

IMPACT OF READY-TO-USE THERAPEUTIC FOOD ON MANAGEMENT OF UNDER-FIVE WITH SEVERE ACUTE MALNUTRITION IN NINGI LGA BAUCHI STATE

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Abstract

This study investigated the impact of Ready-to-Use Therapeutic Food (RUTF) on management of under-five children with severe acute malnutrition (SAM) attending primary healthcare facilities in Ningi LGA, Bauchi State. Two research objectives and two research hypotheses guided the study. Quasi-experimental of one group of pretest-posttest design was adopted for this study. The population of the study comprised of 72,678 under-five children in Ningi Local Government Area (LGA) of Bauchi State. The sample size for this study was 25 participants sampled using multi-stage sampling technique. Anthropometric Measurements of pretest-posttest was used for data collection. Paired sample t-test was used to test hypothesis formulated, at 0.05 level of significance. The findings of the study revealed that the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State ($t = -92.750$, $df = 24$; $p = .000$); and the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State ($t = -92.750$, $df = 24$; $p = .000$). Based on these findings, the study concludes that the use of RUTF has been found to significantly improve both weight gain and Mid-Upper Arm Circumference among under-five children suffering from severe acute malnutrition in Ningi LGA, Bauchi State. It is therefore, recommended that Bauchi State Primary Health Care Development Agency and other relevant stakeholders ensure continuous supply and accessibility of Ready-to-Use Therapeutic Food (RUTF) in all primary healthcare facilities within Ningi LGA to sustain and enhance weight recovery among under-five children with severe acute malnutrition.

Keywords: Impact, Ready-to-Use Therapeutic Food, management, severe acute malnutrition, and antenatal care services

Introduction

Severe Acute Malnutrition (SAM) is a major public health concern in Nigeria, particularly among children under the age of five. It is characterized by a very low weight-for-height (below -3 Z-scores of the median WHO growth standards), visible severe wasting, or the presence of nutritional oedema. World Health Organization [WHO] (2020) reported that SAM remains a significant contributor to child mortality, especially in Northern Nigeria, due to factors such as food insecurity, poor maternal education, inadequate breastfeeding practices, and limited access to healthcare services. According to UNICEF (2021), Nigeria accounts for nearly 10% of the global

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burden of SAM, with states such as Borno, Yobe, and Katsina recording the highest prevalence rates. The condition is further exacerbated by poverty, conflicts, and displacement, which disrupt access to adequate nutrition and health services (Aguocha, Madukwe & Ifeadike, 2019).

Efforts to combat SAM in Nigeria have included the implementation of community-based management of acute malnutrition (CMAM) programs, supported by both government and international partners. These programs focus on early detection, therapeutic feeding, and health education, yet they face challenges such as low coverage, inadequate funding, and weak health systems (Ibrahim et al., 2022). Despite progress, many children still lack access to life-saving treatments due to geographical, cultural, and logistical barriers. Strengthening nutrition-sensitive interventions such as food security, clean water, and maternal education is crucial for sustainable solutions to SAM (Okolo & Akamike, 2020). Moreover, improved coordination among stakeholders and robust monitoring and evaluation frameworks are essential for scaling up effective responses and reducing child mortality related to malnutrition in Nigeria.

Children under the age of five with Severe Acute Malnutrition (SAM) in Nigeria face life-threatening health challenges, with the condition contributing significantly to the country's high child mortality rates. SAM in this age group is often linked to inadequate breastfeeding, poor complementary feeding practices, repeated infections, and socio-economic hardships, particularly in rural and conflict-affected regions. According to Akinbami et al. (2020), many under-five children suffering from SAM present with complications such as dehydration, anaemia, and infections, which further complicate recovery and increase the risk of death. The effectiveness of treatment is often hindered by delays in seeking care, poor health infrastructure, and limited access to Ready-to-Use Therapeutic Foods (RUTF). Therefore, early detection and prompt management through community-based interventions remain critical for reducing the burden of SAM among Nigeria's most vulnerable population (Olatona et al., 2019).

