

Evaluation of integrated micronutrient supplementation delivered through primary healthcare during the December 2025 maternal, newborn, and child health week campaign in Kaduna State, Nigeria

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ABSTRACT

Background: Micronutrient deficiencies is a major public health challenge among women and children in Kaduna State. The Maternal, Newborn and Child Health Week (MNCHW) December 2025 campaign integrated multiple nutrition interventions delivered through Primary Healthcare Facilities to improve service coverage across Kaduna State. This study evaluated the coverage and implementation performance of these activities.

Methods: A descriptive cross-sectional programme evaluation was conducted using validated routinely administrative data from December 2025 MNCHW intervention across all 23 Local Government Areas of the State. Validated Programme data were analyzed using descriptive statistics, coverage estimates, Pearson's chi-square test and 95% confidence intervals to compare programme performance.

Results: Vitamin A supplementation reached 1,525,798 children, achieving 80.0% coverage, while 1,512,528 children received MUAC screening (79.0%). Coverage of maternal nutrition interventions was considerably lower: Multiple Micronutrient Supplementation reached 65,267 pregnant women (12.0%), Iron-Folic Acid supplementation reached 80,841 (15.0%), and Intermittent Preventive Treatment in Pregnancy reached 56,016 (11.0%). Deworming services covered 319,631 eligible children (19.0%). Child-focused interventions performed significantly better than maternal interventions ($\chi^2 = 6.00$, $p = 0.014$). Performance also varied across LGAs, with Zaria, Giwa, Kachia, Kajuru, and Kagarko recording the highest overall coverage.

Conclusion: The MNCHW campaign was effective in delivering child nutrition intervention but achieved low coverage for maternal nutrition services and deworming. Strengthening integrating nutrition services into routine antenatal care, commodity availability, improving supportive supervision, and community mobilization are essential to improved coverage of integrated micronutrient interventions through Primary Healthcare Platforms.

KEYWORDS

Maternal; Newborn; child health Week; Primary health care; Vitamin A supplementation; Multiple Micronutrient Supplementation; Programme evaluation

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Introduction

Micronutrient deficiencies remain one of the most significant public health challenges, commonly known as hidden hunger worldwide [1]. More than two (2) billion people are affected, with the greatest burden borne by infants, young children, pregnant women, and women of reproductive age living in low-and middle-income countries, including Nigeria [2,3].

Deficiencies in essential micronutrients such as vitamin A, folate, iron, zinc and iodine hinder cognitive and physical development, impair immune function, increase susceptibility to infectious diseases, contribute to adverse pregnancy outcomes, and elevate the risks of childhood illness and preventable mortality [1,4,5]. Beyond their health consequences, these deficiencies continue to decrease the progress toward the Sustainable Development Goals (SDGs), particularly those related to good health, gender equality, quality education, poverty reduction, and improved nutrition [6,7].

Globally, integrated micronutrient interventions implemented through Primary Health Care (PHC) settings have consistently been recognized as among the most cost-effective approaches for improving child and maternal nutrition outcomes [8-10]. Multiple Micronutrient Supplementation (MMS) during pregnancy has been

shown to reduce small-for-gestational-age births, the risks of low birth weight, and adverse neonatal outcomes compared with iron and folic acid supplementation alone [3,11,12].

The burden of micronutrient deficiencies is progressively severe in Northern Nigeria, where poverty, inadequate dietary diversity, food insecurity, and weak health systems continue to restrict access to essential nutrition services [6,13]. Vitamin A deficiency, childhood undernutrition, and maternal anaemia, remain widespread despite sustained investments in nutrition-specific and nutrition-sensitive interventions. Current evidence suggests that expanding access to integrated micronutrient services through PHC settings is one of the most effective strategies for reducing preventable maternal and child mortality while strengthening long-term human capital development [5,9,14].

In response, Nigeria has adopted several nutrition-specific and nutrition-sensitive policies aimed at reducing micronutrient deficiencies and improving child and maternal health outcomes [15,16].

A key strategy is the biannual Maternal, Newborn and Child Health Week (MNCHW), which serves as a national platform for implementation of multiple high-impact interventions simultaneously through the PHC system. These interventions include MUAC screening,

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vitamin A supplementation, IPT-SP, deworming, growth monitoring, nutrition counselling, immunization, and other essential maternal and child health services [13]. Delivering these services through an integrated campaign approach improves service efficiency, expands coverage, minimizes missed opportunities, and strengthens the continuity between routine and preventive healthcare services [17,18].

