



**PERFORMANCE OF COMMUNITY MANAGEMENT OF ACUTE MALNUTRITION OF UNDER-FIVE CHILDREN INVOLVED IN OUTPATIENT THERAPEUTIC PROGRAMME CASE STUDY OF PHC BABAN DODO ZARIA LGA, KADUNA STATE.**

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**ABSTRACT**

This study was a clinic-based cross-sectional survey that was incorporated with quantitative and qualitative data collection. Information on sociodemographic characteristics of the caregivers was assessed with the aid of a validated semi-structured questionnaire. Weight, oedema, and Mid up Arm Circumference (MAUC) of the children were measured weekly to monitor the progress of the programme. This study shows that 8(26.67%) of the caregivers were aged 21 – 25 years and 26 - 30 years each, while 7 (23.33%) were 18 - 20 years of age, only 1(3.33%) of the caregiver was above 40 years. The mean age of the respondents was 27 years. Educational status shows that 17(56.67%) of the caregivers attended Secondary school as the highest level of education, 5(16.67%) had no formal education while only 1 attended tertiary institution. Occupation wise, 36.67% (n=11) of the caregivers were Artisan/Skilled Worker, followed by 10(33.33%) who were housewives. The result of the MUAC of the SAM children for 8 weeks shows that the mean value for the first week was 9.73. The boosters of the programme show 76.7% of RUTF, 10% of porridge beans, tofu and turn brown. The cost of transportation and distance as barriers was 60% and 26.7% respectively. The performance indicators show 77.8% cure rate, 8% default rate, 2.7% death rate and no recovery rate was 11.1%. Geographic coverage is 5.8% which when compared with the percentage standard is alarming. Therefore, geographic coverage in this study site was low and this would translate into low program effectiveness.

**Keywords:** CMAM Program, Kaduna, Under 5 children, Zaria.

**INTRODUCTION**

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and or nutrients. The term malnutrition addresses three broad groups of conditions. One is undernutrition which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient-related malnutrition (deficiencies and excesses of vital minerals and vitamins). The others are overnutrition (overweight and obesity) and diet-related non-communicable diseases like diabetes and some cancers (WHO, 2018).

The effects of undernutrition are not just short term and confined to the affected individual but may have important long term and intergenerational consequences. It has many effects ranged from morbidity to constrain to the economic growth and development of a nation. Effectively tackling malnutrition is therefore a global Health priority with potential for far-reaching impact (Kerac, 2015).

Acute malnutrition occurs due to inadequate intake or utilization of food, medical complications, poor appetite, and natural or man-made crises such as the recent insurgency witnessed in several regions of the world (Walton *et al.*, 2011). Though there is weak or no association between the economic growth of a country and the prevalence or the

outcome of childhood undernutrition (Vollmer *et al.*, 2014), yet other factors, such as illiteracy, infections (Jones *et al.*, 2014) and poor infant and young child feeding practices (Mathew *et al.*, 2009) in combination with poverty make undernutrition endemic in sub-Saharan Africa. It is classified into severe acute malnutrition (SAM) and Moderate Acute Malnutrition (MAM) according to WHO based on the degree of wasting and the presence of oedema. The WHO and United Nations Children's Fund proposed diagnostic criteria for severe acute malnutrition in children aged 6 to 59 months (Urnesh, 2009; WHO, 2009).

Severe acute malnutrition (SAM) affects nearly 20 million children under 5 years and causes up to 1 million deaths annually by increasing susceptibility to death from severe infections (Black *et al.*, 2013). The most vulnerable age for malnutrition is 6–18 months when growth velocity and brain development are especially high (Kerac *et al.*, 2015).

Outpatient Therapeutic Programme (OTP) is a programme that provides RUTF and routine treatment using simple medical protocols to children with severe acute malnutrition without complications. OTP is operational at health centres and health posts and offers lifesaving treatments with ready-to-use therapeutic foods (RUTF), usually Plumpy'Nut. Plumpy'Nut is energy, mineral and vitamin-enriched paste-

food designed to treat SAM). A sachet has a serving size of 92 gm and gives an energy of 2,100 kJ (500 kcal).

The CMAM approach empowers the community to identify early signs using the MUAC tapes, check for bilateral pitting oedema, provide home visits, and refer to the OTP clinic. The quality of intervention of this program is measured against the SPHERE indicators (MSFSN, 2015), which are as follows: Recovery/cure rate >75%, defaulter rate of <15%, and death rate of <10%. Recovery is defined as achieving MUAC of >12.5cm for three consecutive visits, progressive weight gains on three consecutive visits, good appetite, absence of complications and oedema. Default is defined as absence from care for three consecutive visits without a cure. Non-recovered is defined as not achieving the discharge criteria after 12 weeks of appropriate medical and nutritional care (CTC, 2014).

