

## Research Article

# Promptness of health-seeking behaviour among children under five years with fever in Malawi: evidence from the 2017 Malawi Malaria Indicator Survey

Yusuf M Salim<sup>1</sup>, Francesca L Cavallaro<sup>2</sup>

<sup>1</sup> Nursing and Midwifery, Karonga District Health Office, Ministry of Health, Malawi, <sup>2</sup> The Health Foundation, London, UK

Keywords: Health-seeking, fever, malawi, children

<https://doi.org/10.29392/001c.77882>

---

## Journal of Global Health Reports

Vol. 7, 2023

---

### Background

Fever in malaria-endemic countries may be caused by malaria. Malaria infection is a major public health problem with substantial risks for severe morbidity and mortality. It is the leading cause of hospital admissions in children under five years of age worldwide. Despite being managed successfully if diagnosed in a timely way, facilitation of prompt health-seeking behaviour remains a challenge with many children reaching a health facility too late or not at all. We aimed to determine factors associated with prompt health-seeking behaviour among caregivers of children under five with fever in Malawi.

### Methods

We used data from the 2017 Malawi Malaria Indicator Survey (MMIS). Survey records for 2314 children aged under five years were identified of which 794 had fever in the past two weeks. Multivariable logistic regression analysis was carried out to identify factors associated with prompt health-seeking behaviour, defined as seeking health care the same day or day after the onset of fever.

### Results

This study reveals that 40.1% of the children under five years presented with fever in the previous two weeks out of which 30.5% were taken for treatment promptly. Public facilities are the most visited places for under five child treatment (68.1%), followed by private drug sellers/pharmacies (17.4) and private/religious facilities (14.5%). Muslims (adjusted odds ratio, aOR=0.54, 95% confidence interval, CI=0.31-0.94) and children aged four years (aOR=0.56, CI=0.34-0.93) were less likely to be taken for treatment promptly compared to Christians and those less than 1 year, respectively. In contrast, children aged two years (aOR=1.71, CI=1.02-2.86) were more likely to be taken for prompt treatment compared to those less than 1 year.

### Conclusions

Age and religion are factors associated with prompt health-seeking behaviour in Malawi. Health education programs should be intensified to raise awareness among caregivers of the importance of early treatment-seeking regardless of the child's age. Qualitative studies should be done in Malawi to explore different religious beliefs and their influence on health-seeking behaviours.

Malaria infection ranks among the major public health problems in the world today.<sup>1</sup> Globally, about 5.3 million children under the age of five years died in 2018.<sup>2</sup> Sub-Saharan Africa remains the region with the highest child morbidity and under-5 mortality rates in the world, with 1 child out of 13 dying before their fifth birthday.<sup>2</sup> Children under the age of five years in sub-Saharan Africa bear the highest burden of malaria with 300 million to 500 million clinical

cases and more than one million deaths of children every year.<sup>3</sup>

A large proportion of fever in malaria-endemic countries may be attributed to malaria.<sup>4</sup> The World Health Organization (WHO) states that malaria is suspected clinically primarily on the basis of fever or a history of fever more especially in malaria-endemic areas,<sup>5</sup> including Malawi. As a result, all cases of fever in children in malaria-endemic settings need to be assessed quickly by a qualified health

provider, to determine whether malaria is present and enable prompt treatment.

Poor health-seeking behaviour for under five children affects their health and leads to complications that make medical care to be ineffective.<sup>6</sup> Furthermore, delay in health care seeking in modern health facilities is a major cause of child death all over the world especially in sub-Saharan Africa.<sup>7</sup> Despite common childhood illnesses being managed successfully if recognized in a timely way, the facilitation of prompt health-seeking behaviour remains a challenge in Malawi. This is evidenced in the 2015-2016 Malawi Demographic Health Survey which found that at least 33% of children under five with fever do not have care sought at all.<sup>8</sup>

According to WHO, global child mortality and morbidity could be reduced by 20% with appropriate health-seeking behaviour.<sup>9</sup> Delay in treating malaria in infants and young children can have fatal consequences, particularly for more severe infections. Therefore, WHO recommends that programs should ensure access to early diagnosis and prompt, effective treatment within 24 to 48 hours of the onset of malaria symptoms (fever) to prevent avoidable morbidity and mortality.<sup>5</sup>

A study done to assess health care-seeking behaviour for children with acute childhood illnesses and its related factors in sub-Saharan Africa from 24 countries found that the sex of a child, number of living children in a household, education of mothers, work status of mothers, wealth index, exposure to media and distance to a health facility were the factors associated with prompt health-seeking behaviour.<sup>10</sup>

The objective of this cross-sectional study was to identify the rate of prompt health-seeking in children under five with fever in Malawi, and to determine factors affecting promptness of health-seeking, using the 2017 Malawi Malaria Indicator Survey (MMIS). Our aim was to contribute to improving the health-seeking behaviour of caregivers by improving the understanding of barriers to timely care-seeking in Malawi.

