Care-seeking behaviour among febrile children under five in Togo

Gountante Kombate1*, Gbènonminvo Enoch Cakpo2, Komi Ameko Azianu2, Matè Alonyenyo Labité2 and Marianne A. B. van der Sande3,4

Abstract

Background: Fever is one of the warning signs of poor health in children. Care-seeking in febrile children is important in reducing child deaths and morbidity. This care-seeking by parents in children with fever is however relatively low in sub-Saharan Africa. The aim of this study is to improve understanding of the behaviour of caregivers in seeking care for children under five with fever and to identify associated modifiable risk factors in Togo.

Methods: Data from a 2013–2014 cross-sectional nationally representative malaria indicator survey was used. Advice or care-seeking is defined as any child under 5 years of age with fever in the two weeks prior to the interview for whom advice or treatment was sought in a public medical area, private medical area, store, market, or from an itinerant medicine seller. Univariate and multivariate logistic regression analysis were performed using Generalized Linear Models.

Results: A total of 1359 febrile children out of 6529 children under five were enrolled. Care had been sought in 38.9% of cases. In multivariate analysis, independent risk factors associated with formal care seeking were accessibility to the nearest health center (aOR = 1.52, 95% CI [1.18–1.95], mother’s education level secondary and above (aOR = 1.85, 95% [1.32–2.59]), mothers who identified as belonging to anist/traditionalist religions compared to mothers who belonged to a formal religion (catholic (aOR = 2.28, 95% [1.55–3.37]), Muslim (aOR = 2.41, 95% [1.67–3.47]), and Protestant (aOR = 1.9, 95% [1.37–2.65]), Maritime region (aOR = 0.49, 95% [0.29–0.82]) compared to Lome commune.

Conclusion: Interventions should specifically target women with limited education, not identifying as part of an official church and at longer distance from health center.

Keywords: Fever, Care-seeking, Children under five, Togo

Introduction

Fever is one of the main signs of illness in children [1] and the primary reason for paediatric health centre consultations and hospitalisations in Africa [2]. Manifested by an elevation in the temperature of the body [3] fever is generally suggestive of an infectious disease, including pneumonia and malaria, which are the main causes of death in children under five in sub-Saharan Africa in 2022 [4]. Over the past two decades, there has been considerable progress in reducing child mortality. A decline from 93 deaths per 1,000 live births in 1990 to 37 per 1,000 live births in 2020 has been recorded [5]. Despite this progress, improving child survival remains a public health priority. In 2020 alone, more than 5 million children died before reaching the age of five in sub-Saharan Africa. Children in sub-Saharan Africa and South Asia bear the greatest burden of child mortality [5]. A large proportion of these deaths were due to preventable and treatable diseases [6, 7].

*Correspondence: gountanto@gmail.com
1 Society for Study and Research in Public Health, Ouagadougou, Burkina Faso
Full list of author information is available at the end of the article

© The Author(s) 2022. Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.
Several factors may result in care not being sought, including distance to health centers, lack of resources including staff, perceived poor quality, costs, etc. If care is being sought, it may not always be appropriate or timely, for reasons including poor quality of care, stock-outs and inadequate health staff training [8]. Other factors such as socio-demographic factors, socio-cultural factors, socio-economic factors, and environmental factors could also contribute to care not being sought in time [4, 9].

In Togo, the infant and child mortality rate was 64 deaths per 1,000 live births in 2020 [10]. Nationally, of all children reported with a fever, for 24% care was sought in 2014 and 56% in 2017 [11]. Very few studies have addressed care-seeking behaviour among febrile children in Togo [12, 13]. Such studies showed that seeking care from a health provider was not frequent while self-medication and reliance on traditional healers during illnesses remain common practice with 85.8% [12] and 80.2% [13] according to these two studies in Togo. So far, the few studies conducted in Togo have included small samples that did not allow extrapolation towards policy adjustments at national level. The present study was conducted in this context with the objective to improve understanding of the behaviour of caregivers in seeking care for children under five with fever and to identify associated modifiable risk factors, using national population-based data [14].

