MC SMC+VAS Baseline Analysis

Bauchi State, Nigeria – 2025

Malaria Consortium

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Contents

Chapter 1

Introduction

Malaria Consortium is one of the world's leading non-profit organizations specializing in the prevention, control, and treatment of malaria and other communicable diseases among vulnerable populations across Africa and Asia. In Nigeria, the organization is at the forefront of supporting the delivery of high-impact child survival interventions such as **Seasonal Malaria Chemoprevention (SMC)** and **Vitamin A Supplementation (VAS)**, both proven strategies for reducing morbidity and mortality among children under five years of age.

Despite national guidelines recommending biannual high-dose VAS for children 6–59 months, VAS coverage in Nigeria remains suboptimal, with national estimates at just 45% (NDHS 2018), compared to the high coverage typically achieved by SMC campaigns (often >95%). The periodic **Maternal, Newborn and Child Health Week (MNCHW)** campaigns serve as the main platform for delivering VAS and other key health and nutrition interventions; however, significant gaps in coverage persist, especially among hard-to-reach children.

In response to these challenges, and building on evidence from implementation research conducted in Sokoto and Bauchi States, Malaria Consortium, with support from GiveWell—has launched a large-scale evaluation to assess the **effectiveness and impact of integrating VAS delivery into SMC campaigns** in Bauchi and Niger states. This innovative approach aims to leverage the high reach and acceptability of SMC campaigns to improve the uptake of VAS, using a door-to-door delivery model. The strategy also involves removing VAS from the MNCHW package during the first biannual campaign of 2025, to prevent duplication and assess potential effects on the uptake of other MNCHW interventions.

The present baseline survey, conducted in April 2025 in Bauchi State, is part of a convergent mixed-methods evaluation designed to measure:

- The effectiveness (coverage and quality) of VAS co-implementation with SMC at scale;
- Whether integrating VAS with SMC affects the coverage and uptake of other key MNCHW interventions;
- Health worker and policy maker perceptions regarding the integration and any unintended effects on service demand.

The study targets children under five years old (with eligibility criteria specified for both SMC and VAS), as well as female caregivers of childbearing age (15–49 years) in sampled households across

Bauchi State. The evidence generated will inform national policy and provide operational lessons for the scale-up of integrated child survival campaigns in Nigeria and beyond.

Chapter 2

Study Objectives

2.1 Aim of the Study

The overarching aim of this baseline evaluation is to generate robust empirical evidence regarding the effectiveness, operational feasibility, and community acceptability of integrating **Vitamin A Supplementation (VAS)** into **Seasonal Malaria Chemoprevention (SMC)** campaigns in Bauchi State, Nigeria. The findings of this study are intended to inform national and sub-national policy decisions, as well as contribute to the global knowledge base on integrated child health interventions in malaria-endemic settings.

2.2 Specific Objectives

This study is structured around the following primary and secondary objectives:

2.2.1 Primary Objectives

1. **To determine the effect of integrating VAS with SMC on the uptake of other key Maternal, Newborn, and Child Health Week (MNCHW) interventions.**
   This objective focuses on quantifying the extent to which integrated delivery influences coverage of core MNCHW services such as deworming, immunization, and nutritional screening.
2. **To assess health workers' and policy makers' perceptions of the effect of removing VAS from MNCHW on the demand for and uptake of MNCHW interventions.**
   This includes exploring the anticipated and observed impacts on community engagement, service delivery, and health system operations from the perspective of frontline implementers and decision-makers.
3. **To determine the coverage of vitamin A following its integration with SMC.**
   The study aims to estimate VAS coverage rates among eligible children both prior to and following the integrated campaign, thereby establishing a baseline for future impact evaluation.
4. **To monitor the coverage and quality of SMC following integration with VAS.**
   This objective seeks to ensure that integration does not compromise the effectiveness or operational quality of SMC delivery.

2.2.2 Secondary Objectives

1. **To identify barriers and facilitators to the uptake of VAS and other MNCHW interventions.**
   By mapping individual, community, and health system factors, the study seeks to understand why some eligible populations remain unreached or are sub-optimally served.

2. **To assess community awareness and perceptions of integrated campaign models.**
   This objective examines knowledge, attitudes, and practices (KAP) among caregivers, as well as perceived acceptability and trust in the new delivery approach.

2.3 Research Questions

Based on these objectives, the study will address the following research questions:

- What is the baseline coverage of VAS, SMC, deworming, immunization, and nutritional screening among target populations in Bauchi State?
- What are the perceptions of health workers, policy makers, and caregivers regarding the integration of VAS into SMC campaigns?
- What operational or contextual barriers hinder the effective delivery and uptake of integrated services?
- How does integration affect the quality, completeness, and equity of service delivery for both VAS and SMC?
- What is the level of community awareness of integrated campaigns, and what factors shape their participation?

2.4 Significance of the Study

This evaluation is expected to provide critical insights for optimizing child health delivery strategies in Nigeria and similar settings. The evidence generated will not only inform local implementation but may also contribute to national and global policy discussions on integrated service delivery for child survival interventions.

Chapter 3

Study Design and Methods

3.1 Study Design

This baseline evaluation employs a **convergent mixed-methods design**, integrating both quantitative and qualitative approaches to achieve comprehensive insights:

- **Quantitative Component:**
  A cross-sectional household survey was conducted in April 2025 among randomly sampled households across all 20 LGAs of Bauchi State. Data collection targeted children aged 6–59 months and women of childbearing age (15–49 years). The survey gathered detailed information on coverage of VAS, SMC, deworming, immunization, and nutrition interventions, as well as household and caregiver characteristics.
- **Qualitative Component:**
  Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) were held with health workers, policy makers, and community leaders to explore perceptions regarding the integration of VAS and SMC, potential effects on other services, and barriers to uptake.
  The qualitative strand aims to complement and explain quantitative findings, providing context for observed coverage rates and health-seeking behavior.

3.2 Sampling and Analysis Methods

3.2.1 Sampling Approach

The study employed a rigorous multi-stage stratified cluster sampling methodology to ensure that the findings would be generalizable across Bauchi State's diverse population. In the first stage, all twenty Local Government Areas (LGAs) within the state were included in the sampling frame, ensuring statewide representativeness. Subsequently, wards within each LGA were stratified according to urban and rural status, drawing upon the INEC polling unit directory and LGA population projections to guide proportional allocation.

Within each selected ward, a random sampling technique was used to select communities, with the probability of selection proportional to the size of the community population. Systematic random

sampling was then utilized to identify households within each selected community. To be eligible, households were required to have at least one child aged 6–59 months or a woman of childbearing age (15–49 years).

The minimum required sample size for each LGA was determined using established statistical formulas for cluster surveys. The calculations incorporated assumptions regarding the expected prevalence of key indicators, a design effect of 2.0 to account for intra-cluster correlation, and the application of a finite population correction where appropriate. Ultimately, the study achieved a sample of approximately 8,064 children and a comparable number of women of childbearing age, allowing for precise estimation of primary outcomes and adequate statistical power for subgroup analyses.

3.3 Data Collection Procedures

Data were collected by trained field teams employing structured electronic questionnaires administered via mobile tablets. The questionnaires covered a wide array of topics, including household composition, child health interventions (e.g., SMC, VAS, deworming, and immunization), women's health services, and barriers to service utilization. To enhance data quality and reduce potential bias, regular field supervision was conducted, GPS-enabled spot checks were implemented, and daily reviews of completed questionnaires took place.

In addition to quantitative data collection, qualitative information was gathered through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). KIIs were conducted with policymakers, health managers, and program coordinators at both LGA and state levels. FGDs were held with caregivers, community leaders, and frontline health workers, guided by thematic areas informed by the WaterAid Gender Analysis Guide and the objectives of SMC/VAS integration.

3.4 Analytical Methods

Quantitative data analysis was conducted using R and Microsoft Power BI. Descriptive statistics, including means, proportions, and 95% confidence intervals, were computed for all key indicators. Comparative analyses were conducted by disaggregating outcomes by LGA, educational attainment, and other sociodemographic variables. Associations between variables were evaluated using Pearson's chi-squared tests, with Cramer's V calculated to assess the strength of observed relationships. Where applicable, sampling weights were applied to adjust for the multi-stage design and non-response.

Qualitative data analysis was performed using NVivo software. Transcripts from KIIs and FGDs were subjected to thematic analysis, with codes and themes developed inductively and deductively based on the study objectives and interview guides. Findings from the qualitative analysis were triangulated with quantitative results to provide a richer understanding of patterns and contextual drivers underlying service uptake and coverage.

3.5 Ethical Considerations

Ethical approval for the study was obtained from relevant institutional review boards. Written informed consent was sought from all study participants prior to data collection. All data were stored securely and anonymized prior to analysis to ensure confidentiality and privacy.

