle cell anaemia annually with SCD contributing up to 16% of under-five deaths in individual West African countries.^{4,29} This brings to the fore the fact that there is need for more intensive health promotion and health education on the need for counseling and prenatal screening for sickle cell disease. There is also need to provide adequate funding in NCDs related programmes, legislative backing to prevent and control NCDs and strengthen the health systems in order to manage those affected with the diseases to reduce the burden of the disease.⁴ An interesting observation in this study was the finding of seizure disorder as the second commonest NCD. With the prevalence of Seizure disorder almost doubling between 2012 and 2015, this could be attributed to poor seizure control because these were only patients seen at the emergency unit or other factors could have increased the prevalence such as perinatal and postnatal morbidities, and central nervous system infections (bacterial meningitis, viral encephalitis) including parasitic infestations like cerebral malaria amongst others which are more

common in childhood.³⁰⁻³² Therefore the need for effective primary health care with emphasis on the prevention of childhood infectious diseases, improved antenatal care and care at delivery and very importantly effective health education cannot be overemphasized.

The third commonest NCD observed was severe protein energy malnutrition. This is not surprising when according to the Nigerian Bureau of statistics,³³ as at 2010 about 69% of Nigerians are still living below the poverty line. Extreme poverty remains high in parts of Nigeria, where political instability, low access to education and inadequate health care are contributing factors of the nation's high rate of poverty. The high burden of malnutrition was reported by Olaf Muller²⁴ that 852 million people were undernourished worldwide and 815 million of this were in developing countries. Though there are policies on ground to tackle malnutrition, implementation of these policies have remain poor. Therefore, there is the need to really address poverty from the grass root. There is need for government to encourage and subsidize agriculture as well as encourage and support small and medium scale industries. In addition there is the need to improve the education of the girl child so that she can know how to make use of locally available resources to provide a balanced meal for her family. An enlightened girl child is also more likely to be empowered and capable of accessing health care for her children. There is also the need for there to be an atmosphere of peace where agriculture and local businesses can thrive.

The need to manage Other NCDs like heart diseases (congenital and acquired), Malignancies and kidney disorders are still important as these conditions as seen in this study collectively contribute significant to emergency room visits in our environment. Interventional catheterization, peritoneal/haemodialysis and histochemical assay for malignancies which are not readily available need to be made available to improve care of these patients.

5. CONCLUSION

The burden of NCD's in children in our environment is very real and when compared with previous studies the trend is on the rise. Our study also shows that children under the age of five are most especially affected and there is a need for government agencies and relevant stakeholders to come together and implement already existing policies that would help reduce the burden of these diseases.

There is need by government and policy makers to ensure services that are targeted to reduce poverty, educate the girl child and continue sensitizing the rural populace who are mostly at risk to improve on weaning practices, to seek healthcare services early and to improve child survival through the child survival strategies which are cheap and affordable. Government should provide legislative backing and provide funds to prevent and control NCDs. Health systems should be strengthened to manage NCDs through training and retraining of professionals, research and provision of adequate/relevant facilities in our hospitals.

CONSENT

Not applicable.

ETHICAL APPROVAL

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

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292 **ABBREVIATIONS**

293

294 AGN- Acute Glomerulonephritis

295 AKI- Acute Kidney Injury

296 CD- Communicable disease

297 CKD- Chronic Kidney Injury

298 EPU - Emergency Pediatric Unit.

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300 HREC - Health Research Ethical Committee

301 JUTH - Jos University Teaching Hospital

302 NCD- Non Communicable disease

303 PEM- Protein energy malnutrition

304 SCD- Sick cell disease

305 WHO- World Health Organization