

Determinants of Acceptability, Uptake, and Adherence to Micronutrient Powder Among Caregivers of Children Aged 6–23 Months in Kano Metropolis: A Concurrent Mixed-Methods Study

Nura Abubakar¹, Rabi'u Ibrahim Jalo², Abubakar Sadiq Abubakar^{3*}, Aminatu Kwaku Chiroma³, Sabitu Shuaibu Yusha'u³, Ibrahim Umar Aliyu¹, Mahdi Gambo Dissi², Isah Ibrahim³, Ahmed Ibrahim⁴

1. Kano State Ministry of Health, Nigeria.

2. Department of Community Medicine, Bayero University Kano, Nigeria.

3. Department of Community Medicine, Aminu Kano Teaching Hospital, Nigeria

4. Malaria Consortium, Nigeria

Abstract

Background

Childhood malnutrition remains a major public health challenge in Northern Nigeria, where micronutrient deficiencies are highly prevalent. The World Health Organization recommends home fortification with micronutrient powder (MNP) to address these deficiencies, yet evidence on its real-world utilization in Kano State is limited.

Objective

This study assessed the acceptability, uptake, and adherence to MNP among caregivers of children aged 6–23 months in Kano Metropolis and identified key predictors and barriers influencing use.

Methods

A concurrent mixed-methods cross-sectional design was employed among 375 caregivers, using interviewer-administered questionnaires and eight focus group discussions. Descriptive, bivariate, and multivariable logistic regression analyses were conducted, with statistical significance set at $p < 0.05$. Qualitative data were thematically analysed to explore facilitators and barriers.

Results

Nearly all caregivers (98.4%) reported having administered MNP at least once, demonstrating high acceptability. However, only 76.4% achieved daily uptake and 78.9% met adherence ($\geq 80\%$ sachets in 24 days). Acceptability was strongly associated with caregivers' belief that MNP can prevent diseases (AOR = 3.58; 95% CI: 1.19–10.73; $p = 0.001$). Uptake was predicted by child tolerance (AOR = 7.21;

95% CI: 3.07–16.89; $p < 0.001$). Adherence was associated with caregiver employment (AOR = 2.03; 95% CI: 1.18–3.52; $p = 0.011$), presence of house help (AOR = 1.87; 95% CI: 1.07–3.26; $p = 0.028$), and child tolerance (AOR = 2.35; 95% CI: 1.15–4.80; $p = 0.019$). Perceived side effects, misinformation, and spousal opposition emerged as major barriers, while caregiver awareness, positive child response, and trust in health workers facilitated use.

Conclusion

Despite high acceptability, uptake and adherence remain suboptimal. Strengthening caregiver education, engaging male household members, and ensuring consistent MNP supply are critical for improving sustained utilisation in malnutrition-prone settings like Kano State.

Keywords : Micronutrient powder, acceptability, uptake, adherence, caregivers, malnutrition, Kano, Nigeria

INTRODUCTION

Malnutrition, particularly micronutrient deficiency, is a persistent public health challenge in low- and middle-income countries, especially across sub-Saharan Africa. In Nigeria, the burden is disproportionately higher in the northern region, with Kano State recording some of the highest rates of child undernutrition and stunting nationally. [1] Micronutrient deficiencies, especially in iron, zinc, and vitamin A are known to impair growth, cognitive development, immune function, and survival in children under five years. [2,3]

Globally, an estimated 2 billion people suffer from vitamin and mineral deficiencies, with infants and young children being the most affected. [4] To address this, the World Health Organization (WHO) recommends home fortification of complementary foods with Micronutrient Powders (MNP) as a cost-effective intervention for improving micronutrient intake among children aged 6–23 months. [5] The MNP formulation typically includes iron, vitamin A, and zinc micronutrients whose deficiencies are most prevalent in this age group. [6] Several randomized trials and implementation studies have demonstrated MNP's effectiveness in reducing the prevalence of anaemia and improving iron status when appropriately delivered and used. [3,7]