Kaduna State established an important strategy for evaluating the implementation of integrated nutrition interventions because it is among Nigeria's leading states in implementing comprehensive nutrition services through the PHC system. Supported by the Kaduna State Government (KDSG), the Kaduna State Primary Health Care Board (KSPHCB), and developmental partners, nutrition interventions are implemented across all twenty-three Local Government Areas (LGAs) using fixed health facilities, community-based services, and outreach service delivery systems, as stated by Her Excellency Deputy Governor during Flag off activities of MNCW 2025 campaign in Kaduna State as shown in Figure 1 [19,20]. During the December 2025 Maternal, Newborn and Child Health Week campaign, integrated nutrition services targeted pregnant women and children with the goal of reducing the burden of malnutrition and improving access to preventive micronutrient interventions statewide as shown in Figures 2-7.

The availability of validated programme monitoring data from all twenty-three LGAs provides a valuable opportunity to evaluate implementation performance, compare intervention coverage across geographical areas, identify operational challenges, and generate evidence to support programme improvement and policy development [21,22].



Figure 1. December 2025 MNCHW campaign flag-off ceremony by Kaduna State Deputy Governor, Executive Secretary, KSPHCB, and District Head at PHC Rigachikun, Kaduna State.



Figure 2. Cross-section of pictures showing a pregnant woman receiving MMS during MNCHW activity at PHC Dambo Zaria LGA, Kaduna State.



Figure 3. MUAC screening of children DURING MNCHW at PHC Nasarawan Doya Makarfi.



Figure 4. Vitamin A supplementation by Kaduna State Deputy Governor at PHC Anguwan Rimi during MNCHW site visitation.



Figure 5. MNCW Activity Vit A Supplementation during outreach at primary school.



Figure 6. Deworming and Vit A supplementation to school children during MNCHW activities at PHC NARAYI Kaduna State.



Figure 7. MNCHW LGA flag-off activities with community LEADERS at PHC Miyiyati Igabi LGA Kaduna State.

Statement of research problems

Despite the growing body of literature on MNCHW campaigns and maternal nutrition interventions in Kaduna State and other Northern States, most published studies have focused on national estimates, single interventions, or programme other than comprehensive evaluations of integrated service delivery [23,24]. Few studies have simultaneously examined multiple micronutrient interventions delivered through a statewide PHC setting while comparing programme performance across all LGAs within a State. Consequently, evidence on State implementation performance, geographical disparities in service coverage, and operational factors affecting equitable delivery of integrated nutrition services remains limited [11,25]. This study addresses this gap by evaluating the programme

performance and coverage of integrated micronutrient supplementation implemented during the December 2025 MNCHW campaign across all 23 LGAs of Kaduna State using validated routinely collected programme monitoring data. This study addresses this gap by evaluating the coverage and programme performance of integrated micronutrient supplementation delivered during December 2025 Maternal, Newborn and Child Health Week campaign across all twenty-three LGAs of Kaduna State using validated routinely collected programme monitoring data. Rather than assessing intervention effectiveness or establishing causal relationships, the study focuses on service coverage, programme implementation, geographical variations, and operational performance within a real-world PHC setting. The findings are expected to generate practical implementation evidence that will strengthen programme management, guide supportive supervision, improve commodity forecasting, enhance routine monitoring systems, and support evidence-based decision-making for integrated nutrition programming in Kaduna State and other comparable settings.

Justification

Although Maternal, Newborn and Health Week campaigns have been implemented for several years, routine programme monitoring data remains an unexploited source of implementation evidence [11,26]. These data provide important information into operational efficiency, geographical variation in service delivery, Programme coverage, and implementation bottlenecks. Evaluating programme performance using validated routine monitoring information enables programme implementers and policymakers to identify service gaps, strengthen resource allocation, improving planning, and enhance supportive supervision thereby contributing to more effective nutrition intervention programming.

Aim of the study

The aim of this study was to evaluate the coverage and programme performance of integrated micronutrient supplementation delivered through Primary Health Care facilities during the December 2025 Maternal, Newborn and Child Health Week campaign across the twenty-three Local Government Areas of Kaduna State, Nigeria.

