Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Research

Knowledge and Uptake of Seasonal Malaria Chemoprevention among Caregivers of Under-five Children in a Tertiary Hospital in Kaduna State, North-western Nigeria

Hyellamurti Midala Tom[1], *Auwal Garba Suleiman[2,3], Suleiman Usman[3], Mohammed Abdu Darma[2,3], Umar Yahaya[2,3], Musa Mbiting Wakawa[3], Aisha Sanusi Hamza[3], Zaharaddeen Shuaibu Babandi[2,3]

[1]The MBBS Training Programme, College of Medical Sciences, Ahmadu Bello University, Zaria, Kaduna State, Nigeria [2]Department of Community Medicine, College of Medical Sciences, Ahmadu Bello University, Zaria, Kaduna State, Nigeria. [3]Department of Community Medicine, Ahmadu Bello University Teaching Hospital, Shika-Zaria, Kaduna State, Nigeria.

Abstract

Background: Malaria is a life-threatening parasitic infection primarily found in the tropics, and seasonal malaria chemoprevention (SMC) is one of the strategies used to protect children. Despite years of implementation, gaps remained in terms of knowledge and uptake among caregivers. This study aimed to assess the knowledge and uptake of SMC among caregivers of children at a tertiary hospital in Kaduna State, North-western Nigeria.

Methodology: Using a cross-sectional study, 234 caregivers of under-five children were selected from immunization and paediatric clinics through systematic sampling. An interviewer-administered questionnaire was used to collect data on sociodemographic characteristics, knowledge and uptake of SMC during the preceding SMC campaign. Data was analysed using IBM SPSS Statistics, and a chi-square test was used to check for associations between relevant variables. A *p*-value <0.05 was considered statistically significant.

Results: All the respondents were females, 226 (95.4%) were married, 175 (73.8%) were Hausa and 98 (41.4%) were unemployed. Up to 182 (76.8%) had heard of SMC, 156 (65.8%) knew it as a drug for prevention, 128 (54.0%) correctly identified it as a rainy season activity, and overall, 128 (54.0%) had good knowledge of SMC. A total of 137 (58.4%) had taken at least one dose of SMC during the last campaign, but only 65 (27.2%) received all four doses. Of the 100 (41.6%) who missed SMC, reasons included not knowing about SMC (54.0%) and the child being absent (20.0%) during distribution. Factors associated with SMC uptake included education, occupation, ethnicity, religion and knowledge on SMC ($p< 0.05$).

Conclusion: Despite good awareness, gaps in knowledge persist with many unable to identify the purpose, duration or eligibility for SMC. Uptake of SMC was moderate, with only a third receiving full coverage. Health authorities should intensify efforts towards community enlightenment and adaptive programming to bridge the identified gaps.

Keywords: Malaria; Seasonal Malaria Chemoprevention; SMC; Intermittent Preventive Therapy; SPAQ; Control Programme.

***Correspondence:** Dr Auwal Garba Suleiman, Department of Community Medicine, Faculty of Clinical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria, Kaduna State, Nigeria. **Email:** agsuleiman@abu.edu.ng

How to cite: Tom HM, Suleiman AG, Usman S, Darma MA, Yahaya U, Wakawa MM, Hamza AS, Babandi ZS. Knowledge and Uptake of Seasonal Malaria Chemoprevention among Caregivers of Under-five Children in a Tertiary Hospital in Kaduna State, North-western Nigeria. Niger Med J 2025;66 (3):1055-1068.https://doi.org/10.71480/nmj.v66i3.835.

Quick Response Code:

Introduction

Malaria is a life-threatening parasitic infection primarily found in the tropics. The disease is largely preventable, and treatment is available for infected individuals; however, without prompt diagnosis and effective treatment, a case of uncomplicated malaria can rapidly progress to a severe disease, which often leads to death.[1] Five species of *Plasmodium* parasite cause malaria in humans, and two of these species, *Plasmodium falciparum* and *Plasmodium vivax*, pose the greatest threat.[2] The parasite is transmitted through the bite of an infected female *Anopheles* mosquito, and there are over 400 different species of *Anopheles*, 40 of which transmit malaria.[2]

In 2023, an estimated 263 million cases of malaria occurred in 83 malaria-endemic countries. About 233 million (94%) were in the African Region, with Nigeria (26%), the Democratic Republic of Congo (13%), Uganda (5%), Ethiopia (4%) and Mozambique (4%), accounting for more than half of the global burden.[3] Kaduna State is one of the most populous states in Nigeria, with a rising incidence of malaria. In 2021, the state contributed 5.3% of Nigeria's estimated 68 million cases of malaria.[4]