Also, the results of the Multiple Indicators Cluster Survey (MICS) conducted in Kaduna in 2018 showed that 4.1% of children under five are severely malnourished, 42.9% are stunted (NNHS, 2018), 11.7% are wasted and 34% are underweight (MICS, 2018).

In 2017, Kaduna State recorded 17,989 children admitted to CMAM out of which 11,324 were cured, 1515 defaulted, and 214 not recovered; and 150 died, as reported by Multiple Indicators Cluster Survey, 2017. Similarly, this burden was confirmed at an event organized by Civil Society-Scale-Up Nutrition (CS-SUNN). According to the news agency of Nigeria (NAN), 132 children have died out of 12,858 hospitalized while 10,604 have been cured between January to October 2018 in the state. (CS-SUNN, 2018).

Almost a billion Naira was spent by the Kaduna state government through Kaduna State Emergency Nutrition Action Plan (KADENAP) and United Nation International Children Emergency Fund (UNICEF) for the flagging and scaling up of the CMAM programme since 2016 to combat malnutrition (Nigeria Health Online, 2017). Despite this tremendous effort and investment to scale up the programme in the state, the prevalence of severe acute malnutrition is still very alarming. In 2016, UNICEF reported that in Kaduna State severely affected are children in Igabi, Zaria and Makarfi local government areas of the state. To address these challenges, the state government set up five CMAM sites each in Zaria and Makarfi local government areas (UNICEF, 2016).

There is a need to consolidate the achievements made through the generation of concrete evidence data on how well the global and national level strategies have worked to strengthen existing programmes and expand treatment for

SAM. Therefore, this study provides information on the effectiveness of the CMAM programme in PHC Rabban dodo, Zaria LGA, of Kaduna State.

## MATERIALS AND METHODS

This study was a clinic-based cross-sectional survey that was incorporated with quantitative and qualitative data collection. Information on the sociodemographic characteristics of the caregivers was assessed with the aid of a validated semi-structured questionnaire. Bilateral pitting oedema was also assessed using a hand thumb pressure, anthropometric indices (weight, MUAC) of children under 5 years were taken to assessed nutrition status using portable calibrated weighing balance, MUAC Tape, and writing materials. The treatment outcomes were described by point coverage, geographic coverage, care rate, death rate, default rate, non-recovery responders to treatment, weight gain and length of stay in the OTP according to the global sphere standards (Sphere, 2011).

Focus group discussions were used to determined boosters and barriers of the CMAM program. Children are aged 6–59 months were recruited at the OTP/community based using specified admission criteria and followed up until discharge. All children between the age group of 6-59 months fulfilling any one of the following criteria as per WHO guidelines about growth parameters were included in the study. Children whose ages cannot be determined, children who are physically challenged and Caregivers who refuse consent were exempted from this study.

The sampling frame was include children (6-59months of age) on outpatient therapeutic (OTP) programme in PHC Baban dodo, Zaria Local Government Area of Kaduna State. A convenience sampling technique was used. The sample size was also determined by the number of cases that were present new to the facility on the OTP visit of the study period.

Sample sizes were calculated using the conventional formula:

$$n = \frac{z^2 pq}{d^2}$$

Where: n = the desire sample size, z= the standard normal deviate usually set at 1.96 (which corresponds to the 95% confidence level), p= the prevalence of malnutrition in the target population (prevalence of malnutrition in Zaria LGA is approximated to 2.2%), q= 1-p, d= absolute precision or accuracy, normally set at 0.05.

$$n = \frac{(1.96)^2 (0.022)(0.883)}{(0.05)^2}$$

$$n = \frac{(3.8416)(0.022)(0.883)}{(0.0025)}$$

$$= 30$$

Determination of the treatment outcomes was done using the formula below.

$$\text{Point coverage} = \frac{\text{Number of children in OIP with MAUC still} < 11.5\text{cm}}{\text{Total number of children with MAUC} < 11.5\text{cm}} \times 100$$

$$\text{Geographical coverage} = \frac{\text{Healthcare facilities delivering treatment for SAM}}{\text{Total number of health facilities}} \times 100$$

$$\text{Cure Rate} = \frac{\text{number of children cured}}{\text{total number of discharges}} \times 100$$

$$\text{Death Rate} = \frac{\text{number of dead children}}{\text{total number of discharges}} \times 100$$

$$\text{Non-Recovery Rate} = \frac{\text{number of children nonrecovered}}{\text{total number of discharges}} \times 100$$

$$\text{Default Rate} = \frac{\text{number of children defaulted}}{\text{total number of discharges}} \times 100$$

### Data analysis

The data obtained were analyzed using SPSS version 20. Baseline variables were analyzed by descriptive statistics. Anthropometric data were analysed using WHO Anthro Software version 3.2.2 (2006). Significance levels were accepted at  $p \leq 0.05$ .