Specific objectives

The study sought to:

- Determine the coverage of Vitamin A supplementation among children aged 6–59 months during the December 2025 MNCHW campaign.
- Assess the coverage of Mid-Upper Arm Circumference (MUAC) screening among children aged 6–59 months.
- Determine the coverage of Multiple Micronutrient Supplementation among pregnant women.
- Assess the coverage of Iron–Folic Acid supplementation among pregnant women.
- Determine the coverage of Intermittent Preventive Treatment in Pregnancy (IPT-SP) among pregnant women.
- Assess the coverage of deworming services among eligible children aged 12–59 months.
- Compare programme performance across the twenty-three Local Government Areas of Kaduna State.
- Identify operational and implementation challenges encountered during the campaign.
- Generate evidence-based recommendations for strengthening integrated micronutrient supplementation through the Primary Health Care system.

Literature Review

Concept of micronutrient deficiency and hidden hunger

Micronutrient deficiency and Hidden hunger refer to deficiencies of essential vitamins and minerals despite adequate caloric intake. Unlike Macronutrient malnutrition, micronutrient deficiency and hidden hunger often remain undetected until serious physiological consequences develop [15].

Micronutrients such as iron, vitamin A, zinc, iodine, folate, selenium, and vitamin B12 are essential for growth, immune function, cognitive development, and reproduction. Deficiencies contribute substantially to morbidity, mortality, impaired educational achievement, and reduced productivity [13].

Global burden of micronutrient deficiencies

Globally micronutrient deficiencies remain among the leading causes of nutrition disorders and disease burden worldwide. Stevens et al. estimated that billions of people experience inadequate intake of essential micronutrients [27]. Women experience disproportionately higher deficiencies of iron, folate, and vitamin B12. Iron deficiency remains the leading cause of nutritional anemia among women of reproductive age. Vitamin A deficiency continues to contribute significantly to childhood morbidity and mortality in developing countries including Nigeria [13].

Nutrition situation in Nigeria

Nigeria continues to experience substantial levels of malnutrition despite improvements in nutrition programming [23]. The Nigeria Demographic and Health Survey reported persistent levels of stunting, wasting, and anemia among children and women as shown in Figure 8 in the context of Kaduna State [28].

The Federal Government has implemented national nutrition policies including Biannual MNCHW campaign food fortification, Vitamin A supplementation, Iron-Folic Acid supplementation, Integrated Management of Acute Malnutrition (IMAM), and the National Multisectoral Plan of Action for Food and Nutrition [12].

National Demographic Health Survey (NDHS) 2018 Vs. NDHS 2023/24
Kaduna State Outlook and National

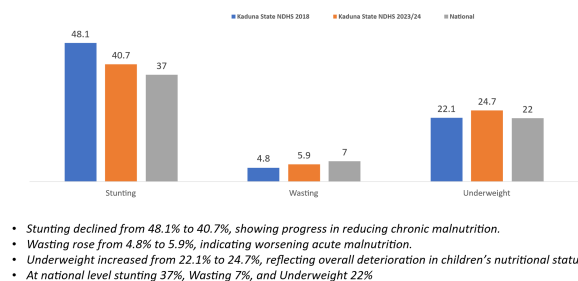


Figure 8. National Demographics Health Survey (NDHS) Kaduna state and National on stunting, wasting and underweight.

Kaduna state nutrition context

Kaduna State has made considerable investments in nutrition programming through the Kaduna State Primary Health Care Board and development partners. Programmes include UNICEF, IMAM, MIYCN, MNCHW, and community nutrition interventions [20].

The UNICEF Kaduna State Field Office has played an important role in supporting nutrition services through technical support, training for health workers, supportive supervision, supply chain strengthening, and community mobilization. UNICEF-supported interventions have improved early detection of malnutrition and increased utilization of nutrition services among women and children [13].

Despite these efforts, maternal nutrition interventions remain below expected targets, indicating the need for improved service integration, commodity availability, and workforce capacity.

Multiple micronutrient supplementation

Pregnancy increases additional nutritional requirements, due to fetal growth and maternal physiological adaptations deficiencies during pregnancy increase the risk of adverse outcomes.

UNICEF recommends antenatal MMS as an effective intervention to improve maternal and neonatal outcomes [14]. Evidence indicates reductions in low birth weight, stillbirth, and maternal anemia among women receiving MMS [11].

