ANKA COMMUNITY MORTALITY IN CHILDREN FROM 6 MONTHS TO 12 YEARS FOR NOVEMBER AND DECEMBER 2022 IN ZAMFARA STATE-NIGERIA

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Abstract

Zamfara state is the worst performing state in public health care delivery (Owen, 2022). The objective is to determine the community mortality rate in children under 12 in Anka Town. Our study is retrospective and transversal. Our population study is 4624 households, for our sampling we used the Lynch formula (n= 331 households) .To select our sample by ward, we used systematic random sampling. Sex(Female 67% ,Male 33%), Age (<5yrs=64% >5yrs=36%), Date of death (November=74% December=26%),Possible cause of death: (Fever=59%,Diarrhea=13%, Malnutrition=13%, Others=15%), Admitted in the hospital two weeks before death(Not admitted=64%, Admitted 36%),Death Locations(Anka community=69%,IDPs=31%).Community members express their concern on the causes of death at home, in which they mentioned economic situation of the country (poverty) , cannot afford to take their children to Anka General Hospital(AGH) since they have to pay and also fear of the tight admission criteria in wards supported by MSF.

Keywords: *Anka , mortality ,children*

LA MORTALITÉ COMMUNAUTAIRE CHEZ LES ENFANTS DE 6 MOIS À 12 ANS DANS LA VILLE D'ANKA EN NOVEMBRE ET DECEMBRE 2022 DANS L'ÉTAT DE ZAMFARA/ NIGÉRIA

Résumé

Zamfara est le moins performant en matière de prestation de soins de santé publique. L'objectif est de déterminer le taux de mortalité communautaire chez les enfants ≤12 ans dans la ville d'Anka. Notre étude est rétrospective et transversale. La population étudiée est de 4624 ménages, pour notre échantillonnage nous avons utilisé la formule de Lynch (n= 331 ménages). Pour sélectionner notre échantillon par quartier, nous avons utilisé l'échantillonnage aléatoire systématique. Sexe (F= 67%, M=33%), âge (<5 ans=64% >5 ans=36%), date du décès (novembre=74% décembre=26%), cause possible du décès : (fièvre=59%, diarrhée=13%, malnutrition=13%, autres=15%), admission à l'hôpital deux semaines avant le décès (non admis=64%, admis 36%), lieux du décès (Autochtone=69%, personnes déplacées=31%). Les membres de la communauté expriment leur inquiétude sur les causes de décès à domicile, en

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mentionnant la situation économique du pays (pauvreté), l'impossibilité de consulter AGH, car payant et critères d'admission stricts dans les services soutenus par MSF.

Mots-clés : *Anka, Mortalité, enfants*

I. INTRODUCTION

According to estimates, some 95 million children under the age of five will be living in West and Central Africa (WCA) in 2021, i.e. 14% of the world's children under the age of five. These children have the lowest survival rates in the world and suffer disproportionately from violations of children's rights. In addition, ten of these countries are classified as fragile or conflict-affected, situations that have repercussions on the health and well-being of children. The health and well-being of children **(**Banque Mondiale, 2023).

In 2021, five million children worldwide died before the age of five, with around 40% of these deaths occurring in West and Central Africa, i.e. almost 1.9 million children3. In the region, a child dies every 17 seconds3. Nigeria and the Democratic Republic of Congo (DRC) account for more than 60% of deaths in the 24 countries of the Africa region (Nigeria: 45%, DRC: 16%. The under-five mortality rate (U5MR) is estimated at 92 deaths per 1,000 live births. Under-five mortality rate (U5MR) in WCA is the highest in the world. It ranges from 14 deaths per 1,000 live births in Cabo Verde to 115 deaths per 1,000 live births live births in Niger (UN-IGME, 2022).

About eighteen states in Nigeria have been ranked poorly on health systems Indicators and inability to provide adequate primary healthcare services for their citizens. Zamfara is the worst performing state in public health care delivery (Owen, 2022).

According to Unicef, the main causes of under-five mortality are malaria, diarrhea and acute respiratory infections **(**Unicef, 2023).

Rising violence in the state of Zamfara in north-west Nigeria is causing a humanitarian crisis, warns the international medical Organisation Médecins Sans Frontières (MSF). MSF is calling for an urgent humanitarian response for the people of the region, who are in desperate need of food, drinking water, shelter, protection and basic services, including healthcare.