Thirty questionnaires were administered to 30 caregivers and the children attending the CMAM program in PHC Babban Dodo, Zaria LGA of Kaduna state and 100% of the sample size was used for the data analysis.

### RESULTS

The demographic profile of the caregivers is presented in Table 1 below. The data include their age, highest education attended, number of children, occupation, the total number of People households and average monthly income.

The result of the study shows that about 8(26.67%) of the caregivers were age 21 – 25 years and 26 - 30 years each, while 7 (23.33%) were 18 - 20 years of age, only 1(3.33%) of the caregiver was above 40 years, while none of them was below 18 years. The mean age of the respondent was 27 years with a standard deviation of 6. Concerning educational status,

over half 17(56.67%) of the caregivers had Secondary school as their highest education attained, about 7(23.33%) had primary school while 5(16.67%) had no formal education and only 1 was tertiary educated.

Regarding the number of children, 13(43.33%) of the respondents have between 1 – 3 children, followed by 9(30.00%) which had between 4 – 6 children, 7(23.33%) had children between 7 – 10 only 1 had 11 – 15 children while none of the respondents had more than 15 children. For the total family size of a household, half of the caregivers responded to 6- 10 people in the household, 8(26.67%) responded to 1 – 5 people, about 5(16.67%) responded to 11 – 15 people while 2(6.67%) responded to between 16 – 20 people none had above 20 people in a household.

Occupation wise most (36.67%, n=11) of the caregivers were Artisan/Skilled Workers, followed by 10(33.33%) who were housewives, 8(26.67%) were traders, 1 recorded farmer while none was a civil servant.

The result shows that all the caregivers earn less than N10,000 (Ten thousand naira) as their average monthly income.

### Table 1: Socio-economic Characteristics of Caregivers

#### Demographic characteristics of SAM children

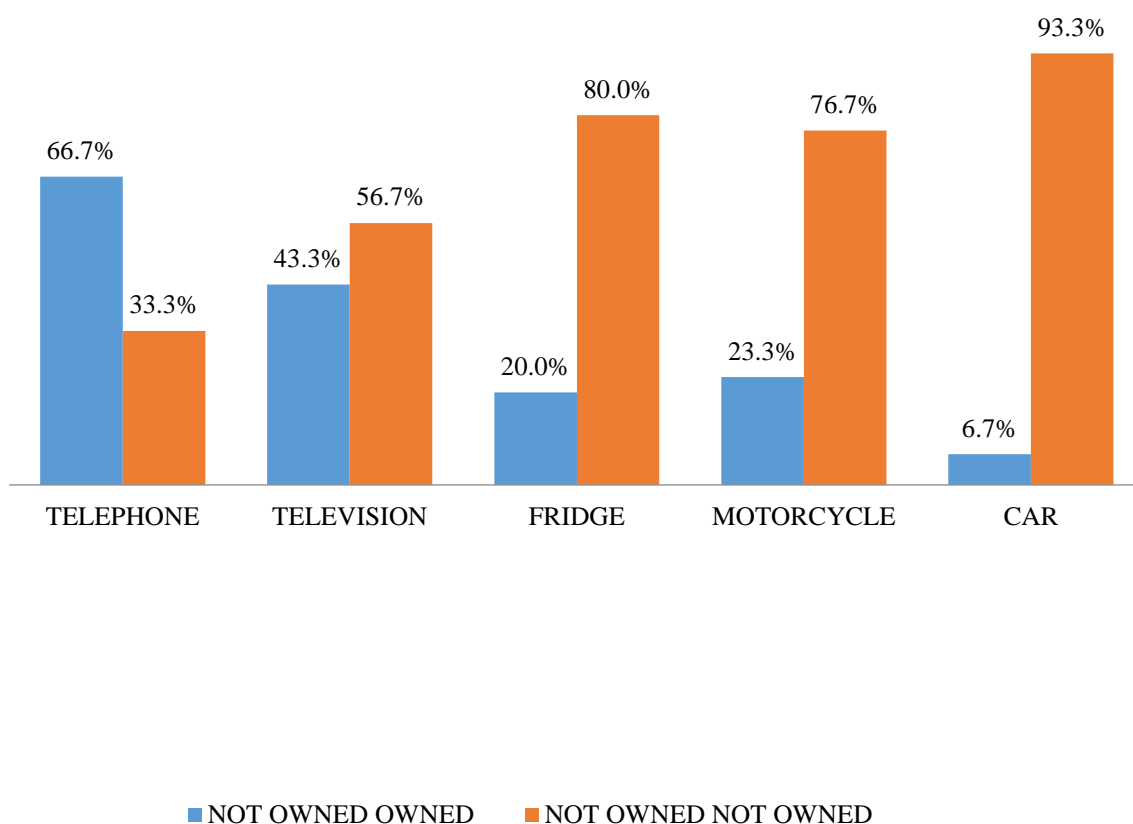
Demographic characteristics of the SAM children are shown in table 2. As revealed in Table 18(60%) of the SAM Children were males while 12 of them were females. The majority 12(40%) of the children were between 7 – 12 months of age, 7(23.33%) were between 19 – 24 months, 3(10%) were above 36 months, while 2(6.67%) were between 25 – 36 months none of the children was between 0 – 6 months of age (table 2).

