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Delay in care seeking for children aged five and under with fever in the malaria endemic setting of rural Malawi

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DELAY IN CARE SEEKING FOR CHILDREN AGED FIVE AND UNDER WITH FEVER IN THE MALARIA ENDEMIC SETTING OF RURAL MALAWI

by

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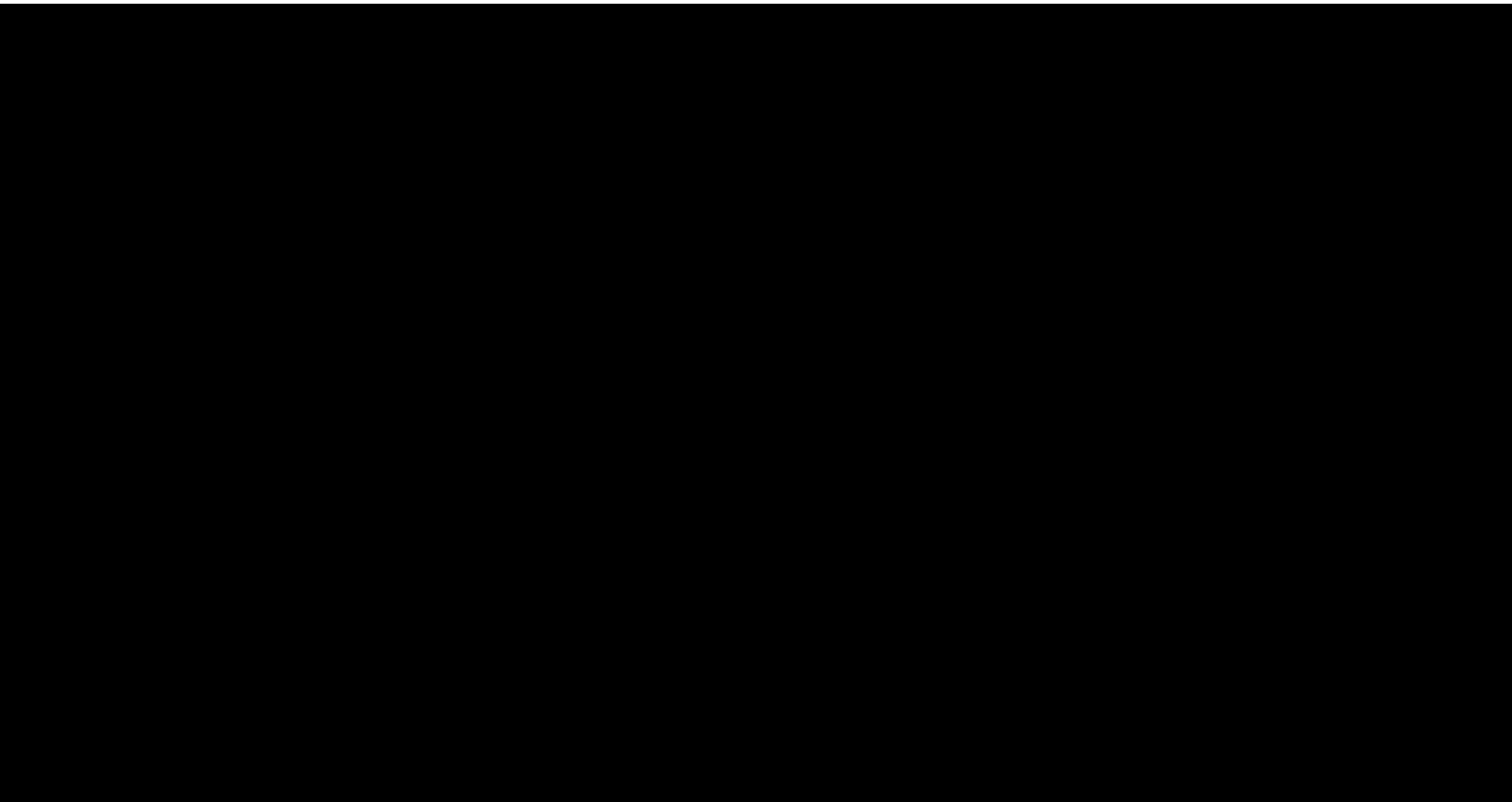

