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RESEARCH ARTICLE

REVISED The proportion and determinants of appropriate health seeking behavior for febrile illness among caregivers of children under-five years in Butula sub-county, Busia county, Kenya

[version 2; peer review: 2 approved, 1 approved with reservations]

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Abstract

Background

Almost 10 million children under the age of five in Kenya, die due to fever-related diseases. In Busia, a county in Kenya, malaria accounts for 13% of all child fatalities under the age of five, a number higher than any other county. This study aimed to determine (a) proportion of appropriate health-seeking behavior and (b) determinants of health-seeking behaviors (HSBs) among their caregivers in Butula Sub-County, Busia County, as reported by the caregivers.

Methods

This cross-sectional mixed-method study included 271 caregivers, 11 community health volunteers, and health facility workers in Butula Sub-County. Systematic random sampling for participants and purposive sampling for key informants were used. A questionnaire collected the data that was analysed using frequency and percentages and logistic regression.

Results

Around seventy percent of caregivers reported seeking care for a child's fever within 24 hours. Individual factors that caregivers

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reported to influence appropriate health-seeking HSB were unemployment (adjusted odds ratio (aOR) = 0.49, 95% CI: 0.217 – 0.593, p = 0.018), self-medication preference (aOR = 0.14, 95% CI: 0.054 – 0.363, p < 0.001), had atleast two children (aOR = 0.63, 95% CI: 0.425 – 0.937, p = 0.042), and confidence in identifying fever (aOR = 7.0, 95% CI: 2.200 – 22.439, p = 0.001). Health-system factors reported to influence HSBs were facility too far (aOR = 0.86, 95% CI: 0.526 – 0.914, p = 0.027), getting health education (aOR = 1.8, 95% CI: 1.201-4.122, p=0.015), and facility level (aOR = 4.4, 95% CI: 2.015 – 9.750, p < 0.001). Qualitative findings found health system factors related to HSB as stockouts, facility distance, and staff workload.

Conclusions

Employment, multiple children, preferences to self-medicate, confidence in fever identification, facility level, distance to facility, and education are ky factors affecting caregiver's HSB. Policy and practice efforts should focus on these significant individual and health system determinants for HSBs among caregivers of children under five with febrile illness.

Plain Language summary

Millions of Kenyan children below five years die from fever. Busia, a County in the Lake region of Kenya, malaria related deaths are at 13%, which is the highest in Kenya. Focusing on an area in Busia, this study looked at the percentage of caregiver who seek appropriate care and factors that might affect behaviors of caregivers to seek care for children who develop fever-related diseases. More than half of caregivers in Butula seek care for their under-five children within a day. Through surveys and interviews, caregiver and healthcare workers reported that having no job, preferring to give their children medication rather than a doctor, having more than two kids, confidence in identifying fever, hospital being too far, being educated on health, and the level of hospital where care is obtained influenced behaviors to seek care for fever. This study concludes that fever-related diseases among children under five year are above average. Efforts to improve fever among children under five years should address key factors influencing caregivers behaviors to seek care for their children.

Keywords

Febrile illness, Health-seeking Behaviors, Children Under-Five Years, Individual-Level Factors, Fever.

This article is included in the Clinical Medicine gateway.

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REVISED **Amendments from Version 1**

We have updated our Conclusion and recommendations, we also addressed the prevalence issue which was in the sample size part.

Any further responses from the reviewers can be found at the end of the article

Introduction

Febrile illness continues to be a significant global health problem, causing approximately 75% of mortality in children under five years old[1]. Although the World Health Organization (WHO) does not classify febrile illness as a disease, it is associated with infectious conditions such as pneumonia, malaria, and typhoid fever, which are linked with high morbidity and mortality in children under five[1,2]. Each year, it is estimated that about 10 million children under five years in developing countries die due to febrile illnesses[3]. In Kenya, more than 10 million children under five years require treatment for acute febrile illnesses[4]. In Busia County (where the study site is located), the highest rate of febrile illness and related mortality is reported in all the Kenyan counties. In 2022, the Kenya Health Information System (KHIS), for instance, reported that the prevalence of under 5 years cases with fever was 20% in Butula Sub-County Busia County[5].

Febrile illness-related deaths are high because caregivers of children under five fail to seek timely medical care. In 2020, the Kenya Malaria Indicator Survey (KMIS) showed that the proportion of children with fever who received treatment dropped from 72% to 64% between 2015–2020[6]. Research shows that the behavior of seeking timely treatment significantly impacts febrile illness[7]. In the current study, these behaviors are referred to as health-seeking behaviors (HSBs). Health-seeking behaviors are defined as any attempt by an individual (in this case a caregiver) to obtain the proper and timely treatment to address a health condition upon symptom manifestation[8]. UNICEF and WHO, in their global action plans, recommend that caregivers obtain adequate treatment for their children to reduce the impact of febrile illness[9].

Many factors may determine HSBs among caregivers of children under five, including individual and health-system factors. Research on health-seeking behavior for febrile illness has revealed regional variations in health-seeking rates. According to Min *et al.*[10], geographic location is linked to the decision not to seek treatment for fever, with only 32.0% obtaining treatment within 24 hours. In sub-Saharan Africa, the percentage of caregivers who sought treatment for children with febrile illnesses was 67.3%, 56.8%, and 27.0% in Malawi, Tanzania, and Zambia[11]. Odimbe and Atuhairwe, in a study conducted in the Ugandan town of Busia Municipality, revealed that factors such as illness severity and caregivers' age influenced caregivers' health-seeking behaviors for children under five years with malaria[12]. Additionally, they identified the quality of health services and health workers' behaviors as factors influencing caregivers' HSBs to treat malaria in children under five[12]. Liyew *et al.*[11] reported that knowledge, educational status, and age influenced caregivers' decision to seek treatment for febrile illness. They also reported that the availability of health facilities influenced caregivers' HSBs for children with fever[11].