**Table 2: Demographic characteristics of SAM children**

Variables		Frequency	%
Age of Children in Household	1 - 6 months	0	0.00
	7 - 12 months	12	40.00
	13 - 18 months	6	20.00
	19 - 24 months	7	23.33
	25 - 36 months	2	6.67
	above 36 months	3	10.00
	<i>Mean = 16, Std=8</i>		
Sex	Male	18	60.00
	Female	12	40.00

**Property/Assets**

Concerning properties or assets owned by the respondents as presented in figure 1, the majority (66.7%) responded to owning telephone, 43.3% owned television, 20% owned fridge, and 23.3% owned motorcycle while for a car only 6.7% owned it.



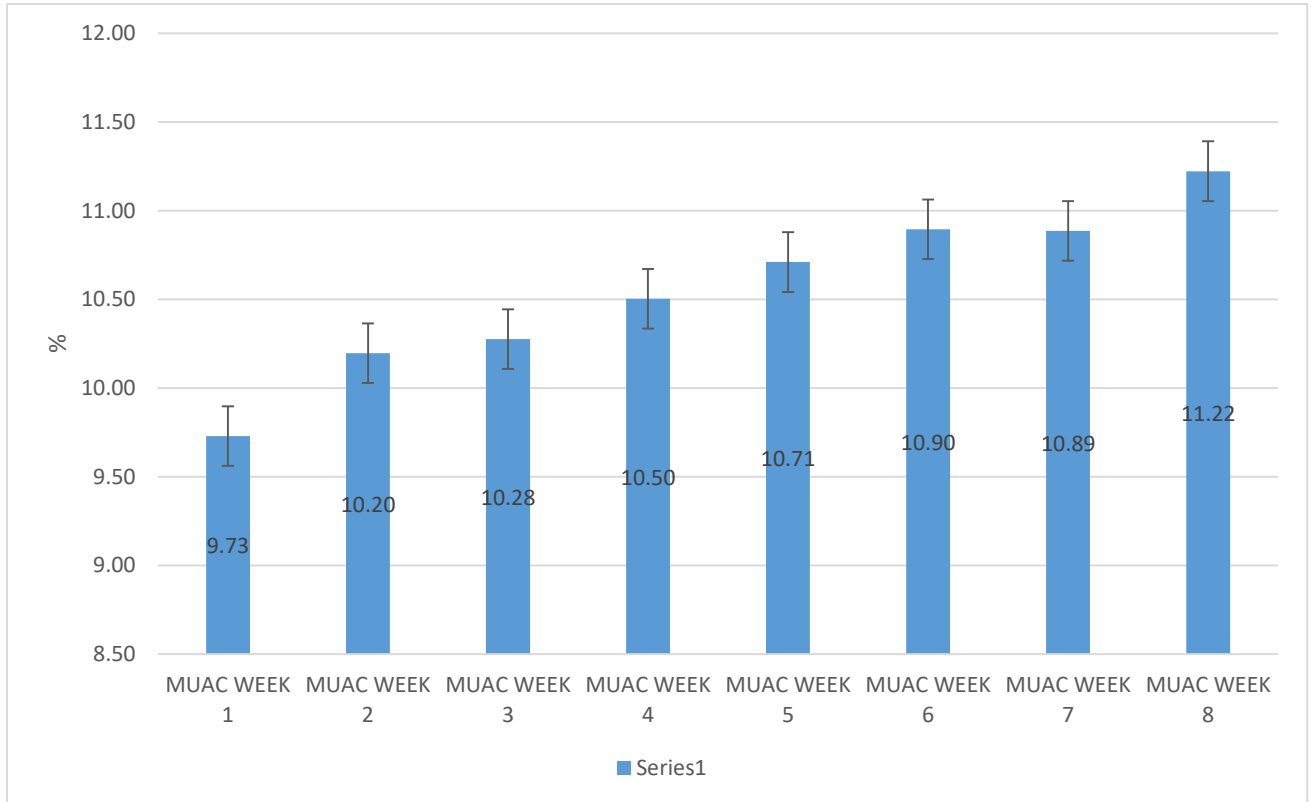
**Figure 1: Property/Assets**

**Mid Up Arm Circumference (MUAC)**

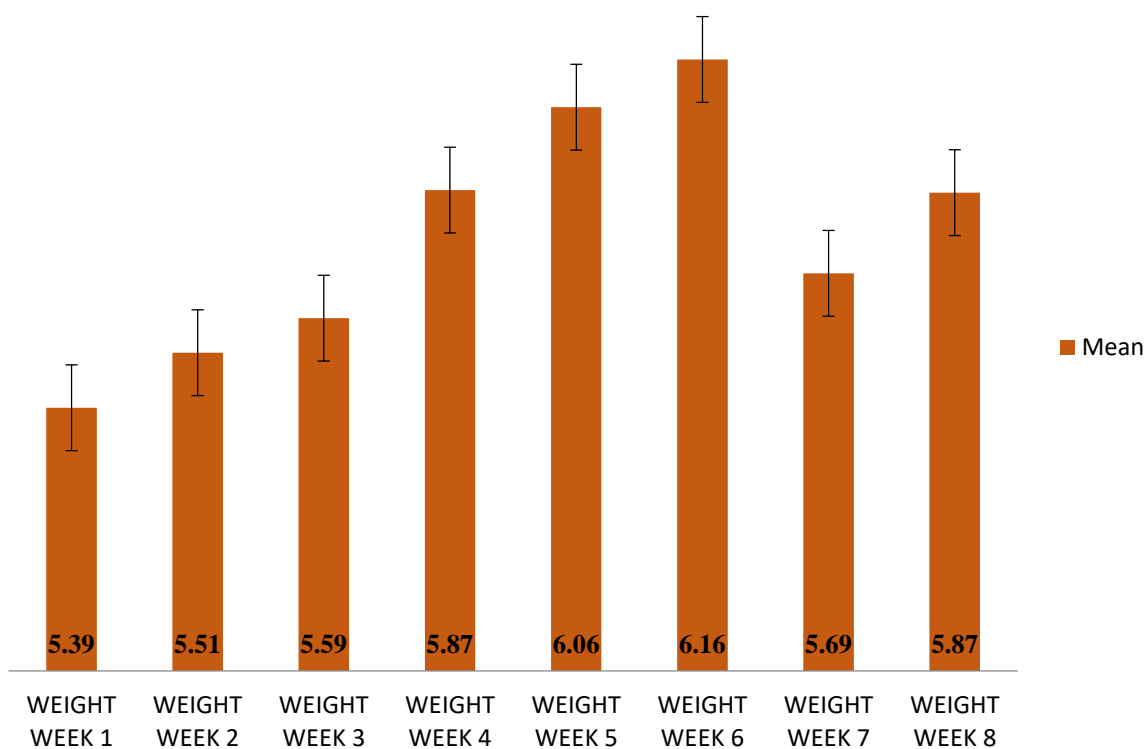
The result of the Mid up Arm Circumference (MUAC) of the SAM children for 8 weeks as presented in Figure 2 shows that the mean value for the first week was 9.73, while 10.2, 10.2, 10.5, 10.7, 10.9, 10.8 and 11.2 are mean value for second to the eighth week respectively.

**Oedema**

For the presence of Oedema as shown in Table 3, week 1 and week 2 about 17.2% were recorded +1 Oedema each, by week 3, week 4 and week 5 a decrease of +1 Oedema was recorded as 13.8%, 10.3% and 6.9% respectively. No cases of +2 and +3 were recorded throughout.