## METHODS

### DATA SOURCE

The study used the nationally representative 2017 MMIS data set conducted by the Demographic and Health Survey (DHS) which interviewed women aged 15-49 who were either permanent residents of the selected households or overnight visitors. We restricted our analysis sample to children under five with fever within the 2 weeks preceding the survey, based on maternal reports. The DHS Program provided technical support for the implementation of MMIS which is a shorter version of the full Demographic Health Survey focused on malaria questions.

The MMIS collected information on the timing for health-seeking behaviour for children with fever. This study used data from the 2017 MMIS.

The 2017 MMIS followed a two-stage sample design to select the first 150 clusters, then 25 households from each cluster. The sampling strategy is described in detail in the

MMIS 2017 report.<sup>11</sup> All eligible respondents were successfully interviewed representing a response rate of 100%.

### EXPOSURE AND OUTCOME DEFINITION

The outcome (dependent) variable was prompt health-seeking behaviour, defined as seeking treatment within the same day or the day after fever onset. The exposure (independent) variables were the factors potentially affecting prompt health-seeking behaviour (age of mother, ethnicity, religion, education, marital status, region, number of children in a household, sex of baby, age of baby, wealth quintile).

### DATA ANALYSIS

Data were analyzed using statistical software (STATA version 16). We used the `svyset` command in Stata to account for the complex survey design (sampling weights, clustering and stratification).

The rate of prompt health-seeking behaviour and children's characteristics were described using percentages, as well as places where treatment for fever in children under five was sought.

Logistic regression analysis was carried out to identify factors that affect prompt health-seeking behaviour among under five children with fever. The logistic regression model was used to study the impact of socio-demographic characteristics of children and caregivers (exposure variables) on prompt health-seeking behaviour of children under five (outcome variable). This model is most widely used when the outcome of interest is binary and is easy to interpret.<sup>12</sup>

First, binary logistic regression analysis was carried out, and the independent variables with p-value <0.1 were included in the final multivariable logistic regression model. A backward stepwise regression approach was used to retain only variables with adjusted p-value <0.1 in the multivariable model.

Our research question was whether the socio-demographic factors of children and caregivers were associated with prompt health-seeking behavior for children under five with fever. Our hypothesis was that socio-demographic factors are associated with prompt health-seeking.

## RESULTS

### PREVALENCE OF FEVER, SOCIAL AND DEMOGRAPHIC CHARACTERISTICS OF CHILDREN UNDER FIVE

Overall, 40.1% of the children under five years presented with fever in the previous two weeks.

Over a quarter of the children (28.0%) had mothers aged 20 to 24 years, 36.4% were from Chewa Tribe, 77.6% were Christians, and 68.2% were educated up to primary level. Most children (86.1%) resided in rural areas; half (51.2%) were males while 22.4% were 4 years old. Less than half (41.3%) of children were living in households with 1-2 children, and 47.7% were from the households in the two bottom wealth quintiles. Most of the children (77.9%) had mothers who did not report high fever in children as a dan-