DELAY IN CARE SEEKING FOR CHILDREN AGED FIVE AND UNDER WITH FEVER IN THE MALARIA ENDEMIC SETTING OF RURAL MALAWI

Irene Ritterman

ABSTRACT

The purpose of this retrospective descriptive study is to examine the factors associated with delay in seeking care among residents in the Mulanje District of rural Southern Malawi, who have febrile children aged five and under. This study will contribute to the literature on care seeking and malaria. It will also help inform public health efforts and health care delivery programs in rural Malawi. A cross-sectional household demographic health survey was conducted in June 2013 and January 2014. Survey data included information on 589 households. The study sample was a subset of families whose youngest child, aged five and under, had experienced a fever in the three months prior to the survey. The dependent variable was binary and defined as timing of care seeking following fever onset. Care seeking was considered delayed when it occurred more than twenty-four hours after fever onset and prompt when it occurred within twenty-four hours of fever onset. Associations between the dependent variable and a number of explanatory variables were explored in the analysis. Data were cleaned and analyzed using STATA 13. The final study sample included 196 families. Eighty-four percent of respondents sought care for their febrile children within 24 hours and 16% delayed care seeking. Overall, participants in the two care seeking groups were found to be similar in terms of median household size, mother's age, marital status, and level of education, access to care, and travel time walking to source of care. However, the group who sought care promptly appeared to be better off socioeconomically than the group who delayed care seeking, based on a

multidimensional poverty index. Eighty-seven percent of the total study population owned at least one mosquito net and 78% had comprehensive malaria knowledge. Only one variable approached statistical significance: naming fever as a sign of malaria ($p = .06$). Based on the results, it appeared that knowing fever is a sign of malaria made families more likely to delay care seeking. This study found that families who promptly sought care and those who delayed care seeking were similar based on the majority of examined explanatory variables. One possible explanation for why people delayed care seeking, despite having a high level of comprehensive malaria knowledge, is that the fever was not perceived as being severe enough to be malaria or warrant care seeking. The primary limitation in the study was the small sample size. This study suggests that public health efforts in the malaria endemic region of rural Malawi should incorporate education on the potential severity of malaria among children five and under and the importance of prompt care seeking, regardless of perceived severity. Nurses can play an important role by advocating for systemic changes to help relieve barriers to care seeking for families.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

In Malawi, malaria is the leading cause of death in children under five years of age, accounting for 17% of mortality in this population (Malawi Ministry of Health, 2011; World Health Organization [WHO], 2014) . A common first sign of potential malaria infection is fever. Therefore, prompt care seeking for children with fever is critical to ensure child health and survival (Littrell et al., 2011; Malawi Ministry of Health, 2015). The globally agreed-upon goal for proper malaria case management is that diagnosis and effective treatment be achieved within 24 hours of symptom onset. Prompt care seeking that leads to early diagnosis and effective treatment can cure malarial infection, thereby preventing progression to severe disease and death. It can also prevent transmission (Breman et al., 2006).

Not only is prompt care seeking important for malaria specifically, but also for childhood illness in general. The WHO and the United Nations Children's Fund (UNICEF) mentioned disease recognition and care seeking as important factors for improving family and community health practices in their Integrated Management of Childhood Illness (IMCI) Strategy (WHO, 2015) . In addition, the WHO has identified the investigation of barriers to health care seeking and access as the highest research priority for reducing child mortality worldwide (Geldsetzer et al., 2014). Efforts to understand care seeking behavior and promote prompt care seeking also contribute to the achievement of United Nations Sustainable Development Goal #3, which is to ensure healthy lives and promote wellbeing for all at all ages. By the end of 2015, the Sustainable Development Goals will replace the Millennium Development Goals, thus guiding international development over the next fifteen years (Open Working Group of the General Assembly on Sustainable Development Goals, 2014).

Despite the understanding that prompt care seeking is important for child survival, many families face limitations in their ability to promptly seek care for their children under age five with fever (Bedford & Sharkey, 2014) . Some common reasons for delayed care seeking are living far away from a clinic or hospital, financial cost of transportation to a medical facility, health care fees, the inability to take time away from work or other family obligations, lack of knowledge around when to seek care, bad experiences with or lack of faith in the health care system, and a preference for traditional or spiritual healers (Bedford & Sharkey, 2014) .

A survey of the literature on timing of care seeking for children under age five with fever revealed common themes. Since a frequent and serious cause of fever in young children worldwide is malaria, much of the literature on this topic explored barriers to care seeking in the context of this disease.

Malaria knowledge

Prompt care seeking in malaria endemic areas is crucial to successful outcomes and has been associated with knowledge about malaria, especially the recognition of fever as an important sign of the disease that signifies the need to seek care as soon as possible. A study from Malawi, using data from the 2012 Malaria Indicator Survey, found that caregivers who knew that fever was a danger sign of malaria sought care for their febrile children under age five two days sooner than caregivers who did not. This difference in timing between the two groups was found to be statistically significant using negative binomial regression ($p < .01$; Oyekale, 2015) .

A study at a Nigerian antenatal care clinic measured the effects of exposure to malaria-related health education and empowerment on pregnant women's malaria knowledge and treatment practice. Investigators found that the number of women who reported visiting a health

center for suspected malaria increased from 35.4% at the beginning of antenatal care to 43.3% a few months before delivery, although this change was not statistically significant (Iriemenam, Dosunmu, Oyibo, & Fagbenro-Beyioku, 2011) .