In Kenya, poor HSBs among caregivers are demonstrated by the significant decline in the proportion of children receiving treatment for fever[6]. Individual and health system factors may contribute to these poor HSBs. Still, there are limited comprehensive studies done in Kenya, particularly in the Western region that is prone to febrile illness, to support these claims. Therefore, this study aimed to achieve two objectives, (a) the proportion of appropriate health-seeking behavior and (b) determinants (individual and health-related factors) of health-seeking behaviors among caregivers of children under 5 years with febrile illness in Butula Sub-County, Busia County, Kenya, as reported by caregivers.

Methods

Study type and period

A community-based analytical cross-sectional, explanatory sequential mixed methods design was employed in the study. The research assistants first collected quantitative data and later qualitative data to support the quantitative data. The study period was between May 22, 2023 and July 28, 2023.

Study setting

The study site was Butula Sub-County, Busia County. It is one seven sub-counties in Busia County, the other being Teso North, Teso South, Nambale, Bunyala (Bundalangi), Samia (Funyula) and Matayos sub-county administrative units. Not much is published about the sub-county. Busia together with Kakamega, Bungoma, and Vihiga counties constitute the western region of Kenya. It borders the Republic of Uganda to the North, Siaya to the south, Kakamega to the east, and Bungoma to the Northeast. Busia County covers an area of approximately 1,683 sq. km and is located between latitudes 00° 01' and 00° 47' North of the Equator and longitudes 33° 57' and 34° 26' East of Greenwich Meridian. Butula sub-county is prone to febrile illness-associated diseases because of being in the Victoria region basin, hence why it was purposively selected as the study area.

Target Population. Caregivers of children under five years old in the study setting.

Inclusion Criteria. Caregivers over 18 years, with a child under five, residing in Butula, and willing to consent.

Exclusion Criteria. Caregivers who had lived in Busia County for less than two weeks before study period as they have not resided in the county to experience febrile diseases and engage in appropriate HSB.

Sampling

Butula sub-county has six wards. Three (Marachi West, Marachi Central, and Kingandole) were selected using simple random sampling. The sample for the quantitative phase

of the study was selected from homes with children under five using systematic random sampling. A sample size of 271 participants was used in the study. This sample was obtained using Fisher's formula with an acceptable confidence level of 95%[13]. The prevalence or proportion used was the prevalence of fever among under-five children[14].

$$n_0 = \frac{Z^2 / pq}{e^2}$$

Where: n_0 is the sample size

Z^2 is the abscissa of the standard curve that cuts off an area α at the tails (1 – α), which equals the desired confidence level at 95%).

e is the desired level of precision

p = Expected prevalence or proportion of an attribute/disease in the population from previous or pilot studies. Data on the prevalence of 20% of children below five with a fever in the two weeks before the malaria survey in Butula sub-county[5].

q is 1-p.

Z = 1.96 for a 95 % level of confidence

$$n_0 = \frac{1.96^2(0.20)(1-0.20)}{0.05^2}$$

= 217 the sample is adjusted upwards by 10% to cushion for attrition cases

The sampling frame was determined from the sub-county register containing the number of households for caregivers under under-five. A selection interval (k) was determined by dividing the total number of households and participants. The randomly generated numbers on a computer were used to select the first household in the study each day. The 271 caregivers were allocated across the three wards at a ratio of 2:2:1.

$$\text{Interval} = \frac{\text{Households of care givers of Under – five children)}}{\text{Sample size (calculated n)}}$$

Healthcare workers who work in the pediatric department at Mayo Sub-county Hospital and community health volunteers providing care to children and caregivers in Butula sub-County were purposively selected as crucial informants. Eleven key informants were found to saturate the qualitative data.

Data collection and tools

Two research assistants collected quantitative data from 271 caregivers between May and July 2023 using a semi-structured questionnaire. The semi-structured questionnaire developed by the primary investigator was used to collect data for the quantitative phase of the study. It contained five parts that collected data on social demographic, social and economic data of caregivers, characteristics of children, the prevalence of febrile, HSBs for febrile illness, and factors influencing HSBs. Its validity and reliability were tested using 10% of the sample in the Nyalenda ward in Kisumu County, which has similar geographical characteristics and experiences high cases of febrile illness as Butula Sub-County. Cronbach's alpha was 0.86, indicating high reliability. Before distributing the questionnaire, the research assistants explained the study's purpose and objectives and obtained a signed informed consent form. An unbiased witness was present when a caregiver was incapable of reading or writing to make sure they received the correct information regarding the study. An in-person (face-to-face) approach was used to administer the questionnaire. The choice of research assistants was based on their educational background; prerequisites for inclusion were (a) a minimum degree of medical training, (b) fluency in English and Kiswahili, and (c) speaking the native language.

A critical informant interview guide, developed by the study investigator, helped collect data from healthcare workers at the Mayo Sub-County Hospital through semi-structured interviews. Interviews with health workers lasted 30–45 minutes and targeted institution-level factors such as turnaround time (TAT), availability of commodities, availability of human resources, distance, hospital fee, and distance. The interview session ended after reaching data saturation—FGDs with CHVs collected data on health-system-related determinants of HSBs. Tape recordings were used to capture and maintain the informants exact words. A focus group discussion (FGD) guide, also developed by principal author, collected data from two FGDs, each lasting 30–60 minutes., The aim of these FGDs was to explore more into the determinants of HSB among caregivers of children under five with for febrile illness. They were conducted until data saturation.