MNP interventions also directly contribute to the achievement of Sustainable Development Goal 2 ending hunger and improving nutrition, and SDG 3, which targets the reduction of preventable deaths in children under five. [8] Despite large-scale rollout of MNP programs in over 40 countries, Nigeria's experience remains limited to few states, often in humanitarian or pilot contexts. [9] The Accelerating Nutrition Results in Nigeria (ANRiN) project, supported by the World Bank and Global Financing Facility, includes MNP distribution as part of its core strategy, with Kano State being a major implementation site. [10]

However, the success of MNP programs depends not only on distribution but also on caregiver acceptability, consistent uptake, and adherence. These outcomes are influenced by a complex interplay of caregiver knowledge, perceptions, cultural norms, child preferences, and supply chain reliability. [11,12] Studies across different countries have highlighted both facilitators and barriers, including trust in health workers, spousal support, perceived child health benefits, and adverse reactions. [13,14,15]

In Kano Metropolis, a densely populated urban area with documented micronutrient deficiencies in both malnourished and apparently healthy children, [16] there is limited evidence on real-world utilization of MNP. This study addresses this critical gap by evaluating the acceptability, uptake, and adherence to MNP among caregivers of children aged 6–23 months in Kano. Furthermore, it investigates the predictors, facilitators and barriers to MNP use within a context marked by poverty, food insecurity, and high levels of childhood malnutrition. Findings from this study are essential for

tailoring community-based nutrition interventions in northern Nigeria and guiding national strategies for scaling up MNP as part of routine child health and nutrition services.

METHODS

Study Design and Setting

This study employed concurrent mixed-methods cross-sectional design, combining quantitative and qualitative data collection and analysis. The study was conducted in Kano Metropolis, the largest urban centre in Northern Nigeria, known for its high population density and persistent burden of childhood malnutrition. Kano is one of the focus states under Nigeria's ANRiN project and has been implementing MNP distribution programs through selected primary healthcare facilities and community health workers.

Study Population and Sampling

The target population comprised caregivers of children aged 6–23 months residing in the eight metropolitan Local Government Areas (LGAs) of Kano. Inclusion criteria were caregivers who had received MNP from health workers within the past three months, and whose children had consumed MNP at least once.

For the quantitative component, a sample size of 375 was determined using the Cochran formula, assuming a 50% adherence rate, 5% precision, 95% confidence level, and accounting for a 10% non-response rate. A multi-stage sampling technique was used: four metropolitan LGAs were randomly selected, followed by random selection of one ward per LGA, and then systematic random sampling of eligible households from a line listing provided by community health workers.

The qualitative component consisted of eight focus group discussions (FGDs), conducted among caregivers purposively selected to reflect variation in age, parity, education, and reported adherence to MNP. Each FGD included 8–10 participants and was conducted in Hausa using a semi-structured guide.

Data Collection Instruments and Procedure

Quantitative data were collected using a structured, interviewer-administered questionnaire, which was pre-tested for clarity, cultural appropriateness, and reliability. The questionnaire captured information on socio-demographic characteristics, MNP knowledge and beliefs, child feeding practices, MNP usage, adherence, and reported side effects. Adherence was defined as the use of $\geq 80\%$ of MNP sachets consumed over 24 days, in line with WHO recommendations.

Qualitative data were collected using FGD guides focusing on perceptions, experiences, motivators, and barriers related to MNP usage. Discussions were audio-recorded, transcribed verbatim, and translated into English for analysis.

Data Management and Analysis

Quantitative data was entered into Microsoft Excel and analysed using IBM SPSS version 25.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed. Chi-square tests were used to assess associations between categorical variables, and binary logistic regression was used to identify predictors of acceptability, uptake, and adherence. Variables with $p < 0.05$ in bivariate analysis were included in the multivariate model. Results were reported as Adjusted Odds Ratios (AORs) with 95% Confidence Intervals (CIs), and statistical significance was set at $p < 0.05$.

Qualitative data were analysed using thematic content analysis. Transcripts were coded inductively and deductively using ATLAS.ti software. Themes and subthemes were developed to reflect key facilitators, barriers, and contextual influences on MNP use.