Physical and geographical barriers to care

Physical and geographical barriers, such as distance from or travel time to the nearest health facility, were commonly cited in the literature as reasons for delaying care seeking or for neglecting to seek care for children under age five with fever (Alegana et al., 2012; Bedford & Sharkey, 2014; Deressa & Ali, 2009; Kassile, Lokina, Mujinja, & Mmbando, 2014; Lindblade, O'Neill, Mathanga, Katungu, & Wilson, 2000; Matovu, Nanyiti, & Rutebemberwa, 2014; Nonvignon et al., 2010; Tobgay & Lhazeen, 2010; Yadav, 2010) . A study by Kassile et al. (2014) found that the caregivers of children in Tanzania living at least five kilometers away from the nearest health facility were twice as likely to delay care seeking until after the 24 hours following fever onset than those living within shorter distances, when controlling for other variables (Adjusted odds ratio [AOR] 1.74, 95% Confidence interval [CI] 1.11 - 2.72).

In a qualitative study involving focus groups from Bhutan, participating community members were asked for reasons why people do not come to health facilities as soon as their young children develop a fever. Many participants stressed that long walking distances to the nearest health facility and difficult terrain were the major barriers to seeking prompt care (Tobgay & Lhazeen, 2010) . Deressa and Ali (2009) found that women in Ethiopia often sought care for their children with fever from community health workers first, partly due to their close proximity to villages. A survey study from Uganda asking people about their approach to malaria treatment during a recent epidemic found that children who lived close to a health care facility

were 2.58 times more likely (95% CI 1.09 - 6.11) to receive care in this type of setting within one day of symptom onset than those who lived far away (Lindblade et al., 2000).

Alegana et al. (2012) conducted spatial modeling of health care utilization for treatment of fever in Namibia to explore travel time as a barrier to health care access. In their study, utilization of the public health sector in northern Namibia for evaluation and treatment of febrile children under age five was modeled as a function of travel time to the nearest health facility. As might be expected, their model showed that the probability of attending a health care facility was greatest in areas with a higher population density and a larger number of public health facilities (Alegana et al., 2012).

A study by Matovu, Nanyiti, and Rutebemberwa (2014) in eastern Uganda was part of a larger randomized controlled trial looking at home and community based treatment of both malaria and pneumonia, or malaria alone, in children under age five with fever. During study recruitment, researchers conducted exit interviews at eight health care facilities on direct and indirect costs the household experienced while seeking care at the visited facility. Direct costs included treatment-related costs and the cost of transportation. Indirect costs included travel time as well as wait time at the health facility. Mean travel time in minutes was significantly longer (M = 90.4, Standard deviation (SD) = 74, $p < .001$) for those in rural areas who lived further from health facilities than for those who lived in urban areas (M = 55.7, SD = 58.9). However, participants living in urban areas had longer wait times once they arrived at the health care facility, so when comparing the overall time spent seeking care at clinics in rural and urban areas the difference was not statistically significant (Matovu, Nanyiti, & Rutebemberwa, 2014).

Another study by Nonvignon et al. (2010) involved a survey to examine factors related to choice of fever treatment in a region of rural Ghana. Investigators found that longer travel,

waiting, and treatment times increased the probability of study participants using self-medication or what researchers called over the counter (OTC) providers versus seeking care at public and private health facilities for their febrile children under five. Self-medication was defined as sponging, giving medications at home, or doing nothing. OTC providers included herbalists, drug peddlers, chemical vendors, and spiritual practices, like prayer camps (Nonvignon et al., 2010).

Yadav (2010) also conducted a survey study on care choices for children under age five with fever. Taking place in a rural region of the Thar Desert in Rajasthan, India, this study revealed that the mean time from fever onset to seeking care at a health facility was 70.3 hours (*SD* = 40.1). Many mothers attempted to treat the fever at home before going to a health care center, because of distances to the health facility greater than five kilometers, long travel time, and the associated cost of transportation (Yadav, 2010).

Socioeconomic status

Four studies explored the relationship between timing of care seeking for children under five with fever and socioeconomic status (SES; Deressa, Ali, & Berhane, 2007; Kassile et al., 2014; Mathanga & Bowie, 2007; Rutebemberwa, Kallander, Tomson, Peterson, & Pariyo, 2009). A study from Malawi found no difference across wealth quintiles in timing of care seeking (Mathanga & Bowie, 2007). However, researchers found that those in the group with the most assets were more likely to have given their children effective antimalarial treatment than those in the poorest group. The authors concluded that giving inadequate treatment could delay access to effective treatment, with the potential for serious complications and even death in children with malaria (Mathanga & Bowie, 2007). Similar to the study by Mathanga and Bowie (2007), a study from Tanzania showed no significant association between household SES and delay in care

seeking (Kassile et al., 2014). Researchers attributed this to the fact that the majority of their sample was living in rural areas and so there may have been insufficient heterogeneity in wealth status among their study population to detect any significant difference between groups (Kassile et al., 2014).

