Under-Five Mortality and Causes of Death in Borno State, Nigeria

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Abstract

There is much reduction in under-five mortality since the world focused its attention on it with the adoption of the Millennium Development Goals in 1990. However disparities persist with sub-Saharan Africa in the lead. Nigeria has the unenviable position of being the under-five mortality capital of the world. Borno State ranks 23rd in Nigeria with U5MR of 86/1000 live births. In addition to the vagaries of climate and socioeconomic underdevelopment, Borno State is also the centre of the Boko Haram insurgency since 2009. This study set out to determine the major diseases that caused deaths among the under-five children in the state between 2009 and 2013 using secondary data from the Epidemiological Unit of the Borno State Ministry of Health. Six Local Government Areas (two from each of the three Senatorial Districts in the state) were purposively selected. The major causes of under-five deaths found were malaria, diarrhoea/vomiting, measles, pneumonia and neonatal tetanus. The highest cause of under-five mortality was malaria in both Borno North and Borno South but malaria was second after diarrhoea/vomiting for Borno Central. The number of under-five deaths for the three senatorial districts have indicated fluctuating and general decline toward 2013 from 2009. It also shows that diarrhoea/vomiting was the highest killer of under-five children constituting 32 per cent of all deaths in this study, followed by malaria (30.3%) and measles (16.5%). Based on the findings, the study recommends the need for Nigeria to be more committed to health interventions and improve funding because all the major killers are preventable and are easily treatable.

Keywords: Borno State, Millenium Development Goals, North-east Nigeria, Sustainable Development Goals and Under-five mortality.

Introduction

In September 2000 the United Nations (UN) launched the United Nations Millennium Development Goals (MDGs) with 1990 scenario as baseline. Goal 4 was aimed at reducing mortality of children aged less than five years worldwide by two-thirds in 2015. By the end of 2015 marking the end of the MDGs' 15 year period, the UN again adopted the Sustainable

Development Goals (SDGs). The SDG Goal 3.2.1 is to end preventable deaths of newborns and Under-five children by 2030 (WHO, 2020). All countries are to aim at under-five mortality rate of 25 or less deaths per 1000 live births by 2030. There has been much decrease in under-five mortality (U5M) which was 93 deaths per 1000 live births (1 in every 11 children) in 1990 to 38 deaths per 1000 live births (1 in every 27 children) in 2019 world wide. Underlying this remarkable progress are persistent disparities among various geographical regions around the world (UNIGME, 2020).

The region which carries the greatest burden of under-five mortality is still sub-Saharan Africa where the estimated under-five deaths is 76 per 1000 live births in 2019 from 180 in 1990. The risk of death for a child under the age of five in sub-Saharan Africa is 20 times higher than in regions that have lowest under-five mortality such as New Zealand and Australia of 1 in 264. Sub-Saharan Africa is 20 years behind the rest of the world. Right now sub-Saharan Africa is the most dangerous place on earth for child survival (UNIGME, 2020). Nigeria is the under-five mortality capital of the world with 859,000 deaths in 2019. The country with the second highest under-five mortality is India having 824,000 deaths. The difference between Nigeria and India is that the population of India is 1.2 billion while that of Nigeria is about 200 million which indicates that proportionally under-five mortality in Nigeria is way higher than that of India (WHO, 2020).

According to the WHO (2020), the leading causes of death in under-five children in the world are pre-term birth complications, birth asphyxia/trauma, pneumonia, congenital anomalies, diarrhoea and malaria. In Nigeria, over 25% of under-five deaths are due to neonatal disorders and preventable diseases such as diarrheal diseases (17.1%), malaria (12.4%) and meningitis (4.2%). Others are invasive non-typhoidal salmonella, whooping cough, other STDs, HIV/AIDs (Statista Research Dept., 2022), and malnutrition (WHO, 2020). According to the UNICEF (2019) Nigeria has second highest stunted growth and highest pneumonia deaths in the world and does not fare well in any health indicator. To cap it all, poor data collection culture makes it difficult to get a lear picture of the situation. The UNICEF (2019) report maintained that Nigeria is the worst place in the world to raise a child.