**Figure 2:** weekly MAUC measurement of under-five children with SAM



**Figure 3:** weekly weight measurement of under-five children with SAM

**Table 3: Oedema**

	NO OEDEMA	OEDEMA +1	OEDEMA +2	OEDEMA +3
WEEK 1	82.8	17.2	0.0	0.0
WEEK 2	82.8	17.2	0.0	0.0
WEEK 3	86.2	13.8	0.0	0.0
WEEK 4	89.7	10.3	0.0	0.0
WEEK 5	93.1	6.9	0.0	0.0
WEEK 6	100.0	0.0	0.0	0.0
WEEK 7	100.0	0.0	0.0	0.0
WEEK 8	100.0	0.0	0.0	0.0

**Performance Indicator of SAM Children**

Out of the total number of 405 children with SAM cases discharged in PHC Babban dodo Zaria local government in 2019 from January to December, 315 were a cure, 11 were dead, 34 defaulted and 45 were no recovery. There were no data for January and February. These numbers of discharges were used to calculate the performance indicators. Overall, when compared with the percentage standard of performance indicators, 77.8% of cure rate, 8% of default rate, 2.7% of death rate are acceptable while there is no percentage standard for no recovery rate which is 11.1%. The Babban dodo community of Zaria LGA is considered a rural area that has geographic coverage of 5.8% of SAM interventional programme (CMAM-programme), which when compared with percentage standard is alarming and there was no data for point coverage. Though there was no data for point coverage.