**Table 1. Prevalence of fever and demographic characteristics of children under five (n =2377)**

| Variable  | Children under five years (%) | Prevalence of fever (%) |
|---|-------------------------------|-------------------------|
| <b>Total</b>                                    | <b>2314</b>                   | <b>794 (40.1)</b>       |
| <b>Age of mother (years)</b>                    |                               |                         |
| 15-19   | 200 (8.7)                     | 67 (3.4)                |
| 20-24   | 657 (28.0)                    | 219 (10.8)              |
| 25-29   | 637 (26.9)                    | 229 (11.8)              |
| 30-34   | 503 (19.5)                    | 150 (7.2)               |
| 35-39   | 247 (9.8)                     | 80 (3.9)                |
| 40-49   | 133 (7.1)                     | 49 (3.1)                |
| <b>Ethnicity</b>                                |                               |                         |
| Chewa   | 710 (36.4)                    | 274 (15.9)              |
| Tumbuka/Nkhonde/Tonga                           | 592 (10.4)                    | 138 (2.9)               |
| Lomwe   | 315 (16.9)                    | 116 (6.7)               |
| Yao   | 319 (18.1)                    | 128 (8.2)               |
| Sena/others                                     | 202 (8.5)                     | 60 (2.9)                |
| Ngoni   | 239 (9.8)                     | 78 (3.5)                |
| <b>Religion</b>                                 |                               |                         |
| Christian                                       | 1972 (77.6)                   | 637 (30.7)              |
| Muslim  | 321 (18.1)                    | 127 (7.7)               |
| No religion/other                               | 84 (4.3)                      | 30 (1.8)                |
| <b>Education of mother</b>                      |                               |                         |
| None  | 240 (14.7)                    | 90 (6.1)                |
| Primary   | 1,485 (68.2)                  | 530 (28.5)              |
| Secondary and above                             | 652 (17.1)                    | 174 (5.5)               |
| <b>Region</b>                                   |                               |                         |
| South   | 786 (46.6)                    | 291 (18.8)              |
| Central   | 847 (42.5)                    | 332 (18.8)              |
| North   | 744 (10.9)                    | 171 (2.5)               |
| <b>Residence</b>                                |                               |                         |
| Urban   | 807 (13.9)                    | 227 (4.1)               |
| Rural   | 1,570 (86.1)                  | 567 (35.9)              |
| <b>No. of children in a household</b>           |                               |                         |
| 1-2   | 1081 (41.3)                   | 360 (16.2)              |
| 3-4   | 752 (31.6)                    | 251 (13.2)              |
| 5 above   | 544 (27.1)                    | 183 (10.8)              |
| <b>Age (years)</b>                              |                               |                         |
| 0   | 483 (19.5)                    | 140 (6.7)               |
| 1   | 445 (19.6)                    | 178 (9.0)               |
| 2   | 434 (18.9)                    | 164 (8.4)               |
| 3   | 447 (19.6)                    | 148 (7.8)               |
| 4   | 505 (22.4)                    | 164 (8.2)               |
| <b>Sex</b>                                      |                               |                         |
| Male  | 1,209 (51.2)                  | 392 (20.3)              |
| Female  | 1,168 (48.8)                  | 402 (19.8)              |
| <b>Household wealth</b>                         |                               |                         |
| Lower/lowest                                    | 772 (47.7)                    | 308 (21.2)              |
| Middle  | 355 (18.6)                    | 128 (7.5)               |
| Higher/highest                                  | 1250 (33.7)                   | 358 (11.5)              |
| <b>Mother reports high fever as danger sign</b> |                               |                         |
| Yes   | 594 (22.0)                    | 191 (9.2)               |
| <b>Mother heard/seen malaria messages</b>       |                               |                         |
| Yes   | 785 (31.2)                    | 264 (12.6)              |
| <b>Slept under net previous night (U-5)</b>     |                               |                         |
| Yes   | 1539 (62.9)                   | 518 (25.6)              |

ger sign, 68.8% said they had never seen or heard malaria messages and 62.9% reported that their child had slept under a mosquito net the previous night (Table 1).

#### HEALTH-SEEKING BEHAVIOUR AND PLACES WHERE TREATMENT WAS SOUGHT

Among 794 children under five with fever, 45.6% were not taken to seek care at all, 23.9% had healthcare sought after

the next day of onset of fever and only 30.5% sought care within the same day or the next day of fever onset (Table 2). Two-thirds (68.1%) of those who sought care went to public health facilities including health surveillance assistants (HSAs), 17.4% went to drug stores and pharmacies and 14.5% visited private and Christian Health Association of Malawi (CHAM) facilities.

**Table 2. Health seeking behavior and places where treatment was sought among children under five with fever**

| Variable                            | Frequency (n) | Percentage |
|-------------------------------------|---------------|------------|
| <b>Health seeking behavior</b>      | <b>794</b>    |            |
| Within the same day or the next day | 254           | 30.5       |
| More than 24 hours                  | 200           | 23.9       |
| Did not seek care                   | 340           | 45.6       |
| <b>Place for treatment/advice</b>   | <b>454</b>    |            |
| Public facilities/HsAs              | 317           | 68.1       |
| Private/CHAM facilities             | 66            | 14.5       |
| Other private/drug sellers          | 71            | 17.4       |

Note: HSA: Health Surveillance Assistants CHAM: Christian Health Association of Malawi

**FACTORS ASSOCIATED WITH PROMPT HEALTH-SEEKING BEHAVIOUR AMONG CHILDREN UNDER-FIVE WITH FEVER**

There was strong evidence of an association of prompt health-seeking behaviour with the child’s age (p-value=0.002), and weak evidence for religion (p-value=0.071), mother’s age (p-value=0.093), and mother’s education (p-value=0.072) in bivariate analyses.