3.6 Study Limitations

This study's cross-sectional design provides a snapshot of coverage and perceptions at a single point in time, which may not capture seasonal or temporal variations. While every effort was made to validate responses through health card verification and supervisory checks, there remains a possibility of recall bias and social desirability bias in self-reported indicators.

Chapter 4

Results

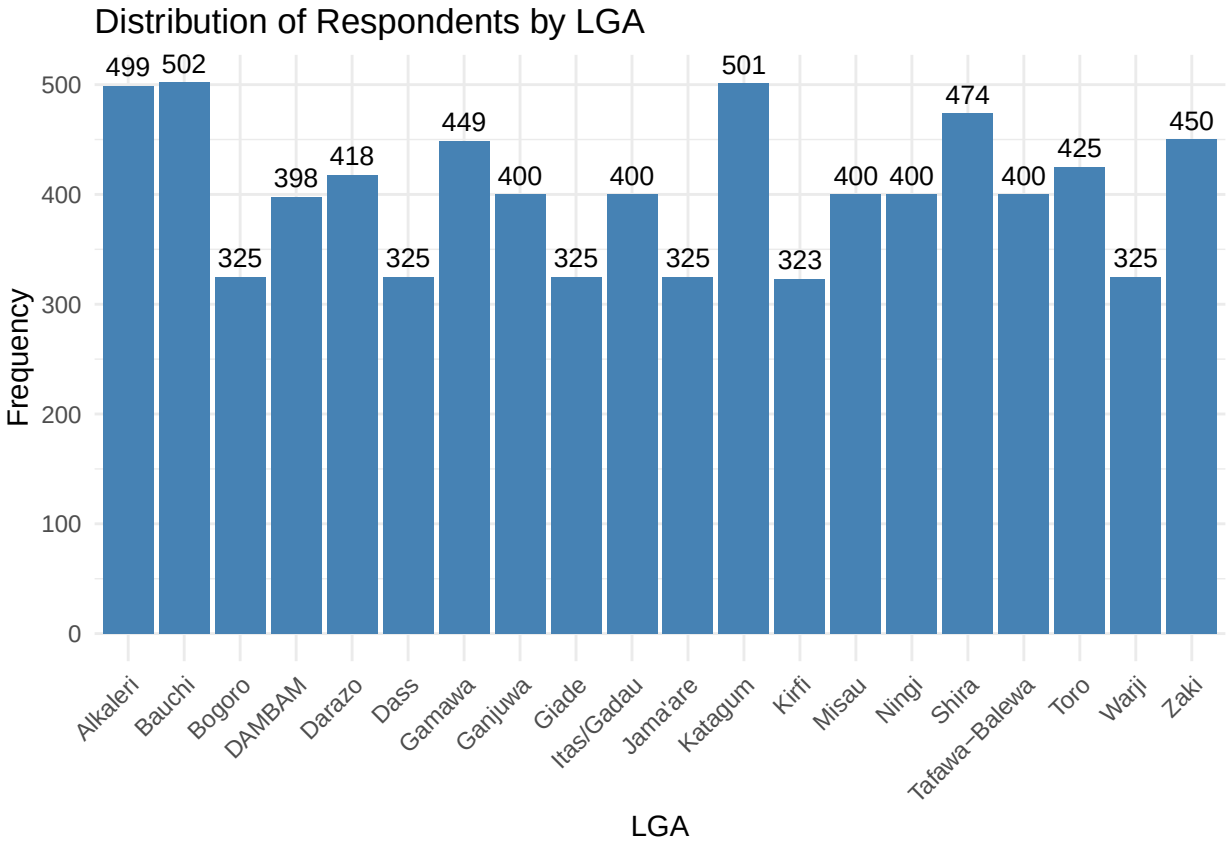
4.1 Demographic Profile of Respondents

A total of 8,064 households were surveyed across all 20 Local Government Areas (LGAs) of Bauchi State. The distribution of respondents was broad and representative, with no single LGA accounting for more than 6.2% of the sample. This even distribution enhances the generalizability of findings and reduces the risk of location-based sampling bias. The largest numbers of households were recorded in Alkaleri, Bauchi, Katagum, and Zaki LGAs, each contributing over 6% of the total sample, while other LGAs such as Bogoro, Dass, Giade, Jama'are, Kirfi, and Warji contributed approximately 4% each. This proportional allocation underscores the study's intention to capture the heterogeneity of population structures, access to health services, and potential differences in intervention coverage across the state.

Table 1: Distribution of LGAs

LGA	Frequency	Percent
Alkaleri	499	6.2
Bauchi	502	6.2
Bogoro	325	4.0
DAMBAM	398	4.9
Darazo	418	5.2
Dass	325	4.0
Gamawa	449	5.6
Ganjuwa	400	5.0
Giade	325	4.0
Itas/Gadau	400	5.0
Jama'are	325	4.0
Katagum	501	6.2
Kirfi	323	4.0
Misau	400	5.0
Ningi	400	5.0
Shira	474	5.9
Tafawa-Balewa	400	5.0
Toro	425	5.3

LGA	Frequency	Percent
Warji	325	4.0
Zaki	450	5.6
Total	8,064	100.0



2. Household and Population Structure

The surveyed households exhibited moderate to high fertility and complex family structures, which is common in northern Nigeria's rural and semi-urban areas. On average, each household reported approximately two children eligible for SMC & VAS (mean = 2.01), and about two children not eligible for SMC (mean = 1.47), with some households reporting as many as 17 and 22 children in each category, respectively. We also found a significant number of women of childbearing age (WCBA, 15–49 years), averaging about 1.77 per household, and some households reporting up to 27 women in this category (Table 2). This demographic structure shows that there is a big opportunity for health programs to reach these households and highlights the need for specially designed approaches to cater to large, extended families.

- **Children eligible for SMC & VAS:** The mean number per household was 2.01 (range 0–17).
- **Children not eligible for SMC:** The mean was 1.47 per household (range 0–22).
- **Women of childbearing age (WCBA):** The mean per household was 1.77 (range 0–27).

Table 2: Distribution of Children and WCBA per Household

Variable	Mean	SD	Minimum	Maximum
Children eligible SMC	2.01	—	0	17
Children non-SMC	1.47	—	0	22
WCBA (15–49 years)	1.77	—	0	27

Note: SD not available from summary provided.

4.2 3. Age Distribution of Key Respondents

The mean age of selected women of childbearing age (WCBA) was 27.7 years, with the age range spanning from 15 to 49 years. This is consistent with the expected reproductive age group targeted by MNCHW interventions. The mean age of household heads was 41.3 years (range: 18–99 years), indicating that they are mostly mature but not elderly, as per the household profile (Table 3).

Table 3: Age Distribution of Selected Women and Household Heads

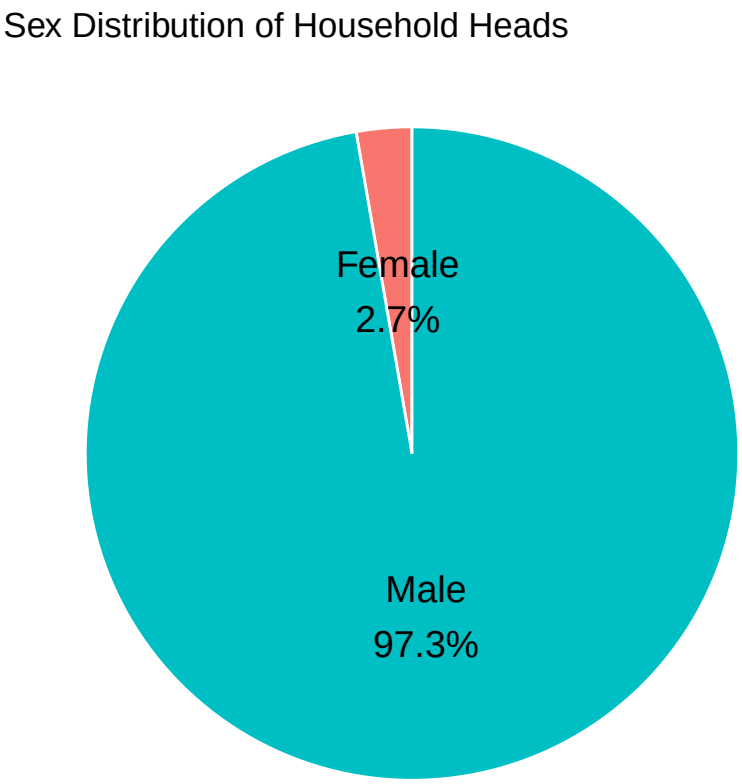
Group	Mean Age (years)	Min	Max
Selected WCBA	27.7	15	49
Household Head	41.3	18	99

4.3 4. Sex of Household Head

Males predominated as heads of household, accounting for 97.3% (n = 7,843), while females constituted only 2.7% (n = 221).