The National Malaria Elimination Programme (NMEP) is a division under the Department of Public Health of the Federal Ministry of Health and Social Welfare with a vision of providing equitable, comprehensive and impactful malaria interventions. Through strategic partnership and collaboration, the NMEP coordinates all malaria prevention and control activities in the country.[5] The National Malaria Strategic Plan (NMSP) 2014-2020 was to reduce Nigeria's malaria burden to pre-elimination levels and bring malaria-related mortality to zero.[6]Although the goal was not achieved, significant success was recorded as malaria prevalence declined from 27% in 2015 to 23% in 2018.[7] The current NMSP (2021-2025) aims to achieve a parasite prevalence of less than 10% and mortality attributable to malaria of less than 50 deaths per 1,000 livebirths. One of the strategic objectives of the plan was to ensure the provision of chemoprevention, diagnosis and appropriate treatment for 80% of the target populations at risk of malaria.[7]

In 2012, the World Health Organization (WHO) issued a policy recommendation for the use of seasonal malaria chemoprevention (SMC) in areas where malaria transmission is highly seasonal, such as the Sahel sub-region of Africa.[8]The intervention involves intermittent administration of a curative dose of anti-malarial drugs to children at risk of malaria during the peak period of malaria transmission. The drugs recommended for SMC are sulfadoxine-pyrimethamine plus amodiaquine (SPAQ), administered at 4-weeklyintervals or cycles.[9]In clinical trials, SMC was shown to prevent 75% of malaria cases during the peak transmission season.[8,10]The current recommendations are for four monthly cycles, but a fifth cycle may be required in some areas to maintain therapeutic concentration of the drugs or effective coverage throughout the period of peak malaria transmission.[9,11,12] In Nigeria, SMC was adopted by the NMEP in early 2014 after pilot implementation in Katsina and Kano States. The intervention was gradually scaled up to 18 states by 2021. [11,13] Since 2023, SMC has been implemented in 21 eligible states, including Kaduna and all its neighbouring states.[14]

Despite several reports affirming the utility of SMC, it was evident that SMC's effectiveness was strictly dependent on access to the drugs, acceptance by communities and uptake among caregivers.[15,16] Reports that examined the coverage of SMC have noted favourable but varying results, depending on time and location.[12,13,17,18] In addition, while uptake of SMC during the first cycle tends to be encouraging, many children tend to miss out on subsequent cycles, with fewer children getting complete doses at the end of the year or SMC round.[13,16]As such, assessing the complete uptake of SMC by estimating the proportion of children who received all four doses of SMC would-be vital to stakeholders for outcome evaluation. It will also guide decision-making towards addressing barriers, creating demand for SMC and developing strategies for scaling up the programme. This study aimed to determine the knowledge and uptake of SMC among caregivers of under-five children attending the immunization and paediatric outpatient clinics of Ahmadu Bello University Teaching Hospital (ABUTH) in Kaduna State, North-western Nigeria.

Materials and Methods

Study Area

This study was conducted at Ahmadu Bello University Teaching Hospital (ABUTH), one of the largest tertiary hospitals in Northern Nigeria. The hospital was established in 1967 as an institute of health according to the statutes of the university. The hospital now serves as an important referral centre for the neighbouring states and provides both specialized and routine services, including general outpatient, immunization, and antenatal and delivery services. However, while the referred cases tend to come from all over the region, clients for basic services such as routine immunization, outpatient consultation and antenatal care services tend to come from the catchment LGAs, including Sabon-Gari, Zaria and Giwa, all in Kaduna State.

Study participants

This was a cross-sectional study among women who presented their children for routine childhood immunization and paediatric outpatient clinics in ABUTH. Such women were considered eligible if they had at least one child aged 0-59 months as at the time of the study. Using Cochran's formula, parameterized with a standard normal deviate (Z) of 1.96, awareness about SMC (p) of 81.9% [13] and a margin of error (d) of 5%, the minimum sample size (n) was estimated as follows:

$$n = \frac{Z^2 p(1-p)}{d^2}$$

$$n = \frac{1.96^2 \times 0.819 \times (1-0.819)}{0.05^2} = 228$$

However, to ease planning for data collection and to allow for uncertainties due to non-response, a sample size of 240 eligible caregivers was targeted (i.e., 15 responses per clinic day).