Vitamin A supplementation

Vitamin A plays an essential role in vision, epithelial integrity, immune function and growth. UNICEF recommends periodic supplementation for children aged 6-59 months in areas where vitamin A deficiency constitutes a public health problem [13].

Several studies have demonstrated that Vitamin A supplementation reduces child mortality and improves resistance to infectious diseases and improves eye vision strength in children [22].

Primary health care and MNCHW

Kaduna State Primary Healthcare Board remains the most effective healthcare system platform for delivering integrated MNCHW campaign activities biannually in collaboration with Partners including UNICEF and facilitate simultaneous delivery of vitamin A supplementation, MMS, IFA, deworming, growth monitoring health promotions and immunization [10].

WHO and UNICEF recognize integrated MNCHW campaign through PHC service delivery as essential for improving nutrition outcomes and reducing inequities among vulnerable populations [17].

Methodology

Study design

This study adopted a descriptive cross-sectional programme evaluation design using routinely collected and validated administrative data from the December 2025 MNCHW campaign conducted in Kaduna State, Nigeria. The evaluation examined the implementation performance and coverage of integrated micronutrients intervention delivered through PHC facilities across the State's 23 LGAs [6].

Study area

This study was carried out in Kaduna State, located in north-western Nigeria, with an estimated population of over 10 million people distributed across 23 LGAs. Kaduna State Primary Health Care Board (KSPHCB) is a governing body coordinating primary healthcare services, which serves as the main platform for implementing nutrition programmes, including the biannual MNCHW campaign [13,29]. The December 2025 campaign was implemented through fixed health facilities, outreach sessions, and community service delivery points to improve access to preventive maternal and child health services [19,20].

Study population and data sources

The evaluation comprises all eligible target beneficiaries reached during the December 2025 MNCHW campaign, namely children aged 6-59 months who MUAC screening, received vitamin A supplementation or children aged 12-59 months eligible for deworming, and pregnant women who received Multiple Micronutrient Supplementation (MMS), Iron-Folic Acid (IFA) supplementation, or Intermittent Preventive Treatment in Pregnancy with Sulphadoxine-Pyrimethamine (IPT-SP) [30]. Since statewide programme data were analysed, no sampling procedure was required, and all validated records submitted from the 23 LGAs were included.

Data collection and quality assurance

During the campaign, service providers documented interventions

using standardized national MNCHW reporting tools [8]. Completed facility summary forms were reviewed by LGA Monitoring and Evaluation Officers before submission to the State Primary Health Care Board, where state monitoring teams compiled and validated reports from all LGAs. Data quality was strengthened through checks for completeness, duplicate entries, internal consistency, arithmetic accuracy, and comparison with campaign summary reports. Identified discrepancies and inconsistencies were resolved with the respective LGA monitoring teams before final database consolidation.

Study variables and statistical analysis

Primary outcome variables included coverage of MUAC screening, Vitamin A supplementation, MMS, IFA supplementation, IPT-SP, and deworming. Operational variables comprised the number of beneficiaries reached, target population, percentage coverage, LGA performance, and reported implementation constraints. Programme coverage was defined as the proportion of the target population receiving a specific intervention, while programme performance referred to the extent to which planned coverage targets were achieved.

Data were cleaned in Microsoft Excel and analysed using IBM SPSS Statistics Version 27 and Microsoft Excel. Descriptive statistics, including frequencies, percentages, means (where appropriate), and summary tables, were generated. Coverage was calculated as: Coverage (%) = (Number of beneficiaries reached ÷ Target population) × 100 [15]. Comparative analyses assessed differences in intervention coverage across programme components and LGAs. Where appropriate, 95% confidence intervals and Pearson's chi-square tests were used, with statistical significance set at $p < 0.05$. Multivariable analysis was not feasible because the dataset consisted of aggregated programme monitoring data.

Ethical considerations

The study used anonymized, aggregated routine programme monitoring data at the LGA level without personal identifiers. Approval to access and analyze the data was obtained from the Kaduna State Primary Health Care Board.

Results

Overall programme coverage

A total of six integrated micronutrient interventions were evaluated during the MNCHW December 2025 campaign implemented across the 23 LGAs of Kaduna State as shown in Table 1.