The North-East where Borno state is located has the second highest under-five mortality in Nigeria with 134 deaths per 1000 live births. Even though the state has the lowest in the sub-region it still ranks 23rd in Nigeria with U5MR of 86/1000 (National Population Commission Nigeria and ICF Macro, 2018). Most of the health indicators for the region show that the Northeast is not faring so well in comparison to other sub-regions in the country, mostly taking the fifth position out of the six geopolitical regions (National Population Commission Nigeria and ICF Macro, 2018).

In the Sahel where the state is located, the weather could be harsh due to high temperatures. The onset of climate change with the resultant increase in average temperatures and extreme weather events have been worsening global health in the the past few decades. Studies show that with limited income in developing countries, severe weather conditions are having adverse effects on the health of populations, especially children who are particularly vulnerable to heat related deaths. This is in addition to the great impact climate change is having on agriculture

and economic wellbeing of the people (Kekere & Salihu, 2021). Attributed to the vagaries of climate and socioeconomic development is the fact that the state is among those prone to epidemic attacks of bacterial and viral origin such as meningitis, cholera and measles as well as malaria and diarrhoea (Borno State Ministry of Health, 2010). In addition to all of these disadvantages the state is also the centre of the Boko Haram insurgency in the Northeast of Nigeria since 2009. With all of these odds stacked against it, this study set out to determine the major diseases that caused deaths among the under-five children in the state between 2009 and 2013 using secondary data and to assess any changes that might have taken place since then.

Research Method

Two Local Government Areas (LGAs) were purposively selected from each of the three Senatorial Districts in the state in order to give fair representation to all areas in the state. Safety of the LGAs were also taken into consideration at the time of data collection due to insurgency. The selected LGAs included Magumeri and Monguno in Borno-North, Maiduguri and Ngala in Borno-Central, and Hawul and Askira/Uba in Borno-South. There are a total of 27 LGAs in the state.

The trend of U5M and the causes of death during the period 2009 and 2013 was analysed using secondary data from the Epidemiological Unit of the Borno State Ministry of Health. The data were summarised on yearly basis by cause of death.

The five major causes of death which accounted for 82 per cent of U5M and morbidity as reported by the National Strategic Health Development Plan (2010) were selected for the analysis (Federal Ministry of Health, 2010). These data were presented according to their senatorial districts. A limitation of the data was that only those who died in the hospitals and clinics were accounted for but it was assumed that the data would reflect the general situation in the society. Unfortunately, this was unavoidable because there were no other reliable records that covered the entire population that could be used. The data were analysed using descriptive statistics which include the use of frequencies and percentages presented in tables and figures.

Result of the findings

Causes of Under-five Deaths between 2009 and 2013 in Borno State

The major causes of under-five deaths as reflected by the data collected are malaria, diarrhoea/vomiting, measles, pneumonia and neonatal tetanus. The data are presented according to the three senatorial districts. Table 1 shows that between January 2009 and December 2013, 160, 362 and 125 under-five deaths were recorded in each of the two LGAs in Borno North, Borno Central and Borno South respectively. The highest numbers of deaths were recorded for the year 2010 in all districts. The highest cause of under-five mortality was malaria in both Borno North and Borno South but malaria was second after diarrhoea/vomiting for Borno Central. The number of deaths recorded in the three senatorial districts also show that Borno Central had the greatest number of deaths and Borno-South recorded the least number of deaths during the period. The three diagrams depicting the number of under-five deaths for the three senatorial districts by cause of death have indicated a fluctuating trend from 2009 to 2013.

Table 1: Under-five Mortality by Cause of Death in the Three Senatorial Districts between 2009 and 2013.

