

Supporting formal education to improve quality of health care provided by mothers of children with malaria in rural western Kenya

Rose Kakai¹, Diana Menya², Wilson Odero¹

¹Maseno University, School of Public Health and Community Development, P.O. Box 333 - 40105, Maseno, Kenya

²Moi University, School of Public Health, P.O. box 4606 - 30100, Eldoret, Kenya

Abstract

Background: Home management of malaria (HMM) has been shown to be an effective strategy for reducing childhood mortality from malaria. The direct and especially indirect costs of seeking health care from formal facilities may be substantial, providing a major barrier for many households. Further evaluations of HMM and community-based utilization of available options will help to optimize treatment strategies and maximize health benefits. The purpose of this study was to determine the effect of education, occupation, and family income on the choice of health care options for malaria.

Methodology: This was a cross-sectional, community-based study conducted between November 2007 and December 2007, using quantitative data collection methods. Mothers of children aged younger than five years were interviewed using a questionnaire to elicit responses on the mothers' level of education, occupation, income and malaria health care options.

Results: A total of 240 mothers of children aged younger than 5 years were interviewed between November and December, 2007. There was a direct relationship between formal education and occupation. The mean monthly family income was highest among those employed (KSh. 14,421) followed by businesswomen (KSh. 3,106) and farmers (KSh. 1,827) respectively ($p < 0.01$). Those employed were more likely to take their ill children to a health facility ($p = 0.05$) or choose an antimalarial drug for home treatment.

Conclusion: Supporting formal education may scale up the income of family health care providers and improve the quality of HMM among children living in rural communities.

Key words: Malaria, formal education, health care

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Introduction

Malaria is mainly a disease of the poor. It accounts for about 25% of all deaths in children under the age of five on the African continent [1]. However, it is a curable disease if treated adequately and promptly. In many temperate areas, such as Western Europe and the United States of America, public health measures and economic development have been successful in achieving near or complete elimination of the disease, other than cases imported via international travel [2]. There are a number of ways to decrease malaria transmission but none currently offers a complete block; therefore, new methods are urgently required [3]. Home management of malaria has been shown to be an effective strategy for reducing childhood mortality from malaria. The direct and especially indirect costs of seeking health care from formal facilities may be substantial, providing a major barrier for many households. In most communities, net use is lowest among the poorest. A survey to evaluate home management practices towards malaria among heads

of households undertaken at the residential quarters of the University of Benin, Benin City, Nigeria, showed that knowledge of the cause of malaria was poor. However, knowledge improved with increase in level of education [4]. Although higher levels of education were associated with improved knowledge and practice about the appropriate strategies for the prevention and treatment of malaria, the role of education and income on the choice of health care options has been less well documented. Further evaluations of home management of malaria and community-based utilization of available options will help to optimize treatment strategies and maximize health benefits. In this paper, the effect of mothers' education on occupation and income and the choice of malaria health care strategy among children younger than five years of age in a rural community in Kenya are examined. The purpose of this study is to determine the role of formal education on occupation and family income as determinants of the choice of health care option for malaria.

Table 1. Mothers' demographic characteristics.

Occupation	Number (%) of mothers' highest level of education				Total N = 242
	Post secondary N = 11 (4.5)	Secondary N = 82 (33.9)	Primary N = 139 (57.4)	No formal education N = 10 (4.1)	
Employed	10 (90.9)	10 (12.2)	1 (0.7)	0	21 (8.7)
Business	0	13 (15.9)	19 (13.7)	0	32 (13.2)
Farming	1 (9.1)	59 (72)	119 (85.6)	10 (100)	189 (78.1)
Mean income (KSh)	18,500	2,861	2,099	1,312	
Mean age (yrs)	33.6	29.6	32	40.9	

KSh = Kenya Shillings, 1 US\$ = KSh. 70, N = Number, Businesswomen = self-employed in the informal sector, Employed = receiving regular salary from the formal sector

Materials and Methods

Study setting

The study was conducted in Bokoli location, Webuye division of Bungoma East District, Western Kenya. The area is located approximately 100 kilometers north of Lake Victoria. The location comprises of four sub-locations namely Bokoli, Miendo, Matisi and Mahanga. The study site, Bokoli sub-location, which is predominantly rural, has 15 villages and lies within a malaria endemic region. There is only one government health centre. The annual temperatures range from 21°C to 25°C and rainfall from 1,600 mm to 2,000 mm. According to the 1999 census, it has a population of 6,166 (2,942 males and 3,224 females) within an area coverage of 15.4km². There are approximately 400 homesteads with 1,158 households. The majority of the residents practice subsistence farming with sugarcane as the main cash crop. There are two main rivers, Kuywa and Bokoli, which flow across the study area.

