Factors Associated with Malaria Care-Seeking for Among Children Under 5 Years of Age in Mozambique: A Secondary Analysis of the 2018 Malaria Indicator Survey

Annette Cassy (annnette.cassy@gmail.com)
Instituto Nacional de Saude, Mozambique https://orcid.org/0000-0002-5036-6524

Sergio Chicumbe
Instituto Nacional de Saúde Mozambique

Abuchahama Saifodine
USAID Mozambique

Rose Zulliger
USAID

Research Article

Keywords: malaria, care-seeking, Mozambique, children

Posted Date: December 14th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-1144704/v1

License: © This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

Mozambique is ranked fourth in a list of the 29 countries that accounted for 95% of all malaria cases globally in 2019. The aim of this study was to identify factors associated with care-seeking for fever, to determine the association between knowledge about malaria and care-seeking and to describe the main reasons for not seeking care among children under five years of age in Mozambique.

Methods

This is a quantitative, observational study based on a secondary data analysis of the 2018 Malaria Indicatory Survey. This weighted analysis was based on data reported by surveyed mothers or caregivers of children aged 0-59 months who had fever in the two weeks prior to the survey.

Results

Care was reportedly sought for 69.1% [95% CI 63.5-74.2] of children aged 0-59 months old with fever. Care-seeking was significantly higher among younger children, <6 months old (AOR=2.47 [95% CI 1.14-5.31]), 6-11 months old (AOR=1.75 [95% CI 1.01-3.04]) and 12-23 months old (AOR=1.85 [95% CI 1.19-2.89]), as compared with older children (48-59 months old).

In adjusted analysis, mothers from the middle (AOR=1.66 [95% CI 0.18-3.37]) and richest (AOR=3.46 [95% CI 1.26-9.49]) wealth quintiles were more likely to report having sought care for their febrile children than mothers from the poorest wealth quintile. Additionally, mothers with secondary or higher education level were more likely to seek care (AOR=2.16 [95% CI 1.19-3.93]) than mothers with no education. There was no association between maternal malaria knowledge or reported exposure to malaria messages and care-seeking behaviors.

The main reasons reported for not seeking care included distance to health facility (46.3% of respondents), perception that the fever was not severe (22.4%) and the perception that treatment was not available at the health facility (15%).

Conclusion

Health facility access and socioeconomic barriers continue to be important constraints on malaria service utilization in Mozambique.

Background

Malaria remains a major public health problem in Mozambique. The country is ranked fourth in a list of the 29 countries that accounted for 95% of all malaria cases globally in 2019. Although the number of
reported malaria deaths has reduced in the past decade, the country is among the six countries that accounted for more than half of the total deaths globally in 2019 (1).

The Mozambican National Malaria Control Program (NMCP) implements social and behaviour change (SBC) interventions to ensure that by 2022 at least 70% of people seek adequate care (2). According to the 2018 Malaria Indicator Survey (MIS) in Mozambique, approximately 69% percent of mothers reported that they sought care for their febrile children (3). However, the proportion of mothers who sought care for their febrile children in 2018 still varied by province, from 51% percent in Nampula to 88% percent in Maputo City. Prior research in Mozambique found that care-seeking for malaria was associated with higher maternal education and with lower wealth quintile (4).

Despite nearly reaching the NMCP’s target of 70% for care-seeking, malaria morbidity and mortality remain high in the country (1, 3) and nearly one in three children with fever still does not receive malaria care.

The aim of this study was to identify factors associated with care-seeking for fever, to determine the association between knowledge about malaria and care-seeking and to describe the main reasons for not seeking care among children under five years of age in Mozambique using data from the 2018 MIS.

**Methods**

**Study design and data source**

This is a quantitative, observational study based on a secondary data analysis of the 2018 MIS data. The 2018 MIS collected nationally and provincially representative data from a representative sample of respondents (5). The survey included a total of 6,196 households distributed over 101 enumeration areas. The response rate for the household questionnaire was 96% percent and for the women questionnaire it was 92% percent (3). Data collection took place from March to June 2018.