Data management and analysis

Quantitative data was cleaned in Excel and imported into Statistical Package for Social Scientists (SPSS) version 25 for descriptive and inferential analysis. Descriptive statistics included frequency, percent, and measures of central tendency and presented as figures and tables. A binominal logistic regression analysis was used to determine the association between individual or health-system factors and HSBs using odds ratio (OR) at 95% confidence interval and p-value less than 0.05. Qualitative data analysis began with transcribing the voice recording and transcripts. Concepts, words, phrases, and sentences were coded to identify themes through categorization. These themes formed the study results. All qualitative data analysis was manually done in Microsoft Excel 365.

Results

In our study, 271 caregivers were enrolled between June and December 2023, and all of them responded to the questionnaire. There were no refusals, however 14 households had no one available during the survey and were omitted from the study altogether.

Participants characteristics

The mean age of participants was 33.4 ± 12.4 years, with most (42.1%) being between 21.3 years. 84.1% were female, and 44.6% had secondary-level education. More than half (59%) were self-employed and earned an income of less than KSH 5000 (75.3%). Most (79.3%) lived in a nuclear family, had two or fewer children (48.7%), and had one child under five years (67.5%). (Table 1).

Table 1. **Demographic characteristics of study participants.**

	Total	Proportion (%)
Age (years)		
≤ 20	26	9.6
21 – 30	114	42.1
31 – 40	80	29.5
41 – 50	20	7.4
51 – 60	18	6.6
≥ 61	13	4.8
Mean age	*M = 33.4 year (SD = 12.4)*	
Sex		
Male	43	15.9
Female	228	84.1
Education Level		
None	13	4.8
Primary	81	29.9
Secondary	121	44.6
Tertiary	56	20.7
Occupation status		
Unemployed	90	33.2
Self	160	59.0
Formal	21	7.7
Religion		
Christians	268	98.9
Others	03	1.1
Residency Ward		
Marachi Central	110	40.6
Kingandole	106	39.1
Marachi West	55	20.3
Income (KSH)		
< 5,000	204	75.3
5,000 – 10,000	36	13.3
10,001 – 20,000	13	4.8
20,001 – 50,000	14	5.2
> 50,000	4	1.5
Type of Household		
Grandparent Family	12	4.4
Single-parent	23	8.5
Nuclear Family	215	79.3
Extended Family	21	7.7
Age of the Child		
≤ 6 months	52	19.2
7 – 12 Months	63	23.2
13 – 24 Months	60	22.1
25 – 36 Months	49	18.1
37 – 48 Months	35	12.9
49 – 60 Months	12	4.4
The mean age of the child	*M = 21.5 months (SD =15.6)*	

	Total	Proportion (%)
Number of Other Children		
Two or less	132	48.7
3 – 5	89	32.8
Six or More	50	18.5
The mean number of other children	*Mean = 2.9 (SD = 2.1)*	
Number of Children < 5 years		
One	183	71.8
Two	64	25.1
Three	6	2.4
Four or More	2	0.8
The mean number of children under 5 years	*M = 1.4 (SD = 2.0)*	

Prevalence of febrile illness among under-five children

Febrile illnesses were assessed on how many children experienced fever-related illnesses in the last two weeks before the study. Figure 1 shows that 64.6% of children experienced fever episodes, and 35.4% did not.

Proportion of appropriate Health Seeking Behavior

The health-seeking behavior was assessed on how long the caregiver took to seek health after detecting the child had a fever. Figure 2 shows that 70.1% of caregivers reported that they did seek healthcare within 24 hours of detecting fever in their child, while 29.9% did not.

Determinants of Health-Seeking Behavior among caregivers

Individual-level factors. The bivariate analysis of individual factors and HSB within 24 hours showed a significant association for some factors. Table 2 shows that unemployment, self-medication, personal beliefs about care, confidence in fever identification, fever severity, using a hand to identify fever, and having multiple children were significantly associated with health-seeking behavior. Being unemployed lowered the likelihood of a caregiver seeking care within 24 hours by 69% (OR = 0.41, 95% CI: 0.212 – 0.807, p = 0.011). Those who addressed fever by self-medication rather than seeking professional health had odds of caring for fever within 24 hours reduced by roughly 84% (OR = 0.16, 95% CI: 0.093 – 0.290, p < 0.001). The belief that it is good to take care of fever within 24 hours was associated with a threefold higher likelihood of seeking health within 24 hours (OR = 3.4, 95% CI: 1.441 – 8.217, p = 0.007). Those confident in identifying fever in under-five-year-old children had close to 9 times higher likelihood of having the child's fever taken care of within 24 hours (OR = 8.8, 95% CI: 3.331 – 23.049, p < 0.001). The severity of the fever increased the chances of care for fever being sought within 24 hours by two times (OR = 2.4, 95% CI: 1.401 – 4.083, p = 0.002). Using the hand to identify fever was associated with 85% chances of low HSB within the first 24 hours (OR = 0.15, 95% CI: 0.019 – 0.693, p = 0.045). Other children seemed to calm the caregiver and lower the tendency to seek care within 24 hours by 46% (OR = 0.54, 95 CI: 0.294 – 0.981).