"Our teams in Zamfara State have witnessed an alarming increase in preventable diseases associated with the lack of food, clean water, shelter and vaccinations," said MSF's Dr Godwin Emudanohwo, speaking from the MSF-supported hospital in the town of Anka. "Children continue to arrive here in a very poor condition. In the first four months of 2021, our teams in Anka, Zurmi and Shinkafi treated 10,300 children for severe acute malnutrition, measles, malaria, watery diarrhoea and respiratory infections. That's 50% more than at the same time last year. (Emudanohwo,2021).

According to the monthly medical report from the ITFC at Anka General Hospital, supported by MSF, mortality is still very high, at over 15% in children with severe acute malnutrition. This is due to the fact that children arrive at hospital late and in a very poor clinical state (MSF, 2022).

OBJECTIVES

Global Objective

The Anka town community mortality tracking is organized in order to understand the magnitude of mortality in Anka town including IDPs and also to have a knowledge cause of death since the restructuring of MSF activities in Anka and find the proper solution to the identified problems.

Specific Objectives

-To determine the causes of community death in Anka LGA.
-Determine the age group most affected by community mortality,
- Prioritize humanitarian and MOH programmes according to the most important causes of mortality and its prevention (neonatal, maternal, violence, malaria, other) in the region.
- obtain evidence for awareness-raising and advocacy purposes,
-Share this analysis with decision-makers and stakeholders in order to strengthen our efforts to end all preventable deaths.

II.METHODOLOGY

For the study of community mortality in children aged 6 months to 12 years, we used as a reference the date on which the MSF expatriates were evacuated from Anka, a period known to all.

Type of study:

This was a descriptive and retrospective study.

Study population: For the analysis of mortality in the community, our study population consisted of the entire population of Anka-Town/Anka LGA/ZAMFARA STATE/NIGERIA.

Target population: The target population of our research was made up of the households of Anka-Town which are estimated at 4624 households according to data from the Anka-Local Government Primary Health Care Management team.

Sampling

To calculate the sample from the households that make up Anka Town, we used the Lych formula knowing the number of households. We then used a two-stage cluster

sampling strategy. The first stage consisted of sampling proportional to the size of the population at the Wards level. In the first stage, the starting points of the clusters were allocated to the 3 Wards of Anka-Town by systematic sampling, with an allocation probability proportional to the respective population size of each ward (probability proportional to size or PPT). The larger we then used systematic random sampling to select the number of starting points for the clusters per municipality. This was done in Excel using specially designed spreadsheets for each Ward. The spreadsheets included space for the sampling frame - i.e. the list of buildings (house numbers) in the town identified in the previous stage, sorted by ward. Automation of the spreadsheet made it possible to:

-Calculate the sampling interval on the basis of the number of units in the sampling frame and the number of cluster starting points required, entered manually.

-select and highlight the first building in the sampling frame using a formula that selects a random number between 1 and the sampling interval.

- select and highlight the remaining buildings based on the sampling interval the population, the more starting points are allocated to the ward

To carry out this study, we used systematic random sampling, which means that there is a gap, or interval, between each unit selected in the sample. For example, you could take the following steps: Number the units included in your sampling frame from 1 to N (where N is the size of the total population**)** (Dan, 2021). All the houses are numbered.

We defined a household as a group of people living in the same house. For eligible and consenting households, we included all people who were part of the household during the recall period.

For the survey, the head of the Ward indicated (Estimate) the centre of the village and then our teams were divided into 4 clusters according to the 4 cardinal points: 1 to the East, 1 to the West, 1 to the North and 1 to the South. Each team of interviewers was made up of 2 people and so a total of 4 teams were deployed in each of the Wards. The survey step was 13 and so they had to skip 13 houses near a chosen house.

If a building did not match a household, we omitted it and chose the nearest building on the right (facing the entrance to the building). Where a building housed more than one household, each household was allocated a questionnaire after verbal consent.

Absent households were revisited at least once during the study day. If neighbours were present, they were asked where the household was and when they expected to return. If, after the second visit, the household was still absent, we replaced it by continuing from the last household surveyed. If the target of 12 households was not reached after visiting

all those in a village, we continued the selection in the nearest locality on the way back. The first house seen on entering the village served as the starting point.