**Setting**

The survey was conducted in Mozambique. The country is located in the east coast of southern Africa and is divided in 11 provinces, being one of the provinces the country’s capitals, Maputo City. Mozambique has a surface of approximately 799,380 km2 (2) and an estimated population of about 31 million inhabitants (6). The two most populous provinces are Nampula and Zambézia, with 6.3 million and 5.7 million inhabitants, respectively. The climate in Mozambique is tropical. The rainy season spans from October to March and the dry season occurs in the rest of the year (2). There is year-round transmission of malaria with seasonal peaks during the rainy season.

**Eligibility criteria**

This analysis was based data reported by surveyed mothers or caregivers about their children aged 0-59 months who had fever in the two weeks prior to the survey.
Measures

The main outcome of this study is care-seeking behaviour of children under 5 years who had fever in the two weeks prior to data collection, as reported by mothers/guardians. Potential covariates were identified for inclusion in a predictive model based on variables identified during a literature review of “care-seeking” and “treatment-seeking” for fever and malaria. A total of 13 socioeconomic and demographic covariates previously shown to be associated with care-seeking (7–11) were identified and used from the 2018 MIS dataset. The covariates included child's age, sex, place of residence (urban or rural), geographic region (province), household wealth quintile, mother’s level of education, mother’s age, child’s use of a bed net, mothers reporting hearing or seeing a message about malaria in the past six months, maternal comprehensive malaria knowledge and three specific questions about malaria knowledge. The following categories were considered for mother’s level of education: no education, primary education and secondary education or higher. The mother’s level of knowledge was assessed using a composite score based on the following five variables: (i) the mother indicated fever as a symptom of malaria; (ii) the mother indicated mosquito bite as a form of malaria transmission; (iii) The mother knows that should sleep inside a mosquito net to prevent malaria; (iv) The mother knows that malaria has a cure; and (v) The mother indicated correctly at least one medicine to treat malaria.

Statistical analysis

Descriptive statistics were used to summarize socio-economic and demographic characteristics of participants, using the children (KR) dataset. Special (svy) survey commands were used to account for the complex multilevel survey design. Data were weighted to account for the differential selection probabilities at the EA, household, and individual levels so that any results with the regional weight factored into it would be representative at the national and regional level. Only weighted survey data are presented in this manuscript. Complex sampling logistic regression model was used to identify factors associated to care-seeking behaviour, with estimated adjusted odds ratio (AOR) and respective 95% confidence intervals (CI).

All statistical analysis were performed using STATA, version 15 (Stata Corporation, College Station, Texas).

Results

Socio-economic and demographic characteristics of children under 5 years of age with fever

As shown in Table 1, a total of 1,473 children under five years of age with history of fever were included in the study. Care was sought for 69.1% [95% CI 63.5-74.2] of these children. Care-seeking was higher in urban areas (74.5% [95% CI 62.9-83.4]) than in rural areas (67.3% [95% CI 60.6-73.4]). Care seeking was
highest in Maputo City (88.4% [95% CI 76.4-94.7]) and lowest in Nampula Province (52.0% [95% CI 39.0%-64.8%]).

Younger mothers (15-19 years of age) sought care for their febrile children more often than older mothers (76.8% [95% CI 65.1-85.4] for 15-19 years vs. 61.4% [95% CI 39.7-79.4] for 45-49 years). Care-seeking was higher among those families with higher socioeconomic status and among mothers with higher education. In fact, care was sought for 58.2% [95% CI 47.2-68.4] of the children from the poorest wealth quintile and for 83.1% [95% CI 75.6-88.6] of the children from the richest quintile. Similarly, mothers with secondary or higher education sought care more frequently that those with no education, 83.2% [95% CI 75.8-88.7] versus 58.2% [95% CI 45.6-70.7].