A study by Rutebemberwa et al. (2009) from eastern Uganda showed that those in the lowest wealth quintile were more likely to delay seeking care for their children under age five with fever than those in the highest (AOR 1.45, 95% CI 1.06-1.97, $p = .019$). These investigators found that as wealth decreased, the likelihood for delaying care seeking increased (Rutebemberwa et al., 2009). Another study from Ethiopia by Deressa, Ali, and Berhane (2007) found that the poorest families in the study tended to seek care later (48 hours after fever onset) than those in the middle and wealthier household categories ($p < .001$).

Maternal age

Few studies focused on the effect of maternal age on care seeking for children under age five with fever. One retrospective descriptive study from Western Nigeria reviewed case notes to determine the prevalence of malaria and treatment outcomes in the neonatal ward of Olabisi Onabanjo University Teaching Hospital over a two-year period between 1998 and 1999 (Runsewe-Abiodun, Ogunfowora, & Fetuga, 2006). In their discussion, the authors stated that maternal age significantly affected the outcome of illness in neonates with malaria, although they did not provide specific data to support this statement. They interpreted their results to mean that the infants of younger mothers were more likely to become infected and that these mothers were less likely to seek prompt care, which was associated with poor prognosis and mortality. They concluded that this was probably due to lack of education and experience. In many cases, the only symptom in these neonates was fever and it was impossible to distinguish malaria from

another infection clinically (Runsewe-Abiodun, Ogunfowora, & Fetuga, 2006). Paradoxically, the study by Oyekale (2015) found that as the age of household head increased by one year, the number of days waited before seeking care for a child under five with fever significantly increased by one ($p < .01$). It should be noted that in this study, the head of household was most often a man, so these results do not directly relate to the relationship between maternal age and timing of care seeking.

Summary

While there were a number of studies looking at the effect of physical barriers to prompt care seeking, such as distance from clinic and travel time (Alegana et al., 2012; Bedford & Sharkey, 2014; Deressa & Ali, 2009; Kassile et al., 2014; Matovu, Nanyiti, & Rutebemberwa, 2014; Nonvignon et al., 2010; Tobgay & Lhazeen, 2010; Yadav, 2010), few papers addressed the direct relationship between malaria knowledge and care seeking behavior for children under age five with fever (Iriemenam et al., 2011; Oyekale, 2015). A small number of studies investigated the association between timing of care seeking for febrile children under five and SES of the family (Deressa, Ali, & Berhane, 2007; Kassile et al., 2014; Mathanga & Bowie, 2007; Rutebemberwa et al., 2009). Finally, there was a lack of studies investigating the relationship between maternal age and care seeking behavior (Oyekale, 2015; Runsewe-Abiodun, Ogunfowora, & Fetuga, 2006).

Knowledge of fever as a sign of malaria may influence families to seek care for their febrile children sooner (Oyekale, 2015). Studies also found that families living in remote areas often live further from health care facilities. The associated distance, long travel times, and cost of transportation may impede prompt care seeking (Alegana et al., 2012; Bedford & Sharkey, 2014; Deressa & Ali, 2009; Kassile et al., 2014; Matovu, Nanyiti, & Rutebemberwa, 2014;

Nonvignon et al., 2010; Tobgay & Lhazeen, 2010; Yadav, 2010). Maternal age may have an impact on care seeking behavior for children with fever, but there is little evidence to support this (Oyekale, 2015; Runsewe-Abiodun, Ogunfowora, & Fetuga, 2006). Those with lower SES have more at stake when it comes to treatment-associated costs, cost of transportation, and cost of lost productive work time, increasing the likelihood that they will delay seeking care for their febrile children under age five (Deressa, Ali, & Berhane, 2007; Kassile et al., 2014; Mathanga & Bowie, 2007; Rutebemberwa et al., 2009; Yadav, 2010).

Objective

The purpose of this study is to examine factors associated with delay in seeking care for febrile children aged five and under in the Mulanje District of Southern Malawi. This study will contribute to the literature on care seeking, barriers to care, and fever in children. It will also help inform public health efforts and health care delivery programs in rural Malawi.

Theoretical framework

The Health Belief Model (HBM) provides an appropriate theoretical framework for the issue of care seeking behavior. As an explanatory theory, it describes the reasons why a problem exists with the ultimate goal of developing behavior change strategies to address it (Maiman, Becker, Kirscht, Haefner, & Drachman, 1977). The HBM looks at the individual's perceptions of the threat posed by a health problem, the benefits of avoiding that threat, and factors influencing the decision to take action. To take this further, health decisions are made on the basis of perceived susceptibility to and severity of the health problem, perceived benefits and barriers to taking action, and self-efficacy, or confidence in one's ability to take action (Maiman et al., 1977).