Controlling Confounding Variables. Table 3 shows the adjusted odds ratio for individual factors influencing HSB within 24 hours after controlling confounders, such as unemployment, self-medication preference, having multiple children, and confidence in disease identification. Unemployment lowered health-seeking behavior rate by 51% (aOR = 0.49, 95% CI: 0.217 – 0.593, p = 0.018). Caregivers who preferred self-medication over professional care for their child's fever had 86% lower chances of seeking care within 24 hours (aOR = 0.14, 95% CI: 0.054 – 0.363, p < 0.001). Those with two or more children witness a 37% lower chance of seeking care within 24 hours than those with one or less (aOR = 0.63, 95% CI: 0.425 – 0.937, p = 0.042). Caregivers who could be confident identifying when their child had a fever were seven times more likely to seek health care services within 24 hours than those who were not confident of detecting fever (aOR = 7.0, 95% CI: 2.200 – 22.439, p = 0.001).

Health systems factors. Health-system factors associated with HSB based are presented in Figure 3. Based on quantitative data, most participants (84.1%, N = 228) confirmed that they had received health education from the providers on fever care while 10.0% did not. Furthermore, 71.2% (N = 193) agreed or strongly agreed to considering the facility level when deciding to seek medical attention. 44.6% (N = 121) verified that long waiting had a negative impact on the delay in seeking medical attention while 32.1% (N = 87) thought that their HSB was unaffected by extended waiting time. 37.3% (N = 86) reported that their HSB was limited by inadequate medication. 37% (N = 86) indicated that the expense of febrile treatment was a limiting factor in their HSB while 49% (N = 134) disputed this. Long distance to the facility was mentioned as a problem restricting HSB by 25.8% (N = 70) of the participants while 63.8% (N = 173) considered long distance was not an issue impacting HSB.

Multivariate analysis showed that a facility being too far was associated with lowering the HSB within 24 hours by 14% (adjusted odds ratio (aOR) = 0.86, 95% CI: 0.526-0.914, p = 0.027). Those offered health education had increased odds of having sought care within 24 hours by 82% (aOR = 1.82, 95%

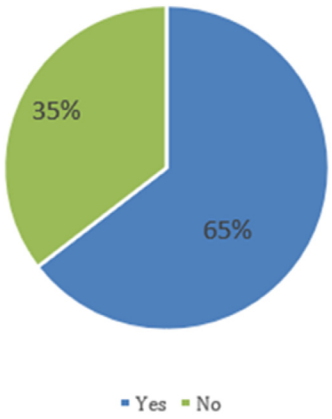

Figure 1. **The proportion of children with fevers as reported by caregivers.**

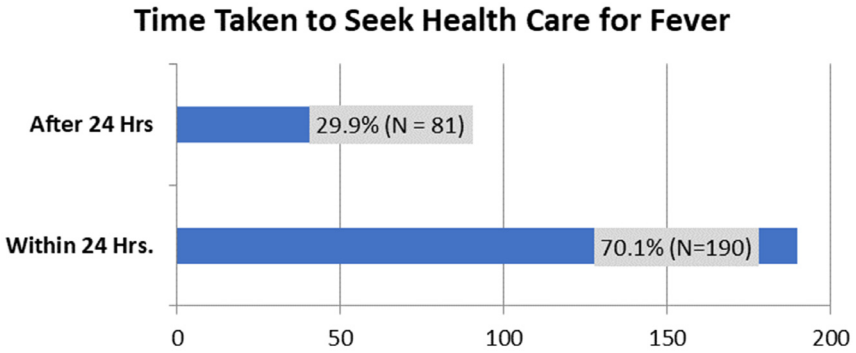

Figure 2. **The period within which caregivers seek health care services after detecting fever in the child.**

Table 2. **A bivariate association between individual factors and caregivers' health-seeking behavior.**

Variable	Good HSB N (%)	Poor HSB N (%)	Odds Ratio (OR) (95% CI)	P -Value
Caregiver Age				
≤ 25 Yrs.	53 (27.9)	20 (24.7)	1.2	0.655
> 25 Yrs.	137 (72.1)	61 (75.3)	(0.650 – 2.142)	
Level of Education				
Primary or None	63 (33.2)	31 (38.3)	0.8	0.486
Secondary or Higher	127 (66.8)	50 (61.7)	(0.466 – 1.373)	
Occupation				
Unemployed	130 (68.4)	68 (84.0)	0.41	0.011
Employed (Self/Formal)	60 (31.6)	13 (16.0)	(0.212 – 0.807)	
Marital Status				
Single/Divorced/Widowed	150 (78.9)	61 (75.3)	1.2	0.525
Married	40 (21.1)	20 (24.7)	(0.761 – 1.749)	
Relationship with Child				
Parent	156 (82.1)	67 (82.7)	0.9	1.000
Others	34 (17.9)	14 (17.3)	(0.483 – 1.902)	