Study design

A community-based, cross-sectional study was conducted between November 2007 and December 2007, using quantitative data collection techniques.

Sampling procedure

The study site was selected by purposive sampling because it has a high prevalence of malaria and there is a government health facility within the location. From every fourth household, study subjects were selected randomly from mothers of children aged 5 years and younger. The selection of mothers continued until applicable subjects were found in line with the above-mentioned rule and the target total number of respondents (240) was secured. The disease was classified as "malaria" based on self-diagnosis according to the community members' own perception.

Data collection

Research assistants were trained on how to conduct interviews. Mothers of children aged younger than 5 years were interviewed using a semi-structured questionnaire to elicit responses on the mothers' age, level of education, occupation, income and choice of malaria health care option. Their responses represent their previous experience in general. Those who could not provide the required information or refused to consent were excluded. To improve validity, the semi-structured questionnaire was pre-tested before data collection.

Data management and statistical analysis

Quantitative data from the questionnaires was entered into Statistical Package for Social Scientists (SPSS version 14), checked for consistency, and analysed using descriptive statistics and One-Way analysis of variance. Association was established using chi-square test for statistical significance at 95% confidence level.

Ethical considerations

Permission to conduct the research was sought from Maseno University School of Graduate Studies, Medical Officer of Health, Bungoma East District and the Local Administration. Informed consent was sought from all the participants.

Results

A total of 242 mothers of children aged younger than five years were interviewed between November 2007 and December 2007. All the respondents were female with a mean age of 31.6 years (range = 18 to 56 years; median = 30 years; mode = 22 years). Out of these, 139 (57.4%) had completed primary level of education followed by 82 (33.9%) secondary, 11 (4.5%) postsecondary and 10 (4.1%) with no formal education (Table 1). The mean age for the mothers with postsecondary, secondary, primary and no education was 33.6, 29.6, 32 and 40.9 years,

Table 2. Relationship between education and drugs used when the child has malaria.

Drugs used	Number (%) of mothers' highest level of education				Total
	Post secondary	Secondary	Primary	No formal education	
Anti-malaria	1 (25)	5 (11)	16 (14.8)	0	22 (13.2)
Others	3 (75)	42 (89)	92 (85.2)	8 (100)	145 (86.8)
Total	4	47	108	8	167
Anti-malaria					
Amodiaquine	0	3 (60)	5 (31.3)	0	8 (36.4)
Chloroquine	0	2 (40)	5 (31.3)	0	7 (31.8)
Fansidar	1 (100)	0	2 (12.5)	0	3 (13.6)
Others	0	0	4 (25)	0	4 (18.2)
Total	1	5	16	0	22
Others					
Paracetamol	3 (100)	36 (85.7)	85 (92.4)	8 (100)	132 (91)
Septin	0	3 (7.1)	4 (4.3)	0	7 (4.8)
Amoxil	0	2 (4.8)	1 (1.1)	0	3 (2.1)
Others	0	1 (2.4)	2 (2.2)	0	3 (2.1)
Total	3	42	92	8	145

P=NS

respectively ($p = 0.03$). Most of the respondents practiced small-scale subsistence and sugarcane farming (78.1%) followed by small scale-businesses (13.2%) and employment (8.7%).

There was a direct relationship between formal education and occupation. Those with the highest level of education (90.9%) were more likely to be employed (Table 1), while all of those with no formal education were unemployed. Only one mother with postsecondary education who was unemployed had recently completed university and was doing farming. Mean income in Kenya shillings (KSh.) was dependent on level of education as follows: 18,500 for post secondary; 2,861 secondary; 2,099 primary; and 1,312 for those with no formal education ($p < 0.01$). Likewise, the mean monthly family income was highest among those employed (KSh. 14,421) followed by businesswomen (KSh. 3,106) and farmers (KSh. 1,827) respectively ($p < 0.01$). The majority of those employed 16/20 (80%) were teachers.

Out of the mothers surveyed, 114/242 (47.1%) reported they had children with malaria within the previous two months before this study. There was an inverse relationship between education and action taken when child has malaria (Figure 1). Whereas the first action to take the ill child to hospital decreased with decreasing level of education, that of using other

methods increased with decreasing level of education ($p = 0.08$, NS). On the other hand, if the children did not recover, almost all the caregivers ($> 80\%$), irrespective of education level, had a tendency to take their children to hospital.