Ethical Considerations

Ethical approval for this study was obtained from the Kano State Ministry of Health Research Ethics Committee (Ref: MOH/Off/797/T.I/2470). Informed written consent was obtained from all participants after explaining the study objectives, procedures, and confidentiality. Participation was voluntary, and caregivers were assured they could withdraw at any time without affecting the services they received. All data were anonymized and securely stored.

RESULTS

Socio-Demographic Characteristics of Respondents

A total of 375 caregivers participated in the study. The majority were aged between 25–34 years (53.3%), married (91.5%), and had attained at least secondary education (54.1%). A substantial number were either unemployed (29.9%) or self-employed (58.1%). (Table 1).

Table 1: Socio-demographic Characteristics of Respondents at Kano Metropolis in 2024

Socio-Demographic Characteristics	Frequency n=375	Percentage
Age group of Caregivers (Years)		
19-28	178	47.5
29-38	129	34.4
39-48	56	14.9
49-58	10	2.7
69-78	2	0.5
Mean (Std. Deviation)	30.6(±8.7)	
Marital Status		
Married	343	91.5
Divorced	18	4.8
Single	9	2.4
Separated	3	0.8
Widowed	2	0.5
Ethnic group		
Hausa	300	80.0
Fulani	33	8.8
Igbo	17	4.5
*Others	17	4.5
Yoruba	8	2.1
Religion		
Islam	342	91.2
Christianity	33	8.8
Occupation		
Trader/Business	194	39.5
Civil Servant	28	7.5
**Others	5	1.3
Unemployed	148	51.7

Socio-Demographic Characteristics	Frequency n=375	Percentage
Level of Education		
Secondary	225	60.0
Primary	57	15.2
Tertiary	56	14.9
Quranic	32	8.5
None	5	1.3
Average monthly Income (N)		
≤70,000	369	98.4
>70,000	6	1.6
Median	5000	
Spouse average monthly Income (N)		
≤70,000	309	82.4
>70,000	66	17.6
Median	45,000	
Age group of the children aged 6-23 months		
6-11	138	36.8
12-17	123	32.8
18-23	114	30.4
Sex of the children		
Male	195	52.0
Female	184	48.0
Presence of House help		
Yes	139	37.1
No	236	62.9

*Other ethnicities include: Igbira, Kanuri, Margi, Nupe etc

**Other occupations include: Tailoring, house help etc

Acceptability, Uptake, and Adherence to MNP

Out of 375 respondents, 98.4% had administered MNP to their children at least once, indicating very high acceptability. However, only 76.4% reported daily administration of a full sachet (uptake), and 78.9% achieved good adherence, defined as usage of $\geq 80\%$ of 24 sachets over one month (Figure 1).