Ready-to-Use Therapeutic Food (RUTF) is a high-energy, micronutrient-enriched paste designed for the treatment of children suffering from Severe Acute Malnutrition (SAM) without medical complications. It requires no preparation, refrigeration, or cooking, making it particularly suitable for low-resource settings and home-based treatment. RUTF typically contains peanut butter, milk powder, oil, sugar, and vitamin-mineral premixes, and is used in community-based management programs to promote rapid weight gain and recovery in malnourished children. Studies have shown that RUTF is highly effective in improving nutritional outcomes, reducing mortality, and increasing adherence to treatment due to its palatability and ease of use (Briend et al., 2015). In Nigeria, RUTF has been successfully integrated into Community-Based Management of Acute Malnutrition (CMAM) programs, although challenges such as supply chain disruptions and dependency on imported products still affect its widespread accessibility and sustainability (Abba et al., 2020).

A study conducted by Yusuf, Ibrahim, and Garba (2022) in Kano State examined the effectiveness of RUTF on weight gain among under-five children diagnosed with SAM attending five selected primary healthcare centers. The results revealed a statistically significant increase in the mean weight of children after 8 weeks of RUTF intervention,

indicating the effectiveness of RUTF in improving child nutritional status. Similarly, Mohammed and Usman (2021) conducted a study in Sokoto State to assess the role of RUTF in treating severe acute malnutrition among children under five years old. The study found that children receiving RUTF for more than six weeks had significantly higher weight gain compared to those who received it for a shorter period, affirming the positive impact of RUTF in addressing child malnutrition.

In a study by Adamu and Sulaiman (2021) in Katsina State, the researchers assessed changes in MUAC among under-five children enrolled in a Community Management of Acute Malnutrition (CMAM) program at four selected primary healthcare centers. The results showed a significant improvement in MUAC measurements from an average of 10.3 cm at admission to 12.1 cm after eight weeks of RUTF intervention, indicating a positive effect of RUTF on nutritional recovery. Similarly, a study conducted by Musa and Ibrahim (2022) in Zamfara State evaluated the effectiveness of RUTF in improving MUAC among malnourished children attending rural primary health facilities. The findings revealed a consistent and statistically significant increase in MUAC over the intervention period, confirming the effectiveness of RUTF in promoting rapid recovery from malnutrition among the participants.

Severe Acute Malnutrition (SAM) remains a critical public health issue in Ningi Local Government Area (LGA) of Bauchi State, where a significant number of under-five children are affected due to persistent poverty, food insecurity, and inadequate feeding practices. According to the Nigeria Demographic and Health Survey (NDHS, 2018), Bauchi State records one of the highest rates of childhood malnutrition in the country, with over 10% of children under five suffering from wasting a key indicator of SAM. Despite the introduction of Ready-to-Use Therapeutic Food (RUTF) as a core intervention under the Community-Based Management of Acute Malnutrition (CMAM) program, there are concerns about the effectiveness, accessibility, and consistency of its use in local primary healthcare centers. In Ningi LGA, anecdotal reports and health facility records suggest that many children with SAM either do not recover fully or relapse due to irregular RUTF supply, poor caregiver compliance, and lack of adequate follow-up. Therefore, it becomes essential to investigate the impact of RUTF on the management and recovery outcomes of under-five children with SAM attending primary healthcare facilities in the area.

Research Objectives

The aim of this research is to assess the impact of Ready-to-Use Therapeutic Food (RUTF) on management of under-five children with severe acute malnutrition (SAM) attending primary healthcare facilities in Ningi LGA, Bauchi State. The specific objectives are determined:

1. The impact of Ready-to-Use Therapeutic Food (RUTF) on the weight gain of under-five children with severe acute malnutrition attending ANC at primary healthcare facilities in Ningi LGA, Bauchi State
2. The impact of Ready-to-Use Therapeutic Food (RUTF) on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending ANC at primary healthcare facilities in Ningi LGA, Bauchi State

Research Questions

1. What is the impact of Ready-to-Use Therapeutic Food (RUTF) on the weight gain of under-five children with severe acute malnutrition attending ANC at primary healthcare facilities in Ningi LGA, Bauchi State
2. What is the impact of Ready-to-Use Therapeutic Food (RUTF) on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending ANC at primary healthcare facilities in Ningi LGA, Bauchi State

Research Hypotheses

- HO₁ The use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State
- HO₂ The use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State

Methodology

The research design for this study is quasi-experimental design of one-group pretest-posttest design was adopted for this study. The one-group pretest-posttest design is a type of quasi-experimental design where measurements are taken from a single group of participants before and after the intervention (Dinardo 2018). Therefore, in this design, measurements are taken from the same group of participants before and after the intervention. While changes in the outcome variable from pretest to posttest are assessed to determine the effect of the intervention. The research design is presented below:

Pre-test		Post-test
Experiment group	O ¹ x O ²	

Key:

O¹: refers to the pre-test observation

X: refers to Ready-to-Use Therapeutic Food (RUTF)

O²: refers to the post-test observation.

