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The Impact of the 5-Year SMC Intervention on the Prevention of Malaria Among Children Under-5 in Sokoto State.

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Abstract
Nigeria suffers the world's greatest malaria burden, with approximately 51 million cases and 207,000 deaths reported annually, SMC has been widely used in the Sahel since the World Health Organization recommended it in 2012 for children under the age of five to prevent malarial disease, with the goal of maintaining therapeutic antimalarial medication concentrations in the blood during the time of peak malarial risk. This study aimed at evaluating the of impact of the 5-Year SMC intervention on the prevention of Malaria among children under-5 in Sokoto State. A total of 5,451,337 children between 3-59 months old were enrolled across all the 23 LGAs of Sokoto state and a total of 1380 respondents' consent were sought. This study was carried out as descriptive-analytical study. Each SMC cycle kicks with mass drugs administration for four (4) days during the implementation period, a complete treatment course of Sulphadoxine-pyrimethamine (SP) plus amodiaquine (AQ) is given to children aged 3-59 months at monthly intervals, beginning at the start of the transmission season, up to a maximum of four doses during the malaria transmission season. Seasonal Malaria Chemoprevention is an intervention with great potential in Sokoto state, and along with other interventions, it could significantly contribute to approaching the threshold where elimination strategies will be envisioned. During the mass drug administration in all 23 LGAs, comprising 244 wards and 8269 settlements, the intervention significantly reduced hospital visit, admission, and malaria indicators in children. The implementation of seasonal malaria chemoprevention program in Sokoto state has been evaluated, and a great impact was observed on reducing mortality rate among children.

Keywords: Impact, 5-Year, SMC, Prevention, Malaria, Children Under-5 and Sokoto State.

Introduction
Seasonal malaria chemoprevention (SMC) is defined as "the intermittent administration of full treatment courses of an antimalarial medicine during the malaria season to prevent malarial illness with the objective of maintaining therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malarial risk (Scholar, 2007; Assob *et al*., 2017). A complete treatment course of Sulphadoxine-pyrimethamine (SP) plus amodiaquine (AQ) should be given to children aged 3-59 months at monthly intervals, beginning at the start of the transmission season, up to a maximum of four doses during the malaria transmission season (Abossie *et al*.,2020).

Materials and Method
Study Design
This study was carried out as descriptive-analytical study. Inclusion criteria was strictly based on those children under 5 years that were eligible for SMC. All those children above 5 years of age were excluded from the study.

data Collection
Interviewer administered questionnaire through the research assistant were used which was adopted from the Sokoto state Malaria Elimination Agency SMC campaign for the purpose of this study.

Ethical Considerations
The ethical clearance for the study was sought and obtained from the State Ministry of Health Sokoto (SKHREC/0108).

Data Analysis
SPSS Statistics version 22.0 (IBM Corp., Armonk, New York, USA) was used to analyse the data. The analysed data were presented in form of figures and tables and expressed as means ± SEM (Standard Error of Mean). Statistical differences were compared by simple descriptive analysis, a *p*-value of $\leq$ 0.05 was considered statistically significant.

Results
Seasonal Malaria Chemoprevention is an intervention with great potential in Sokoto state, and along with other interventions, it could significantly contribute to approaching the threshold where elimination strategies will be envisioned. During the mass drug administration in all 23 LGAs, comprising 244 wards and 8269 settlements, the intervention significantly reduced hospital visit, admission, and malaria indicators in children.

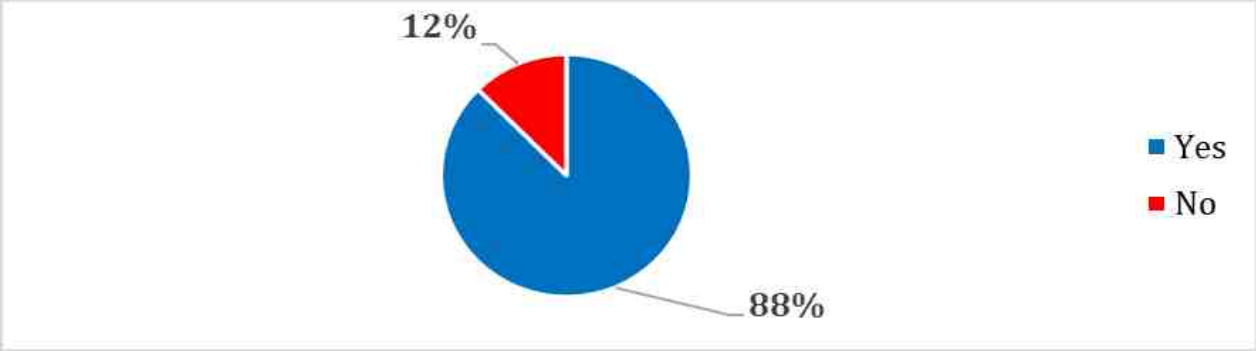

Figure 1: Percentage of the respondents that consented to the questionnaire interview.