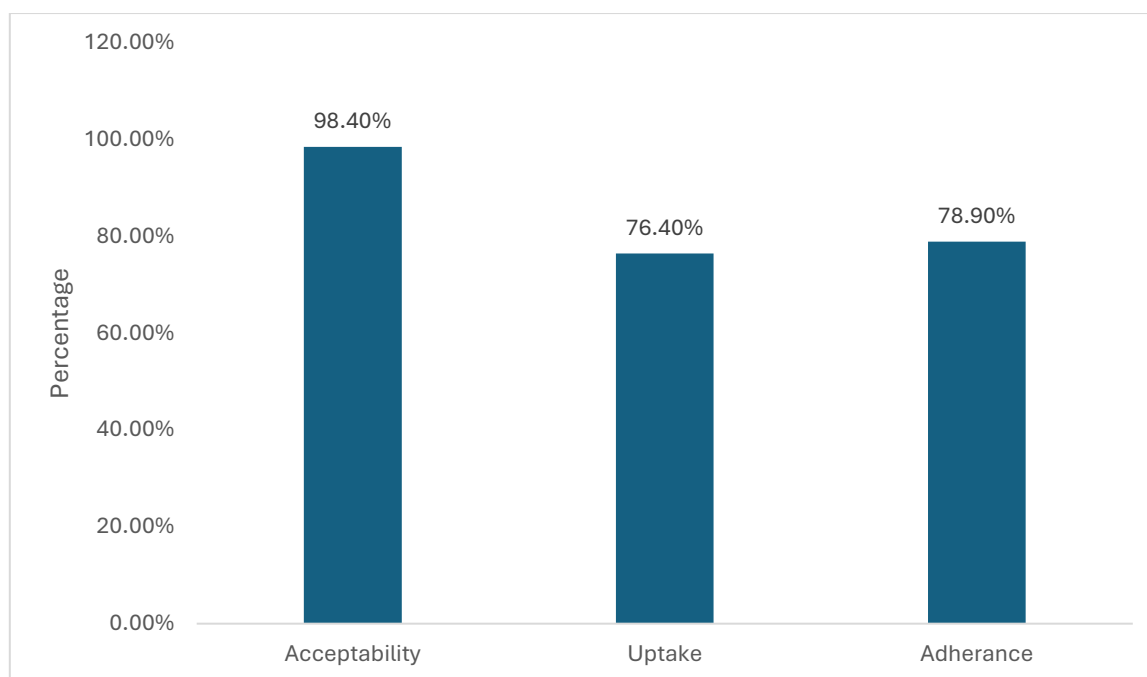


Figure 1: Caregiver engagement with MNP

Predictors of MNP Acceptability, Uptake and Adherence

Multivariate logistic regression analyses identified predictors for each outcome. For acceptability, caregiver's belief that MNP can prevent diseases (AOR = 3.58, 95% CI: 1.19–10.73, $p = 0.001$) was significantly associated with increased likelihood of acceptability, indicating that caregivers who believed in its preventive benefits were more than three times as likely to accept MNP compared to those who did not. Other factors, such as marital status, child's age, child's sex, and number of children, did not show significant associations (Table 2).

For uptake, one key variable stood out. Child's tolerance to MNP (AOR = 7.21, 95% CI: 3.07–16.89, $p < 0.001$) was significantly associated with increased likelihood of uptake, indicating that children who tolerated MNP were more than seven times as likely to continue use compared to those who did not. Other factors, such as caregiver's occupation, education, relationship with the index child, experience of side effects, need for reminders, and socio-demographic characteristics including marital status and household size, did not show significant associations (Table 3).

For adherence, three key variables stood out. Caregiver's occupation (AOR = 2.03, 95% CI: 1.18–3.52, $p = 0.011$) was significantly associated with adherence, with employed caregivers being about twice as likely to adhere compared to unemployed caregivers. The presence of a house help (AOR = 1.87, 95% CI: 1.07–3.26, $p = 0.028$) also increased the likelihood of adherence, suggesting that additional household support may facilitate consistent MNP use. In addition, child's tolerance to MNP (AOR = 2.35, 95% CI: 1.15–4.80, $p = 0.019$) was significantly associated with adherence, indicating that children who tolerated MNP were more than twice as likely to continue regular intake. Other factors, including caregiver and spouse education, child's age, number of visits, perceived preventive benefit of MNP, experience of side effects, and spousal support, did not show significant associations (Table 4).

Table 2: Predictors of MNP acceptability among caregivers of children aged 6-23 months in Kano Metropolis

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
Marital Status							
Single	364(98.6)	5(1.4)			1	1	0.178
Married	3(50)	3(50)	9.402	0.002	0.46(0.05-4.05)	5.79(0.45-74.42)	
Caregiver Believes MNP can Prevent Diseases							
Yes	341(92.4)	28(7.6)	6.965	0.021	1	1	0.001*
No	2(33.3)	4(66.7)			24.36(4.27-138.85)	3.58(1.19-10.73)	
Index Child Age(months)							
<12	134(97.1)	4(2.9)			1	1	0.150
≥ 12	235(99.2)	2(0.8)	11.378	0.001	3.51(0.63-19.40)	5.14(0.79-33.20)	
Index Child Sex							
Male	192(98.5)	3(1.5)			1	1	0.869
Female	177(98.3)	3(1.7)	9.752	0.031	0.29(0.05-1.58)	0.31(0.03-3.08)	
Number of Children							
≤ 4	237(98.8)	3(1.3)			1	1	0.402
>4	132(97.8)	3(2.2)	4.984	0.043	1.80(0.36-9.02)	2.20(0.35-13.87)	