In the final multivariable model, there was evidence of the association of prompt health-seeking behaviour with religion and the age of the child. Children aged 2 years old were more likely to have healthcare sought promptly than those aged below 1 (adjusted odds ratio, aOR=1.71; 95% confidence interval, CI=1.02-2.86), while children 4 years old were less likely to be taken for care in time compared to those less than 1 year (aOR=0.56; 95% CI=0.34-0.93). Muslims were less likely to seek healthcare promptly compared to Christians (aOR=0.54; 95% CI=0.31-0.94) (Table 3).

**DISCUSSION**

Our study found that the prevalence of fever was high in Malawi, affecting 40.1% of children under five in the two previous weeks. However, only 30.5% of children had care sought promptly within the same day or the next day after fever onset, while 45.6% had no care sought at all and 23.9% had care sought late. In this study, age of the child and religion were predictors for prompt health-seeking behaviour. Children 2 years old were more likely to be taken for treatment than those aged below 1, while those aged 4 years and Muslim children were less likely to have care sought within a day or the next day of fever onset compared with those aged 1 below and Christians respectively.

The finding agrees with a 2018 report by USAID through Sustaining Health Outcomes through the Private Sector (SHOPS) Plus which found that 42% of Malawian children experienced fever in the previous two weeks before their survey.<sup>13</sup> The MDHS 2015-16 found a slightly lower prevalence of 29%.<sup>7</sup> This could be brought about because the study was done at a different time of the year

A previous analysis using 2015-2016 Malawi DHS data reported a prevalence of 46.3% for prompt health seeking.<sup>7,14</sup> This is higher than the finding of the current study. In addition to the difference in time of the year, this might be due to the difference in sample size for the two surveys.

The sample size for Malawi Demographic Health Survey 2015-2016 is higher than that of Malawi Malaria Indicator Survey 2017.

Similar lower rates of prompt health-seeking behaviour have been observed in Zambia (42%), North West Ethiopia (51.4%), Kenya (37.9%) and Tanzania (44.6%).<sup>14-17</sup> However, higher rates have been reported in Chad (80%) and Burkina Faso (72%).<sup>18,19</sup> It was argued that high rates of health-seeking behaviour in other countries like Burkina Faso were due to the implementation of the free healthcare policy,<sup>20,21</sup> although the same policy applies in Malawi. However, on a regular basis, Malawi has experienced drug shortages and long periods of drug stock-outs as only nine percent of public hospitals and clinics had adequate supplies of all drugs in the essential health care package.<sup>22</sup> This may lead to fewer caregivers considering seeking healthcare promptly at hospitals in Malawi.

Previous studies have reported that traditional home-based fever treatment practices may contribute to delayed treatment-seeking behaviours.<sup>23</sup> The reported lower rates of prompt health-seeking behaviours in Malawi therefore highlight the importance of formulating strategies to improve caregivers’ ability to seek prompt healthcare for fever in under five children. Awareness campaigns on media like radios should be designed to sensitize caregivers to report to the hospitals in time for treatment. Furthermore, caregivers’ knowledge and attitude about formal health care should be assessed to explore reasons for poor health-seeking behaviour.

Public health facilities are the dominant source of care for sick children in Malawi with 68.1% of children under five with fever taken for care to public health facilities including Health Surveillance Assistants (HSAs). A report by US-AID similarly found that among Malawian caregivers who seek treatment or advice outside their homes, 78% use public sector sources and 19 percent go to private sector sources.<sup>13</sup> It might be useful for under-five children to be taken to formal healthcare facilities because they can be assessed by a qualified provider, rather than a drug seller who may not be qualified to diagnose malaria.

Having younger children taken for healthcare more than older is also reported in Ethiopia, Burkina Faso and Nigeria.<sup>20,24-26</sup> This might be due to caregivers’ common understanding that younger children in general have lower immunity than their elder children do, and thus caregivers may be aware that younger children may be at higher risk of