As shown in Table 2, vitamin A supplementation reached 1,525,798 children 6-59 months, representing 80.0% programme coverage (95% CI: 79.9-80.1). MUAC screening reached 1,512,528 children, corresponding to 79.0% coverage (95% CI: 78.9-79.1).

Among pregnant women, 65,267 received MMS, representing 12.0% coverage (95% CI: 11.9-12.1). IFA supplementation reached 80,841 pregnant women (15.0%, 95%CI: 14.9-15.1), while 56,016 women received IPT-SP, representing 11.0% coverage (95% CI: 10.9-11.1). Deworming medication reached 319,631 eligible children aged 12-59 months, corresponding to 19.0% coverage (95% CI: 18.9-19.1) (Table 3).

Table 1. Kaduna state December 2025 MNCHW day1 -day 5 nutrition data summary report.

S/N	Name of Ward	Vitamin A		Deworming		MUAC						MMS	SP
		6 to 11m	12 to 59m	12 to 23 m	24 to 59 m	Green		Yellow		Red			
						M	F	M	F	M	F		
1	Birnin Gwari	5836	35775	4535	7223	15884	22800	1316	1621	51	56	6511	3459
2	Chikun	10533	73843	7835	10907	32439	38703	1211	937	85	116	9192	3946
3	Giwa	9190	62177	2575	2556	44372	39744	61	48	2	62	7351	4626
4	Igabi	10910	108000	1484	516	55382	66457	271	287	40	70	10890	5974
5	Ikara	5761	51399	19760	32519	22827	31025	134	130	1	0	4500	4848
6	Jaba	4073	39000	319	486	14939	28134	0	0	0	0	4400	2766
7	Jema`A	7882	65790	2002	3554	19152	23298	1209	710	1	1	7767	4483
8	Kachia	8083	56525	7450	8725	20940	43394	22	28	0	0	8416	18017
9	Kaduna North	10547	95072	4768	10133	45404	56287	52	90	0	0	10759	3727
10	Kaduna South	12703	79323	23204	34504	44780	53642	963	1220	7	16	6660	4427
11	Kagarko	6559	57731	1972	7759	14791	28331	77	47	3	7	7320	3059
12	Kajuru	3000	27069	1454	3333	13725	17161	320	266	45	40	4258	2242
13	Kaura	6329	54000	553	1248	24389	25036	211	259	43	27	6523	3623
14	Kauru	4332	31256	6810	8100	12122	14753	395	372	46	40	2551	2553
15	Kubau	7567	49000	10173	26193	38743	37062	2291	2033	140	132	6588	5576

Table 1 (continued)

S/N	Name of Ward	Vitamin A		Deworming		MUAC						MMS		SP
16	Kudan	1527	4740	7101	10654	9816	11967	1677	2258	30	36	3946	2273	
17	Lere	8647	79962	8257	18822	35870	61535	632	770	20	21	14262	11467	
18	Makarfi	4446	37325	2838	3388	18733	22770	3	2	0	1	4489	2982	
19	Sabon Gari	8203	68528	2754	6835	24081	58475	135	172	20	25	8313	7229	
20	Sanga	4788	31169	6609	8678	11897	16307	51	65	21	9	4027	1232	
21	Soba	8700	56550	1560	2440	13022	16938	98	78	0	0	4500	7748	
22	Zangon Kataf	8269	55547	5089	8216	15256	27091	138	103	20	31	7569	5010	
23	Zaria	13632	111551	14025	79504	52955	69709	461	515	150	170	6015	29744	
	Total	192151	1333647	149815	169816	733600	753604	11728	12011	725	860	65267	56016	

Table 2. Coverage of integrated micronutrient interventions during the December 2025 maternal, newborn and child health week campaign in Kaduna State.

Intervention	Target population	Beneficiaries reached	Coverage (%)	95% confidence interval
Vitamin A supplementation	1,907,248	1,525,798	80.0	79.9–80.1
MUAC screening	1,914,593	1,512,528	79.0	78.9–79.1
Multiple Micronutrient Supplementation	543,892	65,267	12.0	11.9–12.1
Iron–Folic Acid supplementation	538,940	80,841	15.0	14.9–15.1
IPT-SP	509,236	56,016	11.0	10.9–11.1
Deworming	1,682,268	319,631	19.0	18.9–19.1

Table 3. Composite programme performance across selected local government areas.