Variable	Good HSB N (%)	Poor HSB N (%)	Odds Ratio (OR) (95% CI)	P -Value
Monthly Income				
≤ Ksh. 5000	142 (74.7)	62 (76.5)	0.9	0.878
> Ksh. 5000	48 (25.3)	19 (23.5)	(0.493 – 1.667)	
How they Often Address Fever				
Self-Medication	49 (25.8)	55 (67.9)	0.16	< 0.001
CHV or Clinician	141 (74.2)	26 (32.1)	(0.093 – 0.290)	
Good to Take Care with 24 Hrs.				
Yes	180 (94.7)	68 (84.0)	3.44	0.007
No	10 (5.3)	13 (16.0)	(1.441 – 8.217)	
Can Identify Fever in Under 5				
Yes	184 (96.8)	63 (77.8)	8.8	< 0.001
No	6 (3.2)	18 (22.2)	(3.331 – 23.049)	
Severity Influenced HSB				
Yes	133 (70.0)	40 (49.4)	2.4	0.002
No	57 (30.0)	41 (50.6)	(1.401 – 4.083)	
Culture Influence HSB				
Yes	7 (3.7)	4 (4.9)	0.74	0.738
No	183 (96.3)	77 (95.1)	(0.209 – 2.588)	
How do you Identify fever?				
Feeling by Hand	175 (92.1)	80 (98.8)	0.15	0.045
Thermometer	15 (7.9)	1 (1.2)	(0.019 – 0.693)	
Has Two or More Children				
Yes	124 (65.3)	63 (77.8)	0.54	0.045
No	66 (34.7)	18 (22.2)	(0.294 – 0.981)	
Has other Under-five Children				
Yes	179 (94.2)	76 (93.8)	1.071	1.000
No	11 (5.8)	5 (6.2)	(0.360 – 3.186)	

Legend: CHV = community health volunteer, HSB-health seeking behavior, OR = odds ratio, p = p-value

CI: 1.201-4.122, p = 0.015). The type/level of the facility was also a factor for consideration, increasing the access to fever care within the first 24 hours by more than four times (aOR = 4.43, 95% CI: 2.015-9.750, p < 0.001). However, cost of care (p = 0.154), long waiting time (p = 0.689), and lack of drugs in the facility (p = 0.891) had no statistical significance association (Table 4).

Findings from critical informant interviews

Based on the interview with health workers, the following themes emerged as impacting HSB among caregivers of children under five years; medication stockouts, staffing issues, facility level, behavior of health professionals, distance from the facility, and lack of funding for outreach activities. These findings supported the quantitative findings.

One health care informant said "… *caregivers preferred facilities with specialists, those that do not charge, where they can get medication, where staffs are more hospitable, those close to caregivers*," but "… *lack of funding for sensitization campaign does limit our reach to the caregivers creating a problem on identifying them*". Another one argued that "… *some prefer facilities with minimum to zero charges for services, those nearer to them, public facilities*" and further added that "*the facility has enough staff, engage the community outreaches programs, but most caregivers tend to ignore the severity of the medical issues*." The issue of drug stock out was further stressed with one interviewee saying "… *caregiver prefer to not go to hospitals since they would not be given any medication even after having been seen*".

FGDs with community health volunteers generated the following themes: caregivers' ignorance, facility accessibility, drug unavailability, poor staff motivation, and care costs. One of the FGD participants highlighted that "… *in some cases and just disturbed by the level of ignorance among*

Table 3. **Multivariable logistic regression on individual-level factors influencing Health-Seeking Behavior.**

Variables	Crude Odds Ratio (95% CI)	P - Value	Adjusted Odds Ratio (aOR) (95% CI)	P - value
Caregiver occupation				
Unemployed	0.41	0.011	0.49	0.018
Employed (Self/Formal)	(0.212 – 0.807)		(0.217 – 0.593)	
How they often address fever				
Self-Medication	0.16	< 0.001	0.14	< 0.001
CHV or Clinician	(0.0.93 – 0.290)		(0.054 – 0.363)	
Good to take care with 24 hours				
Yes	3.44	0.037	1.62	0.401
No	(1.441 – 8.217)		(0.525 – 5.017)	
Can identify fever in under 5-year-olds				
Yes	8.8	< 0.001	7.03	0.001
No	(3.331 – 23.049)		(2.200 – 22.439)	
Severity influenced HSB				
Yes	2.4	0.002	1.23	0.556
No	(1.401 – 4.083)		(0.622 – 2.418)	
How do you identify fever?				
Feeling by Hand	0.15	0.045	0.21	0.156
Thermometer	(0.019 – 0.693)		(0.025 – 1.801)	
Has two or more children				
Yes	0.54	0.045	0.63	0.042
No	(0.294 – 0.981)		(0.425 – 0.937)	

Legend: CHV = community health volunteer.

