Doing more with Seasonal Malaria Chemoprevention Campaigns: Safety, Equity and Cost of full Integration with Vitamin A Supplementation in Nigeria

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Outline

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- Study purpose, objectives and methods
- Study implementation plan
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Background

- **190 million children** under five affected by vitamin A deficiency (VAD) globally
- VAD prevalence is **30%** in Nigeria
- Children with clinical signs of VAD: 3–12 times more likely to die than those non-deficient
- High-dose vitamin A supplementation (VAS) can reduce all-cause mortality in children by **24%**
- WHO recommends twice yearly high-dose VAS (every 4–6 months) to children 6–59 months who are at risk of VAD.

Problem addressed

- VAS campaigns in Nigeria largely ineffective due to poor implementation of MNCH Week strategy
- VAS coverage in 2018 at **45%** with wide variations sub-nationally (**6%–86%**, suggesting inequity)
- States meeting the **effective coverage threshold of 70%** on the decline since 2014
- Addressing VAS coverage is key for child survival and universal health coverage
- **Seasonal Malaria Chemoprevention provides an existing viable, promising platform for integration with VAS to improve coverage**
- Previous study conducted in Sokoto had promising results but did not address some questions.

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Co-implementing vitamin A supplementation with seasonal malaria chemoprevention in Sokoto State, Nigeria: a feasibility and acceptability study

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Study Location

Study sites: 2 local government areas (LGAs), Bauchi state, northeast Nigeria

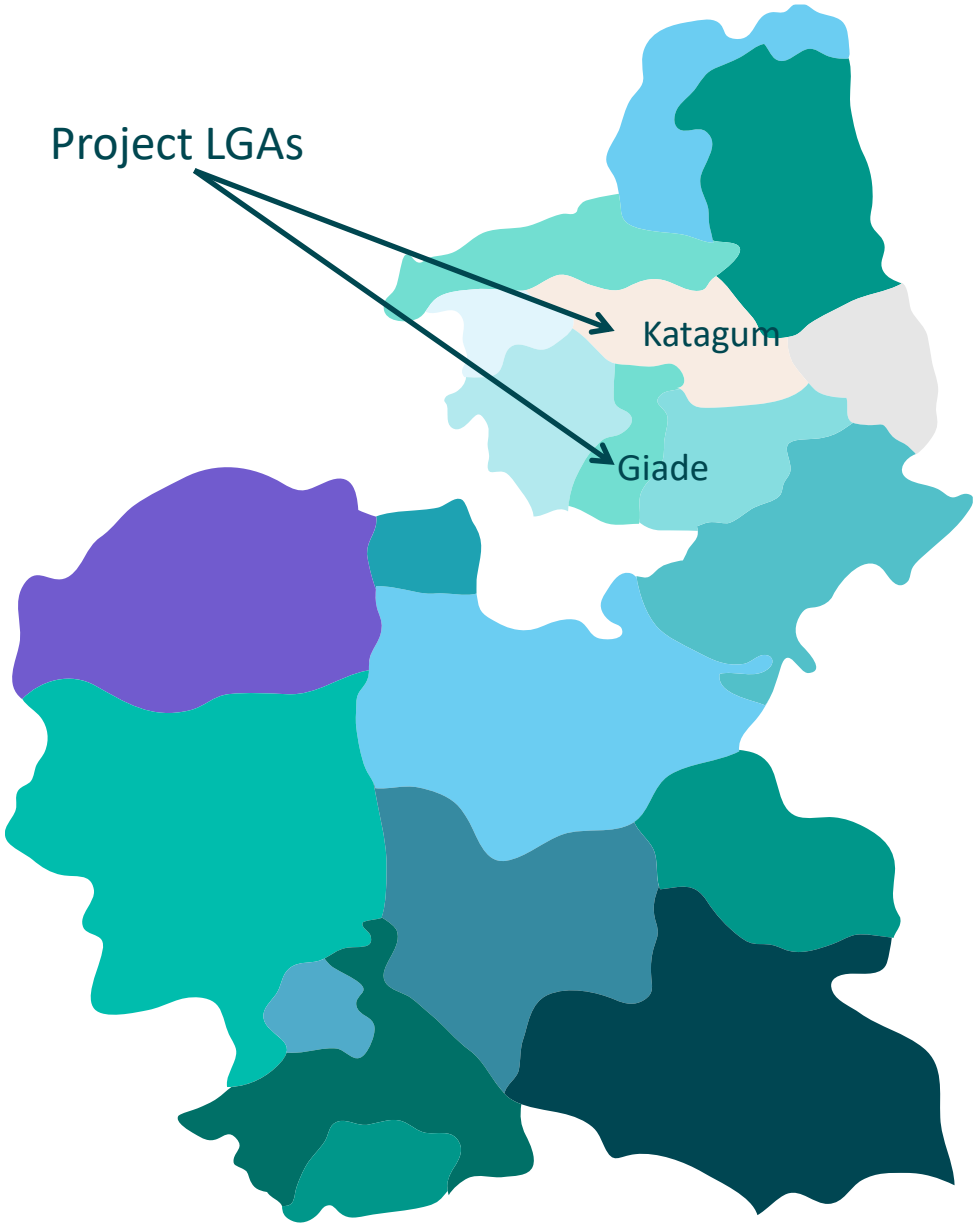
- Giade (rural, Pop 259,192) and
- Katagum (urban, Pop 488,715)