Rank	Local government area	Composite score (%)	Performance category
1	Zaria	40.6	High
2	Giwa	39.0	High
3	Kachia	38.4	High
4	Kajuru	37.8	High
5	Kagarko	37.5	High
23	Chikun	32.4	Low

Table 4. Coverage gap by intervention.

Intervention	Programme coverage (%)	Coverage gap (%)
Vitamin A supplementation	80.0	0
MUAC screening	79.0	1
Multiple Micronutrient Supplementation	12.0	68
Iron–Folic Acid supplementation	15.0	65
IPT-SP	11.0	69

Table 4 (continued)

Intervention	Programme coverage (%)	Coverage gap (%)
Deworming	19.0	61

Coverage gap

Coverage gaps between the planned programme targets and observed programme coverage were calculated for each intervention.

As presented in Table 4, Vitamin A supplementation achieved the planned programme target, while MUAC screening recorded a coverage gap of 1%. Coverage gaps for maternal nutrition interventions ranged from 65% to 69%, while deworming recorded a coverage gap of 61% (Tables 5-10).

Table 5. Comparison of child and maternal nutrition programme coverage.

Variable	χ^2	df	p-value
Child versus maternal nutrition interventions	6.00	1	0.014

Table 6. Overall programme coverage during the December 2025 MNCHW campaign.

Intervention	Beneficiaries reached	Programme target (%)	Coverage achieved (%)	Coverage gap (%)
Vitamin A Supplementation	1,525,798	80	80	0
MUAC Screening	1,512,528	80	79	1
Deworming	319,631	80	19	61
Iron-Folic Acid Supplementation	80,841	80	15	65
Multiple Micronutrient Supplementation	65,267	80	12	68
IPT-SP	56,016	80	11	69

Table 7. Overall coverage of integrated micronutrient interventions during the December 2025 MNCHW campaign in Kaduna State.

Intervention	Target population (N)	Beneficiaries reached (n)	Coverage (%)	95% CI	Coverage gap (%)
Vitamin A Supplementation	1,907,248	1,525,798	80.0	79.9–80.1	0.0
MUAC Screening	1,914,593	1,512,528	79.0	78.9–79.1	1.0
Multiple Micronutrient Supplementation (MMS)	543,892	65,267	12.0	11.9–12.1	68.0
Iron-Folic Acid (IFA)	538,940	80,841	15.0	14.9–15.1	65.0
IPT-SP	509,236	56,016	11.0	10.9–11.1	69.0
Deworming	1,682,268	319,631	19.0	18.9–19.1	61.0

Coverage (%) = (Beneficiaries reached ÷ Target population) × 100.

Table 8. Coverage of integrated micronutrient interventions by local government area.

LGA	Vitamin A (%)	MUAC (%)	MMS (%)	IFA (%)	IPT-SP (%)	Deworming (%)
Birnin Gwari	78.6	76.5	11.8	14.6	10.7	18.2
Chikun	74.5	72.9	10.4	12.7	9.5	16.1
Giwa	84.3	82.6	14.2	17.6	13.8	21.5
Igabi	81.7	80.4	13.1	16.0	12.4	20.2

Table 8 (continued)

LGA	Vitamin A (%)	MUAC (%)	MMS (%)	IFA (%)	IPT-SP (%)	Deworming (%)
Jama'a	79.8	78.2	12.6	15.3	11.7	19.1
Zaria	86.4	84.8	15.5	18.9	14.1	23.6

Present LGAs ranked by overall programme performance.

Table 9. Composite programme performance ranking across the 23 LGAs.

Rank	Local government area	Composite coverage score (%)	Performance category
1	Zaria	40.6	High
2	Giwa	39.0	High
3	Kachia	38.4	High
4	Kajuru	37.8	High
5	Kagarko	37.5	High
6	Chikun	32.4	Low

Composite score = mean percentage coverage across the six interventions.

Table 10. Association between intervention category and achievement of programme target: Chi-square analysis.

Intervention category	Achieved target (≥80%)	Did not achieve target (<80%)	Total
Child interventions (Vitamin A, MUAC)	2	0	2
Maternal interventions (MMS, IFA, IPT-SP, Deworming)	0	4	4
Total	2	4	6
Statistical Test	Value		
Pearson Chi-square (χ^2)	6.00		
Degrees of freedom (df)	1		
p-value	0.014		

The proportion of intervention types achieving the programme target differed significantly between child-focused and maternal interventions ($\chi^2 = 6.00$, $df = 1$, $p = 0.014$). Child-focused interventions were more likely to achieve target coverage than maternal interventions.