**Table 3. Prompt health seeking behavior among children under five with fever in Malawi (n =794)**

| Variable  | Prompt care seeking= 254 n (%) | Crude OR | 95% CI    | Overall P-value | Adjusted OR | 95% CI    | Overall P-value |
|---|--------------------------------|----------|-----------|-----------------|-------------|-----------|-----------------|
| <b>Age of mother (years)</b>                    |                                |          |           |                 |             |           |                 |
| 15-19   | 19 (2.4)                       | 1        |           |                 |             |           |                 |
| 20-24   | 78 (9.1)                       | 1.27     | 0.61-2.62 | 0.093           |             |           |                 |
| 25-29   | 80 (9.5)                       | 1.17     | 0.58-2.36 |                 |             |           |                 |
| 30-34   | 47 (6.2)                       | 1.30     | 0.59-2.89 |                 |             |           |                 |
| 35-39   | 21 (2.2)                       | 0.73     | 0.30-1.75 |                 |             |           |                 |
| 40-49   | 9 (1.1)                        | 0.41     | 0.14-1.18 |                 |             |           |                 |
| <b>Ethnicity of mother</b>                      |                                |          |           |                 |             |           |                 |
| Chewa   | 90 (13.8)                      | 1        |           | 0.244           |             |           |                 |
| Tumbuka/Nkhonde/Tonga                           | 51 (2.2)                       | 0.85     | 0.44-1.63 |                 |             |           |                 |
| Lomwe   | 33 (4.4)                       | 0.67     | 0.32-1.40 |                 |             |           |                 |
| Yao   | 29 (4.4)                       | 0.52     | 0.30-0.90 |                 |             |           |                 |
| Sena/others                                     | 21 (2.6)                       | 1.03     | 0.36-3.01 |                 |             |           |                 |
| Ngoni   | 30 (3.0)                       | 0.99     | 0.49-2.02 |                 |             |           |                 |
| <b>Religion of mother</b>                       |                                |          |           |                 |             |           |                 |
| Christian                                       | 218 (25.5)                     | 1        |           | 0.071           | 1           |           | 0.065           |
| Muslim  | 31 (4.07)                      | 0.54     | 0.31-0.95 |                 | 0.54        | 0.31-0.94 |                 |
| No religion/other                               | 5 (0.9)                        | 0.57     | 0.22-1.49 |                 | 0.66        | 0.23-1.46 |                 |
| <b>Education of mother</b>                      |                                |          |           |                 |             |           |                 |
| None  | 20 (3.3)                       | 1        |           | 0.072           |             |           |                 |
| Primary   | 163 (21.9)                     | 1.61     | 0.87-2.97 |                 |             |           |                 |
| Secondary/above                                 | 71 (5.4)                       | 2.34     | 1.13-4.86 |                 |             |           |                 |
| <b>Region of mother</b>                         |                                |          |           |                 |             |           |                 |
| North   | 70 (2.4)                       | 1        |           | 0.303           |             |           |                 |
| Central   | 99 (14.7)                      | 0.72     | 0.41-1.28 |                 |             |           |                 |
| South   | 85 (13.4)                      | 0.63     | 0.35-1.14 |                 |             |           |                 |
| <b>Residence of mother</b>                      |                                |          |           |                 |             |           |                 |
| Urban   | 75 (3.1)                       | 1        |           | 0.935           |             |           |                 |
| Rural   | 179 (27.4)                     | 1.02     | 0.68-1.51 |                 |             |           |                 |
| <b>No. of children in household</b>             |                                |          |           |                 |             |           |                 |
| 1-2   | 119 (12.1)                     | 1        |           | 0.124           |             |           |                 |
| 3-4   | 86 (11.6)                      | 1.27     | 0.85-1.88 |                 |             |           |                 |
| 5 above   | 49 (6.9)                       | 0.80     | 0.49-1.30 |                 |             |           |                 |
| <b>Age of child (years)</b>                     |                                |          |           |                 |             |           |                 |
| 0   | 48 (4.9)                       | 1        |           | 0.002           | 1           |           | 0.002           |
| 1   | 56 (6.5)                       | 0.95     | 0.57-1.59 |                 | 0.92        | 0.55-1.53 |                 |
| 2   | 68 (9.0)                       | 1.76     | 1.05-2.94 |                 | 1.71        | 1.02-2.86 |                 |
| 3   | 44 (5.9)                       | 1.02     | 0.59-1.76 |                 | 0.98        | 0.57-1.66 |                 |
| 4   | 38 (4.1)                       | 0.58     | 0.35-0.97 |                 | 0.56        | 0.34-0.93 |                 |
| <b>Sex of child</b>                             |                                |          |           |                 |             |           |                 |
| Male  | 121 (15.4)                     | 1        |           | 0.963           |             |           |                 |
| Female  | 133 (15.1)                     | 1.00     | 0.73-1.39 |                 |             |           |                 |
| <b>Household wealth</b>                         |                                |          |           |                 |             |           |                 |
| Lower/lowest                                    | 91 (15.6)                      | 1        |           | 0.724           |             |           |                 |
| Middle  | 45 (6.1)                       | 1.22     | 0.75-1.97 |                 |             |           |                 |
| Higher/highest                                  | 118 (8.7)                      | 1.04     | 0.67-1.62 |                 |             |           |                 |
| <b>Mother reports high fever as danger sign</b> |                                |          |           |                 |             |           |                 |
| Yes   | 64 (7.0)                       | 1        |           | 0.936           |             |           |                 |
| No  | 190 (23.5)                     | 1.02     | 0.66-1.57 |                 |             |           |                 |
| <b>Mother heard/seen malaria messages</b>       |                                |          |           |                 |             |           |                 |
| Yes   | 93 (10.8)                      | 1        |           | 0.129           |             |           |                 |
| No  | 161 (19.7)                     | 1.29     | 0.93-1.83 |                 |             |           |                 |
| <b>Child slept under net previous night</b>     |                                |          |           |                 |             |           |                 |
| Yes   | 178 (20.0)                     | 1        |           | 0.541           |             |           |                 |
| No  | 76 (10.5)                      | 1.13     | 0.77-1.66 |                 |             |           |                 |