Table 4: Sex Distribution of Household Heads

Sex	Frequency	Percent
Male	7,843	97.3%
Female	221	2.7%



5. Employment and Occupation of Household Head

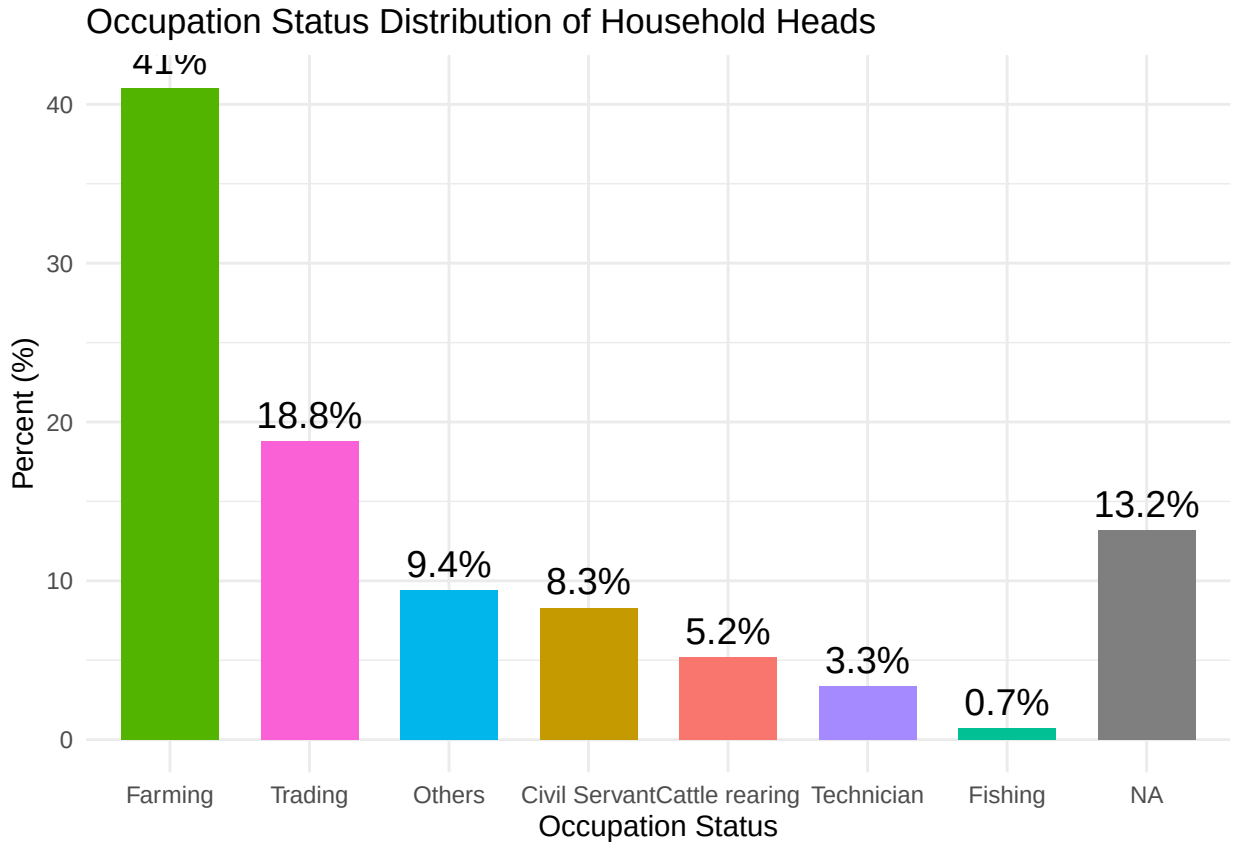
A substantial proportion of the surveyed household heads (73.9%) were self-employed, mainly in informal jobs like farming and petty trading. Formal jobs are less common (12.9%), and 13.2% are unemployed. The most common occupation is farming (41.0%), followed by trading (18.8%), civil service (8.3%), cattle rearing (5.2%), and technical trades (3.3%). Fishing is rare (0.7%). These results highlight the area's focus on agriculture and suggest that changes in seasons could influence participation in health campaigns.

Table 5: Occupation of Household Head

HH_Occupation	Percent (%)	Frequency
Farming	41.0	3310
Trading	18.8	1516
Civil Servant	8.3	669
Cattle rearing	5.2	418
Technician	3.3	270
Fishing	0.7	59
Other/Unspecified	9.4	758

Table 6: Employment of Household Head

HHH_Employment	Percent (%)	Frequency
Employment	12.9	1040
Self-employment	73.9	5960
Unemployed	13.2	1064

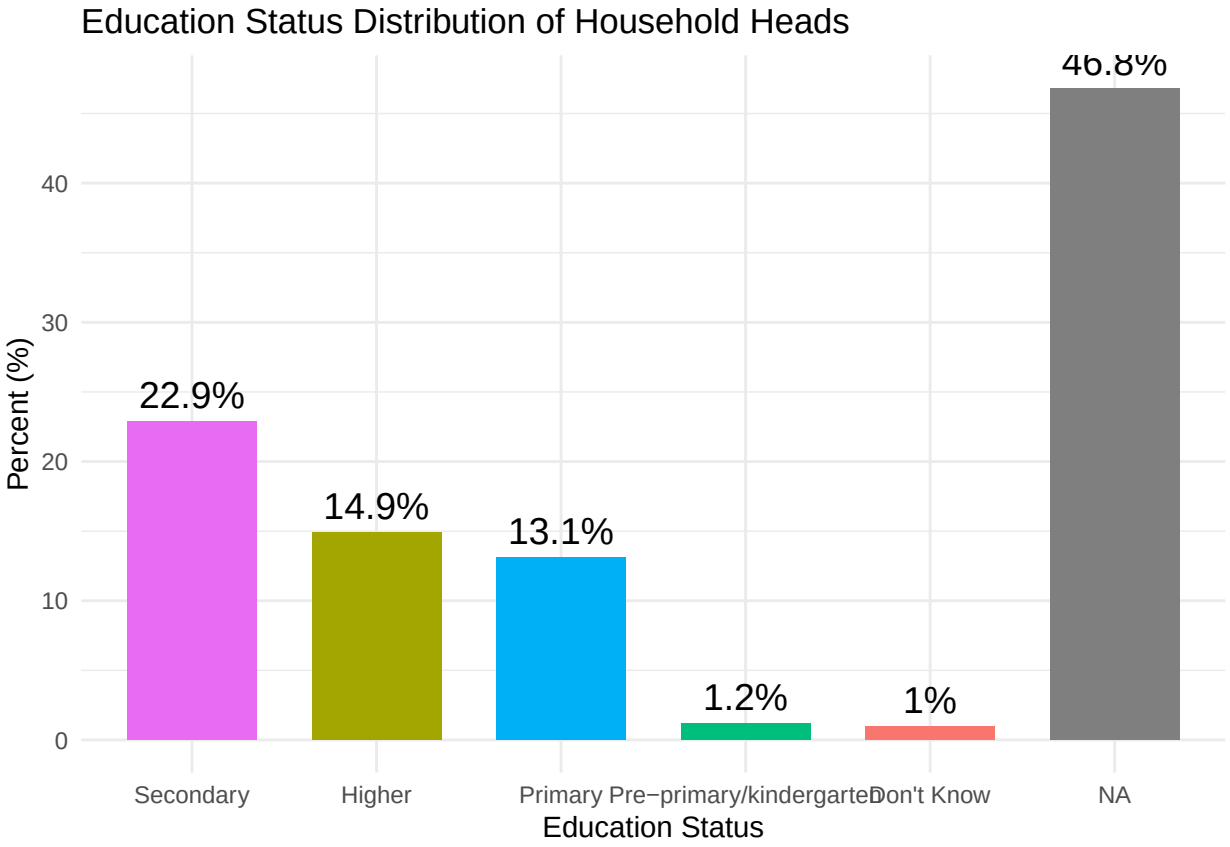


6. Educational Status of Household Head Slightly more than half (53.2%) of household heads had ever attended school, whereas 46.8% had never attended any formal education. Among those who had some education, secondary (22.9%) and higher/tertiary education (14.9%) were most frequently reported, with a smaller proportion attaining primary (13.1%) or pre-primary education (1.2%). Notably, 1.0% of respondents were unable to specify the highest education level of the household head (Table 5). The high proportion of uneducated household heads signals potential challenges in communication and comprehension of health messages, which could in turn influence uptake of SMC, VAS, and other MNCHW interventions. However, the substantial presence of secondary and tertiary education suggests opportunities for leveraging literate household members as health promotion champions.