From a statistical point of view, there are several formulae for determining the sample size;

To find out the size 'n' required to have a given margin of error for a given proportion at a confidence level, simply invert the margin of error equation. According to Claire Durant, for an infinite population, the formula is as follows**:** (Anderson, 2010):

$$n = \frac{Z_{\alpha}^{2}.p\,.\,q}{e^{2}}$$

As with the margin of error, there is also a formula for correcting for finite populations. Here is the formula. It may seem complex, but all you have to do is put the right figures in the right place and make the calculations (Magalie, 2017)

$$n = \frac{NZ_{\alpha}^{2}(p.q)}{Ne^{2} + Z_{\alpha}^{2}(p.q)}$$

$$nR = \frac{n}{1+\frac{n}{N}}$$

- Zα = parameter related to the risk of error which is equal to 1.96 (2) for a risk of error of 5%, 1.65(10%), 2.58 (1%) for our study we take 95 % with 1.96

- q = 1-p: expected prevalence of people not presenting the event

- nR = revised sample size

- e = desired absolute precision. We have considered e= 0.05

- P = expected prevalence of the event in the population

- In practice Zα is fixed, p and q are estimated from previous surveys or from a survey in similar situations. A pre-survey of a few individuals can give an estimate of p if we have no idea of the prevalence.

Let's take P= 0.50, which is our case.

- e: this is a parameter that can be varied (the desired precision). We have taken 5%, and so by replacing in formula (2) above the clear Durant given that in total for the three health areas there are 4624 households in Anka Town.

$$\mathrm{n} = \frac{(4624).(1{,}96)^{2}.(0{,}5).(0.5)}{(4624).(0{,}05)^{2}+(1{,}96)^{2}(0{,}5)(0{,}5)} = 356$$

So the value of the size revise or correct $\mathrm{nR} = \frac{356}{1+\frac{356}{4624}}$ 331 Households

Our sample consisted of 331 households surveyed in the 3 wards of Anka Town: DANGALADIMA, GALADIMA and MAGIJI.

Given that the total number of women in the households in each ward was known in advance, we used the stratified proportional random sampling (S.P.R.S.) formula. To this end, we drew a coefficient from the following formula:

Coefficient of proportionality = $\frac{\mathbf{n}}{\mathbf{N}}$

n = **331**

N= **4624**

Coefficient of proportionality = $\frac{\mathbf{331}}{\mathbf{4624}}$

- Coefficient of proportionality = 0.071583045

Table Nº I: **Number of people to be surveyed by Ward**

	WARD	POPULATION/WARD	COEFFICIENT OF PROPORTIONALITY	SAMPLE BY WARD	SURVEY STEP
1	DANGALADIMA	1494	0.071583045	107	13
2	GALADIMA	729	0.071583045	52	14
3	MAGIJI	2401	0.071583045	172	13
GRAND TOTAL		**4624**	**0.071583045**	**331**	**13**

In short, the sample consisted of 331 households to be surveyed in Anka Town, including DANGALADIMA: 107 households, GALADIMA: 52 households and MAGIJI: 172 households.

Inclusion and exclusion criteria

Within eligible and consenting households, we considered that household members were eligible for inclusion during the survey period. Households were excluded if we could not identify a head of household or if we did not obtain consent. A child-headed household was included if the child head understood and consented and if an adult neighbor could provide or confirm information about the household.

Data collection

We conducted semi-structured interviews with the head of household or a nominated person. KoBo-Collect was used to administer the questionnaire and collect the responses. The survey began with an open-ended question on the difficulties encountered by the household over the past year.

Training the survey team and pre-testing the questionnaires

A 1-day training session was held with the interviewing team (on 28 November 2022). An additional review day (1 December) was organized before the start of data collection due to a delay between the initial training and the start of the survey. The training covered the following topics: purpose and objectives of the survey, protocol, ethics, confidentiality, data protection, use of the smartphone (Kobo Collect). The correct and appropriate formulation of the survey questions in Haussa was determined and put into practice during the training, with the assistance of an interpreter.