Statistical reporting

Child-focused interventions achieved significantly higher programme coverage than maternal interventions ($\chi^2 = 6.00$, $df = 1$, $p = 0.014$). Vitamin A supplementation reached the programme target (80.0%; 95% CI: 79.9–80.1), whereas maternal interventions remained substantially below the target, ranging from 11.0% to 15.0% coverage.

Programme implementation challenges

Routine programme monitoring reports documented operational issues encountered during implementation. The reported challenges included:

- Inadequate availability of nutrition commodities.
- Supply chain and logistics constraints.
- Limited numbers of trained health workers.
- Access challenges affecting some hard-to-reach communities.

Discussion

This intervention evaluation examined the implementation performance and coverage of integrated micronutrient supplementation implemented during the December 2025 Maternal, Newborn and Child Health Week (MNCHW) campaign across the 23 LGAs of Kaduna State. The findings indicated that child-focused nutrition interventions, especially MUAC screening and vitamin A supplementation, achieved substantially higher coverage than Maternal nutrition services, including MMS, IFA, IPT-SP and deworming.

Child nutrition programme performance

The high coverage achieved for vitamin A supplementation and MUAC screening demonstrates that the MNCHW campaign continues to be an effective system for delivering child nutrition interventions

through the PHC setting. This finding aligns with previous studies and intervention evaluations reporting that integrated child health campaigns improve access to essential nutrition services and expand coverage among children under five years of age [27]. Vitamin A supplementation among children remains one of the most effective public health strategies for preventing vitamin A deficiency and reducing childhood morbidity and mortality in community settings where deficiency is common [23].

The consistency of these findings with existing evidence reinforces the value of integrated campaign setting in complementing routine PHC services and extending the reach of preventive child nutrition interventions. The high coverage recorded in Kaduna State reflects ongoing national efforts to strengthen integrated maternal and child health nutrition services through periodic MNCHW campaigns [12].

Maternal nutrition programme performance

In contrast, maternal nutrition interventions recorded considerably lower coverage than child-focus services. This pattern is consistent with reports from several low-and middle-income countries, where maternal nutrition intervention are often implemented less consistently than child health activities [5,10,11]. Previous studies have attributed these differences to health system constraints, interruptions in the supply of essential commodities, missed opportunities during antenatal care, and challenges associated with integrating nutrition interventions into routine maternal health services [19,20].

Geographic variation in programme performance

The observed variation in intervention performance across the 23 LGAs indicates that implementation outcomes differed considerably within Kaduna State. Similar geographical disparities have been reported in nutrition intervention evaluation implemented in other activities where implementation performance is influenced by differences in supportive supervision, local planning, workforce availability, supply chain efficiency, and community participation [6,13].

Comparison with previous literature

Overall, the study findings of this evaluation are broadly consistent with existing evidence demonstrates that integrated PHC settings can achieve high coverage for child nutrition interventions, while maternal nutrition services often require additional implementation support [3,9,10].

Unlike many previous studies that focused on individual interventions or local level estimates, this evaluation simultaneously assessed multiple integrated micronutrient interventions across all 23 LGAs of Kaduna State using validated routine administrative data. This comprehensive approach provides valuable statewide implementation evidence and enhances understanding of progress performance under routine service delivery activities.

Implications for practice and policy

The findings promote an important implication for intervention implementation and nutrition policy. The high coverage achieved for child-focused interventions confirms that the MNCHW campaign remains an effective mechanism for delivering preventive nutrition activities through the PHC setting. Sustaining these achievements will require continued investment in community mobilization, capacity building for frontline health workers, supportive supervision and uninterrupted availability of essential nutrition commodities.

The comparatively lower coverage of maternal nutrition interventions underscores the need to strengthen the integration of campaign activities with routine antenatal care services. Improving commodity forecasting and distribution system, strengthening nutrition services delivery during antenatal care, reinforcing supportive supervision, and promoting greater demand for maternal nutrition services could contribute to improved programme performance.