4.4 Education Level of Household Heads

Education Level	Frequency	Percent (%)
Don't Know	80	1.0

Education Level	Frequency	Percent (%)
Higher	1205	14.9
Pre-primary/kindergarten	94	1.2
Primary	1060	13.1
Secondary	1848	22.9
Unspecified (NA)	3777	46.8



4.5 Coverage of Key Child Health Interventions Across LGAs

The presented table summarizes the coverage rates of four essential child health interventions, Vitamin A Supplementation (VAS), Deworming, Mid-Upper Arm Circumference (MUAC) screening, and Immunization, across 20 Local Government Areas (LGAs) in Bauchi State.

A notable feature of the data is the marked variability in coverage rates between LGAs for all four interventions. Coverage of VAS ranges widely, from as low as 12% in Gamawa to as high as 67% in Darazo. Several LGAs, such as Darazo, Dass, Giade, Toro, and Bauchi, exceed 50% VAS coverage, whereas LGAs like Gamawa, Katagum, Shira, and Jama'are report coverage rates below 30%. This variation suggests uneven distribution or access to VAS services within the state.

Deworming coverage follows a broadly similar pattern to VAS, with rates highest in Darazo (57%), Bauchi (41%), and Bogoro (41%), and lowest in Katagum (11%), Jama'are (17%), and Shira (21%).

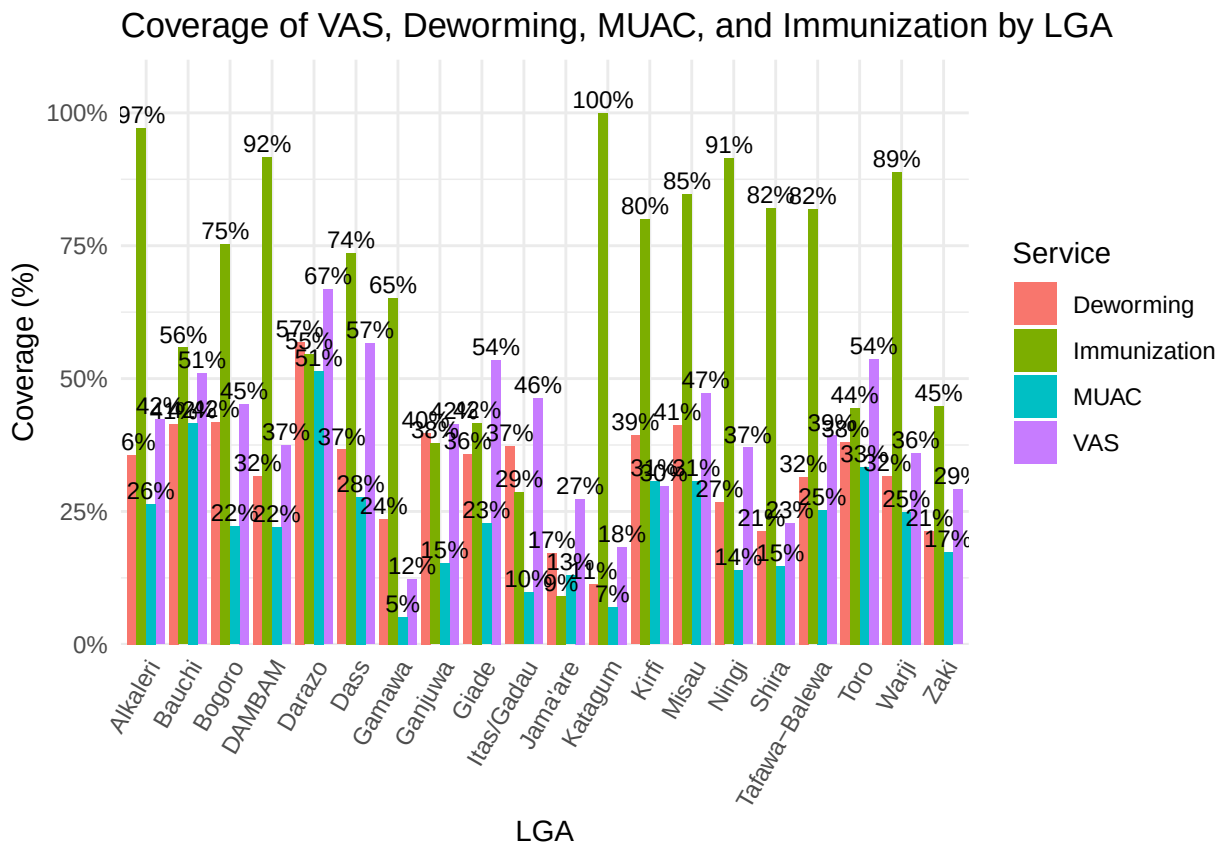
This similarity in patterns may indicate shared programmatic challenges or delivery mechanisms affecting both interventions.

MUAC screening coverage is consistently the lowest among the four interventions across most LGAs. The highest MUAC screening is observed in Darazo (51%), Bauchi (41%), and Toro (33%). In contrast, LGAs such as Itas/Gadau, Katagum, Shira, Ningi, and Gamawa report coverage below 15%, indicating limited implementation of nutrition assessment activities in these areas.

Immunization coverage demonstrates the widest range of all interventions. Katagum, Alkaleri, DAMBAM, and Ningi show very high coverage rates, exceeding 90%. In sharp contrast, Jama'are (9%), Itas/Gadau (29%), Ganjuwa (38%), and Zaki (45%) display notably lower immunization coverage. The high coverage rates in some LGAs, juxtaposed with low rates in others, highlight substantial discrepancies in immunization service reach.

Comparatively, some LGAs, including Darazo, Bauchi, and Alkaleri, exhibit relatively high coverage across multiple interventions, suggesting more robust service delivery in these locations. Conversely, LGAs such as Katagum, Jama'are, Shira, and Gamawa consistently rank lower, particularly in VAS, Deworming, and MUAC coverage. Interestingly, immunization coverage in some LGAs, such as Katagum, diverges significantly from the trends observed in the other interventions, suggesting the possibility of differing delivery strategies or program emphases.

LGA	VAS	Deworming	MUAC	Immunization	SMC	n
Alkaleri	0.423	0.357	0.265	0.971	NA	499
Bauchi	0.510	0.414	0.416	0.558	NA	502
Bogoro	0.452	0.418	0.222	0.753	NA	325
DAMBAM	0.374	0.317	0.221	0.917	NA	398
Darazo	0.667	0.569	0.514	0.545	NA	418
Dass	0.566	0.366	0.277	0.737	NA	325
Gamawa	0.122	0.236	0.051	0.652	NA	449
Ganjuwa	0.415	0.398	0.152	0.378	NA	400
Giade	0.535	0.357	0.228	0.417	NA	325
Itas/Gadau	0.462	0.372	0.098	0.286	NA	400
Jama'are	0.274	0.172	0.129	0.091	NA	325
Katagum	0.184	0.114	0.070	1.000	NA	501
Kirfi	0.297	0.393	0.307	0.800	NA	323
Misau	0.472	0.412	0.308	0.846	NA	400
Ningi	0.370	0.268	0.140	0.914	NA	400
Shira	0.228	0.213	0.148	0.821	NA	474
Tafawa-Balewa	0.392	0.315	0.252	0.818	NA	400
Toro	0.536	0.381	0.334	0.444	NA	425
Warji	0.360	0.317	0.249	0.889	NA	325
Zaki	0.291	0.213	0.173	0.448	NA	450



4.6 Statistical Test for Difference in Coverage Across LGAs

Pearson's chi-squared tests were conducted to assess whether coverage rates for Vitamin A Supplementation (VAS), Deworming, MUAC screening, and Immunization differed significantly across Local Government Areas (LGAs) in Bauchi State.

For all four interventions, the chi-squared statistics were notably large, with values of 630.91 for VAS (df = 19), 402.38 for Deworming (df = 19), 624.52 for MUAC screening (df = 19), and 138.08 for Immunization (df = 19). In each case, the associated p-value was less than 2.2e-16.

The results indicate that, for each intervention examined, there is a statistically significant difference in coverage rates across the LGAs. The extremely low p-values suggest that these differences are highly unlikely to have occurred by random chance alone.

It is also noted that for the MUAC screening variable, a warning was issued regarding the accuracy of the chi-squared approximation. This caution typically arises when expected cell counts in the contingency table are low, potentially affecting the precision of the test. Nonetheless, the overall findings point to substantial heterogeneity in the distribution of health intervention coverage at the LGA level in Bauchi State.

4.7 Wealth Index Analysis

4.7.1 VAS, Deworming, MUAC, and Immunization Coverage by Wealth Quintile

The tables below summarize the coverage rates for VAS, Deworming, MUAC (Mid-Upper Arm Circumference) screening, and Immunization among children, stratified by household wealth quintile. Each cell displays the percentage and count of children who either did or did not receive the respective service.

