

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. Caregivers 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 caregivers 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 ensure that all herbal medicines are safe and of suitable quality

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

1. INTRODUCTION

Malaria remains one of the most prevalent parasitic infections in sub-Saharan Africa. In humans, it is caused by five Plasmodium species namely, *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi* which is common in southeast Asia[1]. Of these, *P. falciparum* is the major cause of severe morbidity and mortality[2]. There is no doubt the importance of *P. falciparum* malaria as a major cause of human suffering and economic drain across sub-Saharan Africa[3].

There were an estimated 219 million cases and 435 000 related deaths in 2017 worldwide. Approximately 70% of the world's malaria burden is concentrated in 11 countries: 10 on the African continent, plus India [4]

P. falciparum-related morbidity and mortality primarily occurs in immune-naïve infants and young children [5]. Severe malaria presents with overlapping clinical sequelae that include severe malarial anemia (SMA), metabolic acidosis, respiratory distress, cerebral malaria (CM) and hypoglycemia [6]. In *P. falciparum* holoendemic transmission areas such as western Kenya, severe malaria is a predominant cause of under-five morbidity and mortality[7], presenting primarily as SMA (Hb<5.0 g/dL and any parasitemia)[8]. Normal Hb values for children is 9.0-15.0g/dl. [9]Caregivers play a pivotal role in the provision and care for childhood diseases. Time of intervention and quality of care received depends on the actions of the caregiver and ultimately determines the outcome[10].

A study performed in Northwestern Nigeria [11] on children who had cerebral malaria revealed that of the 33 cases that were in the study, 24(72.7%) utilized more than one health care options before presenting to the health facility. Some of the health care options that were used were patient medical services (PMS) i.e. individuals licensed to sell a limited number of drugs. The time of presentation to the healthcare facility was also delayed with 25(75.8%) presenting to the health facility 2 days after the onset of the symptoms.

A focused group discussion in a study performed in rural Sudan also revealed that the caregivers could correctly identify a child with severe malaria and the need to be attended to by a health care worker, but on the other hand, any condition including severe malaria irrespective of its severity if it begins at night, had to wait till morning, thus causing delay in initiation of treatment [12].

Malaria treatment-seeking behaviors are also associated with socio-economic, demographic and personal factors. Other important factors are proximity to health facilities, availability of

55 transportation, knowledge of malaria, a history of malaria, cultural beliefs regarding
56 traditional and herbal medicines, satisfaction with health services, and attitude towards health
57 care providers[13]

58 A study conducted in south western Uganda showed that the discerning between “traditional”
59 and “hospital” illnesses is one socio-cultural factor - contributing to delays in care for
60 children with severe malaria. Traditional illnesses were those believed to be caused through
61 bewitching, demons, family curses, or other factors that must be cured through herbal or
62 traditional treatments. In contrast, hospital illnesses were those requiring treatment with
63 western medicines for resolution. Of the families included in the study, 16 (21%) sought care
64 from a traditional healer prior to arrival in the facility. Many more guardians struggled with
65 the choice of whether to seek care initially from a traditional or allopathic provider[14].

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

70 **2. MATERIAL AND METHODS**

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72 **2.1. Study site**

73 The study was conducted between September 2014 to July 2015 at Jaramogi Odinga Oginga
74 Teaching and Referral Hospital (JOOTRH) located in Nyanza region of western Kenya,
75 around L. Victoria. This region is holoendemic for malaria, and experiences stable *P.*
76 *falciparum* transmission (altitude 0-1300 meters). Data from Health Management Information
77 System in JOOTRH shows that malaria accounts for 40% of out-patient visits and 40% of
78 hospital in-patient admissions with between 10-15 pediatric cases of severe malaria often
79 complicated with anaemia and malnutrition, on a daily basis [15]. Malaria transmission
80 occurs all year round, peaking in the rainy season months of April and May and continuing to
81 August. The rainwater does expose a major reservoir for breeding of mosquitoes creating
82 persistent malaria endemic environment. The region experiences warm climate of 20-30°C
83 throughout the year. The humid, warm and mostly swampy environment makes the area a
84 prime breeding ground for the female anopheles mosquito, the vector for the malaria parasite
85 [16].

2.2. Study design

2.2.1. Study site and population

This was a hospital based cross-sectional study that targeted children 10 years and below admitted and diagnosed with severe malarial anaemia (hemoglobin concentration <5.0 g/dl and any density *P. falciparum* parasitaemia- based on WHO definition) [17], as well as their caregivers. Participants were recruited at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), the largest referral hospital in western Kenya that serves both the urban and rural.

2.2.2. Inclusion criteria

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

2.2.3. Exclusion criteria

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

2.2.4. Sample size determination

A total of 271 children were enrolled in the study.