Data collection techniques

The structured interview technique enabled us to interview 331 heads of households in Anka-Town using a closed and open-ended survey questionnaire. In addition, the unstructured interview technique was also used, which did not use fixed questions; instead, the interviewer asked open-ended questions based on a specific research topic, and tried to let the interview unfold like a natural conversation.

It should be noted that these 2 techniques made it easier to fill in the interview guide, which supports the survey questionnaire we used to collect quantitative data in the field.

Conduct of the survey.

The survey was conducted among households in Anka Town. It began on 05-8 December 2022, i.e. 4 survey days.

It was carried out by 8 interviewers per ward, divided into 4 groups of 2 people (Interviewers). 8 interviewers were used for the 3 wards, from Ward to Ward.

A closed-ended questionnaire was used to collect data from 331 heads of households in Anka Town.

Ethical considerations.

Before collecting the data, we took into account both the administrative and ethical dimensions of the research. For the community mortality survey, all respondents were required to give verbal informed consent prior to any interview.

The authorisation of the administrative authorities of the research site, in particular the Director of Primary Health Care of Anka LGA, and that of MSF as a non-governmental humanitarian organisation.

III.RESULT

Table II. Community mortality in children from 6 months to 12 years.

N◦	WARDS	HOUSEHOLDS SAMPLE BY WARDS	NUMBER OF DEATH BY WARD	% OF DEATH PER WARD
1	DANGALADIMA	107	22	56%
2	GALADIMA	52	10	26%
3	MAGIJI	172	7	18%
TOTAL		**331**	**39**	**100%**

56% of community deaths among children aged 6 months to 12 years recorded in DANGALADIMA Ward.

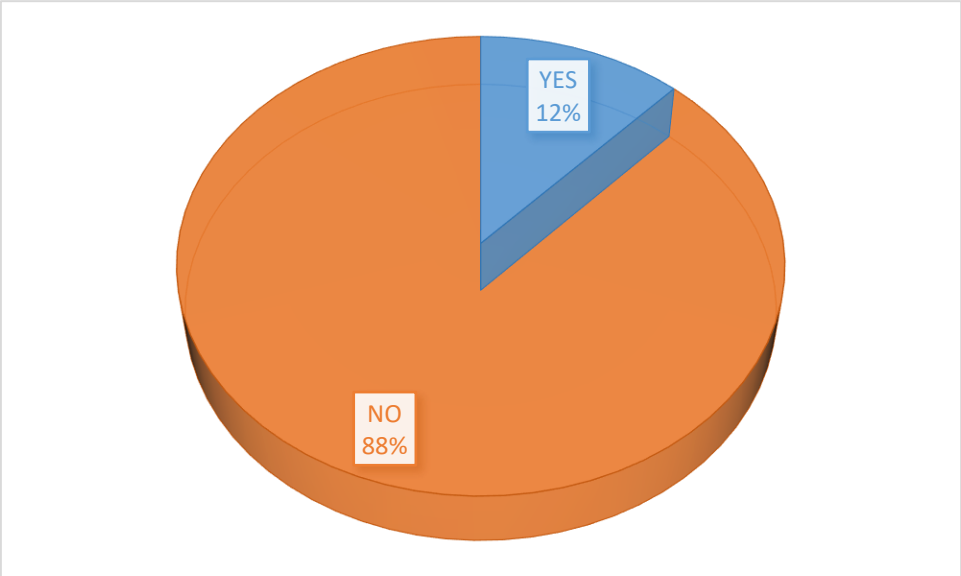
Table III: Community Mortality Survey.

VARIABLES	NUMBER	%
1.SEX		
F	26	67%
M	13	33%
2.AGE		
6month - ≤5 Years	25	64%
> 5 Years - ≤12 Years	14	36%
3.POTENTIAL CAUSES OF DEATH		
Fever	23	59%
Diarrhea	5	13%
Malnutrition	5	13%
Others	6	15%
4.HOSPITAL ADMISSION 2 WEEKS AGO		
No admitted	25	64%
Admitted then die in the community between 1-14 days (Two weeks) after.	14	36%
5.ADDRESSE/STATUTS		
Host community	27	67%
Desplaced(IDPs)	12	51%

This table shows that 67% of the children aged between 6 months and 12 years who died in the community were female, 64% were aged between 6 months and 5 years, 59% had developed fever, 64% had not been admitted to hospital in the two weeks

preceding their death in the community and, finally, 67% of the children who died were from the host community.