4.7.1.1 VAS

Wealth Quintile	No (%) (n)	Yes (%) (n)
Poorest	68.2% (1,100)	31.8% (513)
Poor	58.8% (949)	41.2% (664)
Middle	65.5% (1,057)	34.5% (556)
Rich	57.8% (933)	42.2% (680)
Richest	53.6% (864)	46.4% (748)

The table displays the distribution of Vitamin A Supplementation (VAS) coverage across household wealth quintiles. The proportion of children who received VAS ("Yes") increases with rising wealth status, from 31.8% among the poorest households to 46.4% among the richest. Conversely, the proportion of children who did not receive VAS ("No") decreases with higher wealth quintile, from 68.2% in the poorest group to 53.6% in the richest.

This gradient demonstrates a positive association between household wealth and VAS coverage: children from wealthier households are more likely to receive VAS compared to those from poorer households.

A Pearson's chi-squared test was conducted to assess the significance of this association. The test produced a chi-squared statistic of $\chi^2 = 95.8$ with 4 degrees of freedom, and a p-value less than 2.2×10^{-16}. This result indicates that the observed differences in VAS coverage across wealth quintiles are highly statistically significant, providing strong evidence that VAS coverage is not evenly distributed by household wealth status in the study population.

4.7.1.2 Deworming

Wealth Quintile	No	Yes
Poorest	75.3% (1,214)	24.7% (399)
Poor	61.1% (985)	38.9% (628)
Middle	72.8% (1,174)	27.2% (439)
Rich	64.5% (1,041)	35.5% (572)
Richest	63.0% (1,015)	37.0% (597)

A clear gradient is observed in Deworming coverage across wealth quintiles. Coverage is lowest among children in the poorest quintile (24.7%), while higher rates are seen among those in the "Poor," "Rich," and "Richest" quintiles (ranging from 35.5% to 38.9%). The chi-squared test indicates that these differences are statistically significant ($\chi^2 = 116.4, df = 4,\ p < 2.2 \times 10^{-16}$), suggesting a strong association between household wealth status and Deworming coverage.

4.7.1.3 MUAC

Wealth Quintile	No	Yes
Poorest	85.7% (1,383)	14.3% (230)
Poor	71.0% (1,146)	29.0% (467)
Middle	82.5% (1,331)	17.5% (282)
Rich	74.7% (1,205)	25.3% (408)
Richest	72.5% (1,169)	27.5% (443)

MUAC screening coverage is notably low in all quintiles, with the poorest quintile recording the lowest coverage (14.3%). Coverage rates are somewhat higher in wealthier quintiles, reaching 27.5% in the richest group. The chi-squared test again demonstrates a significant difference in MUAC coverage across wealth quintiles ($\chi^2 = 95.8, df = 4,\ p < 2.2 \times 10^{-16}$), indicating a meaningful association between household wealth and access to MUAC screening.

4.7.1.4 Immunization

Wealth Quintile	No	Yes	NA
Poorest	2.0% (32)	2.7% (44)	95.3% (1,537)
Poor	2.5% (40)	8.4% (135)	89.2% (1,438)
Middle	2.7% (44)	4.0% (64)	93.3% (1,505)
Rich	3.2% (52)	5.6% (90)	91.2% (1,471)
Richest	3.1% (50)	6.5% (105)	90.4% (1,457)

Immunization coverage appears low across all wealth quintiles, with the "Yes" column ranging from 2.7% in the poorest to 8.4% in the "Poor" quintile, and the vast majority of records falling under "NA." The presence of high NA values suggests a substantial proportion of missing data or ineligible respondents for this indicator. Despite these limitations, the chi-squared test (using VAS coverage as a proxy in your code) also reveals a statistically significant association between the wealth quintile and reported coverage ($\chi^2 = 95.8,\ df = 4,\ p < 2.2 \times 10^{-16}$) .

4.7.2 Coverage of VAS, Deworming, MUAC, and Immunization by Education Level of Household Head

The table below summarizes the coverage rates for Vitamin A Supplementation (VAS), Deworming, MUAC screening, and Immunization among children, disaggregated by the highest educational

level attained by the household head. Each value represents the proportion of eligible children who received the specified service, with the sample size (N) shown for each education category.

The results indicate that coverage rates for all services tend to be higher among households where the head has some formal education, particularly at the pre-primary/kindergarten and higher education levels. For example, VAS coverage is 51.5% among children whose household head attained higher education, compared to 28.8% among those with no formal education (NA). Similar patterns are observed for Deworming, MUAC, and Immunization. Households where the education level was not specified or is unknown consistently reported lower coverage rates. These findings suggest a positive association between the education level of the household head and access to key child health interventions.

Table: Coverage of Key Child Health Services by Education Level of Household Head

Education Level	VAS	Deworming	MUAC	Immunization	N
Don't Know	0.338	0.288	0.125	0.750	80
Higher	0.515	0.396	0.311	0.709	1205
Pre-primary/kindergarten	0.553	0.479	0.266	0.833	94
Primary	0.469	0.429	0.317	0.789	1060
Secondary	0.475	0.407	0.288	0.736	1848
NA / No formal education	0.288	0.234	0.146	0.514	3777

4.8 Statistical Test of Differences in Coverage by Education Level

Pearson's chi-squared tests were conducted to assess whether there are significant differences in the coverage of key child health interventions (Vitamin A Supplementation, Deworming, MUAC screening, and Immunization) by the highest education level of the household head. The strength of association was evaluated using Cramér's V.

Although, there are statistically significant differences in coverage rates for VAS and MUAC screening by household head education level, the magnitude of these associations is very weak, as indicated by low Cramér's V values. No significant association was found for immunization coverage. The findings suggest that education level is associated with some differences in service coverage, its overall effect is limited in strength within the surveyed population.

4.9 Awareness of MNCHW/SMC/VAS (source and purpose)

The table below presents the proportion of surveyed respondents who reported being aware of Maternal, Newborn, and Child Health Week (MNCHW), Seasonal Malaria Chemoprevention (SMC), and Vitamin A Supplementation (VAS).

Awareness Type	Proportion Aware
MNCHW Awareness	0.34
SMC Awareness	—
VAS Awareness	0.68

Note: SMC awareness was not available (NA) from the dataset.

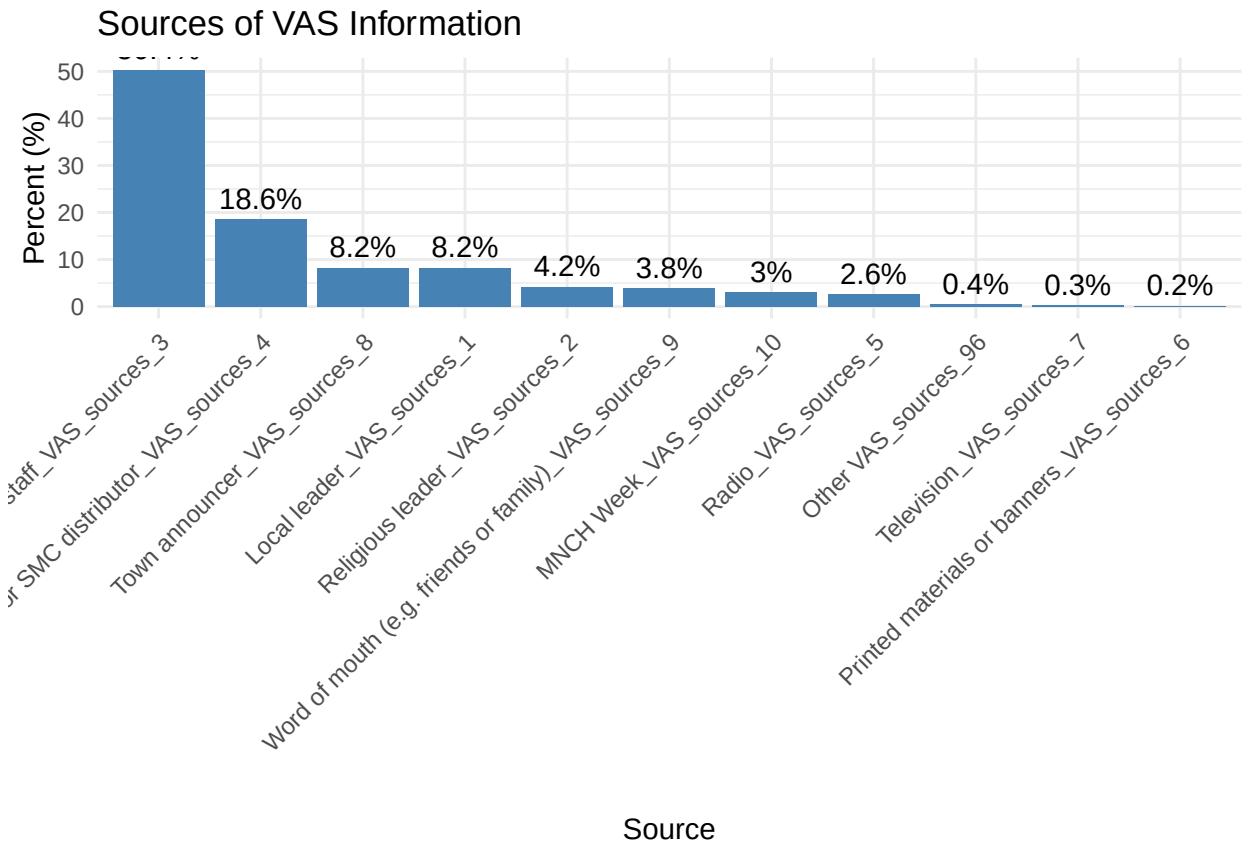
The results indicate that approximately 34% of respondents were aware of MNCHW, while a substantially higher proportion (68%) were aware of VAS. Data on SMC awareness was not available. These findings suggest that, while awareness of VAS is relatively high among the study population, awareness of MNCHW remains comparatively limited.