Sample size was determined using this formulaF:

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

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

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

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

This gave an estimate of 246 participants, plus 10% for non-response, giving a total of 271, The caregivers of the children were also interviewed as part of the study.

2.2.5 Sampling design

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

2.3. Data Collection instruments/tools.

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

2.4. Data Analysis

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

3. RESULTS

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

Majority of the caregivers were in the age category of 19-24 years and 25-29 years 75% (27.67) each. Caregivers below 18 years were the least 10% (3.69)

Majority of the children were below 5 years 74.90% (203). Those above 5 years were 68(25.09) . Mean age of the children was 39 months.

There were more male children than female at 167(61.62) and 104(38.37) respectively.

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

Most caregivers went for health care management from community health worker's if the patient was above 5 years before they presented to a health facility (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. The varied educational status of the caregivers did not statistically impact the child's intervention or treatment . (Table 3)

Caregivers 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, $p = 0.0063$). (Figure 1)

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

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

Table 1: Demographic characteristics of SMA patients and their caregivers

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)

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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195 **Table 3: Association of caregivers' actions with regard to their level of education,**
 196 **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

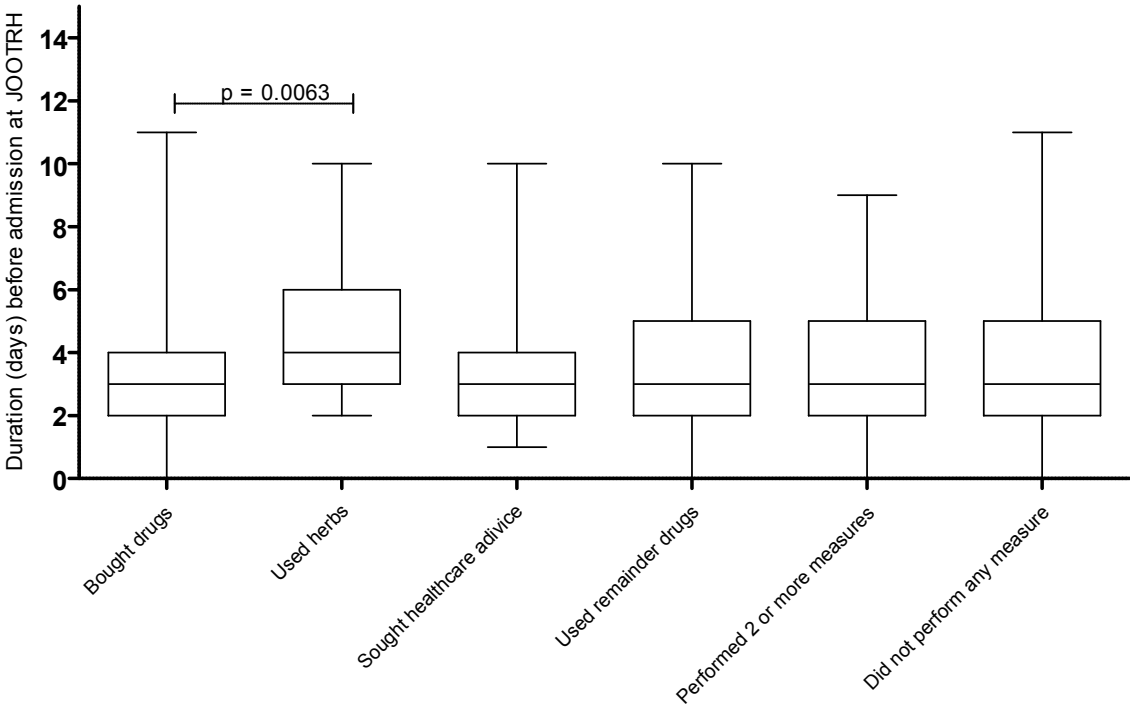


Figure 1. Comparison of the number of days taken before child admission between participants who undertook various pre-hospitalization measures. Caregivers who chose to give herbs to their sick children took longer in deciding to take their children to hospital, thus delaying admission when compared 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, $p = 0.0063$).