**Method**

**Background to the study**

Togo is located in West Africa, with a population that has grown from 2,719,567 in 1981 to 7,886,000 and a density of 152 inhabitants/km² in 2021 [15]. It is bordered to the north by Burkina Faso, to the south by the Gulf of Guinea, to the east by Benin and to the west by Ghana. It has six health regions and forty-three health districts in total (Fig. 1).

The country has a tropical climate (hot and humid), which is partly responsible for the national epidemiological disease profile dominated by infectious and parasitic diseases [16]. The health system in Togo is organised according to a three-tier pyramid structure [17]. The first level consists of the central administration and the various departments and programmes where national directives and policies are developed. The regional (or intermediate) level comprises six health regions that...
provide coordination and technical support to the third-level health districts. The peripheral level is represented by the health district, which is the most decentralised operational entity, comprising 43 health districts and 944 peripheral health units [17].

Type of study and sampling
Data were used from the Togo Demographic and Health Survey (TDHS) 2013–2014 [18]. TDHS (2013–2014) included a representative probability sample of 9,899 households (3,840 in urban areas in 128 clusters and 6,059 in rural areas in 202 clusters). Sample was based on a stratified, two-stage area survey. All women aged 15–49 usually living in the selected households or present the night before the interview with or without children under five were eligible to be interviewed. A total of 9,480 women aged 15–49 (3,591 in urban areas and 5,886 in rural areas) and 6,529 children aged 0–5 years were included in the survey [18]. The study population consisted of children under five years of age for whom fever was reported in the two weeks prior to the survey.

Tools and data collection
Three questionnaires were used in the context of the TDHS 2013–2014 (a household questionnaire, a woman’s questionnaire, and a biomarker questionnaire). The household questionnaire recorded all household members and visitors who slept the night before the interviewer visited the household. The women’s questionnaire was used to collect information on socio-demographic characteristics, knowledge of malaria, births over the last 5 years, prevalence and treatment of fever in children under five, exposure to malaria prevention measures. Information on childhood illness and health care-seeking behaviour during the two weeks preceding the survey was requested. Our study included children under the age of five that had a fever two weeks prior to the surveys. They were children who had a hot body or had a temperature higher than 37.5 degrees. Data collection took place between 10 November 2013 to 15 April 2014.

Study variables
The dependent variable was seeking formal care (Yes: if advice or care was sought from a health professional in public hospitals, dispensaries, and private clinics including community health workers; No: if advice or care was sought from itinerant sellers, pharmacies, shops, markets, families, friends, traditional healers or no advice at all) [4, 19, 20]. The independent variables were the age and sex of the child, whether the child was breastfeeding at the time of the survey, the age of the woman, her level of education, the area of residence, the region, the distance to the nearest health centre, the marital status, the wealth index of the household, the profession, the religion, the ethnicity and the sex of the head of household. The wealth index was constructed through principal component analysis using information on household assets including the possession of a number of consumer goods and housing characteristics [21, 22].

Data analysis
For each of the recoded variables, we assessed the associations with the dependent variable by performing a univariate logistic regression using generalized linear models (GLM) and calculated the Odds ratios. Any association that was found statistically significant at a level of $p \leq 0.10$ in the univariate analysis was included in a multivariate model. We then removed one by one, starting with the highest $p$-value, potential confounding factors and checked whether this resulted in a change of more than 10% in the Odds Ratio and/or whether the likelihood ratio test was significant ($p \leq 0.05$). If these conditions were met, the potential confounding factor was retained otherwise it was removed from the model. This process was continued until all remaining potential confounders were significant as confounders. With the variables retained ($p \leq 0.05$), we tested for interactions between our dependent variable and each of the variables retained in the final model [23]. Data were analysed using R software version 4.0.4.

Results
In total, the survey identified 1359 febrile children out of 6529 children under five (20.8%). There were more febrile boys (51.1%) than girls (48.9%), and the median age of the febrile children was 28 months (IQR 16–42). The largest group of children in the sample (28.7%) were from the poorest wealth index, while only 12.4% were from the richest wealth index. The majority (71.3%) lived in rural areas (Table 1). Among these children, care had been sought in 38.9% of cases.