**Table 4: Shows the performance indicators of SAM children in Babban dodo Primary Health Centre Zaria, LGA. In 2019 from January to December.**

Months	Discharges			
	Cure	Dead	Default	No recovery
January	-	-	-	-
February	-	-	-	-
March	19	1	1	1
April	23	0	1	5
May	18	1	4	4
June	34	1	3	4
July	25	1	3	3
August	25	1	3	2
September	46	1	6	7
October	41	1	6	4
November	47	1	5	8
December	37	2	2	7
Total of each indicator	315	11	34	45
Total of discharge	= 405			

**Table 5: Shows the comparison between the acceptable, alarming and field data collection of performance indicators and coverage of SAM children in PHC Babban dodo Zaria, LGA.**

Indicatorsd	Acceptable	Alarming	Field data
Cure rate	>75%	<50%	77.8%
Default rate	<15%	>25%	8.4%
Death rate	<10%	>15%	2.7%
No recovery rate	Nil	Nil	11.1%
Point coverage	>90%	<90%	Nil
Geographical coverage			-
Urban	>70%	<70%	
Rural	>50%	<50%	5.8%

**Boasters**

Figure 4, revealed the result of the boasters of the Programme, as shown in the figure majority (76.7%) agree to the fact that giving RUTF serves as a boaster, 10% believed that the porridge, beans, tofu and turn brown giving to the children during CMAM programme boast the effectiveness of the programme. A portion of about 6.7% each agrees to health talk, singing and dancing to contribute as boaster to the programme.

**Barriers**

Barriers are presented in Figure 5, about 60% responded to the cost of transportation and 26.7% responded to distance the major barriers to the programme while 6.7% agree to physical/Climate condition and death of the child as the minor barriers, none of the respondents sees the poor attitude of health care staffs as a barrier in the programme.