Care-seeking was higher for children who slept under an insecticide treated net (ITN), 70.7% [95% CI 65.0-75.8] than those who did not sleep under an ITN (58.7% [95% CI 45.6-70.7]). It was also higher for children whose mothers reported hearing or seeing malaria message in past 6 months (72.9% [95% CI 65.0-75.8] than those who did not (67.5 [95% CI 45.6-70.7]) but was not higher for the mothers with the comprehensive malaria knowledge (65.6% [95% CI 58.3-72.1]) than for those without comprehensive knowledge (73.8% [95% CI 67.0-79.7]).

Care seeking was also higher among mothers who reported “hearing that malaria can kill” and those who reported “hearing that they should seek treatment for fever within 24 hours”, 76.6% [95% CI 65.9-84.8] and 75.6% [95% CI 39.7.0-93.6], respectively.

**Factors associated to care-seeking for fever for children under 5 years of age**

As shown in Table 2, reported care-seeking for fever was significantly higher among mothers with younger children, <6 months old (AOR=2.47 [95% CI 1.14-5.31]), 6-11 months old (AOR=1.75 [95% CI 1.01-3.04]) and 12-23 months old (AOR=1.85 [95% CI 1.19-2.89]), as compared with mothers with older children (48-59 months old).

Mothers from the middle (AOR=1.66 [95% CI 0.18-3.37]) and richest (AOR=3.46 [95% CI 1.26-9.49]) wealth quintiles were more likely to report having sought care for their febrile children than mothers from the poorest wealth quintile. Additionally, mothers with secondary or higher education level were more likely to seek care (AOR=2.16 [95% CI 1.19-3.93]) than mothers with no education. Care-seeking was not associated with the sex of the child, place of residence, region, maternal age, ITN use, exposure to malaria messages or maternal comprehensive malaria knowledge.

**Reasons For Not Seeking Care For Fever**

Table 3 summarises the main reasons reported by mothers for not seeking care for a child with fever. The main reasons include distance to health facility (46.3% of respondents), perception that the fever was not severe (22.4%) and the perception that treatment was not available at the health facility (15%).
Discussion

Mozambique has made important progress in improving utilization of health services for fever and by 2018 the NMCP target for care-seeking was nearly achieved with 69.1% of mothers seeking care for their febrile children. This 2018 MIS complements the analysis of the 2011 and 2015 national surveys conducted in Mozambique which found lower care-seeking (4).

Different from earlier results in Mozambique (4), this analysis showed that care-seeking in 2018 was associated with having a younger child (<6 months old, 6-11 months old and 11-23 months old), which might be associated with a mothers’ perception that younger children are more vulnerable and require appropriate care-seeking, as shown in a study from Nigeria (12). This higher care utilization for the youngest children is a positive finding given that younger children are more likely to have worse health outcomes associated to malaria.

Care-seeking in Mozambique was also associated to family’s middle and richest wealth quintiles, despite the fact that most of the mothers sought care in the public sector (95.9%) (3) where malaria diagnosis and treatment are free. This is indicative that while there might not be costs for services, economic factors such as indirect costs like transportation can increase the economic burden to the household, potentially inhibiting care-seeking, as shown in previous studies (13, 14). A prior study in a high burden district of Mozambique found that the median household costs associated with care-seeking for uncomplicated malaria were US$ 3.46 (IQR US$ 0.07–22.41) and US$ 81.08 (IQR US$ 39.34–88.38) per severe case. This median cost of care-seeking for uncomplicated malaria was approximately 21% (US$ 3.46) of the monthly expenditure of a family in the study province (15), indicating that malaria care-seeking may still represent a catastrophic cost for many families in Mozambique. This economic burden was also described in Malawi, with high direct and indirect costs for malaria illness episode in a country where malaria treatment is free in the public sector (16). Additionally, maternal education continues to influence care-seeking.