Care-seeking and associated factors
Table 2 summarises the bivariate and multivariate results for care-seeking among children with fever in the two weeks preceding the survey.

Care was sought more for children living in urban areas (48.6%) compared to those living in rural areas (34.9%). Women with secondary and higher education were more often (47.3%) looked for care, compared to those with primary education (40.0%) and no education (32.7%). For febrile children living in the Maritimes region care was sought less (28.9%) compared to those living in the Lomé commune region (49.2%). However, it should be noted that 39.1% of caregivers did not seek advice or care from any source.
After bivariate analyses, residence, region, distance to the nearest health centre, maternal education, wealth index, ethnicity and region were found strongly and significantly associated with seeking advice or care. No association was observed with the sex of the child and the sex of the head of household. In multivariate analyses, the final predictors of formal advice or care-seeking was distance to the nearest health centre, region, mother’s education, and religion. Febrile children whose mothers perceived easy access to the health centre were more likely (OR = 1.52 (1.18–1.95)) to access care compared to those whose mothers perceived difficult access. Mothers who identified as belonging to animist/traditionalist religions were less likely to use care compared to mothers who belonged to a formal religion. The results also showed that women with a secondary education and above were more likely (OR = 1.85 (1.32–2.59)) to seek formal advice or care compared to those with no education. This relationship showed a clear dose–response curve such that for each increase in the mother’s education level, the likelihood of seeking advice or care for her child with fever increased.

Caretakers living in the Maritime region remained less likely (OR = 0.49 (0.29–0.82)) to seek advice or care compared to those living in other parts of the country.

**Table 1** Study population (n = 1359)

| Age (months) | N (%) |
|--------------|-------|
| 0–11         | 221 (16.3) |
| 12–23        | 359 (26.4) |
| 24–35        | 289 (21.3) |
| 36–47        | 269 (19.7) |
| 48–59        | 221 (16.3) |
| Sex          |       |
| Male         | 694 (51.1) |
| Female       | 665 (48.9) |
| Household head’s sex |       |
| Male         | 1151 (84.7) |
| Female       | 208 (15.3) |
| Currently breastfeeding |       |
| No           | 579 (42.6) |
| Yes          | 780 (57.4) |
| Place of residence |     |
| Urban        | 391 (28.7) |
| Rural        | 968 (71.3) |
| Distance to the nearest health |       |
| Big problem  | 479 (35.2) |
| Not a big problem | 880 (64.8) |
| Region       |       |
| Lome commune | 256 (18.9) |
| Maritime     | 204 (15.1) |
| Plateaux     | 420 (30.0) |
| Centrale     | 126 (09.2) |
| Kara         | 134 (09.8) |
| Savanes      | 219 (17.0) |
| Age of caregiver |     |
| 15–24        | 305 (22.4) |
| 25–34        | 682 (50.2) |
| 35–49        | 372 (27.4) |
| Caregivers’ level of education |       |
| No education | 612 (45.1) |
| Primary      | 472 (34.7) |
| Secondary and high | 275 (20.2) |
| Wealth index |       |
| Poorest      | 339 (25.0) |
| Poorer       | 314 (23.1) |
| Middle       | 279 (20.5) |
| Richer       | 238 (17.5) |
| Richest      | 189 (13.9) |
| Marital status |       |
| Married      | 1251 (92.1) |
| Divorced/widowed | 63 (04.6) |
| Single       | 45 (03.3) |
| Occupation   |       |
| Farmer/trader | 960 (70.6) |