* Statistically Significant

Table 3: Predictors of MNP uptake among caregivers of children aged 6-23 months in Kano Metropolis

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
Age group of caregivers							
<30	140(75.7)	45(24.3)					
≥ 30	142(74.7)	48(25.3)	0.044	0.833			
Marital Status							
Single	22(68.8)	10(31.3)					
Married	260(75.8)	83(24.2)	0.780	0.377			
Ethnicity							
Hausa/Fulani	254(76.3)	79(23.7)					
Others	28(66.7)	14(33.3)	1.847	0.174			
Occupation							
Unemployed	101(68.2)	47(31.8)			1	1	
Employed	181(79.7)	46(20.3)	6.345	0.012*	0.54(0.34-0.87)	0.71(0.38-1.33)	0.277
Care giver Education							
Formal	261(77.2)	77(22.8)			1	1	
Informal	21(56.8)	16(43.2)	7.487	0.006*	2.57(1.28-5.17)	1.83(0.77-4.34)	0.173
Spouse Education							
Formal	22(75.9)	7(24.1)					
Informal	260(75.1)	86(24.9)	0.007	0.932			
Relationship with Index child							
Mother	277(76.3)	86(23.7)			1	1	
Others	5(41.7)	7(58.3)	7.475	0.006*	4.49(1.39-14.52)	3.01(0.82-11.51)	0.097
Average monthly income							
$\leq 70,000$	277(75.1)	92(24.9)					
$> 70,000$	5(83.3)	1(16.7)	0.2.16	0.642			
Index child age (months)							

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
<12	101(73.2)	37(26.8)					
≥ 12	181(76.4)	56(23.6)	0.474	0.491			
Number of children							
≤ 4	182(75.8)	58(58)					
> 4	100(74.1)	35(15.5)	0.143	0.705			
Agreed MNP is good for health							
Yes	280(75.5)	91(24.5)					
No	1(33.3)	2(66.7)	2.828	0.93			
Index child sex							
Male	141(72.3)	54(27.7)					
Female	141(78.3)	39(21.7)	1.822	0.177			
Presence of House help							
Yes	103(74.1)	36(25.9)					
No	179(75.8)	57(24.2)	0.143	0.705			
Experienced side effect							
Yes	47(60.3)	31(39.7)			1	1	
No	235(79.1)	62(20.9)	11.793	0.001*	0.40(0.24-0.68)	0.90(0.41-1.94)	0.778
Child offered MNP by Caregiver							
Yes	278(75.3)	91(24.7)					
No	4(66.7)	2(33.3)	0.238	0.626			
Child did tolerate MNP							
Yes	268(80.2)	66(19.8)			1	1	
No	14(34.1)	27(65.9)	41.601	$<0.01^*$	8.43(4.13-17.23)	7.21(3.07-16.89)	$<0.001^*$
Spouse/Relatives are not in support of giving MNP to the child							

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
Yes	40(67.8)	19(32.2)					
No	242(76.6)	74(23.4)	2.058	0.151			
Caregiver need a reminder to give child MNP							
Yes	71(65.7)	37(34.3)			1	1	
No	211(79.0)	56(21.0)	7.278	0.007*	0.51(0.31-0.84)	0.79(0.37-1.66)	0.530
Ever stop giving MNP							
Yes	46(58.2)	33(41.8)			1	1	
No	236(79.7)	60(20.3)	15.459	<0.01*	0.36(0.21-0.60)	0.58(0.27-1.28)	0.178

* Statistically Significant

Table 4: Predictors of MNP adherence among caregivers of children aged 6-23 months in Kano Metropolis