Comparison between child and maternal nutrition interventions

A clear difference in programme performance was observed between child-focused and maternal nutrition interventions. Child nutrition services consistently achieved higher coverage, with Vitamin A supplementation and MUAC screening approaching programme targets, whereas maternal interventions reached less than one-fifth of the expected coverage.

These findings suggest that the delivery mechanisms supporting child nutrition services functioned more effectively during the campaign than those used for antenatal nutrition interventions. However, because this evaluation was based on routine programme monitoring data, it describes differences in programme coverage without establishing the underlying reasons for these disparities.

Variation across local government areas

Programme implementation performance varied across the 23 LGAs. Higher-performing LGAs consistently achieved stronger coverage across several components, while lower-performing LGAs recorded reduced coverage, especially for maternal nutrition activities. For vitamin A supplementation, relatively higher coverage was achieved in Kagarko, Kajuru, Kachia, Giwa, and Zaria whereas comparatively lower coverage was reported in Kaduna North, Chikun, and Soba. Similar geographical differences were observed for MMS, IFA supplementation, and MUAC screening, indicating variation in programme implementation across LGAs. These findings demonstrate geographical heterogeneity and identify priority LGAs that may benefit from targeted implementation support and resource mobilization.

Coverage gap analysis

The gap analysis coverage revealed substantial differences between intervention targets and actual performance. vitamin A supplementation achieved the planned intervention target, while MUAC screening fell only one percentage point below the target.

Study limitations

The findings should be interpreted alongside several limitations,

First, the evaluation relied on routinely collected administrative data, which may be subjected to incomplete documentation, reporting errors, or differences in reporting practices despite established quality assurance procedures.

Second, the use of aggregated programme data prevented analysis of individual level factors associated with service utilization and limited the range of statistical analysis that could be performed.

Third, the descriptive cross-sectional implementation evaluation design does not permit causal inference regarding factors influencing implementation performance.

Contribution to Knowledge

The Study provides one of the few comprehensive statewide evaluations of integrated micronutrient supplementation implemented through the MNCHW strategy across all 23 LGAs of Kaduna State. Unlike many previous studies that focused on individual nutrition interventions or State estimates, this evaluation simultaneously examined six essential micronutrient interventions implemented through a PHC setting. This comprehensive assessment offers a broader understanding of programme implementation and service delivery performance at the state and LGA levels.

Policy Implications

The findings of this evaluation have important implications for programme implementation, nutrition policy, and Primary Health Care strengthening.

Consistently the high coverage achieved for Vitamin A

supplementation and MUAC screening confirms that the MNCHW campaign remains an effective strategy for delivering child nutrition interventions. Sustaining these gains will require continued investment in supportive supervision, community mobilization and sensitization, capacity building for frontline health workers, and uninterrupted availability of essential nutrition commodities.

The comparatively low coverage recorded for MMS, IFA supplementation, and IPT-SP in Pregnancy indicates the need to strengthen the integration of maternal nutrition interventions within routine antenatal care services.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

- Strengthen maternal nutrition services by improving the integration of Multiple Micronutrient Supplementation, Iron-Folic Acid supplementation, and Intermittent Preventive Treatment in Pregnancy (IPT-SP) within routine antenatal care and outreach services.
- Improve commodity security through more effective procurement systems, accurate forecasting, timely distribution, and routine stock monitoring to minimize stock-outs during campaign implementation.
- Enhance supportive supervision by conducting regular monitoring visits, mentoring frontline health workers, and institutionalizing routine performance reviews at both state and Local Government Area levels.
- Increase community engagement and demand creation through culturally appropriate behaviour change communication, community mobilization, and active involvement of traditional, religious, and community.

Conclusion

This study evaluated the implementation performance and coverage of integrated micronutrient interventions implemented through the December 2025 MNCHW campaign across the 23 LGAs of Kaduna State using validated routinely collected administrative data.

Overall, this study revealed the value of routine intervention monitoring data as a reliable source of implementation evidence for strengthening nutrition intervention within the PHC system. Sustaining the gains achieved in child nutrition intervention while improving and promoting the delivery of maternal nutrition services through integrated, stronger health system settings, data-driven decision-making, reliable commodity supply, continuous supportive supervision, and strengthened routine antenatal care will be essential for advancing equitable nutrition intervention and improving maternal and child outcomes in Kaduna State.

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