**Discussion**

Care seeking for under 5 febrile illness was strongly associated with region, mother’s education, religion and distance to nearest facility. The current study used data from a nationally representative household survey and the results can therefore be considered representative for the national level. However, it should be noted that these data are based on self-reporting of fever by mothers of
| Variables                                | Advice or health care seeking | Crude OR (95% CI) | Adjusted OR (95% CI) |
|------------------------------------------|-------------------------------|-------------------|---------------------|
| **Age**                                  |                               |                   |                     |
| 0–11                                     | Yes 91 (41.2) | No 130 (58.8) | Ref                  | -                   |
|                                          | 12–23 137 (38.2) | 222 (62.8) | 0.81 (0.57–1.13) | -                   |
|                                          | 24–35 107 (37.0) | 182 (63.0) | 0.80 (0.56–1.14) | -                   |
|                                          | 36–47 111 (41.3) | 158 (58.7) | 0.87 (0.62–1.24) | -                   |
|                                          | 48–59 82 (37.1) | 139 (62.9) | 0.78 (0.54–1.13) | -                   |
| **Child sex**                            |                               |                   |                     |
| Male                                     | Yes 266 (38.3) | No 428 (61.7) | Ref                  | -                   |
| Female                                   | 262 (39.4) | 403 (60.6) | 0.98 (0.79–1.21) | -                   |
| **Household head's sex**                 |                               |                   |                     |
| Male                                     | Yes 446 (38.7) | No 705 (61.3) | Ref                  | -                   |
| Female                                   | 82 (39.4) | 126 (60.6) | 1.04 (0.76–1.42) | -                   |
| **Currently breastfeeding**              |                               |                   |                     |
| No                                       | Yes 233 (40.2) | No 346 (59.8) | Ref                  | -                   |
|                                          | 296 (37.9) | 484 (62.1) | 0.91 (0.56–0.93) | -                   |
| **Place of residence**                   |                               |                   |                     |
| Urban                                    | Yes 190 (48.6) | No 201 (51.4) | Ref                  | Ref                 |
| Rural                                    | 338 (34.9) | 630 (65.1) | 0.71 (0.56–0.93) | 1.73 (0.94–3.24)   |
| **Accessibility to nearest health centre**|                               |                   |                     |
| Problematic                              | Yes 153 (32.1) | No 326 (67.9) | Ref                  | Ref                 |
| Not problematic                          | 375 (42.6) | 505 (57.4) | 1.51 (1.21–1.89) | 1.52 (1.18–1.95)   |
| **Region**                               |                               |                   |                     |
| Lomé commune                             | Yes 126 (49.2) | No 130 (50.8) | Ref                  | Ref                 |
| Maritime                                 | 59 (28.9) | 145 (71.1) | 0.34 (0.20–0.55) | 0.49 (0.29–0.82)   |
| Plateaux                                 | 131 (31.2) | 289 (68.8) | 0.59 (0.41–0.86) | 0.79 (0.54–1.16)   |
| Centrale                                 | 49 (38.9) | 77 (61.1) | 0.78 (0.52–1.18) | 0.84 (0.55–1.29)   |
| Kara                                     | 64 (47.8) | 70 (52.2) | 1.11 (0.74–1.67) | 1.64 (0.90–2.54)   |
| Savanes                                  | 99 (45.2) | 120 (54.8) | 1.06 (0.76–1.49) | 1.80 (0.99–2.74)   |
| **Women's age**                          |                               |                   |                     |
| 15–24 yrs                                | Yes 123 (40.3) | No 182 (59.7) | Ref                  | -                   |
| 25–34 yrs                                | 272 (39.9) | 425 (60.1) | 0.99 (0.51–0.81) | -                   |
| 35–49 yrs                                | 133 (35.8) | 262 (64.2) | 0.78 (0.57–1.06) | -                   |
| **Education level**                      |                               |                   |                     |
| No education                             | Yes 201 (32.7) | No 411 (62.1) | Ref                  | Ref                 |
| Primary                                  | 188 (40.0) | 283 (64.8) | 1.12 (0.88–1.44) | 1.15 (0.87–1.52)   |
| Secondary and higher Wealth Index         |                               |                   |                     |
| Poorest                                  | Yes 123 (36.3) | No 216 (63.7) | Ref                  | Ref                 |
| Poorer                                   | 99 (31.4) | 215 (68.6) | 0.82 (0.61–1.11) | 1.02 (0.73–1.42)   |
| Middle                                   | 95 (34.0) | 184 (66.0) | 0.85 (0.62–1.17) | 1.07 (0.74–1.55)   |
| Richer                                   | 104 (43.8) | 134 (56.2) | 1.30 (0.92–1.82) | 1.56 (0.99–2.44)   |
| Richest                                  | 107 (56.1) | 82 (43.9) | 1.62 (1.12–2.33) | 1.92 (0.99–3.35)   |
| **Marital status**                       |                               |                   |                     |
| Married                                  | Yes 483 (38.6) | No 768 (61.4) | Ref                  | -                   |
| Divorced/widowed                         | 29 (46.0) | 34 (54.0) | 0.82 (0.50–1.34) | -                   |
| Single                                   | 16 (35.6) | 29 (64.4) | 0.81 (0.36–1.75) | -                   |
| **Occupation**                           |                               |                   |                     |
| Farmers/traders                          | Yes 358 (37.3) | No 602 (62.7) | Ref                  | -                   |
children and are not validated by medical examination. The completeness of reporting by mothers of children is subject to recall bias which could vary from mother to mother. Also, information on fever characteristics such as severity, duration, location of fever, and perceived quality of care was not collected. This missing information could be relevant factors determining care seeking or not in case of fever in children.