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
Occupation							
Unemployed	55(37.2)	93(62.8)			1	1	
Employed	24(10.6)	203(89.4)	6.351	0.012*	2.41(1.49-3.91)	2.03(1.18-3.52)	0.011*
Care giver Education							
Formal	66(19.5)	272(80.5)			1	1	
Informal	13(35.1)	24(64.9)	4.886	0.027*	0.94(0.43-2.10)	1.28(0.52-3.17)	0.598
Spouse Education							
Formal	72(20.8)	274(79.2)					
Informal	7(24.1)	22(75.9)	0.178	0.673			
Average monthly income							
≤70,000	93(25.2)	276(74.8)					
>70,000	1(16.7)	5(83.3)	0.229	0.632			
Index child age(months)							
≤ 12	42(31.3)	92(68.7)			1	1	
>12	49(20.9)	185(79.1)	4.954	0.026*	1.72(1.06-2.79)	1.15(0.66-1.99)	0.626
Presence of House help							
Yes	50(36.0)	89(64.0)			1	1	
No	29(12.3)	207(87.7)	29.506	<0.001*	2.64(1.62-4.28)	1.87(1.07-3.26)	0.028*
Number of times visited and offered MNP							
≤3	59(18.5)	260(81.5)			1	1	
>3	17(33.3)	34(66.7)	5.931	0.015*	1.29(0.59-2.79)	0.64(0.56-1.59)	0.338
Believed MNP can Prevent Diseases							
Yes	76(22.2)	267(77.8)					

Variable	MNP Acceptability		χ^2 test	P value	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
	Yes n(%)	No n(%)					
No	3(9.4)	267(77.8)	2.876	0.090			
Experienced side effect							
Yes	48(61.5)	30(38.5)			1	1	
No	31(10.4)	266(89.6)	97.010	<0.01*	0.29(0.17-0.50)	1.34(0.55-3.27)	0.519
Child tolerating MNP							
Yes	56(16.8)	278(83.2)			1	1	
No	23(56.1)	18(43.9)	33.972	<0.01*	0.85(0.41-1.78)	2.35(1.15-4.80)	0.019*
Spouse/Relatives not in support of giving MNP to the child							
Yes	37(62.7)	22(37.3)			1	1	
No	42(13.3)	274(86.7)	73.025	<0.01*	4.33(2.34-7.82)	1.78(0.73-4.33)	0.203

*Statistically significant

BARRIERS AND FACILITATORS OF MNP USE

Thematic analysis of the eight focus group discussions revealed two overarching categories influencing MNP utilization:

Facilitators of MNP Use

Several caregivers cited positive experiences with MNP as a motivator for continued use. Perceived improvements in child health, including increased appetite, enhanced playfulness, and reduced episodes of illness, were commonly noted. Health education provided during antenatal and immunization visits also played a significant role in shaping positive perceptions.

“Since I started giving him the powder, I noticed he eats more and doesn’t fall sick like before. That’s why I continued using it.” — Female caregiver, FGD 2

“The nurse explained everything when I took my child for immunization. That’s why I trust it and followed the instructions.” — Female caregiver, FGD 1

Availability of MNP sachets at nearby public health facilities and trust in health workers were also frequently reported as enablers.

Barriers to MNP Use

Despite high initial acceptability, several barriers hindered sustained uptake and adherence. The most common concern was the occurrence of side effects such as diarrhoea, vomiting, or stool colour changes, which were often misattributed to MNP.

“My baby started having loose stool after I gave her the powder, so I stopped because I thought it was harmful.” — Female caregiver, FGD 3

Household opposition, particularly from male heads, was another recurrent theme. Some women were discouraged from continuing use due to their husband’s scepticism or community rumours suggesting that the powder caused infertility or was “family planning in disguise.”

“My husband told me to stop it. He heard from someone that it’s used to stop children from growing well.” — Female caregiver, FGD 4

Other barriers included confusion about dosage instructions, fear of giving the powder on an empty stomach, and concerns about mixing it with certain foods.