Sixty-eight out of 242 (28.1%) preferred to take their children with malaria to a health facility as their first action. Figure 2 shows that out of the 68 mothers, those employed (47.6%) were more likely to take their ill children to a health facility compared to businesswomen (43.8%) and farmers (23.3%), while the reverse applied to other options ($p = 0.01$). When asked which drugs they would use to treat their children for malaria, 9/21 (42.9%) employed mothers chose antimalaria drugs compared to 13/32 (37.5%) businesswomen and 60/189 (31.7%) farmers. Thus employed mothers were also more likely to choose an antimalarial drug for home treatment although this was not statistically significant.

Results shown in Table 2 indicate that out of 167 mothers who did not take their children to hospital as their first action, only 22 (13.2%) used antimalaria drugs. Among the anti-malarial drugs used, amodiaquine (36.4%) and chloroquine (31.8%) were the most common ($p = NS$). The remaining 145 (86.8%) mothers mainly used paracetamol for treatment of malaria irrespective of their education level. However, it was noted that all the mothers with

Figure 1. Relationship between level of education and action taken when child has malaria.

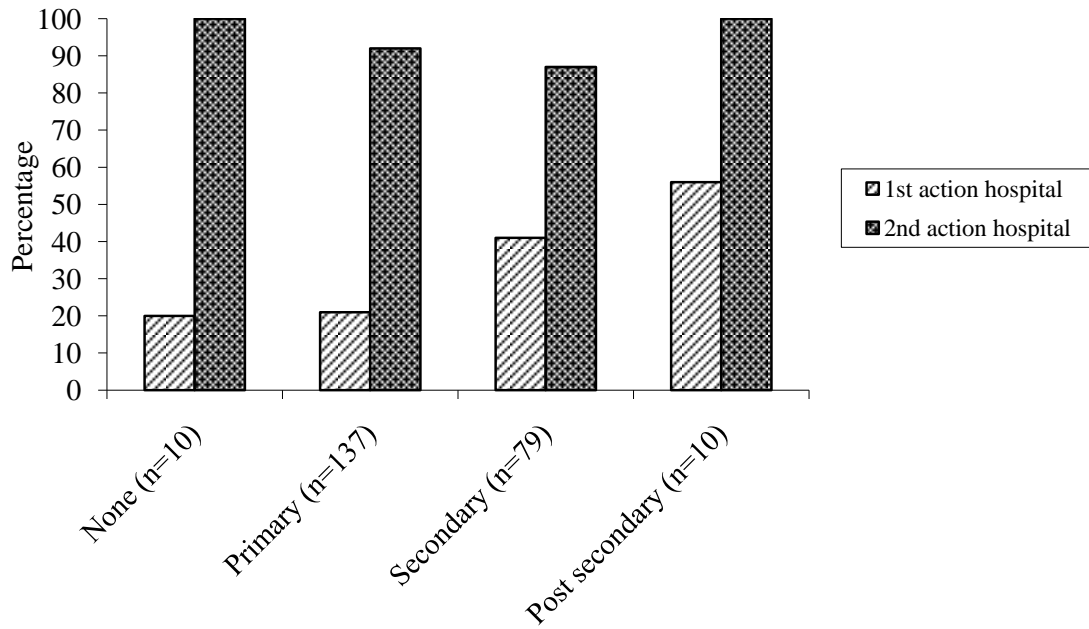
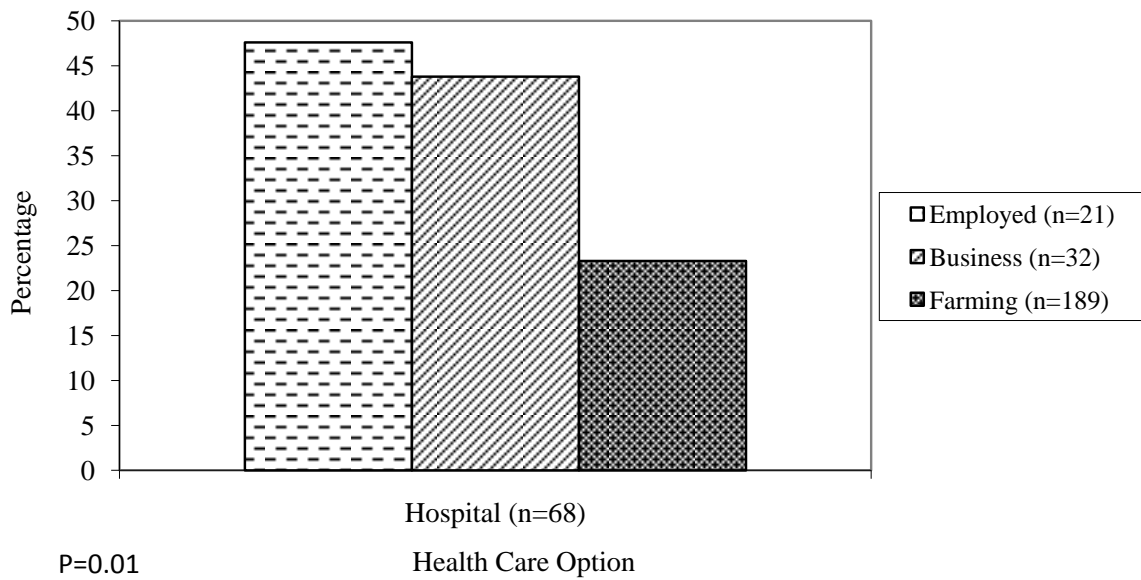