Care was sought for only 38.9% of all children with reported fever in the two weeks preceding the survey. Similar results were found in Malawi [24, 25], Nairobi [26], Burkina Faso [4], and Nigeria [27]. This low uptake of care could be explained by an inability of mothers to recognise fever as a danger sign for the child, cultural aspects, time constraints, lack or cost of transport to the nearest health centre. One of the surprising results is that wealth index was not significantly associated with maladvice or care seeking behaviour. One of the main explanations could be the free of charge child care policy introduced in Togo in 2012. This result is contrary to those obtained in Burkina Faso [4] and Mozambique [28]. For its authors, despite the different policies of free of charge child health care instituted in these countries, care-seeking by parents in children with fever remained relatively low [4, 28]. Also, a study in Mozambique [29] found that the quality of care, unavailability or stock-outs of effective treatment, and long waiting lines are factors that may discourage households from seeking care in health facilities despite the policies of free access.

Maternal education increased the probability of seeking care. Similar results have been reported in Malawi [24] and Nigeria [27]. Maternal education definitely improves understanding of the disease and the ability to seek formal advice or care. These findings reinforce the need to improve literacy rates in Togo as a means to improve care-seeking behaviour. Mothers living in the Maritime region were less likely to seek advice or care compared to those living in the rest of the country. Similar findings were also reported in other studies in Burkina Faso [4] and Malawi [19]. This regional difference is probably related to cultural differences in the perception of health and illness [19]. A study in Uganda, reported similar regional variations in health care seeking behaviour for children [24, 27]. Religion was also strongly associated with seeking advice or care. Compared to the traditionalists, mothers who were Christian and Muslim were more likely to seek formal advice or care in case of fever in their children. This could be explained by the fact that traditionalists more often use plants and tree bark as the first line of care. [27, 30].

The above results have improved the understanding of care-seeking behaviour of parents of children with fever illness. These data are currently the best data available, especially in a Togolese context, and action is needed. Accessibility to care has been a strongly associated and significant factor in the use of care and needs to be explored in advance in the context of the policy of free health care for children under the age of five in Togo.

### Conclusion

The study identified factors associated with seeking care among children under five with fever two weeks preceding the survey. The results confirmed that care seeking for fever in public and private health facilities in Togo is still suboptimal. Geographic variation at the regional level was identified. Interventions to improve universal primary health care coverage in terms of geographical accessibility, literacy and health education are to be

