

Health care seeking behavior among caregivers of sick children who had severe malarial anaemia

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This work was carried out in collaboration between all authors. Stacey Gondi designed the study, wrote the protocol, performed the statistical analysis, and wrote the first draft of the manuscript. Collins Ouma, Harrysone Atieli and Walter Otieno and performed the statistical analysis and managed the literature searches. All authors read and approved the final manuscript.

ABSTRACT

Aims:

The western region in Kenya is holoendemic to malaria and experience stable *P. falciparum* malaria transmission. The use of health care options has a direct influence on the outcome of severe malaria. As such, the current study will assess the health care seeking behavior among caregivers of sick children who had severe malarial anaemia (SMA) in western Kenya.

Study Design: Cross section study

Place and duration of study: The study was conducted at Jaramogi Odinga Oginga Teaching and Referral Hospital (JOOTRH) between September 2014 to July 2015.

Methodology: It was open to all children ≤ 10 years ($n=271$) admitted and diagnosed with SMA (hemoglobin <5.0 g/dl and any density of *P. falciparum* . Caregivers were interviewed on the health care options before seeking care at a health facility, when the child started to get sick, if they took child to another health centre/dispensary/private hospital before coming to JOOTRH

Results: Majority of the caregivers interviewed, 80.07% (217) had attained Primary education. Majority of the caregivers were in the age category of 19-24 75(27.67%) years and 25-29 years 75 (27.67%). 74.90% (203) of their children were below five years and 25.09% (68) were above 5 years. 61.62% (167) Majority of the caregivers gave some remainder drugs before presenting to a health facility 32.5% (88). A good number bought drugs at drug stores/pharmacies 27.7% (75). None visited a traditional healer. A minority used herbs 10% (27). There were no statistically significant differences between most of the pre-hospitalization measures taken with regard to patient's gender and age, and caretaker's level of education. Caretakers who chose to give herbs to their sick children took longer in deciding to take their children to hospital. This was however statistically significant between those who used herbs and those who bought drugs only (median 4 days vs. 3 days, respectively, $p = 0.0063$). There was no significant difference in the delay of child admission at JOOTRH between caretakers who had had primary education only and those with a minimum of secondary education ($p = 0.9842$).

CONCLUSION: Self-medication is a common practice before seeking care at a health facility. There is need for community awareness for correct and comprehensive information about drawbacks associated with self-medication practices. Since safety continues to be a major issue with the use of herbal remedies, it becomes imperative, therefore, that relevant regulatory authorities put in place to ensuring that all herbal medicines are safe and of suitable quality

Keywords: Children, severe malarial anemia, caregivers, health care seeking

22 1. INTRODUCTION

23

24 Malaria remains one of the most prevalent parasitic infections in sub-Saharan Africa. In
25 humans, it is caused by five Plasmodium species namely, *P. falciparum*, *P. vivax*, *P. ovale*, *P.*
26 *malariae* and *P. knowlesi*. Of these, *P. falciparum* is the major cause of severe morbidity and
27 mortality[1]. There is no doubt the importance of *P. falciparum* malaria as a major cause of
28 human suffering and economic drain across sub-Saharan Africa[2].

29 There were an estimated 219 million cases and 435 000 related deaths in 2017 worldwide.

30 Approximately 70% of the world's malaria burden is concentrated in 11 countries: 10 on the
31 African continent, plus India [3]

32 *P. falciparum*-related morbidity and mortality primarily occurs in immune-naïve infants and
33 young children [4]. Severe malaria presents with overlapping clinical sequelae that include
34 severe malarial anemia (SMA), metabolic acidosis, respiratory distress, cerebral malaria
35 (CM) and hypoglycemia [5]. In *P. falciparum* holoendemic transmission areas such as
36 western Kenya, severe malaria is a predominant cause of under-five morbidity and
37 mortality[6], presenting primarily as SMA (Hb<5.0 g/dL and any parasitemia)[7]. Caregivers
38 play a pivotal role in the provision and care for childhood diseases. Time of intervention and
39 quality of care received depends on the actions of the caregiver and ultimately determines the
40 outcome[8].

41 A study performed in Northwestern Nigeria [9] on children who had cerebral malaria
42 revealed that of the 33 cases that were in the study, 24(72.7%) utilized more than one health
43 care options before presenting to the health facility. Some of the health care options that
44 were used were patient medical services (PMS) i.e. individuals licensed to sell a limited
45 number of drugs. The time of presentation to the healthcare facility was also delayed with
46 25(75.8%) presenting to the health facility 2 days after the onset of the symptoms.