Perceived susceptibility to and severity of the health problem

In the case of care seeking for children aged five and under with fever, the health problem includes any illness causing the fever, which is most often malaria in rural Malawi (Malawi Ministry of Health, 2011). Here, fever signifies the need to seek care. *When* a family decides to seek care depends on their perception of the child's illness severity as well as perceived benefits of and barriers to seeking care. Malaria knowledge is one factor that may affect perceived illness severity. For example, knowing that fever is a sign of malaria may prompt families to seek care sooner (Iriemenam et al., 2011; Oyekale, 2015).

Perceived benefits and barriers to taking action

An obvious benefit of seeking care is increased likelihood of child survival if indeed the cause of fever is a serious illness. Other benefits include a shortened illness course with appropriate treatment and prevention of further spread of any communicable or vector-borne diseases, like malaria. According to the literature, barriers include living far away from the nearest health facility, difficult terrain, the direct costs of transportation and treatment, and the indirect costs of lost work time or time away from other family obligations (Alegana et al., 2012; Bedford & Sharkey, 2014; Deressa, Ali, & Berhane, 2007; Deressa & Ali, 2009; Kassile et al., 2014; Mathanga & Bowie, 2007; Matovu, Nanyiti, & Rutebemberwa, 2014; Nonvignon et al., 2010; Rutebemberwa et al., 2009; Tobgay & Lhazeen, 2010; Yadav, 2010).

Self-efficacy

In the context of health behavior, self-efficacy is the perception that one is capable of engaging in a health behavior in order to achieve an expected outcome (Strecher, Devellis, Becker, & Rosenstock, 1986). It is important to emphasize that self-efficacy is a measure of an individual's perceptions about his or her abilities and not a measure of his or her actual capabilities. It is also related to the contextual factors of a given situation, so it may change from

high to low in one individual, depending on the circumstances. Self-efficacy is an important component of the HBM, because in addition to risk perception, it influences whether or not people take action when faced with the need to make a change in their behavior (Strecher et al., 1986).

In the case of fever in a young child, many factors may influence whether a family has high or low self-efficacy. The multitude of barriers already discussed may influence how difficult a family feels it would be to seek care for their child (Bedford & Sharkey, 2014). If a family feels that they cannot afford the cost of taking the child to a health facility or that it is too far to travel, given the time it would take away from other responsibilities, this will influence their self-efficacy and, in turn, their behavior.

Expectations about one's self-efficacy come from four major sources: performance accomplishments, through personal experience of mastering a previously difficult or feared task; vicarious experience, in which one learns by observing other people and/or events; verbal persuasion, which is the strategy frequently used by health educators; and physiological state, which is a powerful influence on whether or not someone believes he or she can complete a task (Strecher et al., 1986). The typical approach to changing self-efficacy, from a health education perspective, includes breaking down the complexities surrounding a target behavior into components, which can be managed more easily. Then, behaviors specific to a target outcome are arranged from simplest ("easiest") to most complex ("hardest"). In this way, progress towards a target behavior is achieved in a stepwise manner. A health educator will often point out progress to the individual and attribute accomplishments to the individual's personal capabilities. Any setbacks in progress would be seen as an opportunity to reflect and then control the factors that led to the setback (Strecher et al., 1986).

Limitations of the model

Given its focus on individual health decisions and behaviors, the HBM is useful for creating interventions that increase people's knowledge, change their perceptions of risk and self-efficacy, and motivate them to change behavior (Maiman, Becker, Kirscht, Haefner, & Drachman, 1977). However, one of the HBM's primary limitations is that it does not take into account sociopolitical, economic, and environmental factors, such as poverty. It assumes access to both information and the means to take action (Boston University School of Public Health, 2013). Therefore, if factors preventing participation go beyond individual beliefs and motivation, the HBM becomes less useful for developing solutions. For example, even if a public health campaign were disseminated to increase families' malaria knowledge and teach them when to bring their febrile children to health facilities, this intervention would not alleviate the financial burden a family living in poverty must bear in order to seek care.

While the HBM is a powerful tool for understanding the health decision-making process families go through, it is limited in its utility for addressing barriers to care for families in rural Malawi. Public health campaigns and individual counseling must be paired with interventions that would allow families to practice recommended health behaviors. These may include public works projects, like building roads, or health delivery efforts involving mobile clinics, or affordable transportation services, just to name a few.