### Table 2 (continued)

| Variables                | Advice or health care seeking | Crude OR (95% CI) | Adjusted OR (95% CI) |
|--------------------------|-------------------------------|-------------------|----------------------|
|                          | Yes (%)                       | No (%)            |                      |
| Public employee          | 71 (32.3)                     | 149 (67.7)        | 1.34 (0.96 - 1.87)   | -                    |
| Not working              | 99 (55.3)                     | 80 (44.7)         | 1.10 (0.65 - 1.83)   | -                    |
| Religion                 |                               |                   |                      |
| Animist/Traditionalist   | 101 (22.4)                    | 350 (77.6)        | Ref                  | Ref                  |
| Catholic                 | 115 (45.8)                    | 136 (54.2)        | 2.20 (0.29 - 0.47)   | 2.28 (1.55 - 3.37)   |
| Muslim                   | 119 (55.9)                    | 94 (44.1)         | 2.31 (1.65 - 3.23)   | 2.41 (1.67 - 3.47)   |
| Protestant               | 193 (43.5)                    | 251 (56.5)        | 1.57 (1.17 - 2.10)   | 1.90 (1.37 - 2.65)   |
| Ethnicity                |                               |                   |                      |
| Ewe/mina/ana-ife         | 133 (26.0)                    | 378 (74.0)        | Ref                  | Ref                  |
| Kabye/tem                | 125 (37.8)                    | 206 (62.2)        | 1.16 (0.86 - 1.56)   | 0.90 (0.61 - 1.32)   |
| Paragrouma/akposso/akebou| 246 (54.4)                    | 206 (45.6)        | 1.58 (1.21 - 2.06)   | 1.14 (0.78 - 1.65)   |
| Others                   | 24 (36.9)                     | 41 (63.1)         | 2.55 (1.38 - 4.77)   | 1.61 (0.76 - 3.41)   |

OR: Odd ratio, Ref: Reference modality, 95% CI: 95% Confident Interval
encouraged. The regional differences highlighted are additional considerations for such interventions [31]. Qualitative studies could provide a further understanding of advice or care-seeking behaviour for fever among children in Togo.

**Abbreviations**
aOR: Adjusted Odds ratios; BCRS: Bioethics Committee for Health Research of Togo; DHS program: Demographic and Health Survey program; GLM: Generalized Linear Models; IQR: Inter-quartile range; MoH: Ministry of Health; OR: Odds ratios; TDHS: Togo Demographic and Health Survey.

**Acknowledgements**
Thanks to the ICF International and DHS (Demographic and Health Surveys) Program for providing and granting permission for the use of the data in this study and to the Ministry of Health, public hygiene and universal access to care, Togo for their support and advise. Our special thanks are owed to Prof. Marianne van der Sande for her advice on data analysis and article writing.

**Authors’ contributions**
GK and MS designed the study. GK and GEC performed the data analysis. KAA and MvDS for her advice on data analysis and article writing. Thanks to the ICF International and DHS (Demographic and Health Surveys) Program for providing and granting permission for the use of the data in this study and to the Ministry of Health, public hygiene and universal access to care, Togo for their support and advise. Our special thanks are owed to Prof. Marianne van der Sande for her advice on data analysis and article writing.

GK and MS designed the study. GK and GEC performed the data analysis. KAA and MvDS for her advice on data analysis and article writing. Thanks to the ICF International and DHS (Demographic and Health Surveys) Program for providing and granting permission for the use of the data in this study and to the Ministry of Health, public hygiene and universal access to care, Togo for their support and advise. Our special thanks are owed to Prof. Marianne van der Sande for her advice on data analysis and article writing.

**Funding**
No funding was available for this study.

**Availability of data and materials**
DHS datasets are publicly available on [www.dhsprogram.org](http://www.dhsprogram.org).

**Declarations**

**Ethics approval and consent to participate**

For this study, ethics approval was not sought since our analysis was based on publicly available data. However, DHS reports that informed consent, both written and verbal, was obtained from all participants by the Institutional Review Board of ICF International and the Bioethics Committee for Health Research (BCRS) of Togo. Prior to the start of the investigation, all ethical guidelines governing the use of human subjects were strictly adhered to and the methods were applied in accordance with the relevant guidelines and regulations of the Declaration of Helsinki. The data set and permission to conduct secondary data analysis were granted by the DHS program.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare that they have no competing interests.

**Author details**
1. Society for Study and Research in Public Health, Ouagadougou, Burkina Faso.
2. Institut Supérieur Des Sciences de La Population, Ouagadougou, Burkina Faso. 3. Global Health, Julius Centre, University Medical Centre Utrecht, Utrecht, The Netherlands. 4. Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium.

**Received:** 5 August 2022  **Accepted:** 4 November 2022  **Published online:** 17 November 2022

**References**

1. Kelly M, Sahm LJ, Shiely F, O’Sullivan R, McGillicuddy A, McCarthy S. Parental knowledge, attitudes and beliefs regarding fever in children: an interview study. BMC Public Health. 2016;16(1):540.