Figure 2: Distribution of the respondents by the tribe

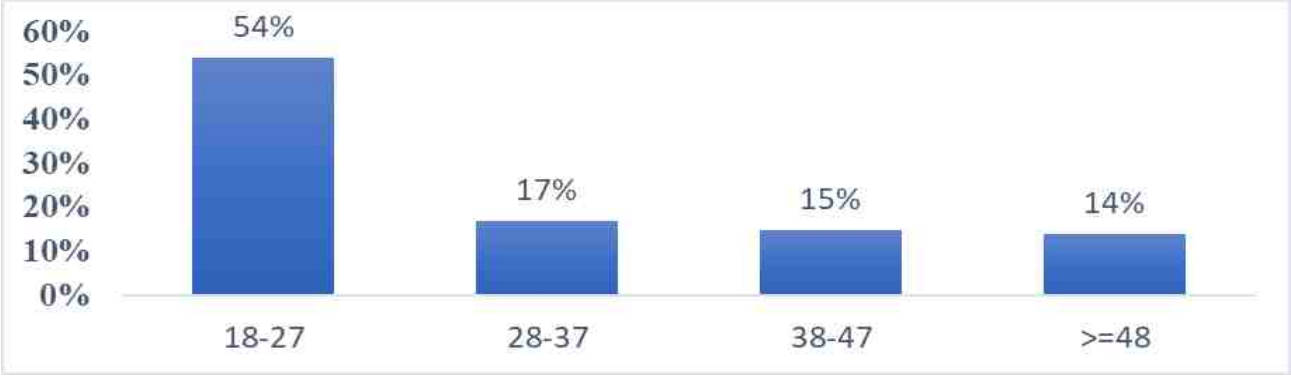

Figure 3: Distribution of the respondents by age

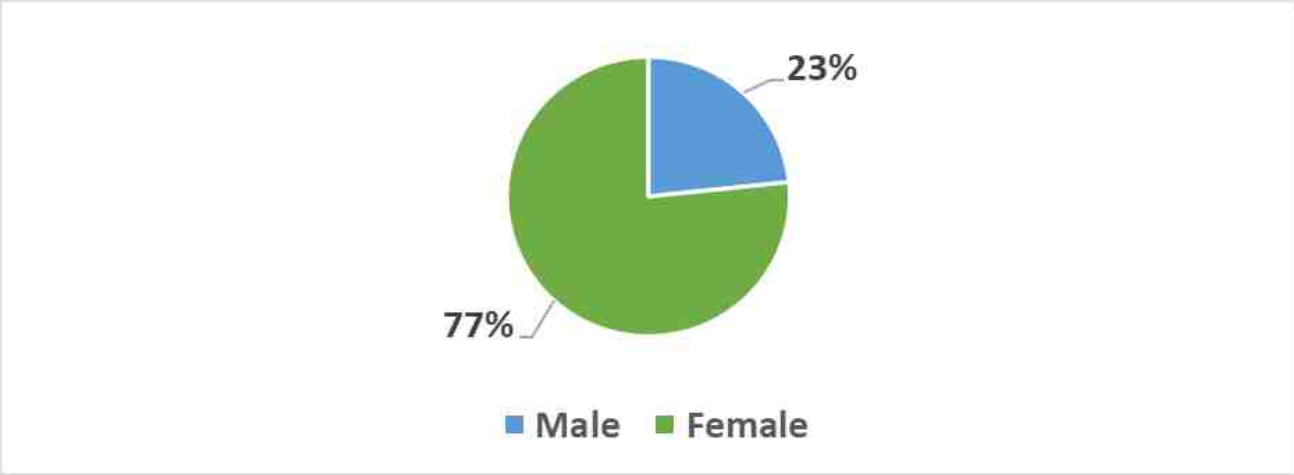

Figure 4: Distribution of respondents by gender

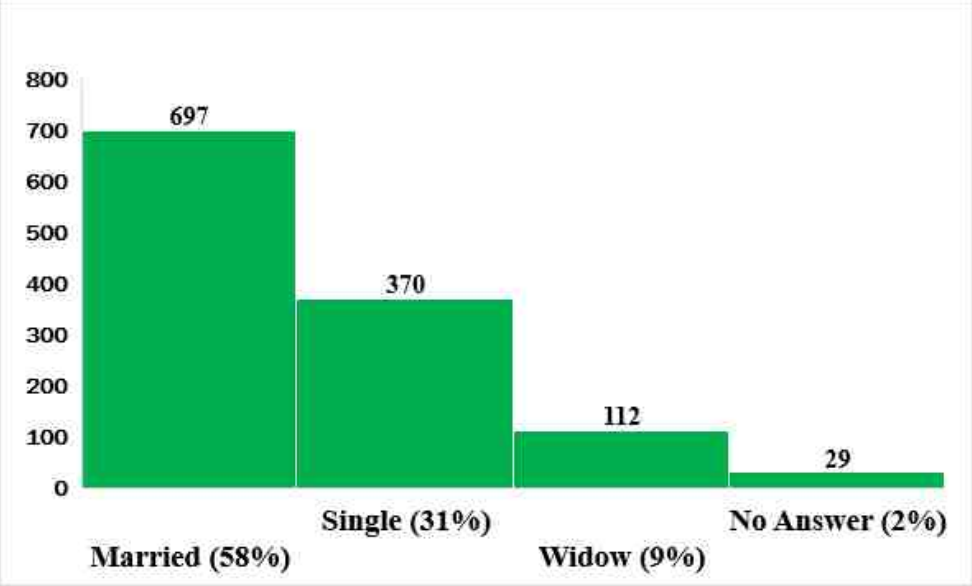

Figure 5: Distribution of the respondent by marital status

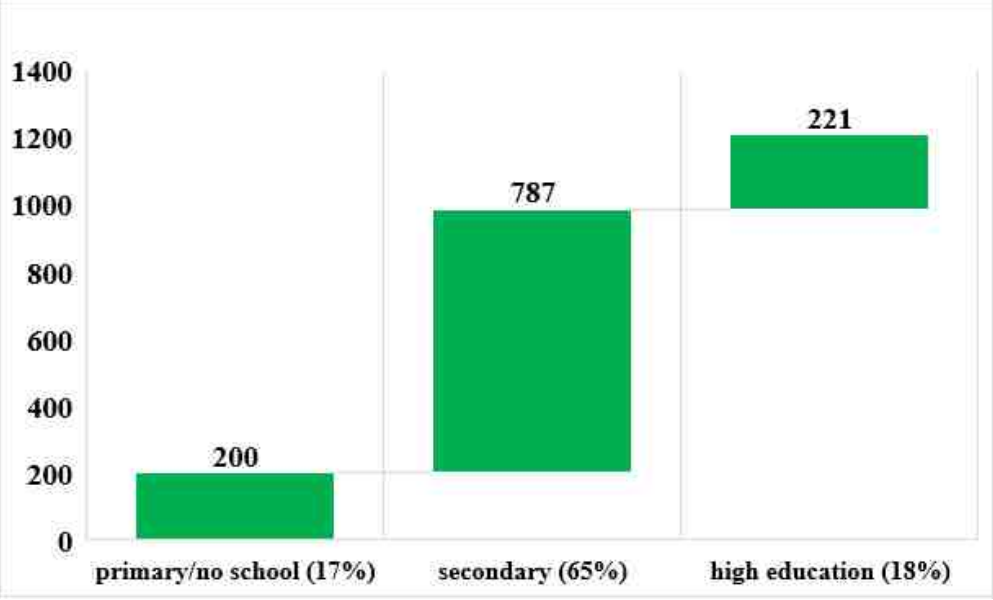

Figure 6: Respondents' Academic Background

Discussion

In March 2012, seasonal malaria chemoprevention (SMC) was recommended by the WHO as a prevention intervention in areas with high seasonal malaria transmission in the Sahel region of sub-Saharan Africa for children under-5 years of age (Munisi et al.,2019; Saha *et al*., 2019). The objective of SMC which is intermittent administration of full treatment courses of an antimalarial medicine to children in areas of highly seasonal transmission during the malaria season is to prevent malarial illness by maintaining therapeutic antimalarial drug concentrations in the blood throughout the greatest malarial risk.

The combination of SP+AQ was chosen for SMC for the following reasons: In clinical trials, SP+AQ conferred greater protection than other drug combinations (Sokhna *et al*., 2008). The use of the two drugs in combination limits the risk for selection for resistance to either SP or AQ used as monotherapy. SP and AQ retain their efficacy in areas of Sahel and sub-Sahel with seasonal transmission where SMC is appropriate (WHO, 2017). The SP+AQ regimen is safe, well-tolerated and relatively cheap. The combination of SP+AQ does not include artemisinin derivatives. Therefore, artemisinin-based combinations can be reserved for the treatment of clinical cases in which the rapid action of an artemisinin derivative is most useful. The recommended dosing schedule by age includes the infants 3 to 11 months old: half of a 153 mg tablet of AQ base given once daily for 3 days and a single dose of half a 500/25 mg tablet of SP; and children 12 to 59 months: a full tablet of 153 mg AQ base given once daily for 3 days and a single dose of a full tablet of 500/25 mg SP. The single dose of SP is given only on the first day, at the same time as the first dose of AQ. The target areas for implementation are those in which: malaria transmission and the majority (> 60%) of clinical malaria cases occur during a short period of about 4 months; the clinical attack rate of malaria is greater than 0.1 attacks per transmission season in the target age group, and SP+AQ remains efficacious (> 90% efficacy) (Maiga *et al*., 2016).

Giving this effective antimalarial treatment at monthly intervals during this period is 75% protective against uncomplicated and severe malaria in children under-5 years of age (Oguike *et al*., 2016).

Conclusion

The implementation of seasonal malaria chemoprevention program in Sokoto state has been evaluated, and a great impact was observed on reducing mortality rate among children.

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