47 A focused group discussion in a study performed in rural Sudan also revealed that the
48 caregivers could correctly identify a child with severe malaria and the need to be attended to
49 by a health care worker, but on the other hand, any condition including severe malaria
50 irrespective of its severity if it begins at night, had to wait till morning, thus causing delay in
51 initiation of treatment [10].

52 Malaria treatment-seeking behaviors are also associated with socio-economic, demographic
53 and personal factors. Other important factors are proximity to health facilities, availability of
54 transportation, knowledge of malaria, a history of malaria, cultural beliefs regarding

55 traditional and herbal medicines, satisfaction with health services, and attitude towards health
56 care providers[11]

57 A study conducted in south western Uganda showed that the discerning between “traditional”
58 and “hospital” illnesses is one socio-cultural factor - contributing to delays in care for
59 children with severe malaria. Traditional illnesses were those believed to be caused through
60 bewitching, demons, family curses, or other factors that must be cured through herbal or
61 traditional treatments. In contrast, hospital illnesses were those requiring treatment with
62 western medicines for resolution. Of the families included in the study, 16 (21%) sought care
63 from a traditional healer prior to arrival in the facility. Many more guardians struggled with
64 the choice of whether to seek care initially from a traditional or allopathic provider[12].

65 The use of health care options has a direct influence on the outcome of severe malaria. As
66 such, the current study will assess the health care seeking behavior among caregivers of sick
67 children who had SMA in western Kenya so as to effectively develop interventions aimed at
68 reducing the burden of this preventable disease.

69 **2. MATERIAL AND METHODS**

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71 **2.1. Study site**

72 The study was conducted between September 2014 to July 2015 at Jaramogi Odinga Oginga
73 Teaching and Referral Hospital (JOOTRH) located in Nyanza region of western Kenya,
74 around L. Victoria. This region is holoendemic for malaria, and experiences stable *P.*
75 *falciparum* transmission (altitude 0-1300 meters). Data from Health Management Information
76 System in JOOTRH shows that malaria accounts for 40% of out-patient visits and 40% of
77 hospital in-patient admissions with between 10-15 paediatric cases of severe malaria often
78 complicated with anaemia and malnutrition, on a daily basis [13]. Malaria transmission
79 occurs all year round, peaking in the rainy season months of April and May and continuing to
80 August. The rainwater does expose a major reservoir for breeding of mosquitoes creating
81 persistent malaria endemic environment. The region experiences warm climate of 20-30°C
82 throughout the year. The humid, warm and mostly swampy environment makes the area a
83 prime breeding ground for the female anopheles mosquito, the vector for the malaria parasite
84 [14].

85 **2.2. Study design**

86 **2.2.1. Study site and population**

87 This was a hospital based cross-sectional study that targeted children 10 years and below
88 admitted and diagnosed with severe malarial anaemia (hemoglobin concentration <5.0 g/dl
89 and any density *P. falciparum* parasitaemia- based on WHO definition) [15], as well as their
90 caregivers. Participants were recruited at Jaramogi Oginga Odinga Teaching and Referral
91 Hospital (JOOTRH), the largest referral hospital in western Kenya that serves both the urban
92 and rural.

93 **2.2.2. Inclusion criteria**

94 All children the age of 10 years (inclusive) who were diagnosed to have SMA were
95 approached to participate in the study. All the caregivers of the children enrolled in the study
96 were also included in the study. The caregivers consented for their children to participate in
97 the study and also for themselves to be interviewed. All children had to be residents of
98 western Kenya. Only children admitted at JOOTRH with SMA were enrolled in the study.

99 **2.2.3. Exclusion criteria**

100 Children with known blood disorders like sickle cell trait were excluded from the study.
101 Those whose caregivers did not provide informed consent and children non-resident of
102 western Kenya were excluded.

103

104 **2.2.4. Sample size determination**

105 A total of 271 children were enrolled in the study.

106 Sample size was determined using this formular:

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$$n = \frac{Z^2 p(1-p)}{d^2}$$
 (Daniel, 1999, Naing, 2006)

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111 Where n is the required sample size, Z is the Z statistic for a level of confidence, P is the
112 expected prevalence or proportion (in proportion of one; if 20%, $P = 0.2$), and d is the
113 precision (in proportion of one; if 5%, $d = 0.05$).