Methods

Study site and population

Malawi is a relatively small land-locked country in Southern Africa, bordered by Zambia, Tanzania, and Mozambique (Central Intelligence Agency [CIA], 2015). Its population is estimated to be 16.4 million (United Nations Development Programme [UNDP], 2014). Malawi

is ranked 174th out of 187 countries included in the United Nations Poverty Index, making it one of the poorest countries in the world. Almost 67% of people live in poverty with approximately 62% living on less than $1.25 per day. Eighty-four percent of the population lives in rural areas (UNDP, 2014).

The life expectancy at birth in Malawi is 55 years old. The infant mortality rate is 46 deaths/1000 live births and the under-five mortality rate is 71/1000 under five children (UNDP, 2014). Despite this, young people under the age of 14, make up 47% of the population, with the median age being 16.3. While health expenditures made up 9.2% of GDP in 2012, the physician density was .02 per 1000 population (CIA, 2015).

Malawians belong to a variety of ethnic groups, the most prominent being Chewa and Longwe. While English is the official language, numerous languages are spoken in the country (CIA, 2015). The mean number of years of schooling is 4.19 (UNDP, 2014).

Mulanje is a small district in Southeast Malawi, bordering Mozambique. The latest government census showed that in 2008 Mulanje had a population of over half a million people with a population density of 254 per km^2. The average household size was 4.1 people. Life expectancy at birth was almost fifteen years less than the rest of the country, with men living to 41 years of age on average and women living to age 45. The literacy rate was 60% (Knoema, 2015).

In a government survey from 2011, it was reported that in the southern region of the country, where Mulanje is located, 82% of households were designated as “agricultural” (Malawi National Statistical Office, 2012). Around 81% of these households were engaged in crop production alone and the rest were engaged in raising livestock alone, or some combination. As a measure of poverty, the same survey found that 47% of households in Mulanje reported

inadequate food, 41% said they had inadequate housing, 48% reported having inadequate clothing, and 14% said they had inadequate health care (Malawi National Statistical Office, 2012).

Among those who participated in the government survey, 38% who had been ill recently had suffered from fever and malaria (Malawi National Statistical Office, 2012). The most common action taken in response to illness was seeking treatment at a government health facility. Those living in Mulanje seem to have relatively good access to health care, as 88% of those with a chronic illness who were surveyed received a formal diagnosis at a medical facility. In addition, the proportion of houses where a child under age five slept under a bed net was nearly 90% (Malawi National Statistical Office, 2012).

Data source

The Global AIDS Interfaith Alliance (GAIA) is a non-governmental organization founded in 2000 that works in Malawian villages to provide basic health services, focusing on prevention, care, and support related to HIV/AIDS, malaria, and TB. Their approach includes connecting remote rural communities to care through mobile clinics and their GAIA Villages Project, which employs a community health worker model to provide health education and home-based care. Health education includes door-to-door counseling, village health talks, and community dramatizations on HIV testing/prevention, destigmatization of HIV, and health-seeking behaviors. The GAIA Villages Project also involves distribution of bed nets (GAIA, 2015).

GAIA routinely collects demographic and health data for the purpose of monitoring and evaluating their programs. GAIA programs run for three years at a time in a given region of Malawi. Normally, three surveys are conducted over this period: a baseline survey prior to

program initiation, a midway point survey looking for any change in health status, knowledge, or behavior after one and a half years of implementation, and an endpoint survey, looking at the overall impact of GAIA programs.

Data for this study came from one of GAIA's cross-sectional baseline household surveys, conducted in June 2013 and January 2014 in two sets of villages in the Mulanje District of Southern Malawi. A statistical power calculation was used to determine adequate sample size for detecting change over time and revealed that a minimum of 264 surveys per group of villages was needed to attain a confidence level of 95%. Ultimately, 589 households in 43 villages participated in the baseline survey. Every fifth household in each village was interviewed. Men and women over the age of 18 were eligible to participate in the survey. There were no exclusion criteria related to language.

The study sample was a subset of families whose youngest child, aged five and under, had experienced a fever in the three months prior to the survey and who sought care for this fever ($N = 196$). It should be noted that even though the literature on care seeking for young children with fever often focuses on children under the age of five, this study includes a sample of families whose febrile children were aged five or under. This decision was made to ensure maximum sample size, while maintaining the focus on young children.

Ethical considerations

This study was approved by the University of California, San Francisco Committee on Human Research. The baseline survey is part of GAIA's ongoing monitoring and evaluation efforts and did not require IRB approval. Nonetheless, interviewers read a statement explaining the survey objectives and their confidentiality policy to potential participants prior to interviewing them. Participants were also informed of their right not to respond to questions,

since the survey included questions on a wide range of topics, some of them sensitive, such as HIV/AIDS. Verbal consent was obtained from potential participants prior to enrollment. The survey team maintained participants' privacy throughout the data collection process and when entering data into GAIA's electronic database. The investigator of the present study used de-identified data and was not given access to any information that would allow her to identify the survey participants.