Health indicators in Bauchi state

- Stunting prevalence 55%
- VAS coverage 29% (National Nutrition and Health Survey 2018)

SMC

- Implementation started in Bauchi in 2020 and covered 10 LGAs, including Giade and Katagum
- Average administrative coverage for the 2020 round was 103%.



Bauchi State, Nigeria

Study purpose and objectives

Purpose

To provide a body of evidence to support policy makers' decision-making regarding full integration of VAS with SMC campaigns at scale and in diverse settings using a mixed-methods study design

Objectives

1. In collaboration with key stakeholders, design and implement an integrated SMC plus VAS campaign at scale, in rural and urban settings in Bauchi state as part of the existing SMC program.
2. Assess the feasibility (including **effectiveness, equity, safety and *cost**) and acceptability of integration among caregivers, community distributors, health workers and policy makers.
3. Develop and implement a research uptake plan.
4. Provide policy makers and stakeholders with a body of evidence to inform decisions about integrated SMC and VAS in Nigeria.

Outcomes

INTERMEDIATE OUTCOME 1

Demonstrated high coverage of VAS delivered through integration with SMC campaigns at scale

INTERMEDIATE OUTCOME 2

Policy decision-making facilitated through availability of a body of evidence on integrating VAS into SMC delivery platforms.

*The cost analysis aimed at determining the economic cost per eligible child per SMC cycle and for SMC-VAS integrated campaign cycle, as well as provide an approximate basis for costing of future interventions, which might serve as a guide to decision makers.

Research questions and methods

Primary research question

What is the effect of full integration of SMC with VAS at scale on vitamin A coverage, SMC coverage, safety, equity and cost?

Secondary research questions

1. What is the acceptability of integrating VAS with SMC from the perspective of community health workers and caregivers?
2. What are caregivers' and community health workers' perceptions of feasibility of integration?

Design

Implementation research study using a convergent **mixed-methods approach** to test integration of VAS with an SMC programme in different settings and provide pragmatic evidence to inform policy adoption and subsequent scale-up/expansion

Qualitative (acceptability and feasibility)

- Focus group discussions with community distributors, their supervisors and caregivers of children who will receive the integrated package
- Key informant interviews (KIIs) with programme managers at policy, LGA and health facility level, and state and technical partners

Quantitative (effectiveness, safety and cost)

- Baseline and endline household surveys before and after distribution of VAS via SMC in study sites
- Cost analysis — an ingredient-based costing approach, with an efficient mix of both primary and secondary data was used in this cost analysis.

Study implementation plan

Planning

- Stakeholder analysis and mapping for the integrated campaign
- National, state and LGA level stakeholder engagement
- Co-creation of implementation strategy
- Inauguration of research uptake committee
- Protocol development and ethics approval

Quantitative evaluation

House-hold (HH) survey of 540 HHs

- Coverage
- Safety
- Equity
- Quality of SMC
- Cost

Implementation

- Adaptation, validation & printing of integrated field implementation tools
- Recruitment and training of Field personnel
- Community mobilization and awareness creation
- Integrated campaign implementation