The main reason reported by mothers for not seeking care was long distance to the health facility. Previous studies have also found that distance to facilities was associated to delay in care-seeking and increased risk of severe malaria (17, 18). This provides additional evidence that there remain broader socioeconomic barriers to care-seeking, underscoring the need to address systemic barriers to care such as physical access to health facilities/community case management. For example, the most frequently cited reason for not seeking care was that the facility was too far. As such, there is a critical need to improve physical and economic access to health services to improve utilization. This is reinforced by the fact that more educated and wealthier mothers were more likely to report having sought care, as previously described (9).

This study found no association between key SBC intervention objectives such as maternal comprehensive malaria knowledge and care-seeking for fever. This finding is similar to a some previous studies from Ethiopia (19) and Myanmar (8). Additionally, there was no association between reported exposure to malaria messages and care-seeking. Thus, in a context such as Mozambique where there is
relatively high malaria knowledge, these behavioural interventions may not be as effective as structural interventions. In the current study, sex of the child, area of residence and province are no longer significantly associated with care-seeking which is different than 2015 findings (4).

The major limitation of this study is the sample size and the relatively low number of mothers that reported hearing or seeing malaria message in past six months. The generalizability of the finding that there was no association in this setting between exposure to malaria messages and malaria knowledge and the target behaviour of care-seeking to settings with higher coverage of SBC interventions may be limited.

**Conclusion**

This study of care-seeking for fever among children 6-59 months old in Mozambique documented important improvements in care access but noted continued inequity in access to care. The analysis of factors associated with care-seeking and of reported reasons for failure to seek care demonstrated that health facility access and socioeconomic barriers continue to be important constraints on malaria service utilization in Mozambique.

**Declarations**

**Financial support**

Financial support for this study was provided by the US President’s Malaria Initiative.

**Manuscript disclaimer**

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the U.S. Agency for International Development.

**Authors’ contributions**

AC designed the study and performed data analysis. AC, AS and RZ drafted the manuscript. All authors read and approved the final manuscript.

**Acknowledgements**

We would like to thank the team that worked on MIS 2018.

**Competing interests**

The authors declare that they have no competing interests.

**Availability of data**
Requests for the data must be made to The DHS Program at https://dhsprogram.com/methodology/survey/survey-display-527.cfm

Consent for publication

Not applicable.

Ethics approval and consent to participate

The 2018 MIS protocol was approved by the ICF Institutional Review Board, the Mozambican National Bioethics Committee and the Office of the Associate Director for Science in the Center for Global Health at the Center for Disease Control and Prevention. Prior to enrolment, all eligible participants from both surveys provided written informed consent to participate. The consent was obtained from the mother or guardian of a child. The data were collected anonymously.

Author details

Instituto Nacional de Saúde, Mozambique; 2 Observatório Nacional de Saúde, Mozambique; 3 U.S. President’s Malaria Initiative, USAID, Maputo, Mozambique; 4 U.S. President’s Malaria Initiative, USAID, Washington, DC, USA.

References

1. WHO. World Malaria Report 2020. 2020.
2. MISAU. Plano Estratégico da Malária 2017-2022. 2017.
3. INS. Inquérito Nacional sobre Indicadores de Malária. 2019.
4. Cassy A, Saifodine A, Candrinho B, Martins M do R, da Cunha S, Pereira FM, et al. Care-seeking behaviour and treatment practices for malaria in children under 5 years in Mozambique: a secondary analysis of 2011 DHS and 2015 IMASIDA datasets. Malar J [Internet]. 2019 Dec 2;18(1):115. Available from: https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-2751-9
5. The DHS Program. MIS Overview [Internet]. 2021 [cited 2021 Aug 9]. Available from: https://dhsprogram.com/methodology/survey-types/mis.cfm
6. Instituto Nacional de Estatistica [Internet]. Available from: http://www.ine.gov.mz/
7. Babalola OJ, Ajumobi O, Ajayi IO. Rural–urban disparities and factors associated with delayed care-seeking and testing for malaria before medication use by mothers of under-five children, Igabi LGA, Kaduna Nigeria. Malar J [Internet]. 2020 Dec 18;19(1):294. Available from: https://malariajournal.biomedcentral.com/articles/10.1186/s12936-020-03371-w
8. Thandar M, Kyaw M, Jimba M, Yasuoka J. Caregivers’ treatment-seeking behaviour for children under age five in malaria-endemic areas of rural Myanmar: a cross-sectional study. Malar J [Internet]. 2015;14(1):1. Available from: http://www.malariajournal.com/content/14/1/1
9. Adedokun ST, Yaya S. Factors influencing mothers’ health care seeking behaviour for their children: evidence from 31 countries in sub-Saharan Africa. BMC Health Serv Res [Internet]. 2020 Dec 7;20(1):842. Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-05683-8