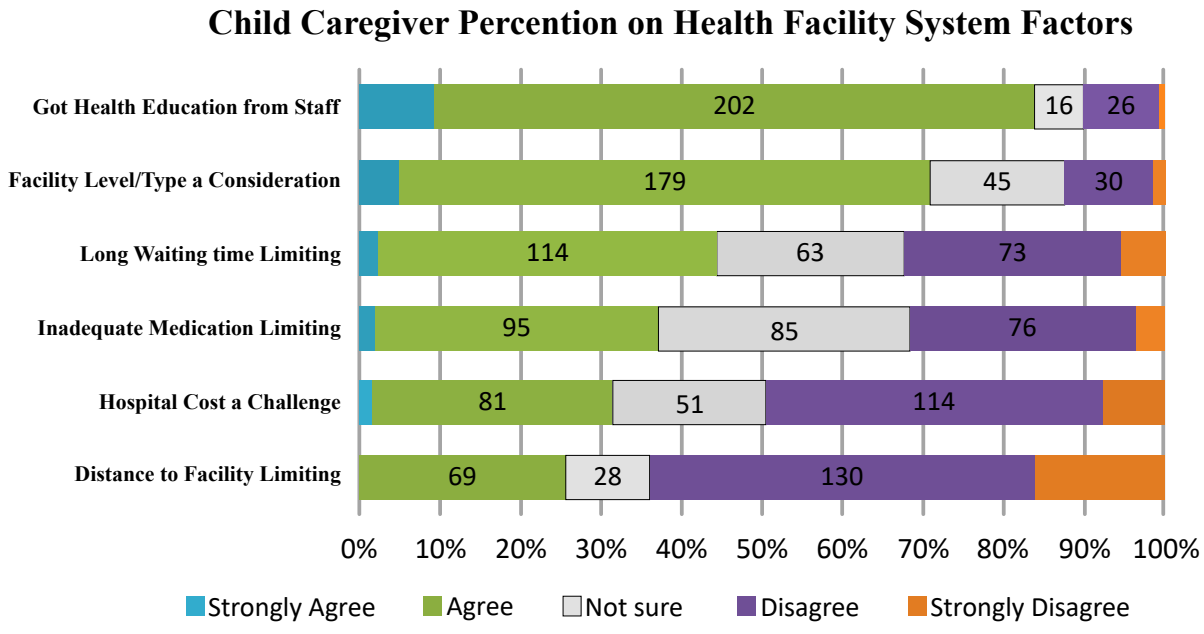

Figure 3. **Participants' perception on facility system factors influence on HSB.**

Table 4. Bivariate and multivariate association between health seeking behavior and health system factors.

	Good HSB N (%)	Poor HSB N (%)	OR (95% CI)	p	Adjusted OR (95% CI)	p
Facility too Far						
No (reference)	150 (78.9)	51 (63.0)	0.45	0.010	0.86	0.027
Yes	40 (21.1)	30 (37.0)	(0.256 – 0.802)		(0.526 – 0.914)	
Cost of Care						
No (reference)	135 (71.1)	50 (61.7)	0.66	0.154	-	-
Yes	55 (28.9)	31 (38.3)	(0.380 – 1.135)			
Long Waiting Time						
No (reference)	112 (58.9)	36 (44.4)	0.56	0.033	0.85	0.689
Yes	78 (41.1)	45 (55.6)	(0.330 – 0.942)		(0.378 – 1.902)	
Lack of Drugs in Facility						
No (reference)	120 (63.2)	50 (61.7)	0.94	0.891	-	-
Yes	70 (36.8)	31 (38.3)	(0.550 – 1.609)			
Staff Offered Health Education						
No (reference)	19 (10.0)	24 (29.6)	3.8	< 0.001	1.82	0.015
Yes	171 (90.0)	57 (70.4)	(1.934 – 7.423)		(1.201 – 4.122)	
Facility Type/Level						
No (reference)	44 (23.2)	34 (42.0)	2.4	0.003	4.43	< 0.001
Yes	146 (76.8)	47 (58.0)	(1.378 – 4.182)		(2.015 – 9.750)	

Legend: HSB = health seeking behavior, OR = odds ratio, p = p-value

caregivers not taking fever seriously in a region prone with malaria cases...." with a fellow participant adding, "*… sometimes you feel for them, especially after knowing how bad the situation can be praying that it does not turn out to be malaria.*" In terms of facility accessibility, another FGD participants noted "*…from my interaction, I think the long distance they have to cover to the facility has demotivated them to seek the health care services*." Participants agreed that the county government should do more to motivate the staff, emphasizing the im-portance of fever care and "*… authorities to recognize the significant role CHVs can have in primary care*." The social economic activity for most of the people in the region is farming, "*cost of care lowers health seeking behavior due to poverty*" and that "*… creates a problem to dispensaries and level three facilities not charging by having long waiting time and drug stock out*."

Discussion

The aim of this study was to determine the determine the proportion of appropriate health-seeking behaviour for febrile illness among caregivers of children under five years and the individual factors and health-system factors associated with health-seeking behaviors among their caregivers in Butula sub-county, Busia County. The findings have revealed that the proportion of HSB is high in this community. This finding is consistent with the survey findings by KMIS who reported a prevalence of 67%[15] and Liyew *et al.*[11] who found a prevalence of 67.3% in Malawi. These is significantly higher than reported in O'Meara *et al.*[4] at 22.4% but slightly lower than reported by Nyaoke *et al.*[16] at 84%.

The study findings have revealed that individual factors influencing appropriate health-seeking behavior are unemployment, preferring self-medication over professional care, having two or more children, and confidence in identifying fever. Caregivers who reported not being unemployed were 0.49 less likely to seek appropriate healthcare. These findings support Chauhan *et al.*[17], who reported that occupation influences health-seeking behavior. Caregivers who could identify fever signs were seven times more likely to Have appropriate HSB. This is consistent with Zenebe *et al.*[9], who reported that the proportion of mothers with good knowledge of childhood illnesses was around two times more likely to seek healthcare than those with poor knowledge. Similarly, Guntur *et al.*[7] reported that understanding fever signs positively influences health-seeking behavior. It is unclear why these factors significantly influenced HSB and not the others. Unemployment might affect caregiver's financial ability to support HSB. Caregivers who prefer not to give their children medication for febrile illness on their own may have poor HSB. Having more than two children and confidence in identifying fever may give caregivers the perceptions that they have the experience to care for their sick children without professional care. However, further enquiry is needed to support these assertions.