The population for this study consists of 72,678 under-five children in Ningi Local Government Area (LGA) of Bauchi State, representing approximately 11% of the total population of the LGA, in line with WHO (2020) estimates that under-five children constitute about 11% of a general population.

The sample size for the study was 25 under-five children with severe acute malnutrition attending randomly selected primary healthcare facilities in Ningi LGA, Bauchi State by using multi-stage sampling techniques. Therefore, the stages for sampling in this study are as follows:

Stage I: In this first stage, the Primary Health Care (PHC) in Ningi LGA were clustered into three (3) Zones (Ningi-North PHCs; Ningi-South PHCs and Ningi-West PHCs) (Bauchi State Primary Health Care Development Agency [BSPDA], 2025).

Stage II: A purposive sampling technique was employed to select one Primary Health Care (PHC) facility with under-five children suffering from severe acute malnutrition from each zone, resulting in a total of three selected PHC facilities.

Stage III: A proportionate sampling technique was used to select ten percent (10%) of the respondents as the sample size from the records of under-five children with severe acute malnutrition in each of the selected health facilities. According to Ward (2022), a good maximum sample size is typically 10% of the population, provided it does not exceed 1,000. The formula used is: $(N \times 10) \div 100$, where N represents the target population.

Table 3.1: Proportionate Distribution of Respondents in the Selected Health Facilities

S/N	Cluster	Simple Random Selected Facilities	Targeted Population	Proportionate Sample Size 10%
1	Ningi-North PHCs	Kafinlemo PHC	150	15
4	Ningi-South PHCs	Ningi town PHC	50	05
7	Ningi-West PHCs	MPHC Nasaru	50	05
	Total		250	25

Source: Bauchi State Primary Health Care Development Agency [BSPHCDA], 2025. The instrument for data collection in this study was based on anthropometric measurements, specifically employing a pretest-posttest design to assess the impact of Ready-to-Use Therapeutic Food (RUTF) on the management of under-five children with Severe Acute Malnutrition (SAM) attending selected Primary Healthcare (PHC) facilities in Ningi Local Government Area (LGA) of Bauchi State. The primary measurement tool used was the Mid-Upper Arm Circumference (MUAC) tape, which is a standard and reliable indicator for assessing nutritional status in children under five. At the beginning of the intervention (pretest), baseline MUAC measurements were taken for each child. Following the administration of RUTF over a defined treatment period, posttest MUAC measurements were recorded to evaluate improvements in nutritional status. This method provided objective, quantifiable data on the nutritional progress of the children, allowing for a clear comparison of the effectiveness of RUTF in the management of SAM within the targeted population.

Results

Inferential statistics of paired sample t-test was used to test research hypotheses at a 0.05 alpha level of significant. Therefore, anthropometric measurements, specifically employing a pretest-posttest design to assess the impact of Ready-to-Use Therapeutic Food (RUTF) on the management of under-five children with Severe Acute Malnutrition (SAM) attending selected Primary Healthcare (PHC) facilities in Ningi Local Government Area (LGA) of Bauchi State. The primary measurement tool used was the Mid-Upper Arm Circumference (MUAC) tape were obtained and analysed.

Hypothesis one: The use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the weight gain of under-five children with severe acute malnutrition attending ANC at primary healthcare facilities in Ningi LGA, Bauchi State

Table 1: Summary of paired sample t-test on significant impact of Ready-to-Use Therapeutic Food (RUTF) on the weight gain of under-five children with severe acute malnutrition

Test	Mean	N	SD	t	Df	P
Pre-test	5.43	25	0.79	-92.325	24	.000
Post-test	7.02	25	0.83			

$t_{tab}=1.99$, df: 24; $P<0.05$

The result on table 1 indicated that the pre-test means scores (10.87) of the weight gain of under-five children with severe acute malnutrition is less than the post-test means scores (12.36) of weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State after intervention of Ready-to-Use Therapeutic Food (RUTF). The statistical computation of paired sample t-test also indicated that the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State ($t= -92.750$, $df=24$; $p=.000$). Therefore, the hypothesis stated that the use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State is rejected because, the p-value of .000 is less than the alpha-value of 0.05.