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

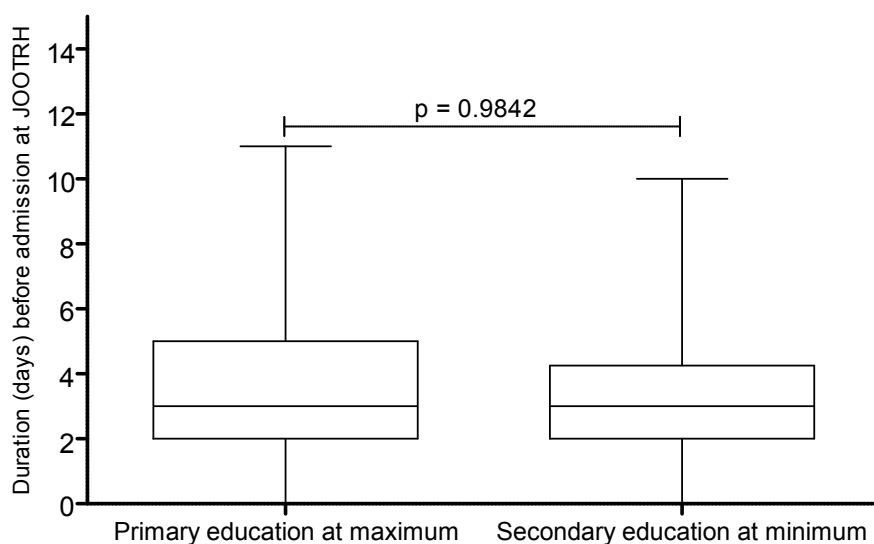


Figure 2. Comparison of the number of days taken before child admission between caregivers who studied up to primary level versus those with secondary education at minimum. There was no significant difference in the delay of child admission at JOOTRH between caregivers who had had primary education only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

4. DISCUSSION

Majority of the caregivers gave some remainder drugs before presenting to a health facility 32.5% (88). This implies that caregivers have some mini drug stores in their houses. The drugs they had may have been for treating this child's previous ailment or for treating another family member, and which raises a number of questions? Why did they not finish the dose? Under what conditions were the drugs stored? What was the expiry date and did they check

that before administering the drug? What dose of the drug did they give? These are fundamental drug administration issues that can affect the outcome of a disease. A study done in northern Ethiopia revealed that most drugs kept at home were not appropriately labeled and stored in a safe place.[18] The current study did not find out the how the labeling was done and under what storage conditions the medicines were kept, but there could be adverse outcomes if the findings in Northern Ethiopia were the same in this area.

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

The source of these drugs was not established in this study, but the drugs that the caregivers had at home and gave the children may have come from initial excessive prescribing for treatment, inadequate adherence to treatment and anticipated future use as was found in a study in Iraq[19].

As in other studies, [20, 21] caregivers could effectively name the anti-malarial drug they gave. ACT was the drug commonly used.

A majority of the caregivers also gave their children pain killers which could mask the ongoing disease process. Pain killers relieve symptoms that can make a caregiver not take her child to the hospital immediately thinking that they are improving but the disease condition is progressing. Anti-malarials were also given without malaria confirmatory tests.

A good number 27.7% also bought drugs at drug stores/pharmacies. Previous Studies[22, 23] done have reported that the common reasons for self-medication were shortages of drugs at health facilities, long waiting time at health facilities, long distance to health facilities, inability to pay for health care charges and the freedom to choose the preferred drugs. These may have also been the reasons in this study.

None visited a traditional healer. Other studies have reported low use of traditional healers as it is at times associated with stigma hence those using them may not openly declare so[24].

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

A minority used herbs 10%. Herbal medicines can cause kidney failure and liver damage because they contain toxic chemicals or heavy metals, or react harmfully with other drugs[25]. The medications have not been documented and scientifically evaluated to determine their efficacy and dosage vis-à-vis the alleged indications[25]. From my personal experience when working at the pediatric emergency care room, children who had history of having taken herbs and presenting with severe disease always had adverse

outcomes as compared to children with severe disease with no history of having have taken herbs.

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. This was a little bit different from the finding in a study done in rural Tanzania[26] that revealed , the younger the child, the likelihood that care will be sought from a heath facility immediately. The study however was comparing the heath seeking behavior in children who were under 5 years old only whereby those below 1 year, care was sort more from a heath facility. Gender discrimination is seen within health seeking behavior in other Sub-Saharan African countries [27], the current study revealed otherwise.

Caregivers 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 finding is the same as was found in a study done in Bangladesh that found that alternative medicine was 4 times more likely to cause delay in health seeking. The study though was on breast cancer patients [28].

There was no significant difference in the delay of child admission at JOOTRH between caregivers who had primary education only and those with a minimum of secondary education. This was an interesting finding as it differs with other studies that have indicated that parents who took their children earlier to the hospital had more education than parents who took longer[10, 29]. The difference could be explained by the fact that the current study did not have illiterate participants. Most of the mothers were also young mothers and currently the government has been investing big in education access to all Kenyans[30].

4. CONCLUSION

This study demonstrated that 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. Deliberate efforts by the government and other stakeholders to improve health care services, particularly at primary health care facilities will help to reduce 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 appropriate measures to protect public health by ensuring that all herbal medicines are safe and of suitable quality

This study explores the requirements of a successful home management strategy

RECOMMENDATIONS

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

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

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DISCLAIMER

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

ETHICAL APPROVAL

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

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