Note: 1: Reference category C.I: Confidence Interval OR: Odds Ratio

getting seriously ill.<sup>20,26</sup> Another explanation could be that older children have experienced multiple episodes of fever before, and given that it is not their first time, caregivers may be more experienced in dealing with their older children's illnesses than younger ones.<sup>20</sup> Nonetheless, care-

givers should be encouraged to seek treatment early regardless of the child's age to prevent severe disease.<sup>27</sup>

This study has found that healthcare-seeking behaviour is higher in children two to three years old than in those aged below one year. This could be due to various home

management for these one-year-old children like reducing wrappers and bathing frequently.<sup>28</sup>

On religion, this study is consistent with the multilevel analysis done in Malawi using 2015-2016 DHS data which found that febrile children whose caregivers belonged to the Muslim and other religious groups were less likely to be taken for prompt treatment than children of Christian mothers.<sup>14</sup> With the same result, it is argued that religious beliefs have been associated with the use of health services thereby affecting behaviours in health-seeking.<sup>29,30</sup>

However, in Ghana, religious beliefs are associated with adherence to medication.<sup>31</sup> Therefore, qualitative studies are suggested to be done in Malawi to understand different religious beliefs and their influence on health-seeking behaviours<sup>14</sup> as well as assessing knowledge and attitude about caregivers on health-seeking practices.

Our study had several strengths. The use of the Malawi Malaria Indicator Survey dataset provided nationally representative, reliable estimates at the national level. Additionally, appropriate adjustment for sampling design, including sampling weights was employed and there was a 100% response rate during the survey interview. On the other hand, the main limitation of the study is the use of cross-sectional data which cannot address causality. Longitudinal data would help to study the change in health-seeking behaviour and factors over time. Additionally, small sample size would limit statistical power to detect the associations especially in adjusted models.

## CONCLUSION

This study analyzed secondary data from 2017 Malawi Malaria Indicator Survey to identify predictors for prompt health-seeking behaviour in children under five. We found that 45.6% of children under five were not taken for treatment at all and 23.9% sought treatment late. Government health facilities were the most visited in terms of health-care seeking. Additionally, children aged four years and from Muslim caregivers were less likely to be taken for treatment in time, while children two years old were more likely to be taken for care in time compared to those 1 year and below. Therefore, caregivers should be encouraged to seek treatment early regardless of the child's age to prevent severe disease. Qualitative studies should be done in Malawi to explore different religious beliefs and their influence on health-seeking behaviours. Improving timely health-seeking behaviour will ultimately reduce progression to severe disease, improve management and reduce under-five mortality.

.....

## ACKNOWLEDGEMENTS

We are grateful to the DHS Program for granting us access to the 2017 Malawi Malaria Indicator Survey dataset. We also thank the organisers and coaches of DHS 2022 Summer Course attended by the first author at the Institute of Tropical Medicine – Antwerp, Belgium for their continuous technical support which made this work possible.

## ETHICS STATEMENT

All participants provided informed consent to the MMIS surveyors at the start of the interview. Ethical approval for data collection was provided by the Malawi National Health Sciences Research Committee and ICF Institutional Review Board. No additional ethical approval was required by the National Health Sciences Research Committee for this secondary analysis of de-identified data. Permission to use and access to the de-identified MMIS data for this study was provided by the DHS Program. More details regarding DHS data and ethical standards are available at: <http://goo.gl/ny8T6X>.