10. Olapeju B, Adams C, Hunter G, Wilson S, Simpson J, Mitchum L, et al. Malaria prevention and care seeking among gold miners in Guyana. Thet Wai K, editor. PLoS One [Internet]. 2020 Dec 29;15(12):e0244454. Available from: https://dx.plos.org/10.1371/journal.pone.0244454

11. Ayanore MA, Tetteh J, Amekoe A, Axame WK, Alhassan RK, Adoliba Ayanore A, et al. Reproductive-Age Women’s Knowledge and Care Seeking for Malaria Prevention and Control in Ghana: Analysis of the 2016 Malaria Indicator Survey. J Trop Med [Internet]. 2019 Feb 12;2019:1–17. Available from: https://www.hindawi.com/journals/jtm/2019/2316375/

12. Oluchi S, Manaf R, Ismail S, Udeani T. Predictors of Health-Seeking Behavior for Fever Cases among Caregivers of Under-Five Children in Malaria-Endemic Area of Imo State, Nigeria. Int J Environ Res Public Health [Internet]. 2019 Oct 4;16(19):3752. Available from: https://www.mdpi.com/1660-4601/16/19/3752

13. Hailu A, Lindtjorn B, Deressa W, Gari T, Loha E, Robberstad B. Economic burden of malaria and predictors of cost variability to rural households in south-central Ethiopia. Carvalho LH, editor. PLoS One [Internet]. 2017 Oct 11;12(10):e0185315. Available from: https://dx.plos.org/10.1371/journal.pone.0185315

14. Dalaba MA, Welaga P, Oduro A, Danchaka LL, Matsubara C. Cost of malaria treatment and health seeking behaviour of children under-five years in the Upper West Region of Ghana. Carvalho LH, editor. PLoS One [Internet]. 2018 Apr 13;13(4):e0195533. Available from: https://dx.plos.org/10.1371/journal.pone.0195533

15. Alonso S, Chaccour CJ, Elbolobo E, Nacima A, Cadrinho B, Saifodine A, et al. The economic burden of malaria on households and the health system in a high transmission district of Mozambique. Malar J [Internet]. 2019 Dec 11;18(1):360. Available from: https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-2995-4

16. Hennessee I, Chinkhumba J, Briggs-Hagen M, Bauleni A, Shah MP, Chalira A, et al. Household costs among patients hospitalized with malaria: evidence from a national survey in Malawi, 2012. Malar J [Internet]. 2017 Dec 2;16(1):395. Available from: https://malariajournal.biomedcentral.com/articles/10.1186/s12936-017-2038-y

17. Mpimbaza A, Ndezei G, Katahoire A, Rosenthal RJ, Karamagi C. Demographic, Socioeconomic, and Geographic Factors Leading to Severe Malaria and Delayed Care Seeking in Ugandan Children: A Case–Control Study. Am J Trop Med Hyg [Internet]. 2017 Nov 8;97(5):1513–23. Available from: https://ajtmh.org/doi/10.4269/ajtmh.17-0056

18. Romay-Barja M, Cano J, Ncogo P, Nseng G, Santana-Morales MA, Valladares B, et al. Determinants of delay in malaria care-seeking behaviour for children 15 years and under in Bata district, Equatorial
Tables

Tables 1, 2, and 3 are available in the Supplementary Files section.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- CareseekingMIS2018.xlsx