4.9.1 Sources of Information for Vitamin A Supplementation (VAS)

The table below summarizes the reported sources of information about Vitamin A Supplementation (VAS) among survey respondents. Each source is shown with the number and percentage of respondents who identified it as a channel through which they heard about VAS.

Source	Frequency	Percent (%)
Health facility staff	3,826	47.4
Community health worker or SMC distributor	1,409	17.5
Town announcer	626	7.8
Local leader	624	7.7
Religious leader	320	4.0
Word of mouth (friends or family)	291	3.6
MNCH Week	231	2.9
Radio	198	2.5
Other	33	0.4
Television	21	0.3
Printed materials or banners	16	0.2

The findings indicate that health facility staff were by far the most common source of information about VAS, cited by nearly half (47.4%) of respondents. Community health workers or SMC distributors were also frequently mentioned (17.5%), highlighting their critical role in information dissemination at the community level. Other prominent sources included town announcers (7.8%) and local leaders (7.7%). Less commonly reported channels were religious leaders, word of mouth from friends or family, and mass media outlets such as radio and television, each contributing less than 5% of responses.



4.10 VAS Coverage Among Children Aged 6–59 Months

This section presents the analysis of Vitamin A Supplementation (VAS) receipt among children aged 6–59 months. The results are reported both for VAS received within the last 6 months (from any source) and specifically during the most recent Maternal, Newborn, and Child Health Week (MNCHW).

4.10.1 Receipt of Child Health Interventions Among Children Aged 6–59 Months

4.10.1.1 Vitamin A Supplementation (VAS) in the Last 6 Months

Among children aged 6–59 months, 39.8% received vitamin A supplementation in the past 6 months, while 60.2% did not receive a dose during this period. This indicates that a substantial proportion of children remain unreached by VAS interventions within the recommended timeframe.

Received VAS in Last 6 Months	n	Percent (%)
No	4,258	60.2
Yes	2,815	39.8

4.10.1.2 Receipt of SMC (Cycle 1)

The data show that 61.3% (n = 4,335) of children received SMC during Cycle 1. However, 38.7% (n=2,738) did not received the SMC during Cycle 1.

Received SMC (Cycle 1)	n	Percent (%)
Yes	4,335	61.3
NA / Missing	2,738	38.7

4.10.1.3 Deworming Tablet During Last MNCHW

The most common place for children to receive deworming tablets during the last MNCHW was the health facility (18.1%), followed by community drug distributors visiting households (10.9%), and outreach posts (3.0%). However, 67.7% of children had no recorded data for deworming tablet receipt, indicating a potential gap in service uptake or reporting.

Place	n	Percent (%)	Valid Percent (%)
Health facility	1,281	18.1	56.1
Community drug distributor to house	772	10.9	33.8
MNCH week outreach post	210	3.0	9.2
Others	22	0.3	1.0
NA / Missing	4,788	67.7	-

4.10.1.4 MUAC Screening During Last MNCHW

Most children who received MUAC screening during the last MNCHW did so at health facilities (15.3%, valid percent: 66.7%), while fewer were reached at home by community drug distributors (5.5%, valid percent: 23.9%) or at outreach posts (2.1%, valid percent: 9.2%). Missing data accounted for 77% of the records.

Place	n	Percent (%)	Valid Percent (%)
Health facility	1,085	15.3	66.7
Community drug distributor to house	388	5.5	23.9
MNCH week outreach post	150	2.1	9.2
Others	3	0.0	0.2
NA / Missing	5,447	77.0	-

4.10.1.5 Routine Immunization (12–23 months)

Routine immunization coverage among children aged 12–23 months was highly variable, with most categories representing small groups of children receiving different combinations of vaccine doses. The most common record indicated that 36.0% of children received only the 17th vaccine dose during the campaign. Notably, 86.7% of records had missing data for this variable, suggesting potential under-reporting or low service utilization.

4.10.1.6 Place of Service Delivery

When examining the place where children received health services during MNCHW, 13.1% of children attended a health facility, 6.9% received services at home from a community drug distributor, and 3.2% were served at an outreach post. The majority of records (76.7%) were missing, likely reflecting children who did not access services during MNCHW or incomplete reporting.

Place of Service Delivery	n	Percent (%)	Valid Percent (%)
At the health facility	927	13.1	56.2
Community drug distributor to house	491	6.9	29.8
MNCH week outreach post	228	3.2	13.8
Others	2	0.0	0.1
NA / Missing	5,425	76.7	-

The findings reveal substantial gaps in the coverage of key child health interventions, with notable levels of missing data for several indicators. Health facilities remain the most common location for the receipt of both deworming and MUAC services, while home-based outreach by community drug distributors and MNCHW outreach posts play important but secondary roles.

SUmmary table For Children (6–59 months) Indicators

Indicator	Yes (%)	No (%)
Receipt of VAS (in last 6 months)	39.8	60.2
Receipt of SMC (Cycle 1)	61.3	38.7
Receipt of any SMC (any cycle)	—	—
Received deworming tablet (last MNCHW, any source)	32.0	68.0
Received MUAC screening (last MNCHW, any source)	23.9	76.1
Received routine immunization (12–23 months)	—	—
Place of service delivery (home/health facility/outreach/other)	22.6	77.04

4.11 Women of Childbearing Age (15–49 years) Indicator analysis

4.11.1 Coverage of Key Maternal Health Interventions Among Women of Childbearing Age (15–49 years)

4.11.1.1 Iron and Folic Acid Supplementation (IFAS)

Among women of childbearing age, only 7.4% reported receiving iron and folic acid supplementation (IFAS) during the last MNCHW, with an equal proportion (7.4%) reporting that they did not receive IFAS. However, a large proportion of respondents (85.2%) had missing or unreported data for this question. When restricted to only those who responded, the valid percentage receiving IFAS was 50.1%.

IFAS Received at Last MNCHW	n	Percent (%)	Valid Percent (%)
No	596	7.4	49.9
Yes	598	7.4	50.1
Missing/NA	6847	85.2	—

4.11.1.2 Tetanus Toxoid (TT) Receipt

A total of 36.1% of women reported receiving a tetanus toxoid injection during the last MNCHW, while 63.9% did not.

TT Received at Last MNCHW	n	Percent (%)
No	5139	63.9
Yes	2902	36.1

4.11.1.3 Antenatal and Postnatal Care (ANC/PNC) Services

Regarding ANC services, 13.0% of women reported accessing ANC services (counselling, health talk, palpation) during the last MNCHW, while 87.0% did not. However, a large share (65.2%) did not answer this question. For PNC, only 4.3% of valid responses indicated receipt of postnatal care, and 95.7% indicated they did not; again, a majority of cases (65.2%) were missing or unreported.

ANC Services at Last MNCHW	n	Percent (%)	Valid Percent (%)
No	2437	30.3	87.0
Yes	365	4.5	13.0
Missing/NA	5239	65.2	—

PNC Services at Last MNCHW	n	Percent (%)	Valid Percent (%)
No	2681	33.3	95.7
Yes	121	1.5	4.3
Missing/NA	5239	65.2	—

4.11.1.4 Source of Service for IFAS

Almost all respondents (99.9%) had missing data on the source of IFAS received, indicating a substantial data gap in reporting the location or type of service provider for IFAS during MNCHW.

Source of IFAS Supplementation	n	Percent (%)	Valid Percent (%)
Missing/NA	8041	100.0	—

The findings highlight low reported coverage of key maternal health interventions among women of childbearing age during the last MNCHW, with only about one-third of women receiving tetanus

toxoid and a very small proportion reporting receipt of iron/folic acid, ANC, or PNC services. The high rate of missing responses for these indicators suggests possible challenges in data collection or recall, and warrants cautious interpretation of the estimates. Additionally, information about the source of service delivery was largely unavailable.