Preliminary checks indicated that the paediatric outpatient department (POPD) and the routine immunization clinics see a combined average of 60 clients per day. Thus, using a sampling interval of four, an average of 15 clients were selected per day through a systematic random sampling technique over 16-day period. Each day, selection began by randomly choosing one out of the first four eligible caregivers to come to the clinic through balloting. Subsequent caregivers were then selected by adding the sampling interval to the serial number of the first caregiver selected.

Data collection

Data was collected using a semi-structured interviewer-administered electronic questionnaire adapted from three previous studies in Ghana, Guinea and Tanzania. [18-20] Additional questions were included based on extensive review of literature. The questionnaire was deployed by two trained research assistants who administered it in English language with the option of translating to Hausa language for respondents who preferred that option. The questionnaire comprised three sections, namely: Section A (sociodemographic characteristics), Section B (knowledge of SMC) and Section C (acceptance and coverage of SMC). The questionnaire contained both closed- and open-ended questions, and for section B (knowledge of SMC), scores were awarded such that a correct answer attracted a score of one, while a wrong answer attracted a score of zero. A total of ten questions in the section were scored this way; as such, for each respondent, the minimum attainable score was zero and the maximum was ten. Respondents who scored a total of five or above were considered to have good knowledge, whereas those who scored less than five were graded poor knowledge.

Statistical analysis

The data was analysed using IBM SPSS Statistics (version 27.0) after preliminary checks in Microsoft Excel (2016). Categorical responses were presented using frequency distribution tables. The age of respondents was further categorized into age groups before being presented in frequencies (%). For

bivariate analysis, Pearson chi-square, or, where appropriate, Fisher's exact test,was used to check for associations between different categorical variables and uptake of SMC. For decision-making, a *p*-value less than 0.05 was considered statistically significant.

Ethical considerations

Ethical approval for the study was obtained from the Health Research Ethics Committee of Ahmadu Bello University Teaching Hospital on 30th October 2023 (DUNS number: 954524802). For each of the respondents, a written informed consent was obtained prior to participation, with options to either voluntary participate, freely decline or withdraw at any time during the study without any adverse consequences. In addition, the study made no attempt to collect any identifying information from the respondents, and all the data collected was treated as confidential, to be used strictly for academic purposes.

Results

Sociodemographic characteristics

At the end of 16 days of data collection, a total of 237 questionnaires were completed by the respondents, giving a response rate of 98.8%. Table 1 shows the sociodemographic characteristics of the respondents. All the respondents were female caregivers, and the majority (95.4%) were married, belonging to the Hausa ethnic group (73.8%). The predominant religion among the respondents was Islam (87.3%), with the majority of the respondents having post-primary education (79.8%). With regards to occupation, 98 (41.4%) were unemployed, compared to 35 (14.8%) who were civil servants. All the women had at least one child aged 0-59 months, with the majority (89.5%) having one or two children in that age category.

Table 1: Sociodemographic characteristics of respondents at ABUTH, November 2023 (N=237)

Characteristics	Frequency	Percent
Age group (years)		
15-19	3	1.3
20-24	50	21.1
25-29	54	22.8
30-34	50	21.1
35-39	77	32.4
40-44	3	1.3
Marital Status		
Single	9	3.8
Married	226	95.4
Divorced	1	0.4
Widowed	1	0.4
Religion		
Christianity	30	12.7
Islam	207	87.3

Ethnicity		
Hausa	175	73.8
Yoruba	16	6.8
Igbo	3	1.3
Others[a]	43	18.1
Educational Status		
No formal education	8	3.4
Quranic	13	5.4
Primary	27	11.4
Secondary	91	38.4
Tertiary	98	41.4
Occupation		
Unemployed	98	41.4
Petty-trader	57	24.1
Civil servant	35	14.8
Tailor	15	6.3
Teacher	13	5.5
Business	12	5.1
Others[b]	7	3.0
Number of children (<5 years)		
1	128	54.0
2	84	35.5
3	19	8.0
4	6	2.5

[a]Others: Baju, Edo, Fulani, Gbagyi, Ebira, Idoma, Jaba, Kagoma, Kagoro, Kataf, and Mangu [b]Others: farming, healthcare work, self-employed, unskilled labourer and private company work