## DATA AVAILABILITY

2017 MMIS dataset is available for download from the DHS Program website upon reasonable request: [www.dhsprogram.com](http://www.dhsprogram.com).

## FUNDING

This research did not receive external funding.

## AUTHORSHIP CONTRIBUTIONS

YS and FC designed the study and the analysis. YS conducted data analysis, and interpreted the results with FC. YS drafted the manuscript. YS and FC revised and approved the final draft.

## DISCLOSURE OF INTEREST

The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author) and disclose no relevant interests.

## CORRESPONDENCE TO:

Yusuf Salim BSc, MSc Epi  
 Karonga District Health Office, Ministry of Health, Karonga  
 Country: Malawi  
 Email: [ayuyayusuf@gmail.com](mailto:ayuyayusuf@gmail.com)

Submitted: March 29, 2023 BST, Accepted: May 25, 2023 BST



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

## REFERENCES

1. World Health Organization. *World Malaria Report 2013*. World Health Organization (WHO); 2013.
2. UNICEF, WHO, World Bank Group, United Nations. *Levels & Trends in Child Mortality: Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation*. United Nations Children's Fund; 2019.
3. World Health Organization. *World Malaria Report 2018*. WHO; 2018.
4. Tarimo DS, Lyimo EO, Moshiri C. Accuracy of fever and fraction of fevers attributable to malaria among under-fives under reduced malaria infection prevalence in district. *Malar Chemother Control Elimin*. 2014;3:1. [doi:10.4172/2090-2778.1000121](https://doi.org/10.4172/2090-2778.1000121)
5. *WHO Guidelines for Malaria, 16 February 2021*. World Health Organization; 2021.
6. Webair HH, Bin-Gouth A. Factors affecting health seeking behavior for common childhood illnesses in Yemen. *Patent Prefer Adherence*. 2013;2013(7):1129. [doi:10.2147/ppa.s51124](https://doi.org/10.2147/ppa.s51124)
7. Noordam AC, Carvajal-Velez L, Sharkey AB, et al. Care seeking behaviour for children with suspected pneumonia in countries in sub-Saharan Africa with high pneumonia mortality. *PLoS One*. 2015;10(2):e0117919. [doi:10.1371/journal.pone.0117919](https://doi.org/10.1371/journal.pone.0117919)
8. National Statistical Office (NSO) [Malawi] and ICF. *Malawi Demographic and Health Survey 2015-16*. NSO and ICF; 2017.
9. Wardlaw T, You D, Hug L, Amouzou A, Newby H. UNICEF Report: Enormous progress in child survival but greater focus on newborns urgently needed. *Reprod Health*. 2014;11(1):82. [doi:10.1186/1742-4755-11-82](https://doi.org/10.1186/1742-4755-11-82)
10. Yaya S, Oduşina EK, Adjei NK. Health care seeking behaviour for children with acute childhood illnesses and its relating factors in sub-Saharan Africa: evidence from 24 countries. *Trop Med Health*. 2021;49(1). [doi:10.1186/s41182-021-00385-1](https://doi.org/10.1186/s41182-021-00385-1)
11. National Malaria Control Programme (NMCP) and ICF. *Malawi Malaria Indicator Survey 2017*. NMCP and ICF; 2018.
12. Hammond FM, Malec JF, Nick TG, Buschbacher RM, eds. *Handbook for Clinical Research, Design, Statistics, and Implementation*. Springer Publishing Company; 2014. [doi:10.1891/9781617050992](https://doi.org/10.1891/9781617050992)
13. USAID. *Sources for Sick Child Care in Malawi*; 2018.
14. Nkoka O, Chuang TW, Chen YH. Multilevel Analysis of Factors Associated with Treatment-Seeking Behaviors among Caregivers with Febrile Children in Malawi. *Am J Trop Med Hyg*. 2019;100(6):1454-1465. [doi:10.4269/ajtmh.18-0900](https://doi.org/10.4269/ajtmh.18-0900)
15. Hamooya BM, Chongwe G, Dambe R, Halwiindi H. Treatment-seeking Behaviour for Childhood Fever among Caretakers of Chivuna and Magoye Rural Communities of Mazabuka District, Zambia: A Longitudinal Study. *BMC Public Health*. 2016;16(1):762. [doi:10.1186/s12889-016-3460-8](https://doi.org/10.1186/s12889-016-3460-8)
16. Wanjiku EN, Oyore JP. Cross Sectional Survey of Care Seeking For Acute Respiratory Illness in Children Under 5 Years in Rural Kenya. *Am J Pediatr*. 2018;4(3):69-79. [doi:10.11648/j.ajp.20180403.15](https://doi.org/10.11648/j.ajp.20180403.15)
17. Kassile T. Determinants of delay in care seeking among children under five with fever in Dodoma region, central Tanzania: a cross-sectional study. *Malar J*. 2014;13:348. [doi:10.1186/475-2875-13-348](https://doi.org/10.1186/475-2875-13-348)
18. Budu E, Seidu AA, Ameyaw EK, et al. Factors associated with healthcare seeking for childhood illnesses among mothers of children under five in Chad. *PLoS ONE*. 2021;16(8):e0254885. [doi:10.1371/journal.pone.0254885](https://doi.org/10.1371/journal.pone.0254885)
19. Institut National de la Statistique et de la Démographie (INSD) et ICF International. *Enquête Démographique et de Santé et à Indicateurs Multiples du Burkina Faso. 2017-2018*.
20. Negatou M, Ouedraogo M, Donnen P, Paul E, Samadoulougou S, Kirakoya-Samadoulougou F. Care-Seeking for Fever for Children Under the Age of Five Before and After the Free Healthcare Initiative in Burkina Faso: Evidence from Three Population-Based Surveys. *Risk Management and Healthcare Policy*. 2021;14:2065-2077. [doi:10.2147/rmhp.s297983](https://doi.org/10.2147/rmhp.s297983)
21. Bicaba F, Browne L, Kadio K, Bila A, Bicaba A, Druetz T. National user fee abolition and health insurance scheme in Burkina Faso: how can they be integrated on the road to universal health coverage without increasing health inequities? *Journal of Global Health*. 2020;10(1). [doi:10.7189/jogh.10.010319](https://doi.org/10.7189/jogh.10.010319)

