I. INTRODUCTION

In 2015, malaria was the leading cause of mortality and morbidity in children under 5 years of age in Mali with a microscopic parasite prevalence of 36% (Malaria Indicator Survey in Mali 2015). The National Malaria Control Program (NMCP) in Mali adopted Seasonal Malaria Chemoprevention (SMC) for children aged 3 to 59 months as a national policy in 2012. Implementation began in one pilot district in 2012 and was gradually scaled-up with nation-wide coverage achieved in 2016.

Among children 5 to 14 years of age, mortality due to malaria is 4% in Kayes region (SLIS 2016). The age group of 5 to 10 years still bears the burden of malaria despite the positive impact of SMC implementation in children under 5 (Touré 2016). In 2016, the NMCP introduced a pilot approach to extend SMC to children 5 to 10 years old.

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II. SMC INTERVENTION

SMC, recommended by the WHO in March 2012 as a malaria control strategy in the Sahel countries, uses a combination of sulfadoxine-pyrimethamine and amodiaquine (SP + AQ), at therapeutic dose, during the period of high transmission. Medications are given monthly for four months. After each administration, SP + AQ at Day 1, AQ at Day 2 and Day 3, the child is protected for four weeks.

In Mali, the SMC strategy is implemented as a national campaign with community health volunteers and community health workers mobilized to conduct door-to-door administration and direct observation of the first dose, counsel families on side effects, and leave doses two and three with the family for administration over the following two days. Families are mobilized through different channels from interpersonal communication to mass media. The campaign is repeated monthly for four months during the rainy season (July to November). CHWs are trained and supervised by the local health center technical director. District, regional, and national health authorities also carry out supervision during each campaign round.
IV. STUDY OBJECTIVES

Measure coverage, impact and cost of adding Seasonal Malaria Chemoprevention (SMC) to children aged 5 to 10 years during the malaria transmission season.

V. STUDY SAMPLE PARAMETER

- Detection of a 50% difference in children 5 to 10 years old
- Estimated parasitemia of 25% in districts at follow-up
- 80% power, alpha risk = 0.05

VI. STUDY METHODOLOGY

A non-randomized, pre-post design, with an intervention (Kita) and control (Bafoulabe) district including:

- Administration of SP + AQ at monthly intervals in children 5-10 years in July, August, September and October of 2017 and 2018;
- Cross-sectional sub-sample testing for anemia and malaria parasitemia, before/after intervention (July 2017, December 2018);
- Only Kita: adherence and coverage cross-sectional study in 10 villages (200 HH total) of Kita after each SMC round, 2017 and 2018; and
- Routine data on malaria cases tested and treated (July to Dec 2017 and 2018);
- Cost analysis of SMC extension to ages 5-10.

Clinical assessment

⇒ Axillary temperature measurement (by electronic thermometer);
⇒ Weight & height measurement;
⇒ Brachial perimeter measurement

Lab tests

⇒ Blood and thin smear: for parasitic prevalence detection and quantification;
⇒ Hemoglobin level measurement: anemia classification;
⇒ Dried blood spots: to identify resistance markers by PCR;
⇒ RDT: in case of fever (T₀ ≥ 37.5)
VII. RESULTS

1 Coverage rates among 5-10 year olds in Kita was over 90% across the 4 rounds of the SMC campaign. Side effects from the drugs were minimal, with less than 12% of 5-10 year olds reporting diarrhea (the most common side effect).

2 Figure 1: Malaria prevalence among children 5 to 10 years old according to routine data in both districts, 2017-2018

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kita</td>
<td>Bafoulabe</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Parasite prevalence</td>
<td>88</td>
<td>23.3</td>
</tr>
<tr>
<td>Fever (To &gt;37.5)</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Severe anemia (Hb &lt;10 g/dl)</td>
<td>49</td>
<td>13</td>
</tr>
</tbody>
</table>

- Children aged 5 to 10 years had comparable malaria parameters in both districts prior to the SMC campaign (p-0.05)
- In children aged 5 to 10 years, the parasite prevalence was higher in Bafoulabe with 22.0% versus 16.9% in Kita and the difference was significant (p-0.010)

3 Prevalence of malaria among children 5 to 10 years old, Kita and Bafoulabe districts, 2017-2018

4 Evolution of SP-AQ resistance markers in pre- and post intervention, Kita and Bafoulabe districts, 2017-2018
VIII. KEY FINDINGS

- Similar prevalence of parasitemia in intervention and control districts before SMC implementation (23.3% vs 27.1%, p=0.28).
- SMC intervention among children aged from 5 to 10 years was associated with a reduction of malaria infection prevalence (16.9% in Kita vs 22.0% in Bafoulabé).
- Anemia prevalence in children 5 to 10 years was similar prior (13.0% vs 11.8%, p=0.64) and after SMC implementation (20.2% vs 17.2%, p=0.34) in intervention and comparison districts.
- Implementation costs do not vary significantly with the extension to children 5 to 10 years old.
- SP-AQ resistance markers findings did not show a resistance to the drugs in pre- and post-intervention.

IX. CONCLUSION

- The inclusion of children 5 to 10 years of age in SMC campaigns shows favorable results.
- Burden on the health system decreased.
- Caretakers supported the inclusion, as hospitalization and deaths due to severe malaria in children aged 5 to 10 years in Kita district decreased.
- The cost of a child fully covered by the SMC was 1,844 FCFA ($3.35 USD) in Kita, the average cost of the SMC (460 FCFA) per round and per child was lower than the support of an episode of simple malaria at the health center. The extension of SMC to the 5 to 10 years old requires about 170 FCFA ($0.30 USD) per child.

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