Quantitative & qualitative

HH survey of 540 HHs

- Coverage
- Safety
- Equity
- Quality of SMC
- Cost

12 FGDs & 12 KIIs

- Acceptability
- Feasibility

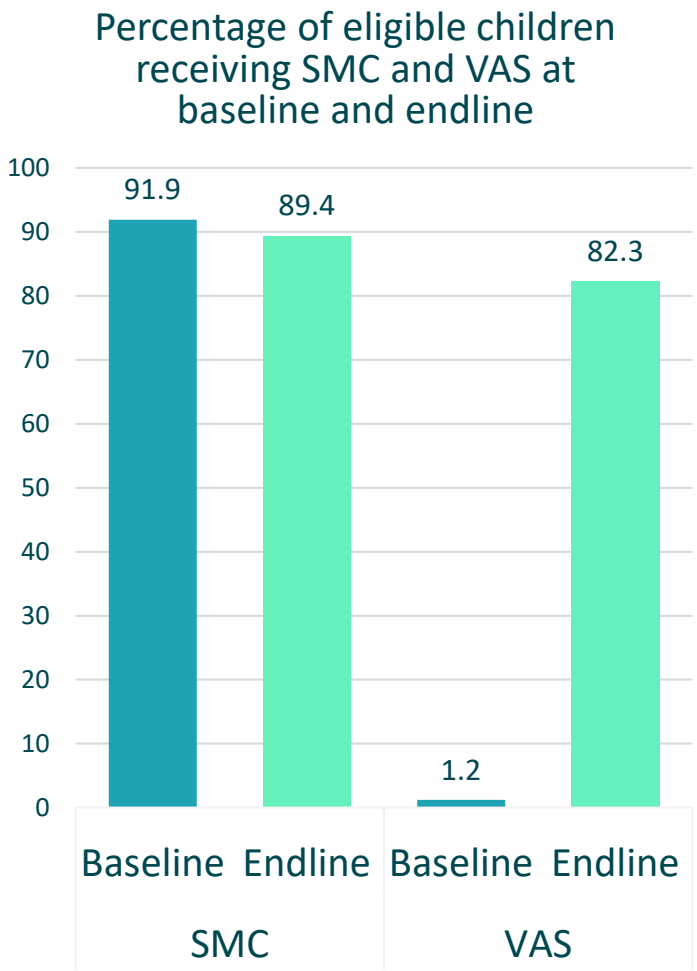
Dissemination

- State level dissemination
- National dissemination
- Dissemination April 2022

Research uptake plan and timeline

Project inception	Baseline evaluation	Intervention	Endline evaluation
February – March 2021	September 2021	April – October 2021	November 2021

Results: Coverage and effectiveness



- VAS coverage increased from 1.2% at baseline (without SMC integration) to 82.3% at endline (with SMC integration), in both project LGAs.
- Integration did not adversely affect the coverage of the SMC campaign.
- SMC coverage was 91.9% at baseline and 89.4% at endline; however this difference was not statistically significant (p-value =0.175).
- Self-reported SMC and VAS coverage were higher than card-confirmed coverage.

Results: Quality of SMC delivery

First dose SMC given as DOT	Baseline	Endline	p-value
	n (%)	n (%)	
No	114 (22.9)	68 (14.1)	<0.0001
Yes	384 (77.1)	414 (85.9)	
Total	498 (100)	482 (100)	

- Quality of SMC delivery improved significantly from baseline to endline following integration.
- The proportion of children who received the first dose of SMC as directly observed treatment increased from 77.1% at baseline to 85.9% at endline.

Results: Equity

Background characteristics	VAS			SMC		
	No	Yes	p-value	No	Yes	p-value
	n (%)	n (%)		n (%)	n (%)	
Child's age						
6–11months	11 (11.6)	40 (9)	0.624	8 (14.0)	43 (8.9)	0.211
12–59months	84 (88.4)	402 (91)		49 (86.0)	439 (91.1)	
Child's sex						
Female	55 (57.9)	189 (42.8)	0.064	30 (52.6)	215 (44.6)	0.149
Male	40 (42.1)	253 (57.2)		27 (47.4)	267 (55.4)	
Household religion						
Christianity	3 (3.2)	4 (0.9)	0.126	3 (5.3)	4 (0.8)	0.190
Islam	92 (96.8)	438 (99.1)		54 (94.7)	478 (99.2)	
Wealth index						
Lowest	39 (40.2)	158 (35.7)	0.838	27 (47.4)	170 (35.3)	0.683
Middle	30 (30.9)	145 (32.8)		16 (28.1)	159 (33.0)	
Upper	28 (28.9)	139 (31.4)		14 (24.6)	153 (31.7)	

No significant difference between children who received SMC and VAS at endline and those who did not, when analysed against background demographic characteristics: child's age, sex, household religion and wealth index.