Graph 1. Breakdown of households by type of death at home



12% of households surveyed had recorded the death at home of at least one child aged between 6 months and 12 years.

IV.DISCUSSION

Children aged between 6 months and 5 years are most affected (64%) and fever is the leading cause of death among these children.

Based on the community mortality data collected in December 2022, in the town of Anka, there were 39 deaths of children aged between 6 months and 12 years, and the estimated population of children in this age group is 12,362. This means that the crude death rate at home in the town of Anka for November and December 2022 is equal to 3 deaths per 1,000 children aged between 6 months and 12 years. Community members express concern about the causes of mortality at home, citing the country's economic situation, which means that community members cannot afford to take their children to the Ministry of Health clinic as they have to pay for each service, and also the fear of being rejected by the MSF clinic because of the new admission criteria for the MSF-supported ITFC-Anka General Hospital paediatric ward, which have become very strict.

The communities have depended on MSF's free medical services for their children for more than ten years, so the new admission criteria are making community members sceptical about going to the clinic, opting instead for treatment at home, which is increasing the mortality rate in the community. The high communities are more

affected by this mortality, as MSF places particular emphasis on displaced people living in very vulnerable situations.

Every country in the world is affected by some form of malnutrition. The fight against malnutrition in all its forms is one of the most important challenges for global health. Women, infants, children and adolescents are particularly at risk of malnutrition**.** (WHO, 2021).

In north-east Nigeria, more than 800,000 children are expected to suffer from acute malnutrition in 2021, and severe acute malnutrition poses an immediate mortal threat to almost 300,000 of them.

The situation is even more critical in the north-west of the country. In Kebbi State, the rate of chronic malnutrition is 66%, 20% higher than in Borno State, in the north-east. In Sokoto State, also in north-western Nigeria, nearly 18% of children suffer from wasting and 6.5% from severe wasting. In the Democratic Republic of Congo, it is estimated that 3.3 million children under the age of 5 will suffer from acute malnutrition in 2021, including at least one million from severe acute malnutrition. (Unicef, 2020).

In the state of Zamfara, MSF teams screened more than 36,000 children under the age of five in Gummi in June 2022, following a nutrition alert. The results were alarming, with more than half of the children screened suffering from malnutrition and almost a quarter being severely malnourished, requiring urgent medical care. MSF, in cooperation with the authorities, immediately deployed an emergency response in the region. In Katsina, the teams quickly had to increase their hospitalisation capacity from 100 to almost 280 beds over the last few weeks, but faced with the influx of malnourished children, restricted admission criteria had to be introduced in some treatment centres. In Kebbi, where MSF runs an inpatient centre and two outpatient centres, around 1,500 malnourished children have been treated since March.(MSF,2022)

This is why, as we enter 2021, UNICEF is particularly concerned about the health and well-being of 10.4 million children who are expected to suffer from acute malnutrition next year in the Democratic Republic of Congo (DRC), north-eastern Nigeria, the Central Sahel, South Sudan and Yemen. All these countries and regions are experiencing severe humanitarian crises, growing food insecurity, a deadly pandemic and, except in the central Sahel, the threat of famine.

With the pre-electoral crisis of 2022, there has been a massive movement of people to large cities fleeing insecurity in their respective villages, forcing them to abandon their fields to take refuge in large cities without any assistance, leading to food insufficiency and increasing the risk of developing malnutrition. The underlying causes of malnutrition in Nigeria include poor infant and young child feeding practices,

inadequate access to healthcare, water and sanitation, and high levels of poverty**.** (USAID, 2018).

Beyond the 1st month of life, malaria, diarrhoea and acute respiratory infections remain the three main causes of death. Effective, high-quality child survival interventions for child survival can address these issues as part of primary health care. primary healthcare (Perin,200).