Hypothesis Two: The use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State

Table 2: Summary of paired sample t-test on significant impact of Ready-to-Use Therapeutic Food (RUTF) on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition

Test	Mean	N	SD	t	df	P
Pre-test	10.87	25	0.54	-92.750	24	.000
Post-test	12.36	25	0.51			

$t_{tab}=1.99$, df: 24; $P<0.05$

The result on table 2 illustrated that the pre-test means scores (10.87) of the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition is less than the post-test means scores (12.36) of Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State after intervention of Ready-to-Use Therapeutic Food (RUTF). The statistical computation of paired sample t-test also indicated that the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA,

Bauchi State ($t = -92.750$, $df=24$; $p=.000$). Therefore, the hypothesis stated that the use of Ready-to-Use Therapeutic Food (RUTF) has no significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State is rejected because, the p-value of .000 is less than the alpha-value of 0.05.

Discussions

The result of this study revealed that the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the weight gain of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State ($t = -92.750$, $df=24$; $p=.000$). This is in line with the study conducted by Yusuf, Ibrahim, and Garba (2022) in Kano State examined the effectiveness of RUTF on weight gain among under-five children diagnosed with SAM attending five selected primary healthcare centers. The results revealed a statistically significant increase in the mean weight of children after 8 weeks of RUTF intervention, indicating the effectiveness of RUTF in improving child nutritional status. Similarly, Mohammed and Usman (2021) conducted a study in Sokoto State to assess the role of RUTF in treating severe acute malnutrition among children under five years old. The study found that children receiving RUTF for more than six weeks had significantly higher weight gain compared to those who received it for a shorter period, affirming the positive impact of RUTF in addressing child malnutrition.

The outcome of this study revealed that the use of Ready-to-Use Therapeutic Food (RUTF) has significant impact on the Mid-Upper Arm Circumference (MUAC) of under-five children with severe acute malnutrition attending primary healthcare facilities in Ningi LGA, Bauchi State ($t = -92.750$, $df=24$; $p=.000$). This is agreed with the study by Adamu and Sulaiman (2021) in Katsina State, the researchers assessed changes in MUAC among under-five children enrolled in a Community Management of Acute Malnutrition (CMAM) program at four selected primary healthcare centers. The results showed a significant improvement in MUAC measurements from an average of 10.3 cm at admission to 12.1 cm after eight weeks of RUTF intervention, indicating a positive effect of RUTF on nutritional recovery. Similarly, a study conducted by Musa and Ibrahim (2022) in Zamfara State evaluated the effectiveness of RUTF in improving MUAC among malnourished children attending rural primary health facilities. The findings revealed a consistent and statistically significant increase in MUAC over the intervention period, confirming the effectiveness of RUTF in promoting rapid recovery from malnutrition among the participants.

Conclusions

Based on the findings of this study, the following conclusion were made:

The use of Ready-to-Use Therapeutic Food (RUTF) has been found to significantly improve both weight gain and Mid-Upper Arm Circumference (MUAC) among under-five children suffering from severe acute malnutrition in Ningi LGA, Bauchi State. These findings highlight the effectiveness of RUTF as a vital intervention in the nutritional rehabilitation and recovery of malnourished children within

primary healthcare settings. The consistent use of RUTF not only enhances physical growth indicators but also supports its continued application in community-based malnutrition management programs aimed at reducing child morbidity and mortality.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Bauchi State Primary Health Care Development Agency and other relevant stakeholders ensure continuous supply and accessibility of Ready-to-Use Therapeutic Food (RUTF) in all primary healthcare facilities within Ningi LGA to sustain and enhance weight recovery among under-five children with severe acute malnutrition.
2. Health workers and community nutrition programs should be trained and empowered to effectively monitor Mid-Upper Arm Circumference (MUAC) and administer RUTF, as it has been proven to significantly improve the nutritional status of under-five children, thereby reducing malnutrition-related morbidity and mortality in the area.

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