“I didn’t know the correct way to mix it, so I was afraid of making a mistake.” — Female caregiver, FGD 2

DISCUSSION

This study provides critical insights into the acceptability, uptake, and adherence to micronutrient powder (MNP) among caregivers of children aged 6–23 months in Kano Metropolis, a region in Northern Nigeria characterized by persistently high levels of child malnutrition. The overall high level of acceptability observed where 98.4% of caregivers administered MNP at least once is consistent with findings from studies conducted in Anambra and Bauchi States in Nigeria, where caregivers similarly expressed enthusiasm toward MNP as a perceived solution to undernutrition. [1,2]

However, the gap between initial acceptability and continued uptake (76.4%) and adherence (78.9%) observed in this study is noteworthy. This divergence highlights the importance of sustaining caregiver motivation beyond initial introduction. Previous studies from Kenya and Ethiopia also documented a similar trend, where high initial enthusiasm declined due to confusion regarding instructions, perceived

side effects, and inconsistent supply chains. [3,4] The finding that caregiver awareness and belief in MNP's preventive capacity significantly predicted acceptability aligns with the theory of planned behaviour, which underscores the role of knowledge and perceived benefit in shaping health behaviour. [5,6]

Child tolerance and willingness to reuse MNP emerged as strong predictors of uptake. These findings resonate with reports from Ethiopia and Bangladesh, where caregivers' decisions to continue administering MNP were heavily influenced by their child's response and ease of administration. [7,8] Furthermore, qualitative data from this study reinforced that caregivers were more likely to continue use when they perceived positive health outcomes such as increased appetite or improved activity levels. This triangulated evidence affirms the need to incorporate behavioural feedback loops in program communication strategies.

Adherence, though relatively high, was negatively affected by perceived side effects at bivariate level. Caregivers frequently misattributed common childhood symptoms such as diarrhoea or vomiting to MNP use, a finding consistent with studies from Vietnam and Kenya where similar fears reduced long-term compliance. [9,10] This emphasizes the need for anticipatory guidance and side effect counselling during MNP rollout. Moreover, qualitative data revealed that opposition from male household heads or extended family members could override caregiver intentions, highlighting the critical influence of household power dynamics in adherence, a theme similarly reported in Nigerian and South Asian contexts. [11,12]

From a public health perspective, the findings reinforce the relevance of community-based MNP interventions in regions like Northern Nigeria, where the burden of iron deficiency anaemia and undernutrition among children under five remains substantial. These interventions align with WHO recommendations for point-of-use home fortification in areas with a high prevalence of anaemia (>20%) and poor dietary diversity. [13] MNP also supports Nigeria's commitment to achieving Sustainable Development Goal 2.2, which aims to end all forms of malnutrition by 2030. [14]

Policy implications from this study include the need for robust community engagement strategies that involve not just mothers but also male decision-makers and elders, particularly in socioculturally conservative regions. Training for community health workers and facility staff must include effective counselling techniques to address caregiver concerns and prevent misinformation. Additionally, program success depends on sustained availability of MNP sachets and strong monitoring and evaluation systems to track use, identify gaps, and iterate interventions.

This study is not without limitations. First, the cross-sectional design limits causal inference; however, the integration of qualitative findings enhances the contextual interpretation of statistical associations. Second, reliance on self-reported adherence introduces potential recall and social desirability bias, though triangulation with FGD data helped mitigate this. Third, the study was confined to an urban setting, and findings may not be generalizable to rural communities with different healthcare access and sociocultural dynamics.

Nevertheless, this study has notable strengths. The mixed-methods design allowed for a deeper understanding of caregiver perspectives and program implementation realities. The rigorous multivariate analysis enabled identification of independent predictors of MNP behaviours, while qualitative narratives contextualized these factors within lived experiences. The findings thus offer practical insights for programmatic scale-up and policy design in similar settings across sub-Saharan Africa.

CONCLUSION

This study revealed high acceptability but moderate uptake and adherence to micronutrient powder (MNP) among caregivers in Kano Metropolis. Key facilitators included caregiver awareness and child tolerance, while barriers such as perceived side effects and household opposition hindered adherence. Culturally tailored education, male household engagement, and consistent MNP availability are essential to improve sustained use. These findings support the potential of MNP interventions to address malnutrition in Northern Nigeria and contribute to achieving national and global nutrition targets.

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