According to the results of the Mortality Survey carried out in OUAKA in the Central African Republic by MSF in March-April 2020, Mortality among children under five years:

-U5MR:1.87 deaths/10,000 people/day (95% CI: 1.37-2.54),The 2019SMART survey: U5MR of 0.90 (95% CI: 0.41-1.96) in Ouaka, SMART survey: U5MR of 0.62 (95% CI: 0.29-1.34) in Ouaka, Causes of death:Malaria/fever(30.5%), Diarrhoeal diseases(24.0%) ,Neonatal deaths(11.9%) ,Lower respiratory tract infections (6.8%), Measles

-5 measles-related deaths (6.6%),44 out of 591 households (7.4%) reported measles as a challenge.(MSF, 2020).

According to the survey carried out in the Central African Republic, the population's inaccessibility to healthcare was explained by the following:

-Challenges in accessing care were cited, due either to the absence of health facilities or their distance (64 households), or to financial obstacles (34 households)

-The lack of medicines to buy in the village or in health facilities was also cited (23 households).

These results corroborate our own, given that although the population is close to the hospital, it does not access it because the admission criteria have been tightened up and only seriously ill children should be hospitalized, and the rumour was circulating that MSF, which supports paediatrics, was only going to care for displaced children and not the host community, This has pushed the host population to use traditional products at home, as they do not have the means to pay for treatment in the unsupported services, where everything has to be paid for.

According to previous estimates of mortality in the Central African Republic in 2018:

Under-5 mortality rate (U5MR).

-SMART surveys estimated a national U5MR of 1.12 and 0.76/10,000/day respectively (ICSEES, 2018; Unicef, 2020)

–Ouaka: SMART survey 2019: U5MR of 0,90 (IC de 95 %: 0,41-1,96) (WHO,2012).
-Ouaka: SMART survey 2019: U5MR of 0.90 (95% CI: 0.41-1.96)
SMART 2018: U5MR of 0.62 (95% CI: 0.29-1.34**)** (Frontières Ms, 2019).

CONCLUSION

Thus, this implies that the crude mortality rate at home in Anka town for November and December 2022, is equal to 3 deaths per 1000 children of 6 months to 12 years of age, which is beyond the sphere standard of Community Mortality Rate(CMR) >2/10.000/Day which is beyond the sphere standard of Community Mortality Rate (CMR) >1/10,000/day or Under five year old Mortality Rate(U5CMR) >2/10,000/day (The Sphere Handbook, 2018),community members express their concern on the causes of death at home, in which they made mention of the economic situation of the country and therefore community members cannot afford to take their children to MoH clinic since they have to pay for every services and also the fear of rejection from MSF clinic for the new admission criteria, in Anka town, communities are solemnly dependent on MSF free medical services for their children, following the decade MSF have been providing free medical service, consequently, the new admission criteria makes community members skeptical to attend the clinic thereby adopting home treatment, thus, increase the mortality rate in the community. We recommend to MSF to organize a big sensitization about his activities in Anka General Hospital and admissions criteria so that Host community and the IDPs will access to free care on time, which will reduce the community Mortality rate in the whole community.

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APPENDIX

LIST OF ABBREVIATIONS

AGH: Anka General Hospital

CMR: Community Mortality Rate

DRC: Democtaric Republic of the Congo

F: Feminin

IDP: Internal displaced population

LGA : Local Government

M: Masculin

MOH: Ministry of Health

MSF: Médecins Sans Frontières

OPD: Outpatients Department

U5CMR: Under Five Community Mortality

UN: United Nations

USAID:Unite State Agency for International Development

WCA: West and Central Africa

WHO: World Health Organization

SURVEY QUESTIONNAIRE

1. What is your status?

-Host community ☐

-Displaced (IDPs) ☐

2. Do you have or did you have a child aged between 6 months and 12 years?

-Yes ☐

-Non ☐

3.Have you had a child aged between 6 months and 12 years who died at home since MSF reduced its activities and relocated its International staff .

-Yes

-No

4. If yes how old was he/she

- Six months - ≤5 Years

-> 5 Years - ≤12 Years

5.If yes , which gender

-Male

-Female

6. Why did the child die in the community?

-Lack of financial resources

-Tight admission criteria

-Others reasons

7. What is the potential causes of death

-Fever

-Diarrhea

-Malnutrition

-Others

8 .Was the child admitted to Anka General Hospital 2 weeks before his death?

-Not admitted

-Admitted then die in the community

-Between 1-14 days (Two weeks) after discharge from the hospital