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115 The prevalence of admission with inpatient malaria in the health facility was 20%, Z statistic
116 used was at 95% which is conventional with a Z value of 1.96 and the precision set at 0.05 so
117 as to obtain a confidence interval width of 10%.

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$$\frac{(1.96)^2 (0.2) (0.8)}{(0.05)^2} = 245.8$$

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122 This gave an estimate of 246 participants, plus 10% for non-response, giving a total of 271,
123 All the caregivers of the 271 children enrolled in the study were also be interviewed

124

125 **2.2.5 Sampling design**

126 Following the presentation of patients to the health facility, and subsequent diagnosis with
127 severe malaria anemia, the patients and their caregivers were consented to participate in the
128 study.

129 **2.3. Data Collection instruments/tools.**

130 Structured case report forms were used to collect data. Caregivers were interviewed on the
131 health care options they had in mind before taking their child to JOOTRH. The structured
132 questionnaire consisted of sections on: when the child became sick; if they took the child to
133 another health centre (dispensary or private hospital) before visiting JOOTRH; and what first
134 aid measures/ or what pre-hospital measures they performed to their sick child before visiting
135 JOOTRH.

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137 **2.4. Data Analysis**

138 The collected data was entered and stored on an excel spreadsheet. Statistical analysis was
139 performed using GraphPad Prism 5. Health seeking behavior among the caregivers was
140 determined by use of frequencies and comparing proportions. P-value less than 0.05 was
141 considered statistically significant for all the analyses performed.

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143 **3. RESULTS**

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145 A total of 271 caregivers of children presenting with severe malaria anemia were interviewed
146 for health care seeking behavior. Majority of the caregivers interviewed, 80.07% (217) had
147 attained Primary education. 14.76% (40), 4.79% (13), and 0.36% (1) had attained Secondary,
148 Tertiary, and University level of education, respectively.

149 Majority of the caregivers were in the age category of 19-24 years and 25-29 years 75%
150 (27.67) each. Caregivers below 18 years were the least 10% (3.69)
151 74.90% (203) of their children were below five years and 25.09% (68) were above 5 years.
152 61.62% (167) of their children were males and 38.37% (104) were females (Table 1)

153

154 Majority of the caregivers gave some remainder drugs before presenting to a health facility
155 32.5% (88). A good number also bought drugs at drug stores/pharmacies 27.7% (75). None
156 visited a traditional healer. A minority used herbs 10% (27). (Table 2)

157

158 Most caregivers went for health care management from community health worker's if the
159 patient was above 5 years before they presented to a health facility (26.9% vs. 15.2%, $p =$
160 0.0431). There were no statistically significant differences between most of the pre-
161 hospitalization measures taken by the caregivers with regard to patient's gender and age, and
162 caretaker's level of education. (Table 3)

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164 Caretakers who chose to give herbs to their sick children took longer in deciding to take their
165 children to hospital, thus delaying admission when compared to those who took other pre-
166 hospitalization measures. This was however statistically significant between those who used
167 herbs and those who bought drugs only (median 4 days vs. 3 days, respectively, $p = 0.0063$).
168 (Figure 1)

169

170 There was no significant difference in the delay of child admission at JOOTRH between
171 caretakers who had had primary education only and those with a minimum of secondary
172 education ($p = 0.9842$). (Figure 2)

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174 Majority of the respondents gave painkillers 58(65.9%). 14(15.9%) gave Anti-malarial drugs
175 while 13(14.7%) and 3 (3.4%) gave Antibiotics and iron supplements, respectively.

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183 **Table 1: Demographic characteristics of SMA patients and their caregivers**
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Variable	Frequency, n (%) N=271
Age of child with SMA	
< 5 years	203(74.90)
> 5 years	68(25.09)
Gender of child with SMA	
Male	167(61.62)
Female	104(38.37)
Age of caregivers (years) N = 271	
< 18	10(3.69)
19-24	75(27.67)
25-29	75(27.67)
30-34	57(21.03)
35-39	21(7.74)
> 40	33 (12.17)
Caregivers' level of education	
University	1(0.36)
Tertiary	13(4.79)
Secondary	40(14.76)
Primary	217(80.07)

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Table 2: Actions taken Pre-hospitalization

Pre-hospitalization measures	Frequency n (%), N = 271
Bought drugs at nearby drug store/private pharmacy	75(27.7)
Traditional healer	0(0)
Use herbs	27(10)
Community health worker	49(18.1)
Used remainder drugs	88(32.5)
No action taken	32(11.8)