Variables of interest and a priori assumptions

Dependent variable. The dependent variable was defined as prompt versus delayed care seeking. Care seeking was defined as prompt if families sought care within 24 hours of their child's fever onset and delayed if families sought care more than 24 hours after fever onset. All but one participant sought care for their febrile children within four days of fever onset. Due to the study's small sample size and the right-skewed distribution of the dependent variable, care seeking was dichotomized. The categories for timing of care seeking were created based on the universally accepted recommendation that children at risk for malaria seek care within 24 hours of fever onset (Breman et al., 2006). Associations between the dependent variable and a number of explanatory variables were explored in the analysis. Explanatory variables were chosen based on the literature and for their clinical relevance.

In this study, locations of care seeking ranged from government or private stationary and mobile clinics to community health workers to pharmacies to a relative or friend in the case of one participant. Because the focus of the study was timing and the majority (95%) of participants did seek care at health facilities, all of those who sought care for their febrile children were included in the study sample.

Maternal characteristics. Since in the majority of cases (95%) it was the mother who took the febrile child to seek care, it was assumed that she would be the most influential family member when it came to care seeking decisions. This notion was supported by a qualitative study on Malawian mothers' decisions to enroll their children in malaria clinical studies and the involvement of partner and relatives in the process. Researchers found that the majority of mothers made study enrollment decisions on their own, without first consulting their partners or relatives (Masiye, Kass, Hyder, Ndebele, & Mfutso-Bengo, 2008). Based on these findings, maternal age, educational level, and marital status were analyzed. Data for maternal age and educational level were missing for three households in the sample.

Survey respondents were asked only about their own marital status. Since the survey respondent was not always the mother of the sick child, or some families either did not have mothers in the household or it was impossible to determine which woman of childbearing age in the household was the child's mother, 15 surveys had incomplete data. Mothers were considered married when they reported being married or that they were cohabitating with a partner and unmarried when they were single, separated, divorced, or widowed.

Malaria knowledge. Comprehensive malaria knowledge was a composite variable consisting of three responses that came from a series of malaria knowledge questions in the baseline survey. These questions were designed to test people's ability to recall information, rather than recognize correct responses. People were determined to have comprehensive malaria knowledge if they affirmed that mosquito bites cause malaria, sleeping under a bed net helps prevent malaria, and fever is a sign of malaria. If they answered any of these questions incorrectly, they were considered not to have comprehensive malaria knowledge. The individual

components of comprehensive malaria knowledge were also analyzed to look for any statistical relationships between them and the dependent variable.

Socioeconomic status. SES was based on a weighted multidimensional poverty index (MPI), adapted from the technical notes of the 2013 UNDP Human Development Report (Khalid, 2013). The index included education, health, and standard of living sections. Each section had a list of "deprivations," or poverty indicators. A weighted count of deprivation (WCD) was calculated for each household by multiplying the sum of each deprivation by its weight. The total possible score was 10 with each of the three sections having a maximum possible score of 3.33. This value was divided across deprivations in each section. For example, the two indicators in the health section were each weighted as 3.33 divided by two, or 1.67 and each of the six indicators in the standard of living section had a weight of 3.33 divided by six, or 0.56. If the WCD for a household was greater than or equal to three, it was considered to be multi-dimensionally poor. If the WCD was less than three, the household was considered not to be multi-dimensionally poor (Khalid, 2013).

Households were given one point if no one in the household had completed five years of schooling and one point if at least one school-aged child was not enrolled in school (Khalid, 2013). For the health-related section of the index, households were assigned a point if at least one member was malnourished. Malnourished was defined as having anything less than three meals a day. Normally, the MPI calls for households to be assigned a point if one or more children in the household have died. The adapted version of the index excluded this parameter, since GAIA did not collect data on child mortality in the baseline survey. Elements of the index were re-weighted to account for this omission.

In the standard of living section, households were assigned one point each if they had the following: no electricity; no access to clean drinking water; no access to adequate sanitation; had a dirt floor; used "dirty" cooking fuel; had no car and at most one bicycle, radio, motorcycle, refrigerator, telephone, or television (Khalid, 2013). Clean water was considered water accessed through any source except an unprotected well, unprotected spring, pond, river, or stream. Adequate sanitation was considered anything except using a bucket, bush or field as a toilet. For the purposes of this study, roofing material was used as a proxy for "household has dirt floor," since the baseline survey data contained no information on material of flooring. Rooftops made out of anything other than metal sheeting, concrete, or clay tiles were considered inadequate and equivalent to dirt flooring. Dirty cooking fuel was defined as dung, firewood, or charcoal. In addition, cell phones did not count as telephones, since so many people in sub-Saharan Africa have access to cell phones (Aker & Mbiti, 2010).