Knowledge of SMC

Table 2 shows the knowledge of respondents on SMC. A total of 182 (76.8) women heard of SMC prior to the study, with the most common source of information being community health workers (86.3%). Other, less common sources included friends and community leaders. Up to 156 (65.8%) correctly described SMC as drugs used to prevent malaria, while 72 (30.4%) respondents correctly identified four months as the duration of SMC in Kaduna State. Additionally, more than half of the respondents correctly identified SMC as a rainy season activity; however, when it comes to eligibility, more than half of the respondents either did not know or incorrectly identified the minimum and maximum ages of eligibility. Also, regarding the number of SMC tablets, about half of the respondents incorrectly described the number of SMC tablets taken on both day 1, day 2 and day 3, as shown in Table II.

Table 2: Knowledge on SMC among respondents at ABUTH, November 2023

Variable	Frequency	Percent
Awareness of SMC (n=237)[a]		
Yes	182	76.8
No	55	23.2
Source of information (n=182)		
Community health workers	157	86.3
Friends	20	10.9
Community leader	3	1.7
Others (e.g., teachers and relatives)	2	1.1
Satisfaction with information (n=182)[a]		
Yes	118	64.8
No	64	35.2
What is SMC (n=237)		
Drug for malaria prevention	156	65.8
Drug for malaria treatment	13	5.5
Don't know	68	28.7
Number of SMC rounds (n=237)		
1 month	18	7.6
2 months	21	8.9
3 months	42	17.7
4 months	72	30.4
Don't know	84	35.4
Season of SMC activities (n=237)		
Rainy	128	54.0
Dry	25	10.5
Don't know	84	35.4
Number of tablets taken on Day 1 (n=237)		
1	30	12.7
2	127	53.6
Don't know	80	33.8
Number of tablets taken on Day2 (n=237)		

1	124	52.3
2	21	8.9
Don't know	92	38.8
Number of tablets taken on Day-3 (n=237)		
1	126	53.2
2	10	4.2
Don't know	101	42.6
Minimum age of eligibility (n=237)		
3 months	32	13.5
6 months	31	13.1
12 months	44	18.6
Don't know	130	54.9
Maximum age of eligibility (n=237)		
5 years	134	56.5
10 years	14	5.9
Don't know	89	37.6
Sick children may take SMC (n=237)		
Yes	65	27.4
No	105	44.3
Don't know	67	28.3
Visit clinic if adverse event occurs (n=237)		
Yes	180	75.9
No	57	24.1

[a]Not included in the computation of knowledge score

Regarding the level of knowledge, after computing individual scores and grading of the respondents, a total of 128 (54.0%) respondents had good knowledge, while the remaining 109 (46.0%) had poor knowledge.

Uptake and barriers to SMC

Table 3 shows uptake and barriers to SMC among caregivers at ABUTH. A total of 137 (58.4%) respondents reported that their children had received at least one cycle of SMC during the last SMC campaign, with the most common method of distribution being door-to-door (93.4%). Reasons for the uptake included perceived effectiveness of the drug against malaria (75.2%) and persuasion by community healthcare workers (38.7%). Among those who reported that their children did not take SMC during the last campaign, the most common reasons provided were not knowing about SMC activities (54.0%) and children being absent during the distribution periods (20.0%). According to the respondents, other barriers that could deter parents from participation in SMC included distrust of healthcare service

(33.3%), SMC drugs perceived as ineffective against malaria (12.7%) and fear of side effects (10.5%). As such, respondents suggested various strategies to promote uptake of SMC which included increased community awareness (73.0%), education on side effects (15.2%) and provision of incentives to both parents (11.0%) and community healthcare workers (3.0%).

Table 3: Uptake and barriers to SMC among respondents at ABUTH, November 2023 (N=237)

Variable	Frequency	Percent
Child received SMC during last campaign		
Yes	137	58.4
No	100	41.6
Distribution (n=137)		
Door-to-door	128	93.4
Fixed location	6	4.4
Both	3	2.2
Reason for the uptake of SMC (n=137)*		
SMC is effective against malaria	103	75.2
Persuasion by community health workers	53	38.7
Other children in the community accepted SMC	12	8.8
Endorsement by community leaders	9	6.6
Reason for missing SMC (n=100)		
Did not know about SMC	54	54.0
Child was not around during the distribution period	20	20.0
Thought my child was not old enough	9	9.0
Did not trust the drug	7	7.0
Worried about side effects	7	7.0
Child was sick during the campaign	3	3.0
Perceived barriers to SMC (n=237)*		
Distrust of healthcare services	79	33.3
Drugs may not be effective	30	12.7
Fear of side effects	25	10.5
No need for drugs if a child is not sick	15	6.3
Strategies to promote uptake (237)*		
Create more community awareness	173	73.0
Educate public on side effects	36	15.2
Provide incentives to parents	26	11.0