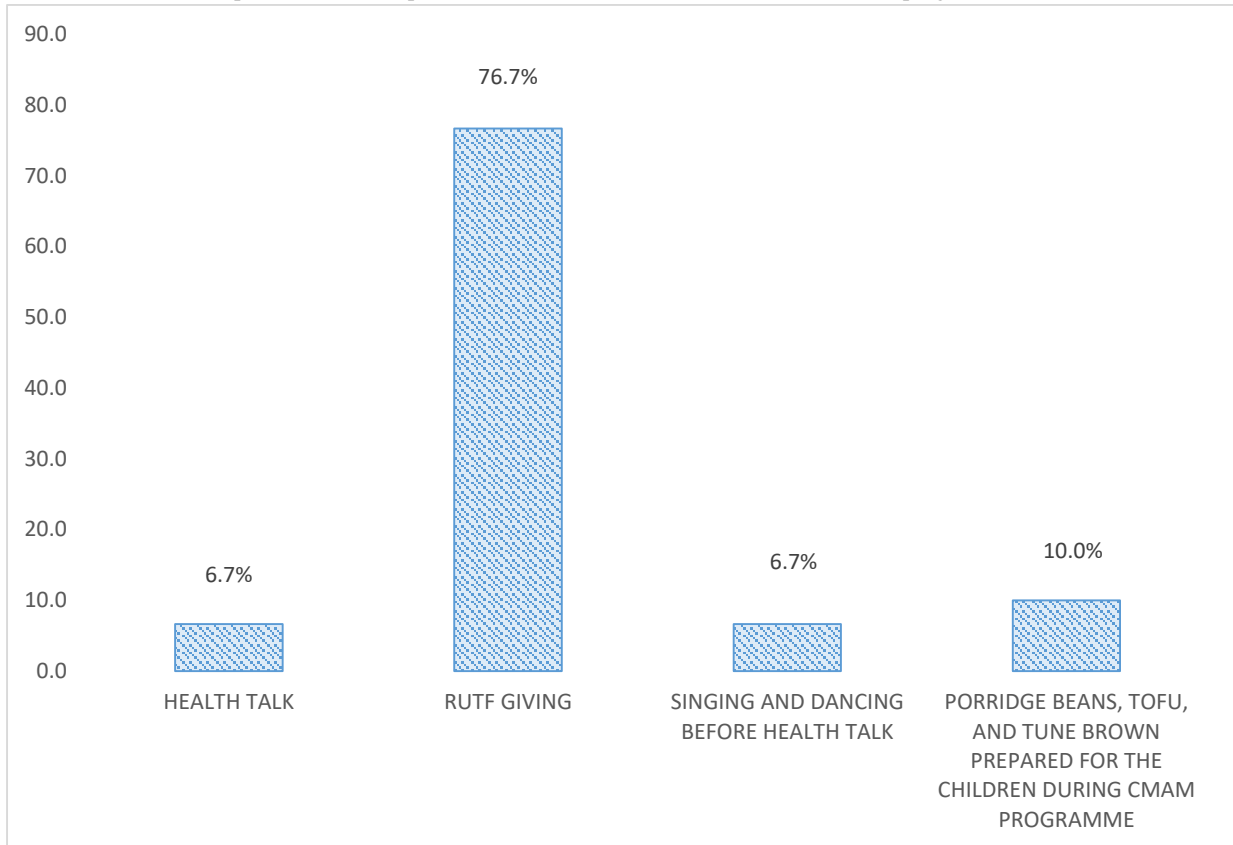


Figure 4: Boaster of CMAM Program in PHC Babban dodo Zaria, LGA



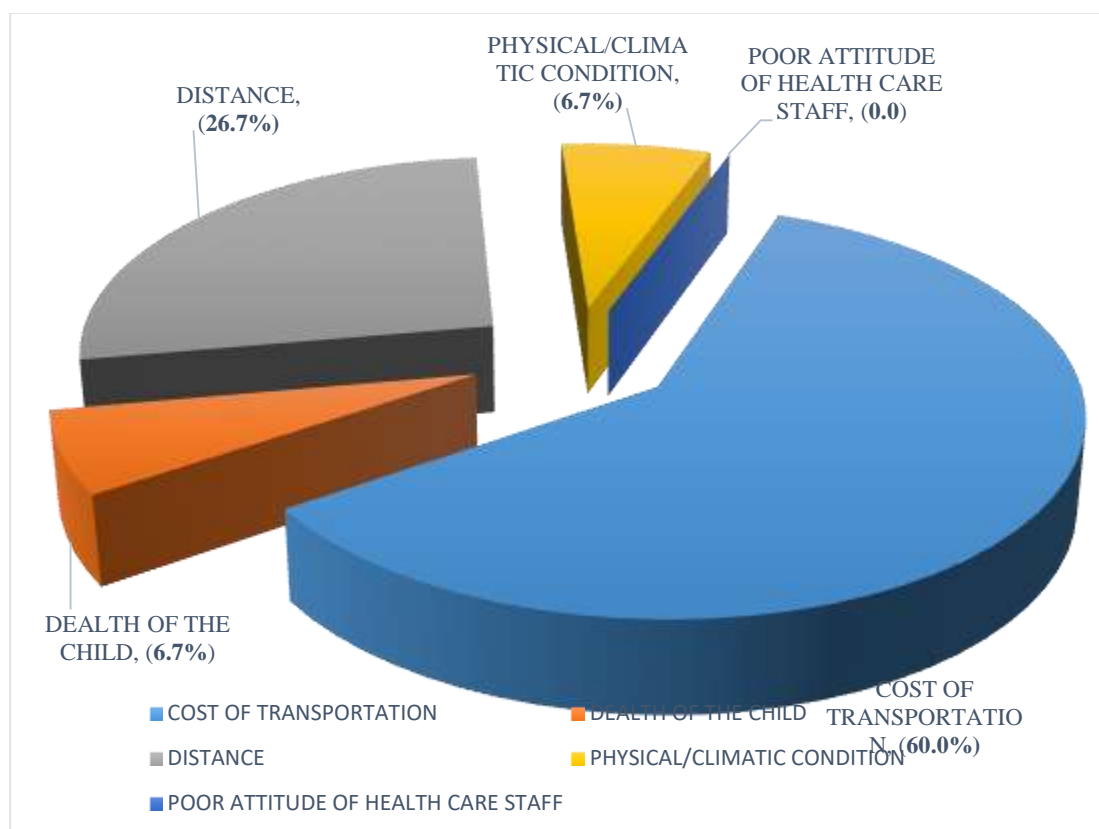


Figure 5: Barriers of CMAM Program in PHC Babban dodo Zaria, LGA

## DISCUSSION

Acute malnutrition is a major public health problem throughout the developing world. Although its contribution to the worldwide burden of child mortality varies by country and is reflected differently in different studies (Tawfik, et al., 2010). In in this study over 24,000 children were treated for SAM in the community within a year which was contrary to the results reported from Ethiopia [Teferi, et al., 2020]. But less than what was reported from the Republic of Niger. [Tectonid, 2006]. In contrast, the report from Niger was obtained during a famine, this could explain the higher cases reported from Niger. This study shows that only 5.8 % of the health facilities of the target population were covered, which is inadequate compared to the minimum of 50% of the target population set as a standard [MSFSN, 2015]. The low coverage in this study indicates nutritional intervention. A higher coverage with a low cure rate may be better than a low coverage with a high cure rate in meeting the needs of these children [TGCMAM, 2008].