	Year					
LGA/Diseases	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Borno-North						
Malaria	19	15	9	5	2	**50**
Diarrhoea/Vomiting	11	11	6	12	5	**45**
Measles	10	8	5	7	2	**32**
Pneumonia	3	12	12	4	2	**33**
Neonatal Tetanus	0	0	0	0	0	**0**
Total	**43**	**46**	**32**	**28**	**11**	**160**
Borno-Central						
Malaria	24	30	20	14	15	**103**
Diarrhoea/Vomiting	25	42	17	31	15	**130**
Measles	15	32	11	7	4	**69**
Pneumonia	10	29	4	7	4	**54**
Neonatal Tetanus	2	1	2	1	0	**6**
Total	**76**	**134**	**54**	**60**	**38**	**362**
Borno-South						
Malaria	12	3	11	9	6	**43**
Diarrhoea/Vomiting	8	16	4	2	2	**32**
Measles	3	9	7	2	7	**28**
Pneumonia	5	6	6	1	2	**20**
Neonatal Tetanus	0	1	0	1	0	**2**
Total	**28**	**35**	**28**	**15**	**17**	**125**

Source: Epidemiological Unit, Borno State Ministry of Health, 2013.

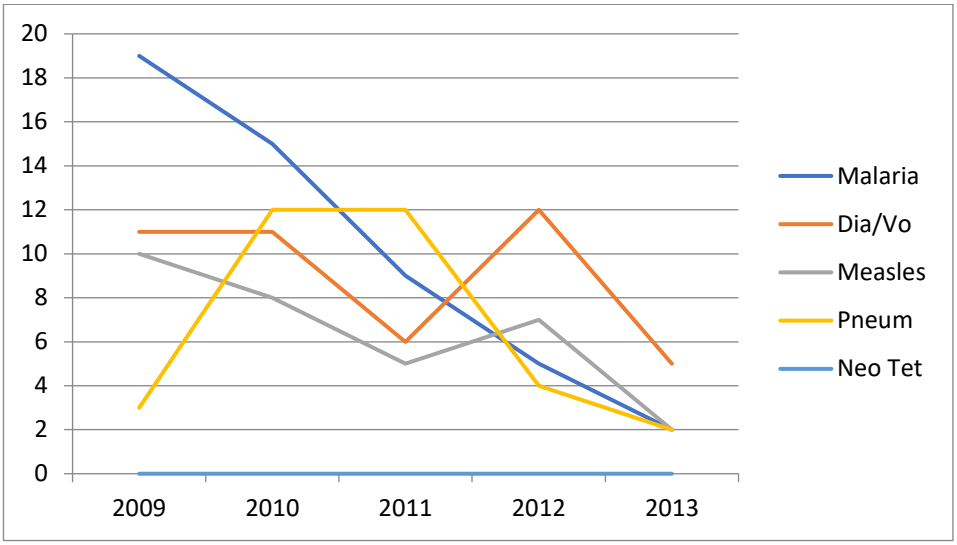

Figure 1: Trend of Under-five Mortality by cause of death in Borno-North, 2009 to 2013. Source: Epidemiological Unit, Borno State Ministry of Health, 2013.