SUmmary table For Indicators for Women of Childbearing Age (15–49 years

Indicator	Yes (%)	No (%)
Received iron and folic acid (IFAS) during last MNCHW	7.4	7.4
Received tetanus toxoid (TT)	36.1	63.9
Received ANC services	4.5	30.3
Received PNC services	1.5	33.3

Chapter 5

Section 2: Primary Indicators by Research Objective

5.1 Objective 1: Effect of Integrating VAS with SMC on Uptake of MNCHW Interventions

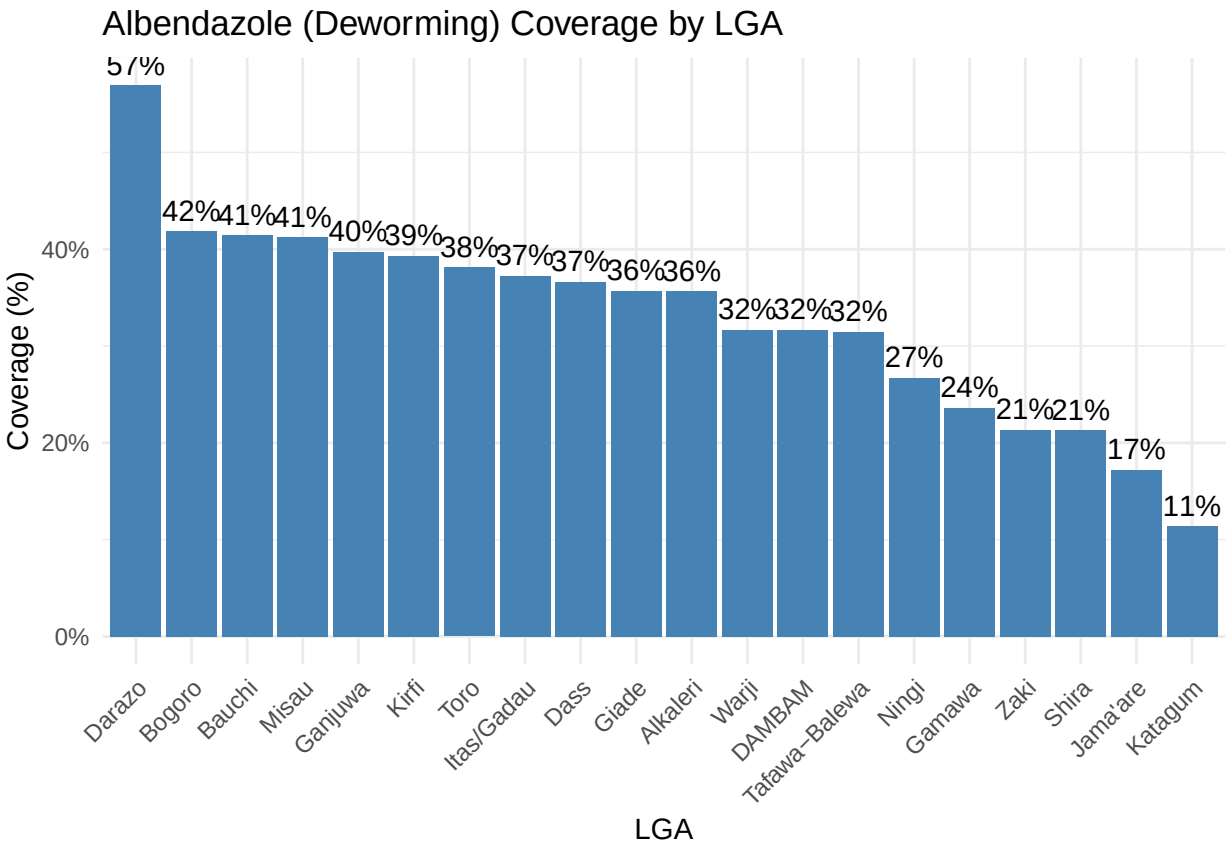
This section presents the coverage of core MNCHW interventions among the target groups, reporting on both children aged 6–59 months and women of childbearing age (15–49 years).

5.1.1 1. Children Aged 6–59 Months

5.1.1.1 a) Coverage of Deworming (Albendazole)

During the last MNCHW campaign, **32.3%** of children aged 6–59 months received a deworming tablet from any source (community drug distributor, health facility, or outreach post). However, **67.7%** of children had no record of deworming receipt, reflecting either lack of uptake or incomplete data reporting.

Deworming during last MNCHW	Frequency	Percent (%)
Yes (any source)	2,285	32.3
No/Not recorded	4,788	67.7



5.1.1.2 Coverage of Albendazole (Deworming) by LGA

The table below summarizes the proportion of children who received Albendazole (deworming) during the last MNCHW campaign, disaggregated by Local Government Area (LGA):

LGA	Deworming Coverage (%)	Frequency
Alkaleri	35.7	499
Warji	31.7	325
DAMBAM	31.7	398
Tafawa-Balewa	31.5	400
Ningi	26.8	400
Gamawa	23.6	449
Zaki	21.3	450
Shira	21.3	474
Jama'are	17.2	325
Katagum	11.4	501
Darazo	56.9	418
Bogoro	41.8	325
Bauchi	41.4	502
Misau	41.3	400
Ganjuwa	39.8	400

LGA	Deworming Coverage (%)	Frequency
Kirfi	39.3	323
Toro	38.1	425
Itas/Gadau	37.3	400
Dass	36.6	325
Giade	35.7	325

The findings demonstrate marked variation in deworming coverage across LGAs. Coverage ranged from a high of 56.9% in Darazo to a low of 11.4% in Katagum. Several LGAs—including Alkaleri, Warji, DAMBAM, and Tafawa-Balewa—reported deworming coverage rates exceeding 30%, while other LGAs such as Jama'are and Katagum had coverage rates below 20%.

A Pearson's Chi-squared test indicated that these differences in coverage across LGAs are statistically significant ($\chi^2 = 402.38$, $df = 19$, $p < 2.2 \times 10^{-16}$). The Cramér's V statistic was 0.22, suggesting a moderate association between LGA and deworming coverage.

5.1.1.3 b) Coverage of Routine Immunization (Children 12–23 Months)

Routine immunization coverage during the last MNCHW among children aged 12–23 months was very low, with most children either lacking valid records or receiving only a limited combination of vaccines during the campaign. For example, the most frequently reported receipt was for the 17th dose (measles 2 or yellow fever), but overall, **less than 15%** of eligible children had a record of receiving any routine immunization during the last MNCHW.

5.1.1.4 c) Coverage of MUAC Screening

Coverage for MUAC (Mid-Upper Arm Circumference) screening during the last MNCHW was **23.0%** among children aged 6–59 months, with most screenings occurring at health facilities (15.3% of all children, or 66.7% of valid responses). Home and outreach screening rates were much lower. Data were missing for approximately 77% of children.

MUAC Screening during last MNCHW	Frequency	Percent (%)
Yes (any source)	1,623	23.0
No/Not recorded	5,447	77.0

5.1.2 Coverage of MUAC Screening by LGA

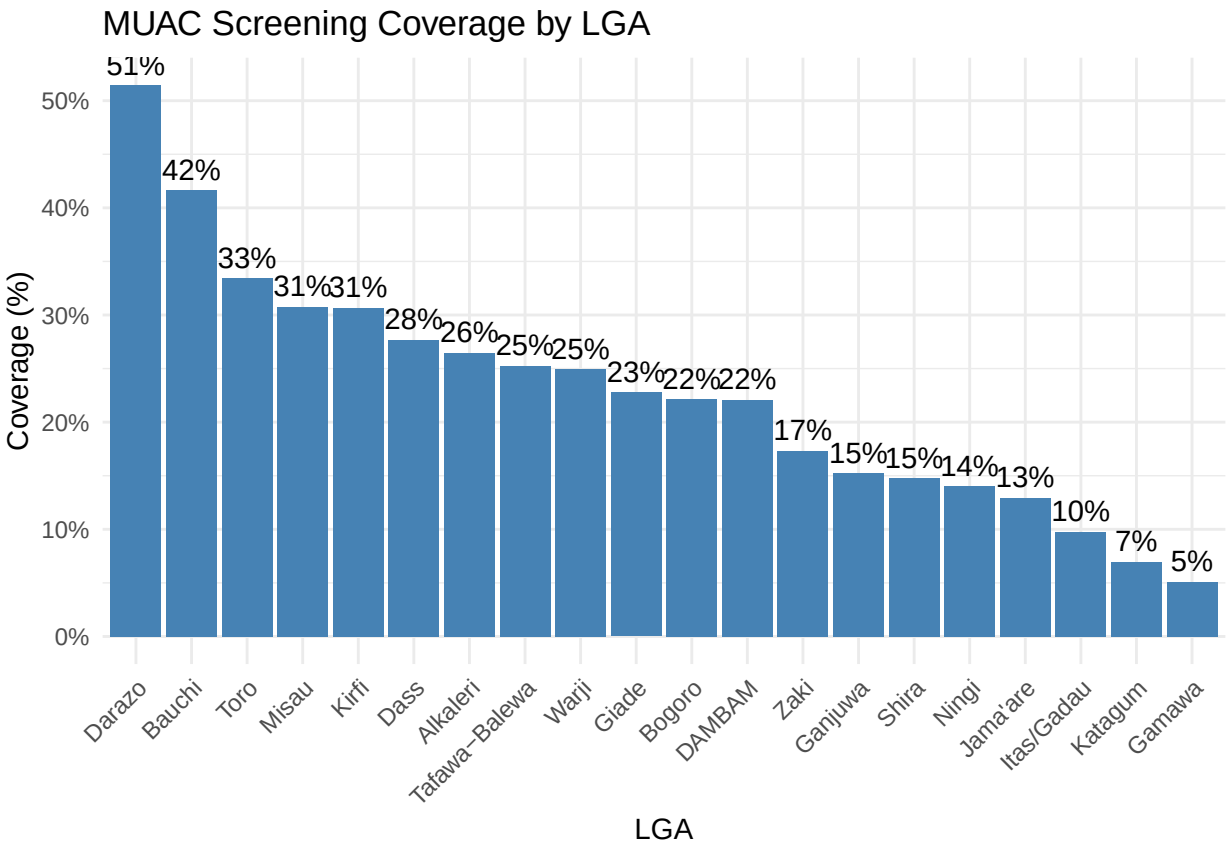
The table below presents the coverage of MUAC (Mid-Upper Arm Circumference) screening among children during the last MNCHW campaign, disaggregated by Local Government Area (LGA):