About 8.4% of the enrolled children exited the program. Also, there were 11.1% of 'no recovery rate' and 2.7% of a death rate. An appreciable number of cases (77.8 %) were cured and saved from death due to malnutrition, which is above the minimum standard of 75% [MSFSN, 2015]. Which is similar to a higher cure rate reported from Ethiopia [Teferi, et al., 2020]. The lowest cure rates were recorded from Birniwa, the highest defaulter rate was also recorded from the same place which is in contrast with our result [MSFSN, 2015]. The defaulter rate of 8.4% in this study is less than the minimum rate of 15% required [MSFSN, 2015]. The long distances

over clinics as well as the poor transportation system may contribute to the high default rate, the death rate and no recovery rate which is also a contrary to the result reported in Niger [MSFSN, 2015].

Several CMAM assessments have reported very low coverage; in Sierra Leone of the 13 Ministry of Health Administrative districts that were assessed for CMAM coverage in 2012, not even one was deemed to have achieved high coverage (>50%); more than 75% of the districts reported low coverage (<20%) (Guevarra, 2020). Two surveys conducted in Ghana also reported low coverage of less than 30% which is similar to the result finding in our study [CMAM FORUM, 2020; GHS, 2013].

geographical coverage was low from all data sources which is similar to our findings. Literature on the other coverage indicators such as point and treatment is scanty, but geographical coverage, which is more commonly reported in the literature, could be a pointer to programme effectiveness; if geographical coverage is high, the services reach the targeted population, and it would be the rest step to ensuring that all other coverage indicators are high and programme effectiveness is achieved. The 1978 Tanahashi model of health service coverage and effectiveness presents levels of coverage; availability, accessibility, acceptability, contact and effectiveness, [GHS, 2013]. All of which were also covered in our study.

In Ghana, there are inequities between rural and urban populations in terms of coverage of health services; there are many more health facilities in urban than in rural Ghana. Except for a few services such as family planning services,

(this exception is a recent development), which has greater coverage in rural than urban Ghana [Tanahashi, 1978], other health services have higher coverage in urban than rural Ghana. Our study shows that the factors that act as pull factors in the utilization of CMAM services/health services (contact coverage) differ between urban and rural populations; the rural residents had a wider range of factors when compared with the urban population. Myatt and Guerrero model (2013) tries to explain the nexus between low coverage and poor outcomes/low effectiveness which is similar to our findings [GSS, 2017].

The National Nutrition and Health Survey (NNHS) 2018 showed that the prevalence of global acute malnutrition based on Middle Upper Arm circumference (MUAC) was reported to be 5.5% in Kaduna State; the state also emerged among states with the highest prevalence of severe acute malnutrition of 2.4% based on MUAC (NNHS 2018). This study is contrary to our work, which shows that the mean value for the first week was 9.73, while 10.2, 10.2, 10.5, 10.7, 10.9, 10.8 and 11.2 are mean values from the second to the eighth week, respectively. Therefore, there is limited data on monitoring of CMAM program in PHC Babba dodo Zaria, LGA. Thus this may serve as baseline data for decisions and policymaking.

## CONCLUSION

This study revealed that majority (8, 26.67%) of the caregivers were aged 21 – 25 years. The educational status (17, 56.67%) of the caregivers was poor. The major occupation (36.67%, n=11) of the caregivers were Artisan/Skilled Worker, followed by 10(33.33%) who were housewives. The result of the MUAC of the SAM children for 8 weeks was as low as 9.73. The study also shows that the boosters of the Programme were RUTF, porridge beans, tofu and turn brown. The cost of transportation and distance serve as a barriers to the program. The performance indicators and geographic coverage in this study when compared with the percentage standard is alarming. Therefore, geographic coverage in this study site was low and we can conclude that, this would translate into low program effectiveness.

There are limitations to this study. First, we were unable to determine geographic coverage and point coverage. This study is the rest in primary health care Babban dodo in Zaria local govern area of Kaduna State to assess coverage and effectiveness of CMAM in settings using a mixed-methods approach which presents the added advantage of triangulation. The data allow us to draw some conclusions regarding the CMAM coverage and effectiveness in this setting as evidence to inform policymakers, a low mortality rate as observed in this study in PHC Babban dodo Zaria. Therefore, a large number of children can be successfully treated for SAM on an outpatient basis, scale-up and government/community ownership will increase the coverage and improve the outcome of this program.

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