Figure 2. Relationship between occupation and first action taken when child has malaria.



no formal education chose to use paracetamol and none used any antimalaria drug. The mean income for those who took their children to hospital (KShs.) was higher than those who did not (KShs. 3505 vs. 2676, $p = 0.3$, NS).

Discussion

Education can have a positive impact on the malaria burden and medium or long-term improvement of overall literacy rates [5]. Those who have acquired education are better able to comprehend ideas. Women are the custodians of family healthcare. They are also the least educated. In our study, all the respondents were women, the majority of whom had completed only up to the primary level of education.

First action taken by the mothers when the child had malaria differed with the level of education. Those with post secondary education were more likely to take their child to hospital than take any other action, while those with no formal education were more likely to take other action rather than hospital. The critical point appears to be acquisition of secondary education. However, if the child did not recover, almost all the respondents chose to take their children to hospital irrespective of their level of education. In Nigeria, complicated malaria was associated with the increasing number of days before presentation at a health facility and delay in the use of anti-malarials [6]. The nearer the treatment venue is to the home the more likely the treatment will start early. The earlier the treatment starts after diagnosis of signs/symptoms of the disease, the better for reduction of complications and eventual death. This all important malaria control strategy lies in the hands of lay people (mothers and care givers) in the community who would usually commence treatment at home. Finding that only 13.2% of mothers in our study who did not take their children to hospital used anti-malaria drug is of main concern. There is therefore need to educate all strata of the society on the importance of taking children to hospital promptly in order to reduce the impact of the disease.

The mean monthly income was directly linked to the level of education such that the higher the education level, the higher the chances of being employed, and the higher the income. Those employed were more likely to take their ill children to a health facility or choose an anti-malaria drug for home treatment. Home management of malaria is an

important strategy that needs to be sustained. However, inadequate treatment regimen remains a hindrance to the success of this vital control effort. Persistent incorrect administration of common anti-malarials continues to pose a huge problem in the efforts towards effective control of malaria [7]. In our study, paracetamol (analgesic) was the most commonly used drug as first action to treat malaria in children, thereby causing further delay in seeking appropriate treatment. This is similar to a study in Nigeria in which low level of knowledge about the cause of malaria among residents in an academic community was an indication that outside the area of specialization, individuals do not show interest even in matters affecting their health [4].

Malaria imposes substantial costs to both individuals and governments. Costs to individuals and their families include: purchase of drugs for treating malaria at home; expenses for travel to, and treatment at, dispensaries and clinics. Such costs can add substantially to the economic burden of malaria on families in endemic countries and impede their economic growth. Previous studies in Kenya have shown that children whose mothers were educated to secondary level or above were twice as likely to use nets purchased from the retail sector compared to mothers who had no formal education [8]. In our study, those employed were more likely to take their ill children to a health facility. It was not clear if this was because they had a medical cover/insurance from their employer or they could afford to pay for the services. Economic constraints on those unemployed probably diminish their capacity to access health care services for their children. More formative research is required to establish whether this is true and whether in the face of a newly established policy for universal free primary and secondary education in Kenya, this might change. This is likely to improve accessibility and affordability of health services to a larger sector of the rural poor. Investing in formal education as a strategy for malaria control may offer an opportunity for a new solution to an old problem. Further evaluations of home management of malaria and community-based utilization of available options will help to optimize treatment strategies and maximize health benefits.

Conclusion

Ensuring equitable access to education and basic health services for malaria control and management must remain a priority. Supporting formal education

may scale up the income of family health care providers and improve the quality of home management of malaria among children living in rural communities.

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Corresponding Author

Dr. Rose Kakai

Maseno University, School of Public Health and Community Development

P.O. Box 333 - 40105, Maseno, Kenya

Tel.: 254 725 980935

E-mail: kakairm@yahoo.com

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