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190 **Table 3: Association of caregivers' actions with regard to their level of education,**
 191 **patient's gender and patient's age before visiting JOOTRH**

Pre-hospitalization measures	Participant's demographics		
Patient's gender (N = 271)	Male (n)	Female (n)	p-value
Bought drugs at nearby drug store/private pharmacy	45(26.9%)	30(28.8%)	0.7807
Did not buy drugs	122	74	
Used herbs	16(9.6%)	11(10.6%)	0.8362
Did not use herbs	151	93	

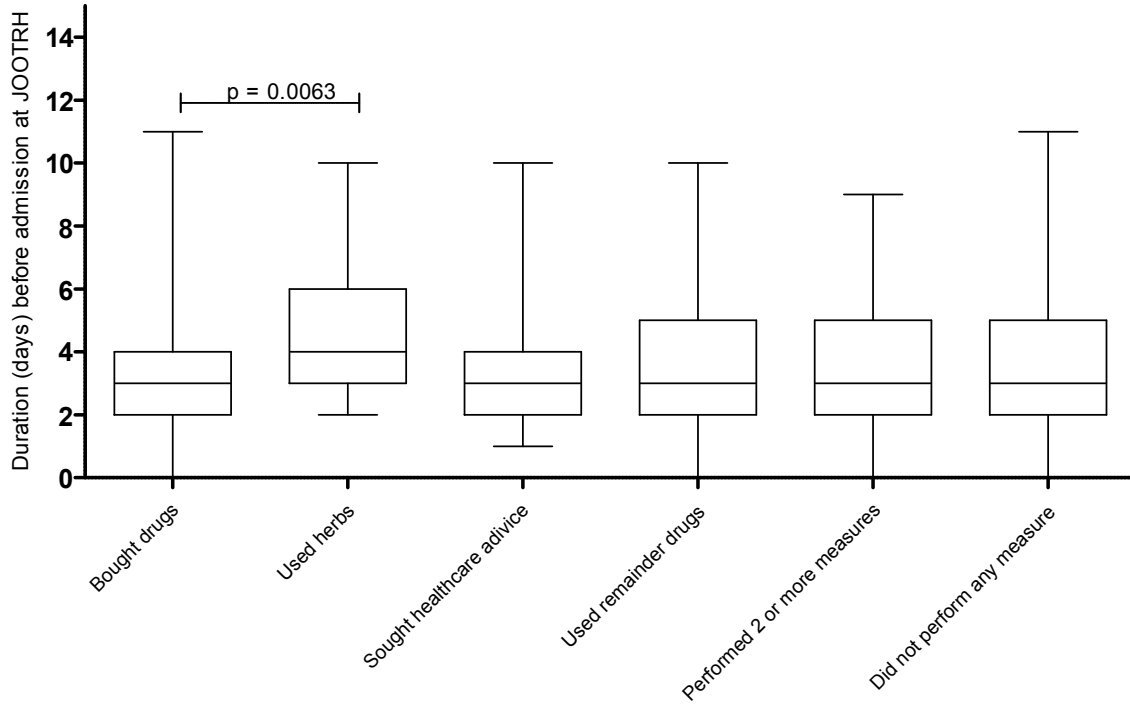
Sought community health worker's advice	25 (15.0%)	24(23.1%)	0.1054
Did not seek community health worker's advice	142	80	
Used remainder drugs	56(33.5%)	32(30.8%)	0.6899
Did not use remainder drugs	111	72	
Patient's age (N = 271)	<5 years (n)	≥5 years (n)	
Bought drugs at nearby drug store/private pharmacy	56(27.5)	19(28.4%)	0.8762
Did not buy drugs	148	48	
Used herbs	20(9.8%)	7(10.4%)	0.8186
Did not use herbs	184	60	
Sought community health worker's advice	31(15.2%)	18(26.9%)	0.0431
Did not seek community health worker's advice	173	49	
Used remainder drugs	69(33.8%)	19(28.4%)	0.4543
Did not use remainder drugs	135	48	
Caretaker's level of education (N = 271)	Attended primary education at maximum (n)	Attended secondary education at minimum (n)	
Bought drugs at nearby drug store/private pharmacy	60(27.6%)	15(27.8%)	1.0000
Did not buy drugs	157	39	
Used herbs	23(10.6%)	4(7.4%)	0.6162
Did not use herbs	194	50	
Sought community health worker's advice	36(16.6%)	13(24.1%)	0.2353
Did not seek community health worker's advice	181	41	
Used remainder drugs	68(31.3%)	20(37.0%)	0.4218
Did not use remainder drugs	149	34	

Table 3: Many of the patients investigated in this study (75.3%) were below the age of five years. The ratio of male to female patients was about 1.6 : 1. 80% of the caregivers had only attained primary education. Most caregivers sought community health worker's advice if the patient was above 5 years before they were admitted at JOOTRH (26.9% vs. 15.2%, p = 0.0431). There were no statistically significant differences between most of the pre-hospitalization measures taken by the caregivers with regard to patient's gender and age, and caretaker's level of education.