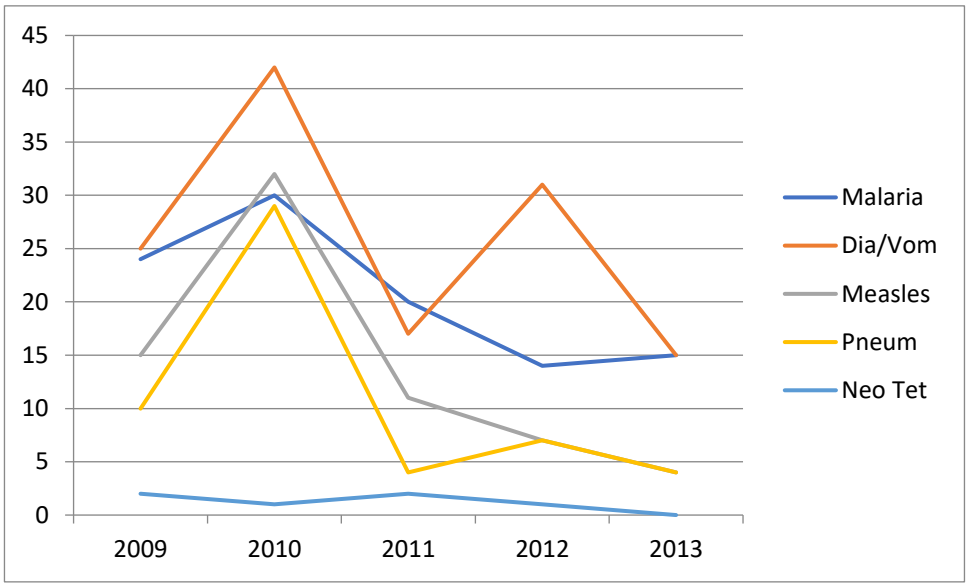

Figure 2: Trend of Under-five Mortality by cause of death in Borno-Central, 2009 to 2013.

Source: Epidemiological Unit, Borno State Ministry of Health, 2013.

Figure 2 shows trend of U5M in Borno-South indicating a highly variable pattern of fluctuation with Malaria being the highest killer followed by Diarrhoea and vomiting showing the same pattern as in Borno-North. For all three senatorial districts the third highest killer is Measles.

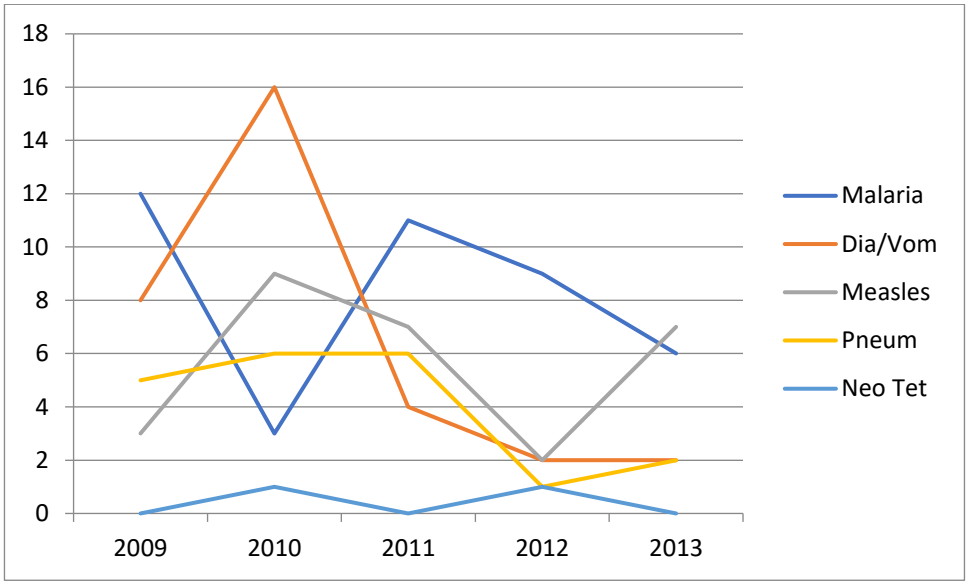

Figure 3: Trend of Under-five Mortality by cause of death in Borno-South, 2009 to 2013.

Source: Epidemiological Unit, Borno State Ministry of Health, 2013.