Additionally, the findings revealed that factors that significantly influence HSBs included staff offered health education, distance to facility, care costs, and facility type or level. There was a high probability that caregivers would engage in HSB when they received health education about febrile diseases from the facility staff. This could be explained by perceived higher confidence levels among caregivers in the nursing staff's knowledge or increased levels of trust for them to provide accurate information during the education. The healthcare facility, being level three, increased HSB twofold. Level three hospitals provide more services and have better medical equipment and other resources. According to Getahum[18], a lack of adequate resources is a factor determining HSB. Medication stockouts, personnel shortages, and insufficient funding for community outreach programs were associated with poor HSB[18]. Our results are consistent with previous research. According to Muriithi *et al.*[19], even when a patient desired medical attention, getting there would be difficult due to the distance to the institution. Kamat[20] made similar observations that caregivers tend to choose nearby institutions when seeking medical attention, mostly due to the reduced cost of treatment. Ease of access to healthcare facilities is a motivator to HSB[20]. Demand for healthcare reduces as the distance to the facility increases due to limited means of transportation and lack of transport fees[19]. Health institutions that promoted illness education to moms were favored above those that did not[18]. Oladigbolu *et al.*[21] also revealed that knowledge, medicine availability, and the high cost of care were some factors limiting HSB.

Limitations

A major limitation of the study is that it was cross-sectional and therefore limited to a specific period. It does not allow for further analysis of how HSB changes over time. Another limitation was that the investigators did not confirm whether caregivers' health seeking behavior was within the indicated time and therefore relying on sincerity of the caregivers. There was potential for data collection bias.

Conclusion

In conclusion, the proportion of HSB in the investigated community was high. Individual factors significantly associated with appropriate health-seeking behavior were occupation, how they address fever, ability to identify fever in under-five, and number of children per household. Furthermore, we concluded that health system factors associated with HSB include facility being too far, staff workload, drug stock out, inadequate sensitization due to shortage of community outreach program, facility type, and health education. Interventions or initiatives to improve HSBs should consider targeting these factors if efforts to address febrile illnesses is realized in this community and similar neighboring communities. Further research should focus on longitudinal prospective cohort studies to help establish a causal-effect relationship between HSBs and individual or health-system factors, targeting Busia County in its entirety to understand the problem at the county level, possibly opening room for further investigations at the national level.

Ethics and consent

The Ethics Review Board at Jomo Kenyatta University of Agriculture and Technology approved the study (ref: JKU/ISERC/02316/0834) on March 9, 2023. Busia County government approved Butula Sub-County as the study site. Study participants signed the informed consent form before enrolling in the study. Privacy and confidentiality were maintained by omitting personal identifiers and storing the data in password-protected devices.

Data availability

Underlying data

Dryad: Data from: Determinants of appropriate health-seeking behavior for febrile illness among caregivers of children under 5 years in Butula sub-county, Busia County, Kenya. https://doi.org/doi:10.5061/dryad.g4f4qrfzd[22].

The project contains the following underlying data:

- Jean_Louis_row_data_File---1.xlsx
- Jean_Louis_Coded_Data_File---1.xlsx

Extended data

Dryad: Data from: Determinants of appropriate health-seeking behavior for febrile illness among caregivers of children under 5 years in Butula sub-county, Busia County, Kenya. https://doi.org/doi:10.5061/dryad.g4f4qrfzd[22].

The project contains the following extended data:

- Additional_file1.docx (a collection of the consent form, questionnaire for caregivers, key informant interview (KII) guide and a focus group discussion guide)
- README.md (summary of what the two attached Excel files contain, including abbreviations and codes)

Data are available under the terms of the Creative Commons Zero "No rights reserved" data waiver (CC0 1.0 Public domain dedication).

Acknowledgments

I am grateful to my supervisors and research assistants for this study.

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Open Peer Review

Current Peer Review Status: ✔ ? ✔

Version 2

Reviewer Report 27 December 2024

https://doi.org/10.21956/openreseurope.20726.r48573

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Prashant Kulkarni
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1. Please clarify if it's semi-structured questionnaire or semi-structured interview schedule? "The respondent fills out the questionnaire on their own. A trained interviewer asks questions and records the responses. Schedules are often used to record activities or events, such as a day's schedule."

2. Please provide details of quotes (anonymous) to bring more weight to the response.

3. "Health-seeking behavior (HSB) is the actions people take when they perceive themselves to be ill or have a health problem".The conclusion says - the proportion of HSB was high. What does it mean? Does it mean correct HSB??

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Community based research; qualitative; quantitatie research; health system research

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Version 1

Reviewer Report 02 December 2024

https://doi.org/10.21956/openreseurope.19483.r46400

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This study explores the patterns and determinants of health-seeking behavior for febrile illnesses among caregivers of children under five in Butula Sub-County, addressing a critical gap in child health outcomes in rural Kenya. Its relevance is grounded in the high prevalence of febrile illnesses, such as malaria, which significantly contribute to morbidity and mortality in this vulnerable population.

However, please the author should kindly check the prevalence used in calculating the sampling size in the study, p used was 0.20 instead of 0.17 according to the malaria survey (KDHS,2022).

Also, the study design adopted should be cross-sectional, explanatory sequential mixed-methods.

The study provides valuable insights into a specific rural setting, offering context-specific data that can inform targeted interventions. By examining both individual and systemic factors, the study captures the multifaceted nature of health-seeking behavior. Findings emphasize the need for community-level education and health system strengthening to improve timely care-seeking.

The determinants highlighted from the study were only individual factors and health system factors other contextual factors were not succinctly elucidated.

In conclusion , the article is well written and fills the research gap in its study context, however noting the corrections will enhance the credibility of the work.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health Systems and Services; Health behavior research; and Health policy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 10 Dec 2024

Jean Louis Kananura

All comments have been addressed in the manuscript version 2

Competing Interests: No competing interests were disclosed.