Provide incentives to community health workers	7	3.0

*Multiple response items

Regarding uptake or number of treatment cycles received by children, the respondents gave various responses as to how many cycles of SMC their children had received during the last campaign. A total of 137 (58.4%) respondents reported that their children received at least one cycle of SMC, but as shown in Figure 1, only 65 (27.2%) reported that their children had received all four cycles of SMC during the last campaign.

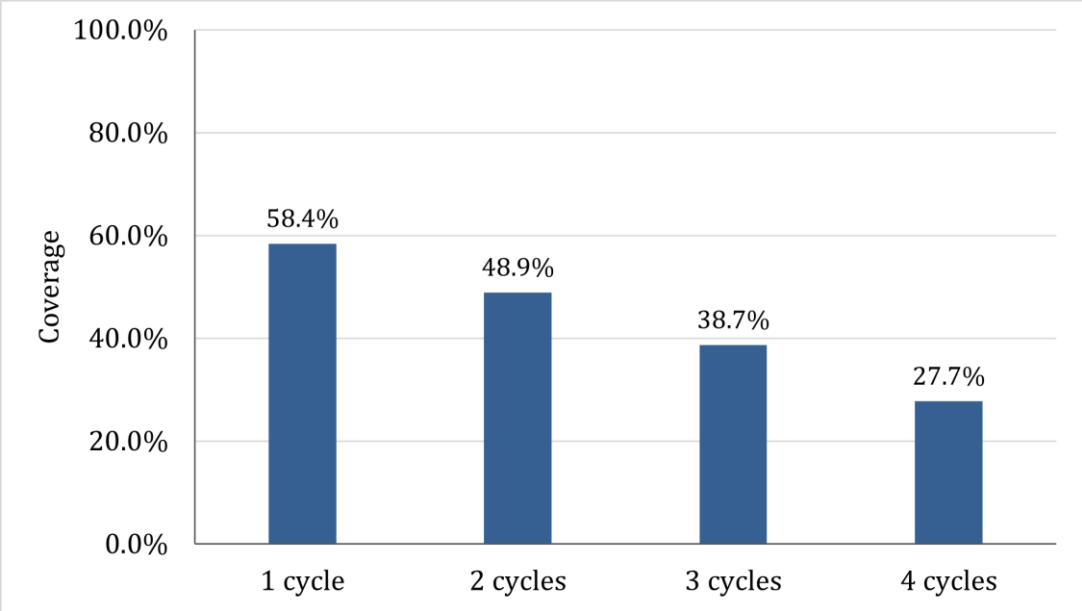

Figure 1: Number of treatment cycles received by children as reported by their caregivers at ABUTH, November 2023 (n=137)

Factors associated with uptake of SMC

Table 4 shows the factors associated with good knowledge of SMC among the caregivers of children at ABUTH. There was a statistically significant association between knowledge on SMC and ethnicity (χ^2=15.992, p<0.001) and occupation of respondents (χ^2=6.993, p=0.032). There was, however, no significant association between knowledge on SMC and age, religion and educational status of respondents.

Table 4: Association between knowledge on SMC and selected attributes of caregivers at ABUTH, November 2023

Characteristics	**Knowledge on SMC**		**χ^2**	***p* value**
	Good	**Poor**		
	n (%)	**n (%)**		
Age group (years)				
15-24	28 (52.8)	25 (47.2)	0.062	0.971
25-34	56 (53.8)	48 (46.2)		
≥ 35	44 (55)	36 (45)		
Religion				

Christian	13 (43.3)	17 (56.7)	1.576	0.242
Muslim	115 (55)	94 (45)		
Ethnicity				
Hausa	108 (61.7)	67 (38.3)	15.992	<0.001*
Non-Hausa	20 (32.3)	42 (67.7)		
Educational status				
No formal education	6 (75)	2 (25)	5.053[a]	0.166
Quranic	10 (76.9)	3 (23.1)		
Primary	16 (59.3)	11 (40.7)		
Post-primary	96 (50.8)	93 (49.2)		
Occupation				
Unemployed	59 (60.2)	39 (39.8)	6.933	0.032*
Civil Servant	18 (37.5)	30 (62.5)		
Other[b]	51 (56)	40 (44)		