Table 2: Under-five Mortality by Cause of Death from 2009 to 2013 for all LGAs Combined

Diseases	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**	**%**
Malaria	55	48	40	28	25	196	30.3
Diarrhoea /Vomiting	44	69	27	45	22	207	32.0
Measles	28	49	23	16	13	129	19.9
Pneumonia	18	47	22	12	8	107	16.5
Neonatal Tetanus	2	2	2	2	0	8	1.3
Total	**147**	**215**	**114**	**103**	**68**	**647**	**100**

Source: Epidemiological Unit, Borno State Ministry of Health, 2013

Table 2 and Figure 4 show the trend of cause of death over the five-year period combined for all senatorial districts. It shows a highly fluctuating trend with highest under-five deaths in 2010 followed by 2009 and a decline toward 2013 thereafter. This indicates that U5M is making an unsteady decline from 2009 to 2013. It also shows that diarrhoea/vomiting is the hi ghest killer of under-five children with 32 per cent of all deaths in this study followed by malaria (30.3%) and measles (16.5%).

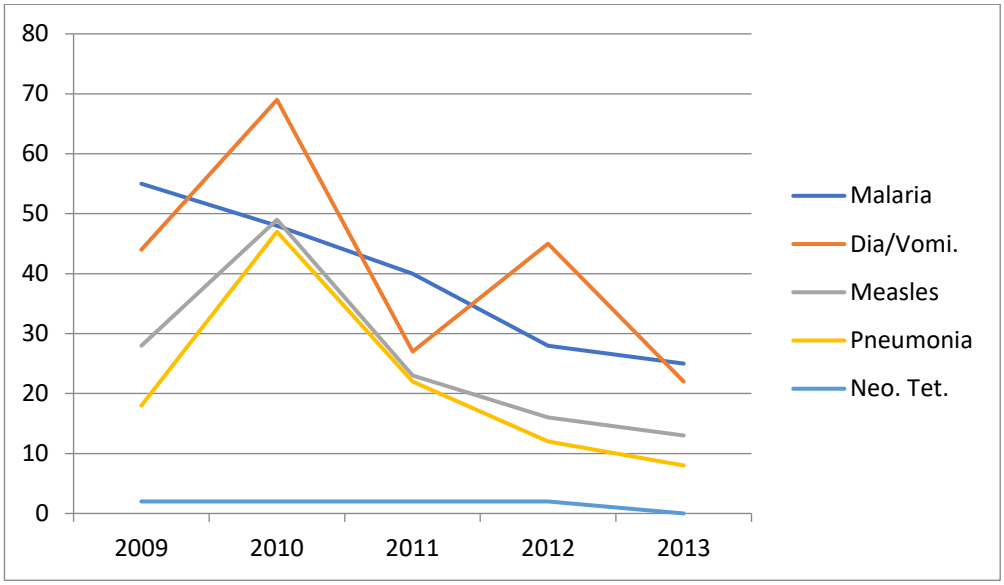

Figure4: Under-five mortality by cause of death and period for all senatorial districts combined, 2009 to 2013.

Source: Epidemiological Unit, Borno State Ministry of Health, 2013.

Discussion of Findings

Even though diarrhoeal diseases constitute the second cause of death in Nigeria (Statista Research Dept., 2022) in this study, the greatest number of deaths were due to diarrhoea/vomiting. There were more deaths as a result of diarrhea/vomiting in the state as a whole and Borno Central in particular. These findings agree with Fotso *et al* (2007) who attributed the prevalence of diarrhoea and vomiting to unclean conditions in urban areas of developing countries. According to them the importance of access to safe drinking water on child health, especially in urban areas, has been well documented as diarrhoea remains the major cause of deaths among children under five. Peter and Umar (2018) also indicated that the Boko Haram insurgency which led to the displacement of large number of people into temporary and overcrowded shelters is often associated with polluted water sources, inadequate sanitation, poor hygiene practices and contaminated food. This expectedly would worsen the already bad situation.

The second highest killer of under-five children in this study was malaria which comes after neonatal disorder and diarrhea/vomiting just as in the national rates reported by National Population Commission Nigeria and ICF Macro (2018). This finding is corroborated by other studies which reported that the most vulnerable group to malaria are the under-five children who account for as much as 90% of national malaria mortality and as much as 36% of under-five mortality (United States Embassy in Nigeria, 2011; Adewemimo *et al* 2017).