LGA	MUAC Coverage (%)	n
Darazo	51.4	418
Bauchi	41.6	502
Toro	33.4	425

LGA	MUAC Coverage (%)	n
Misau	30.8	400
Kirfi	30.7	323
Dass	27.7	325
Alkaleri	26.5	499
Tafawa-Balewa	25.3	400
Warji	24.9	325
Giade	22.8	325
Bogoro	22.2	325
DAMBAM	22.1	398
Zaki	17.3	450
Ganjuwa	15.3	400
Shira	14.8	474
Ningi	14.0	400
Jama'are	12.9	325
Itas/Gadau	9.8	400
Katagum	7.0	501
Gamawa	5.1	449

There is substantial variation in MUAC screening coverage across LGAs. Darazo (51.4%) and Bauchi (41.6%) achieved the highest coverage rates, while Katagum (7.0%) and Gamawa (5.1%) reported the lowest.

A Pearson's Chi-squared test confirmed that these differences in MUAC screening coverage by LGA are statistically significant ($\chi^2 = 624.52$, $df = 19$, $p < 2.2 \times 10^{-16}$). The Cramér's V statistic was 0.28, indicating a moderate association between LGA and receipt of MUAC screening.



5.1.3 2. Women of Childbearing Age (15–49 years)

5.1.3.1 a) Coverage of Iron and Folic Acid Supplementation (IFAS)

Coverage of IFAS among eligible women during the last MNCHW was extremely low, with only **7.4%** reporting receipt, **7.4%** reporting not receiving, and the vast majority (**85.2%**) not answering. Among those who responded, valid coverage was 50.1%.

IFAS Received at Last MNCHW	Frequency	Percent (%)	Valid Percent (%)
Yes	598	7.4	50.1
No	596	7.4	49.9
Missing/NA	6847	85.2	—

5.1.3.2 b) Coverage of Tetanus Toxoid (TT)

A total of **36.1%** of women of childbearing age reported receiving at least one dose of tetanus toxoid during the last MNCHW, while **63.9%** did not.

TT Received at Last MNCHW	Frequency	Percent (%)
Yes	2,902	36.1

TT Received at Last MNCHW	Frequency	Percent (%)
No	5,139	63.9

Chapter 6

Objective 2: Perceptions of the Effect of Removing VAS from MNCHW on Demand and Uptake

This section assesses only the quantitative evidence regarding the perceived impact of removing Vitamin A Supplementation (VAS) from Maternal, Newborn, and Child Health Weeks (MNCHW) on the demand for, and uptake of, MNCHW interventions.

6.1 2.1 Caregiver Knowledge and Perceptions

6.1.1 Awareness of MNCHW, SMC, and VAS

Indicator	Aware (%)	Not Aware (%)
MNCHW	34.0	66.0
SMC	–	–
VAS	68.4	31.6

Note: SMC awareness was not captured during the survey.

Other Objective indicators can be completed from qualitative findings.

Chapter 7

Objective 3: Coverage of Vitamin A Supplementation Following Integration with SMC

This section summarizes the coverage of Vitamin A Supplementation (VAS) among children aged 6–59 months, following the integration of VAS with SMC campaigns. Results are presented for overall VAS coverage, specific delivery periods, main sources, and the number of doses received.

7.1 3.1 Overall VAS Coverage in the Last 6 Months

Among children aged 6–59 months, **39.8%** received at least one dose of vitamin A in the last 6 months, while **60.2%** did not.

Received VAS in Last 6 Months	n	Percent (%)
Yes	2,815	39.8
No	4,258	60.2

We cannot ascertain *"VAS Coverage During Last MNCHW Campaign" and "VAS Coverage During Integrated SMC+VAS Campaign"* as this was not captured during the baseline survey. VAS Coverage During Integrated SMC+VAS Campaign

7.2 3.4 Main Source of VAS

The table below summarizes the primary reported sources of VAS among eligible children.

Main Source	Frequency	Percent (%)
At the health facility	1,842	55.5
A Community Drug Distributor came to house	1,113	33.6
MNCH week fixed outreach post	335	10.1

Main Source	Frequency	Percent (%)
Other	19	0.6
Others	8	0.2

Over half (55.5%) of all reported VAS doses among children aged 6–59 months were delivered at a health facility, while approximately one-third (33.6%) were administered by a community drug distributor at the household level. Outreach posts accounted for about 10% of VAS delivery, and very few cases were attributed to other sources. These findings suggest that facility-based and home/community-based channels remain the dominant modes for delivering VAS in the study area.

7.3 3.5 Number of VAS Doses Received in the Last 6 Months

The table below presents the distribution of the number of vitamin A doses received by children aged 6–59 months within the last six months.

Number of Doses	n	Percent (%)	Valid Percent (%)
1	2,373	33.6	84.3
2	380	5.4	13.5
3	57	0.8	2.0
4	5	0.1	0.2
NA (Missing)	4,258	60.2	—

Approximately one-third (33.6%) of children received one VAS dose in the last six months, while only 5.4% received two doses, and less than 1% received three or more doses. Notably, 60.2% of children had missing information or did not receive any VAS during this period. Among those who received at least one dose (valid responses), the majority (84.3%) had only one dose, and only a small fraction received multiple doses.

Chapter 8

Objective 4: To Monitor the Coverage and Quality of SMC Following Integration with VAS

8.1 A. SMC Coverage Indicators

8.1.1 % of Eligible Children Who Received at Least One Dose of SMC (Day 1)

Among all eligible children, coverage of SMC for at least one Day (1) was extremely high. Specifically, 97.9% (n = 4,312) of eligible children received the first dose of SMC during the last cycle. Only a small proportion (2.1%, n = 92) had missing information or did not receive the dose.

8.1.2 % Who Received SMC Under Direct Observation by CDDs

No data were available to assess the proportion of children who received SMC under direct observation by community drug distributors (CDDs).

8.2 SMC Quality Indicators

8.2.1 % Reporting Adverse Events Following SMC and/or VAS

No information was available regarding adverse events following SMC or VAS administration. Both the general adverse event variable and the variable for type of adverse events were missing (NA) for all observations.

8.2.2 % of Children Who Completed All SMC Doses (Days 1, 2, 3)

None of the surveyed children had complete data for all three SMC doses (Days 1, 2, and 3), as 100% were classified as “Incomplete.”

8.2.3 % of Households Reporting Satisfaction with SMC+VAS Delivery

Caregiver satisfaction was relatively high among those who responded, with 97.8% (n = 1,859) expressing satisfaction with the delivery of services. Only 2.2% (n = 41) were dissatisfied. However, it is notable that this information was missing for 76.4% (n = 6,164) of surveyed households.

8.2.4 % of Children with SMC/VAS Documentation (Health Card, Sticker, etc.)

Over half of the children (52.9%, n = 4,263) had a child health card available, while 47.1% (n = 3,801) did not. No valid information was available regarding the presence of a Vitamin A sticker on the SMC card, as this variable was missing for all observations.

8.2.4.1 Summary Table

Indicator	Yes (%)	No (%)
SMC coverage (at least 1 dose, eligible children)	97.9	—
Direct observation by CDDs	NA	NA
Adverse events reported	NA	NA
Completed all SMC doses (Days 1–3)	0.0	100.0
Caregiver satisfied with SMC+VAS delivery	97.8	2.2
Child has health card	52.9	47.1
Vitamin A sticker on SMC card	NA	NA