*Statistically Significant; [a]Fisher's exact test; [b]Others: petty-traders, tailors, and farmers

Table 5 shows the factors associated with uptake of SMC among respondents at ABUTH. For this analysis, uptake was defined as the receipt of at least one cycle of SMC. There was a statistically significant association between uptake of at least one cycle of SMC and religion of the respondents (χ^2=10.888, p=0.001), ethnicity (χ^2=22.469, p<0.001) and educational status of respondents (χ^2=7.832, p=0.047). Other factors that had significant association with uptake of SMC included occupation of respondents (χ^2=10.531, p=0.001) and knowledge on SMC (χ^2=75.882, p<0.001). The only factor that was not associated with uptake of SMC was the age of respondents.

Table 5: Association between uptake of SMC and selected attributes of caregivers at ABUTH, November 2023

Characteristic	**Uptake of SMC**		**χ^2**	***p* value**
	Yes	**No**		
	n (%)	**n (%)**		
Age group(years)				
15-24	27 (50.9)	26 (49.1)	1.38	0.509
25-34	63 (60.6)	41 (39.4)		
≥ 35	47 (58.8)	33 (41.2)		
Religion				
Christian	9 (30)	21 (70)	10.888	0.001*
Muslim	128 (61.8)	79 (38.2)		
Ethnicity				
Hausa	117 (66.9)	58 (33.1)	22.469	<0.001*
Non-Hausa	20 (32.3)	42 (67.7)		

Educational status				
No formal education	6 (75)	2 (25)	7.832[a]	0.047*
Quranic	11 (84.6)	2 (15.4)		
Primary	19 (70.4)	8 (29.6)		
Post-primary	101 (53.4)	88 (46.6)		
Occupation				
Unemployed	56 (57.1)	42 (42.9)	10.531	0.005*
Civil Servant	19 (39.6)	29 (60.4)		
Others[b]	62 (68.1)	29 (31.9)		
Knowledge on SMC				
Good	107 (83.6)	21 (16.4)	75.882	<0.001*
Poor	30 (27.5)	79 (72.5)		

*Statistically Significant; [a]Fisher's exact test; [b]Others: petty-traders, tailors and farmers

Discussion

The study noted that all the respondents were females, the majority of whom were married and belonged to the Hausa ethnic group. This is to be expected, given that the population targeted were mothers with their sociocultural identities reflecting that of the study area. The majority of the respondents were aware of seasonal malaria chemoprevention from various sources, including community healthcare workers and friends. This agrees with findings of a report from Northern Nigeria, which confirmed a high level of awareness among households in the region (81.9%).[13] Elsewhere in Guinea, Burkina Faso and the Upper East region of Ghana, awareness levels of up to 97.9% were reported.[18,20,21] In the past, parents and caregivers had identified a lack of awareness as a fundamental barrier to SMC uptake,[11] further underscoring the need for more awareness to allow caregivers to make informed decisions about SMC and make the necessary preparations to ensure the availability of their children during the distribution periods.

In terms of knowledge on SMC, a sizeable proportion of the respondents showed a lack of proper understanding of the purpose, timing, eligibility and number of tablets given during SMC, highlighting the need for proper health education. Poor understanding of the intervention may lead to outright rejection, poor compliance or misuse of the drugs. In addition, parents who lacked proper understanding of the eligibility criteria may present children who are either too young or too old for SMC, which could potentially compromise the effectiveness of the exercise. In Nigeria, receipt of SMC drugs by age-ineligible children is already a well-recognised problem. In 2022, an end-of-round SMC survey across nine implementing states observed that up to 30.3% of age-ineligible children aged 5-10 years received at least one dose of SMC.[22] Similarly, a coverage survey across four North-western States in 2017 confirmed SMC administration to age-ineligible children, with 21.4% to 78.5% of children aged 6-7 years receiving at least one dose of SMC depending on the state.[13]