Under-five mortality due to measles was higher than deaths due to pneumonia for all Senatorial districts combined. However, in Borno North, deaths due to pneumonia were slightly higher. Deaths due to measles were higher in both Borno Central and Borno South. High mortality due to measles is indicative of low immunization up-take that is characteristic of the people in the state as indicated in Monguno (2010). In his study, Monguno found that only 10.5% of the children in the state were fully immunized. The immunization coverage in the state in 2013 was 9.7% for all basic and 17.3% for measles which rose to 43.3% for all basic and and 46% for measles in 2018 (National Population Commission Nigeria and ICF Macro, 2018). These improvements could be the reason the U5MR for Borno stood at 86/1000 placing the state at 23rd position in the country. This is because child immunization has been identified as a key factor influencing child survival in developing countries considered to be the most cost-effective health intervention (Fotso, 2007). The fifth cause of child mortality in this study i.e. Neonatal Tetanus is quite negligible compared to the other causes of mortality in this study.

Level of Progress toward SDG Targets

From the period of the study spanning five years from 2009 to 2013 and 2018 in which the Nigeria demographic and health survey was conducted there is indication that there are some improvements in some areas and decline in others. A study conducted in 2019 by Ogbuoji & Yamey, 2019 suggests that at current average annual rates of decline, Nigeria is unlikely to meet the SDGs targets of under-five mortality for the country. While some states are close to the target others could meet it only in 2088 (in 58 years) instead of 2030. Although meeting the target could avert 5.96 million under-five deaths over the 2018 to 2030 period, it cannot be realised under the present circumstances. To realise the country's potential, the rest of the states need to learn from highly performing states such as Ogun (30/1000) and Bayelsa (31/1000) (Ogbuoji & Yamey, 2019)

According to a UNICEF (2018) report, the Nigerian government made attempts to improve primary health care nation wide to reach the country's 10,000 administrative wards but coverage is patchy with severe obstacles in health care provision. Community and household interventions have the highest impact (61%) but are given lowest priority (Shoo, 2008). Malnutrition is underlying cause to 54% of under-five deaths (Shoo, 2008). With 57 million Nigerians without access to improved water sources, 103 million without improved sanitation and 25% of the population practicing open defecation, hygiene remains a major challenge contributing significantly to high levels of diarrhoea-related deaths. The number of out-of-school children in Nigeria accounts for one out of five in the world with more girls affected than boys and worse case scenario in the North-East. Nigeria has the highest number of child brides in Africa. A study by Ezeh *et al* (2014) indicated that there is increased risk of U5M in children whose mothers have not gone to school among other factors. In addition, the insurgency has worsened the situation with many people who have left their homes in dire situations and children who have been acutely affected in the state. Furthermore, the insurgency has made worse the difficulty in obtaining accurate and upto date data that are needed for addressing the numerous problems (UNICEF, 2018).

Conclusion

This study has examined under-five mortality and causes of death in Borno State, Nigeria. The findings of the study revealed that the major causes of U5M in the study area were diarrhoea/vomiting, malaria, measles and pneumonia. The disparity between the three Senatorial Disrticts is not significant because all of them share similar socioeconomic and environmental characteristics. Since all the major child killers are preventable and are easily treatable with more commitment to health interventions and improved funding, the Nigerian government needs to adopt policies to reach the poor and implement them even though there are many challenges.

Recommendations

Based on the findings of the study, the following recommendations were made;

i. Access to basic life saving interventions such as child birth delivery care, postnatal care vaccinations, and early childhood preventive and curative services to address early causes of death are critical. Combating malaria through ridding the environment of refuse, providing mosquito nets and free treatment of malaria for the under-five children is crucial.

ii. Furthermore, government should improve on coverage in interventions that improve childhood nutrition, access to improved water sources and sanitation. Returning IDPs to their localities and improving their conditions of living will also go a long way in improving child survival.

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