Results: Equity

Background characteristics	VAS			SMC		
	No	Yes	p-value	No	Yes	p-value
	n (%)	n (%)		n (%)	n (%)	
Locality						
Urban	58 (61.1)	211 (47.7)	0.023	46 (80.7)	225 (46.7)	<0.0001
Rural	37 (38.9)	231 (52.3)			257 (53.3)	
Caregiver's highest level education attended						
No formal education	78 (82.1)	344 (78.0)	0.474	45 (79.0)	215 (44.6)	0.200
Pre-primary	0 (0)	1 (0.2)		0 (0)	267 (55.4)	
Primary	5 (5.26)	45 (10.4)		6 (10.5)	170 (35.3)	
Secondary	7 (7.37)	40 (9.0)		2 (3.5)	159 (33.0)	
Higher	5 (5.26)	11 (2.5)		4 (7.02)	153 (31.7)	

However, children living in urban areas were less likely to be reached with SMC or VAS.

Results: Safety

Adverse Drug Events reported for child?	Endline		P-value
	SMC	VAS	
	n (%)	n (%)	
No	462 (95.9)	435 (98.4)	>0.0001
Yes	20 (4.1)	7 (1.6)	
Total	**482(100)**	**442 (100)**	

Results: Safety

Type of ADE reported	Baseline (SMC only)	Endline (VAS+SMC)	P-value
	n (%)	n (%)	
Vomiting			
No	493 (99.0)	429 (99.1)	0.925
Yes	5 (1.0)	4 (0.9)	
Diarrhoea			
No	494 (99.2)	428 (98.8)	0.174
Yes	4 (0.8)	5 (1.2)	
Skin reaction			
No	497 (99.8)	433 (100)	0.537
Yes	1 (0.2)	0 (0)	
Yellow eyes			
No	498 (100.0)	432 (99.8)	0.493
Yes	0 (0.0)	1 (0.2)	
Fever			
No	468 (94.0)	419 (96.8)	0.062
Yes	30 (6.0)	14 (3.2)	
Loss of appetite			
No	496 (99.6)	433 (100.0)	0.537
Yes	2 (0.4)	0 (0.0)	

Results: Cost

Cycle	Cost Indicator	Total Cost (₦)	No. of Children reached	Cost per Child (NGN)	Cost per Child (USD)
SMC (Baseline)	Total cost per child receiving only SMC (Cycle 1)	65,105,015.72	168820	₦385.6	$0.94
SMC VAS (Endline)	Total cost per child receiving both Vitamin A and SMC (Cycle 4)	76,366,858.73	157876	₦483.71	$1.18
Additional cost of integration per child per cycle		$0.24 (₦98.11)			

The main cost categories and proportion of total cost for the SMC campaign in Cycle 1 (SMC) and 4 (SMC-VAS) campaigns, in Giade and Katagum LGAs, Bauchi State 2021

Cost category	SMC			SMC-VAS		
	Cost (₦)	Cost ($) *	Proportion (%)	Cost (₦)	Cost ($) *	Proportion (%)
Distribution cost	19,894,200.00	48,565.67	30.6	24,361,950.00	59,472.34	31.9
SPAQ	19,568,976.10	47,771.74	30.1	19,750,021.15	48,213.71	25.9
Training	11,790,658.37	28,783.33	18.1	18,656,700.00	45,544.69	24.4
Supplies	10,287,838.39	25,114.65	15.8	5,631,716.00	13,748.13	7.4
Meetings	802,117.00	1,958.13	1.2	3,081,850.00	7,523.41	4.0
Labour cost	2,581,225.87	6,301.28	4.8	2,763,589.19	6,746.47	3.6
Supervision	180,000.00	439.42	0.3	387,350.00	945.60	0.5
Vitamin A	-	-	-	1,399,682.39	3,416.90	1.8
Social mobilization	-	-	-	334,000.00	815.36	0.4
Total	**65,105,015.72**	**158,934.21**	**100.0**	**76,366,858.73**	**186,426.60**	**100.0**

** Exchange rate used for conversion is NGN409.635 to USD1*

Summary of Key Messages

High-dose VAS delivered twice annually is a proven low-cost intervention shown to reduce all-cause mortality in children.

Integrating VAS with SMC improved VAS coverage, without lowering the quality of SMC service. Using an established platform is a viable sustainability strategy.

Stakeholder and caregiver engagement at all levels was critical to success.

Integrating VAS with SMC is safe, feasible, acceptable, and can be achieved at minimal additional cost.

Integration can strengthen the health system for more equitable service delivery, guiding deployment in other health interventions.

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