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Figure 1 Action taken pre-hospitalization and duration (days) before hospitalization

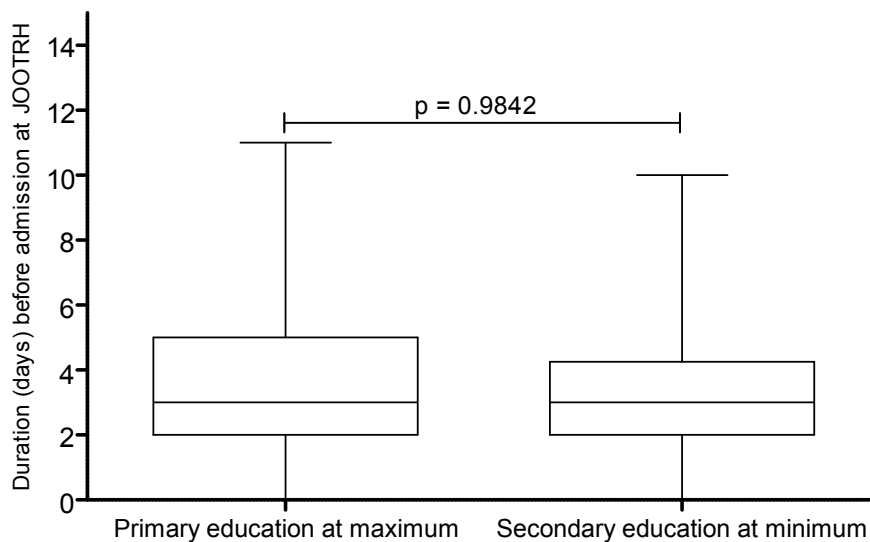


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Figure 1. Comparison of the number of days taken before child admission between participants who undertook various pre-hospitalization measures. Caretakers who chose to give herbs to their sick children took longer in deciding to take their children to hospital, thus delaying admission when compared to those who took other pre-hospitalization measures. This was however statistically significant between those who used herbs and those who bought drugs only (median 4 days vs. 3 days, respectively, $p = 0.0063$).

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Figures 2: Level of education and duration (days) taken before hospitalization



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Figure 2. Comparison of the number of days taken before child admission between caretakers who studied up to primary level versus those with secondary education at minimum. There was no significant difference in the delay of child admission at JOOTRH between caretakers who had had primary education only and those with a minimum of secondary education ($p = 0.9842$).

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4. DISCUSSION

252 Majority of the caregivers gave some remainder drugs before presenting to a health facility
253 32.5% (88). This implies that caregivers have some mini drug stores in their houses. The
254 drugs they had may have been for treating this child's previous ailment or for treating another
255 family member, and which raises a number of questions? Why did they not finish the dose?
256 Under what conditions were the drugs stored? What was the expiry date and did they check
257 that before administering the drug? What dose of the drug did they give? These are
258 fundamental drug administration issues that can affect the outcome of a disease. A study
259 done in northern Ethiopia revealed that most drugs kept at home were not appropriately
260 labeled and stored in a safe place.[16] The current study did not find out the how the labeling
261 was done and under what storage conditions the medicines were kept, but there could be
262 adverse outcomes if the findings in Northern Ethiopia were the same in this area.

263

264 The caretakers gave painkillers, 65.9%, anti-malarial, 15.9% and antibiotics 14.7%.

265 The source of these drugs was not establish in this study, but the drugs that the caregivers had
266 at home and gave the children may have come from initial excessive prescribing for
267 treatment, inadequate adherence to treatment and anticipated future use as was found in a
268 study in Iraq[17].

269 As in other studies, [18, 19] caregivers could effectively name the anti-malarial drug they
270 gave. ACT was the drug commonly used.