2. Nguefack F, Wamba DSF, Tague OAK, Nguefack S. Perceptions des Mères et Traitement Traditionnel de la Fièvre chez leurs Enfants Fébriles. Health Sci Dis. 2021;22(4). Available from: [http://bsd-fmsb.org/index.php/bsd/article/view/2628](http://bsd-fmsb.org/index.php/bsd/article/view/2628). [Cited 5 Feb 2022].

3. Urbane UN, Likopa Z, Gardovska D, Pavare J. Beliefs, practices and health care seeking behavior of parents regarding fever in children. Medicina. 2019;55(7):398.

4. Negatou M, Ouedraogo M, Donnen P, Paul E, Samadoulougou S, Kirakoya-Samadoulougou F. Care-seeking for fever under the age of five before and after the free healthcare initiative in Burkina Faso: evidence from three population-based surveys. Risk Manag Healthc Policy. 2014;7:2655–77.

5. UNICEF, WHO, World Bank Group. United Nations. Levels and trends in child mortality - UNICEF DATA. 2020. Available from: [https://data.unicef.org/resources/levels-and-trends-in-child-mortality/](https://data.unicef.org/resources/levels-and-trends-in-child-mortality/). [Cited 5 Feb 2022].

6. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. WHO estimates of the causes of death in children. Lancet. 2005;365(9465):1147–52.

7. Geldsetzer P, Williams TC, Kiolos A, Mitchell S, Ratcliffe LA, Kohli-Lynch MK, et al. The recognition of and care seeking behaviour for childhood illness in developing countries: a systematic review. PLoS ONE. 2014;9(4):e93427.

8. Negatou M, Ouedraogo M, Donnen P, Paul E, Samadoulougou S, Kirakoya-Samadoulougou F. Care-seeking for fever under the age of five before and after the free healthcare initiative in Burkina Faso: evidence from three population-based surveys. Risk Manag Healthc Policy. 2014;7:2655–77.

9. Aung T, Liwin MM, Sudhinaraset M, Wei C. Rural and urban disparities in health-seeking for fever in Myanmar: findings from a probability-based household survey. Malar J. 2016;15(1):386.

10. UNICEF. Country profile, Togo; Trends in under-five mortality rate in Togo. UNICEF DATA. 2021. Available from: [https://data.unicef.org/country/togo/](https://data.unicef.org/country/togo/). [Cited 7 Feb 2022].

11. Ministry of Health, ICF. Togo Malaria Indicator Survey 2017. 2018 p. 165. Available from: [https://dhsprogram.com/publications/publication-M529-M515-Final-Reports.cfm](https://dhsprogram.com/publications/publication-M529-M515-Final-Reports.cfm). [Cited 13 Jun 2021].

12. Potchoo Y, Awizoba A. Socio-Demographic Factors of Parental Self-Medication among Children under 13 Years, at the Teaching Hospitals of Lomé, Togo. 2018. Available from: [http://60.205.143.183/academic-journal-al-foreign_detail_thesis/0204117684188.html](http://60.205.143.183/academic-journal-al-foreign_detail_thesis/0204117684188.html). [Cited 5 Feb 2022].

13. Gbeasor-Komlanvi FA, Zida-Compaore WIC, Tairou S, Ekouevi DK. Evaluation de l’automedication dans les officines de Lomé, Togo. J Res Sci Natale. 2017;19(3):411–21.

14. Cook J, Amevibge P, Cost M, Gbetoglo D, Tursz A, Assimadi JK. Health seeking behavior of children in togo. 1999. Available from: [https://www.researchgate.net/profile/Jo-Cook-2/publication/12724960_Health_seeking Behaviour_of_children_in_Togo/links/5c49037f0458581506d7722cf1/Health-seeking-behaviour-of-children-in-Togo.pdf](https://www.researchgate.net/profile/Jo-Cook-2/publication/12724960_Health_seekingBehaviour_of_children_in_Togo/links/5c49037f0458581506d7722cf1/Health-seeking-behaviour-of-children-in-Togo.pdf). [Cited 7 Feb 2022].