This study observed a moderate uptake of SMC among caregivers at the facility, with more than half of them affirming that their children received at least one dose of SMC during the last campaign. The main reasons for accepting SMC were belief in its effectiveness and persuasion by healthcare workers. This agrees with findings from previous studies in sub-Saharan Africa. [23,24] Lack of awareness, distrust in healthcare workers and being absent during SMC campaigns were the major barriers to uptake of SMC. This finding builds on existing evidence of such barriers. [11,24,25] However, the majority of the respondents did not consider side effects as major barriers, which is contrary to findings reported in a previous study from Nigeria.[11]

This study estimated that about half of the children received at least one dose of SMC, which is encouraging and further speaks to the need for authorities to re-double their efforts towards scaling up SMC distribution in the state. Elsewhere in Nigeria, significantly higher uptake and coverage of SMC were reported. In 2014, during the implementation trial of SMC in neighbouring Katsina State, an administrative coverage of 83.9% was reported.[15] In 2017, a coverage survey comprising four states in North-western Nigeria reported an administrative coverage of 72.7%.[13] In 2023 and 2024, two end-of-cycle surveys across nine states in Nigeria reported high coverage rates of 97.6% and 94.9% respectively.[12,17] Outside Nigeria, similar surveys have reported higher SMC coverage rates from 82.6% in Mali to 88.6% in Burkina Faso.[21]

Disturbingly, despite modest coverage, less than a third of caregivers confirmed that their children received all four doses of SMC. This finding poses a direct threat to the effectiveness of SMC as a public health intervention, since only children who received the complete cycles of SMC would be expected to benefit maximally from it. However, evidence suggests that this challenge is not limited to this study area as several studies have observed relatively low protective coverage in other places. In Sokoto State, for instance, despite achieving an administrative coverage of 59.2% in one of the cycles in 2017, further checks revealed that only 19.0% went on to receive all four cycles of SMC.[13] Elsewhere in Guinea, a coverage report in 2020 revealed that despite achieving an administrative coverage of 85.5% across the country, only 41.4% of children received all four cycles of SMC.[18]

In this study, several factors were found to be associated with uptake of at least one cycle of SMC. These included educational status, occupation, ethnic background, religion and knowledge on SMC. These associations were unadjusted measures of relationship and could have stemmed from the fact that either knowledgeable caregivers were more inclined to participate in SMC activities or participation in SMC campaign made some caregivers more knowledgeable about the exercise. In a study among caregivers in Builsa North District in Ghana, uptake of SMC was found to be associated with several attributes of the caregivers, including place of residence and size of household (more than five members).[20] Given that in this study, the most common reason why caregivers missed out on SMC was not knowing about it in the first place, it is highly plausible that these observations reflect differences in terms of local access, rather than inherent tendencies of caregivers to accept or reject the intervention. For instance, caregivers who reside in secluded neighbourhoods, living independent lives and spending a considerable amount of time outside their usual residence either for work or other livelihood activities may easily miss out on SMC campaigns compared to those who live in communal settings, where extended family members and neighbours often propagate awareness and facilitate uptake.

Study Limitations

This study has a number of limitations including the diverse places of residence where the respondents came from, which makes it difficult to make conclusions on any particular area of residence or LGA. The cross-sectional nature of the study also means temporal associations could not be established. As a hospital-based study, respondents in the study may not be judged as sufficiently representative of their communities since both access to healthcare and care-seeking behaviour are not evenly distributed. In addition, both recall bias and social desirability could influence the quality of the responses obtained from the caregivers. Nevertheless, this study represents a valuable attempt at understanding the level of knowledge and participation in SMC activities among a typical group of caregivers accessing basic services at a tertiary hospital in North-western Nigeria.

Conclusion

Despite high level of awareness on SMC, respondents showed important knowledge gaps in terms of purpose, duration, eligibility and number of tablets given during SMC campaign. Uptake of SMC was moderate, with only about a third of caregivers confirmed that their children received all four doses of SMC. These findings raised concerns on the level of implementation of the programme and underscored the need for health authorities to re-double their efforts towards creating awareness on SMC through

health education by healthcare workers, community influencers and mass media campaigns. The health authorities should prioritize context-specific approaches and adaptive programming to ensure that all children eligible for SMC are reached. This can only be achieved through deliberate and tailored interventions that recognize the peculiarities, accommodate the preferences and respond to the needs of the communities when it comes to SMC interventions. It is equally recommended that the health authorities develop and implement a comprehensive system for monitoring and evaluation to enhance both administrative and protective coverage of SMC among eligible children in Kaduna State.

Conflict of Interest: All authors have no conflict of interest to declare.

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