271 Majority of them gave pain killers. Pain killers relieve symptoms that can make a mother
272 not take her child to the hospital immediately thinking that they are improving but the disease
273 condition is progressing. Some gave anti- malarial assuming the child had malaria even
274 before doing a blood test to confirm diagnosis.

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276 A good number 27.7% also bought drugs at drug stores/pharmacies. Previous Studies[20, 21]
277 done have reported that the common reasons for self-medication were shortages of drugs at
278 health facilities, long waiting time at health facilities, long distance to health facilities,
279 inability to pay for health care charges and the freedom to choose the preferred drugs. These
280 may have also been the reasons in this study.

281 None visited a traditional healer. Other studies have reported low use of traditional healers as
282 it is at times associated with stigma hence those using them may not openly declare so[22].

283 We could not verify in this study if this was also the case.

284 A minority used herbs 10% .Herbal medicines can cause kidney failure and liver damage
285 because they contain toxic chemicals or heavy metals, or react harmfully with other
286 drugs[23]. The medications have not been documented and scientifically evaluated to
287 determine their efficacy and dosage vis-à-vis the alleged indications[23]. From my
288 personal experience when working at the pediatric emergency care room, children who had
289 history of having taken herbs and presenting with severe disease always had adverse
290 outcomes as compared to children with severe disease with no history of having have taken
291 herbs.

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293 There were no statistically significant differences between most of the pre-hospitalization
294 measures taken by the caregivers with regard to patient's gender and age, and caretaker's
295 level of education. This was a little bit different from the finding in a study done in rural
296 Tanzania[24] that revealed , the younger the child, the likelihood that care will be sought
297 from a health facility immediately. The study however was comparing the health seeking
298 behavior in children who were under 5 years old only whereby those below 1 year, care was

299 sort more from a health facility. Gender discrimination is seen within health seeking behavior
300 in other Sub-Saharan African countries [25], the current study revealed otherwise.

301

302 Caregivers who chose to give herbs to their sick children took longer in deciding to take their
303 children to hospital, thus delaying admission when compared to those who took other pre-
304 hospitalization measures. This finding is the same as was found in a study done in
305 Bangladesh that found that alternative medicine was 4 times more likely to cause delay in
306 health seeking. The study though was on breast cancer patients [26].

307

308 There was no significant difference in the delay of child admission at JOOTRH between
309 caretakers who had primary education only and those with a minimum of secondary
310 education. This was an interesting finding as it differs with other studies that have indicated
311 that parents who took their children earlier to the hospital had more education than parents
312 who took longer[8, 27]. The difference could be explained by the fact that the current study
313 did not have illiterate participants. Most of the mothers were also young mothers and
314 currently the government has been investing big in education access to all Kenyans[28].

315 **4. CONCLUSION**

316

317 This study demonstrated that self-medication is a common practice before seeking care at a
318 health facility. There is need for community awareness for correct and comprehensive
319 information about drawbacks associated with self-medication practices. Deliberate efforts by
320 the government and other stakeholders to improve health care services, particularly at
321 primary health care facilities will help to reduce self-medication practices.

322

323 Since safety continues to be a major issue with the use of herbal remedies, it becomes
324 imperative, therefore, that relevant regulatory authorities put in place appropriate measures to
325 protect public health by ensuring that all herbal medicines are safe and of suitable quality

326 This study explores the requirements of a successful home management strategy

327

328 **RECOMMENDATIONS**

329

330 The Ministry of Health and Civils Society Agencies need to educate and sensitize caregivers
331 of children 10 years and below on proper health seeking practices and the benefits that come
332 with them.

333 Proper health education should be given to the patients on a regular basis by the government
334 by adopting an educational attitude. This aspect is of particular importance with respect to the
335 self-medication of children by their parents or caregivers.

336

337 **ACKNOWLEDGEMENTS**

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339 funding for this study. GSK had no role in the study design, collection, analysis and
340 interpretation of data or in the writing of the manuscript.

341

342 **DISCLAIMER**

343

344 The findings and conclusions presented in this manuscript are those of the authors and do not
345 necessarily reflect the official position of Maseno University or JOOTRH. The
346 corresponding author had full access to the study data and had final responsibility for the
347 decision to submit for publication.

348 **ETHICAL APPROVAL**

349 Ethical approval was obtained from Maseno Ethical Review Committee
350 (MSU/DRPC.MUERC/00079/14 and Jaromogi Oginga Odinga Teaching and Referral
351 Hospital (JOORTH) ERC/1B/VOL.1/208 before the study begun.

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