15. National Institute of Statistics (INSEE). Socio-Demographic Indicators. 2021. Available from: [https://ineedtg.org/](https://ineedtg.org/). [Cited 24 Oct 2021].

16. Ministry of health/Togo. National Policy on the Quality of Health Services in Togo. 2019. Available from: [https://www.giz.de/en/downloads/Politique%20Nationale%20de%20Qualite%20des%20Services%20en%20Sante%20Togo.pdf](https://www.giz.de/en/downloads/Politique%20Nationale%20de%20Qualite%20des%20Services%20en%20Sante%20Togo.pdf). [Cited 7 Feb 2022].

17. Ministry of health/Togo. National Health Development Plan 2017–2022. 2017. Available from: [https://sante.gouv.tg/tag/systemes-de-sante/](https://sante.gouv.tg/tag/systemes-de-sante/). [Cited 7 Feb 2022].

18. The DHS Program. Demographic and health survey, 2013–2014. 2014. Available from: [https://dhsprogram.com/methodology/survey/survey-display-328.cfm](https://dhsprogram.com/methodology/survey/survey-display-328.cfm). [Cited 7 Feb 2022].

19. Nioka 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):1454–65.

20. Oguoma VM, Anyasodor AE, Adeleye AO, Eneanya OA, Mbanefo EC. Multilevel modelling of the risk of malaria among children aged under five years in Nigeria. Trans R Soc Trop Med Hyg. 2021;115(5):482–94.

21. DHS Program and ICF International. Wealth Index Construction. DHS Program. 2018. Available from: [https://www.dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm](https://www.dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm). [Cited 15 May 2021].

22. Howe LD, James R H, Hurty, SR. Issues in the construction of wealth indices for the measurement of socio-economic position in low-income
countries | SpringerLink. 2008. Available from: https://link.springer.com/article/https://doi.org/10.1186/1747-2875-6-40. [Cited 7 Feb 2022].

23. Menard S. Applied Logistic Regression Analysis. SAGE, 2002. 130 p. Available from: https://books.google.fr/books?hl=fr&lr=&id=EAI1QmUJzibUCQ6ifn68pg=PF7&mtp=0#v=onepage&q=Logistique%20regression%3A%20Predictive%20model%20with%20R&f=false.

24. Kazembe LN, Appleton CC, Kleinschmidt I. Choice of treatment for fever at household level in Malawi: examining spatial patterns [SpringerLink. 2017. Available from: https://link.springer.com/article/https://doi.org/10.1186/1475-2875-6-40. [Cited 7 Feb 2022].

25. Chibwana AI, Mathanga DP, Chinkhumba J, Campbell CH. Socio-cultural predictors of health-seeking behaviour for febrile under-five children in Mwanza-Neno district, Malawi. Malar J. 2009;8(1):219.

26. Taffa N, Chepngeno G. Determinants of health care seeking for childhood illnesses in Nairobi slums. Tropical Med Int Health. 2005;10(3):240–5.

27. Abdulkadir MB, Abdulkadir ZA. A cross-sectional survey of parental care-seeking behavior for febrile illness among under-five children in Nigeria. Alexandria J Med. 2017;53(1):85–91.

28. Cassy A, Saifodine A, Candrinho B, Martins MDR, daCunha 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 INASIDA datasets. Malar J. 2019;18(1):115.

29. Lindelow M. Understanding spatial variation in the utilization of health services: does quality matter? 2004; Available from: https://econwpa.ub.uni-muenchen.de/econ-wp/dev/papers/0409/0409058.pdf

30. Salako LA, Brieger WR, Afolabi BM, Umeh RE, Agomo PU, Asa S, et al. Treatment of childhood fevers and other illnesses in three rural Nigerian communities. J Trop Pediatr. 2001;47(4):230–8.

31. Kombate G, Gmakouba W, Scott S, Azianu KA, Ekouevi DK, van der Sande MA. Regional heterogeneity of malaria prevalence and associated risk factors among children under five in Togo: evidence from a national malaria indicators survey. Malar J. 2022;21(1):1–11. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-022-04195-6.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.