22. Mazengera S. *Missing Medicines in Malawi: Campaign against Stock-Outs of Essential Drugs*. Oxfam GB Programme Insights; 2012.
23. Lungu EA, Biesma R, Chirwa M, Darker C. Healthcare Seeking Practices and Barriers to Accessing Under-five Child health Services in Urban Slums in Malawi: a Qualitative Study. *BMC Health Serv Res*. 2016;16(1):401. doi:10.1186/s12913-016-1678-x
24. Terefe T. Health Seeking Behaviors to Common Childhood Illness Among Mothers/Caregivers Having Under Five Children and Associated Factors on Model and Non-Model Kebeles Comparative Cross-sectional Study North East Ethiopia. *J Bio Energetics*. 2021;9(5):25056.
25. Simien MM, Mengistu MY, Gelagay AA, Gebeyehu MT. Mothers' health care seeking behavior and associated factors for common childhood illnesses, Northwest Ethiopia: community based cross-sectional study. *BMC Health Serv Res*. 2019;19(1):59. doi:10.1186/s12913-019-3897-4
26. 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. *International Journal of Environmental Research and Public Health*. 2019;16(19):3752. doi:10.3390/ijerph16193752
27. Hanyinza S, Chilyabanyama R, Hamainza B, Shawa ST, Sitali L. *Health Seeking Behaviour Among Care-Givers for Children Under-Five Years in Zambia - a Comparative Analysis of 2015 and 2018 Malaria Indicator Survey*. Research Square; 2022. doi:10.21203/rs.3.rs-1272161/v1
28. Ansari S, Soltero EG, Lorenzo E, Lee RE. The impact of religiosity on dietary habits and physical activity in minority women participating in the health is Power (HIP) study. *Prev Med Rep*. 2017;5:210-213. doi:10.1016/j.pmedr.2016.12.012
29. Bantie GM, Meseret Z, Bedimo M, Bitew A. The prevalence and root causes of delay in seeking healthcare among mothers of under five children with pneumonia in hospitals of Bahir Dar city, North West Ethiopia. *BMC Pediatr*. 2019;19(1):482. doi:10.1186/s12887-019-1869-9
30. Chege PM, Kimiywe JO, Ndungu ZW. Influence of culture on dietary practices of children under five years among Maasai pastoralists in Kajiado, Kenya. *Int J Behav Nutr Phys Act*. 2015;12(1):131. doi:10.1186/s12966-015-0284-3
31. Kretchy I, Owusu-Daaku F, Danquah. Spiritual and religious beliefs: do they matter in the medication adherence behaviour of hypertensive patients? *Biopsychosoc Med*. 2013;7:15.