Reviewer Report 25 November 2024

https://doi.org/10.21956/openreseurope.19483.r46399

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Reviewer's comments
The proportion and determinants of appropriate health seeking behavior for febrile illness among caregivers of children under-five years in Butula sub-county, Busia county, Kenya
Authors mentioned use of questionnaire method but considered interviews with community and stakeholders. Please check if it's questionnaire or interview schedule used for the enquiry.
Were qualitative findings congruent with survey findings?
"*...quantitative data from 271 caregivers between May and July 2023 using a semi-structured questionnaire*". How only quantitative data generated using semi-structured interviews?
Participant characteristics did not bi-furcate providers and caregivers.
Was the proportion of febrile illnesses considering all the seasons?
In Figure-3 kindly differentiate between perception and knowledge/awareness-based data.
The findings from healthcare workers' interviews need to be corroborated with the survey findings.
The discussion should be made stronger and more precise. Currently it is mixed of discussion and

conclusion.
Conclusion part includes results. Make it more concise and specific. It also includes recommendations which are not mentioned anywhere in the result section.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Community based research; qualitative; quantitatie research; health system research

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 10 Dec 2024

Jean Louis Kananura

Answer1: I mentioned questionnaire for caregivers while the key informants interview were used for the key informants from the pediatric departments, and yes the qualitative findings were congruent with survey findings(and it has been addressed in manuscript)

Answer2: Semi-structured questionnaires were used on quantitative data collection and semi-structured interview were used on key informant (key informant interview),However it wasn't specified in manuscript, but it now has been addressed.

Answer3:The participants characteristics did not bi-furcate providers and caregivers because health care providers were not main part of the study , they were care giver. Health care provider served for gathering qualitative data in order to support the study

Answer4: No. The study was conducted in a Kenyan winter season (June, July) This The study is standard cross section study , proportion of febrile illness data was collected by considering if they had a fever within previous two weeks

Answer5: Depending on how questions were framed, all variables were perception based-data N.B:I have updated my conclusion and recommendation

Competing Interests: No competing interests were disclosed.

Reviewer Report 16 September 2024

https://doi.org/10.21956/openreseurope.19483.r43554

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Reviewer's report
Title: Appropriate and relevant
Authors name: Not uniformly written. All the three names of the first author were written fully while the other two authors' second names were abbreviated. The authors should choose and stick to only one format for writing all their names.
Abstract: Background and methods were well written. The 70.1% (The proportion of caregivers that reported seeking care for a child's fever within 24 hours) under results should be written in words since sentences are not started with figures. The conclusion contained only the recommendation for improving the situation without a summary of the findings. The authors should summarize the findings of the study in one sentence before giving the recommendation.
Introduction: Well written and captured the background information, the statement of the problem, the justification for the study and the objectives of the study.
Methods -
Study setting: Line 1- 'Its one seven sub-counties in Busia County...' should be corrected to It is one of the seven ...
Line 4 – ' It border the Republic of Uganda...' should be corrected to It borders the ....
Exclusion criteria: Authors should note that exclusion criteria are not the opposite of inclusion criteria rather they are the characteristics found in those included in the study that will lead to their being disqualified from participating in the study. The authors should correct the exclusion criteria appropriately and also provide their explanation for excluding care-givers who had lived in Busia County for less than two weeks before the study period from the study.
Sampling: The authors should clarify whether the three out of the six wards in Butula sub-county were selected at random or using simple random sampling technique.
Sample size determination: p should be the proportion or prevalence obtained for the outcome

variable (ie proportion of appropriate health seeking behavior for febrile illness in this instance) in a previous study rather than the prevalence of an attribute/disease (ie fever) in the population from previous studies used by authors. The authors should note this for subsequent studies.
The authors mentioned that they used the prevalence of 17% of children below five with a fever in the two weeks before the malaria survey (KDHS, 2022) for determining the sample size. But in the formula, p was equal to 0.20 instead of 0.17. The authors should provide an explanation for this.
Data collection and tools
Paragraph 2 line 5 – 'Tape recordings were used capture ...' should be corrected to Tape recordings were used to capture ....
Data management and analysis: Line 1 – 'Quantitative data was cleaed in Excel ..' should be corrected to Quantitative data was cleaned in Excel...
Line 4 - A binominal logistic regression analysis was used ..... and p-value less than 0.1. The authors should correct this or provide an explanation for why they used p-value less than 0.1 here to denote statistical significance instead of the desired level of precision at 0.05 that they mentioned in their sample size determination.
Results: The authors mentioned that 14 households had no one available during the survey. They should provide an explanation on what they did with those 14 households.
Table 1: Demographic characteristics of the respondents
The authors should explain why some of the figures were highlighted or written in bold in this table. For example – 44.6% for secondary education, 59% for self- employed, etc
16 (5.9%) of the respondents did not have any child less than 5 years, yet they were included in this study when the inclusion criterium was care-givers over 18 years with a child under five. The authors should provide an explanation for this.
Discussion: Line 1 – 'The aim of this study was to determine the prevalence of febrile illness among children under five years...' should be corrected to ... to determine the proportion of appropriate health-seeking behaviour for febrile illness among children under five years ....
Conclusion: Well written and drawn from the findings from the study.

Reviewer's impression – The article is well written and indexable. However, the authors need to address the issues raised above to make it more scientific.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public health, Health Systems Management

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 10 Dec 2024

Jean Louis Kananura

All comments are addressed in version 2(new version)

Competing Interests: No competing interests were disclosed.