If data were missing for a particular deprivation, the weights were adjusted. For example, if a household had no data on the education deprivations, the health and living standards sections were each given a weight of five, so that the total weight would still be ten.

Travel time. For the most part, people either walked or used a bicycle to reach the health facility where they sought care. The travel time variable combined walking and cycling time, as mean cycling times (M = 91 minutes, SD = 58.7) were slightly greater than mean walking times (M = 81 minutes, SD = 71.6). This may be due to the fact that those living further from health facilities used bicycles as transportation and living further from the health facility corresponded to increased travel time.

Travel time data were missing for eight of the 196 expected respondents. Four respondents said their child was transported to a health facility via motor vehicle. Because so few

people used motor vehicles and driving times had the potential to skew the data, these participants were dropped from the analysis. The remaining four respondents were missing data, so they were also dropped.

Research questions

This retrospective descriptive study had the following research questions:

(1) Were mothers who promptly sought care older than mothers who delayed seeking care for their children aged five and under with fever?

(2) Were mothers who promptly sought care for their febrile children more educated than those who delayed care seeking?

(3) Would married mothers be more likely to seek care within 24 hours of fever onset than those who were unmarried?

(4) Were those with comprehensive malaria knowledge less likely to delay care seeking?

(5) Were those with a higher SES more likely to promptly seek care for their febrile children?

(6) Were those with any mosquito net in the house less likely to delay care seeking?

(7) Would those living further away from the health facility where they sought care be more likely to delay care seeking?

Analysis

Data were cleaned and analyzed using STATA 13 (StataCorp, 2013). Bivariate analyses were used to assess statistical relationships between explanatory variables and timing of care seeking. Because the distribution of the dependent variable was right-skewed, the two-sample Wilcoxon rank-sum Mann-Whitney test was used for continuous explanatory variables. Chi-squared or Fisher's exact tests were used to analyze categorical variables, depending on cell frequencies. The Fisher's exact test was used in the case of variables with any cell frequencies

less than five. Results were considered statistically significant based on a 95% confidence interval and/or an alpha level of 0.05.

Results

The final study sample included 196 families whose child aged five and under had experienced a fever in the three months preceding the survey. One hundred sixty-four (84%) families sought some form of care within 24 hours of fever onset, while 32 (16%) sought care 24 hours after fever onset. Table 1 describes the ages and genders of the children included in the study sample. Overall, there were more males than females in the study sample. The majority (70%) of the children were aged three or under, with only four five-year-olds included.

Table 1. Ages and genders of children, who experienced fever in the last three months by timing of care seeking

Characteristic	Prompt (care in ≤ 24h)	Delayed (care in > 24h)	Total (%)
Gender			
Female	73	19	92 (47%)
Male	91	13	104 (53%)
Age (years)			
0	35	6	41 (21%)
1	43	11	54 (27.6%)
2	33	9	42 (21.4%)
3	28	1	29 (14.8%)
4	21	5	26 (13.2%)
5	4	0	4 (2%)

Table 2 outlines the results of the bivariate analyses conducted to explore the relationship between the explanatory variables expressed in the research questions and timing of care seeking. As was described above, missing data for certain variables led to some variation in final numbers. Overall, participants in the two care seeking groups were found to be similar. Only one variable approached statistical significance: naming fever as a sign of malaria ($p = .06$).

Table 2. Characteristics of families and timing of care seeking for children aged five and under with fever expressed as means and standard deviations (SD) or frequencies and percentages (%)

Characteristic	*n*	Prompt (care in ≤ 24h)	Delayed (care in > 24h)	*Z*	*p*-value
Household size	196	5.24 (1.7)	5.22 (1.4)	-0.16	0.87
Mother's age in years	193	27.33 (6.6)	27.34 (8)	0.32	0.75
Mother's # years of education	193	5 (2.8)	5.3 (2.7)	-0.78	0.43
Mother's marital status[§]	181			-	0.88
Married		124 (82%)	24 (83%)		
Not married		28 (18%)	5 (17%)		
Socioeconomic status[$]	196			-	0.61
WCD < 3		90 (55%)	16 (50%)		
WCD ≥ 3		74 (45%)	16 (50%)		
Named mosquito bites as the cause of malaria	196			-	0.9
Yes		158 (96%)	31 (97%)		
No		6 (4%)	1 (3%)		
Named mosquito nets as a way to prevent malaria	196			-	0.67
Yes		150 (91.5%)	30 (94%)		
No		14 (8.5%)	2 (6%)		
Named fever as a sign of malaria	196			-	.06
Yes		138 (84%)	31 (97%)		
No		26 (16%)	1 (3%)		
Comprehensive malaria	196			-	0.1

knowledge*					
Yes		125 (76%)	29 (91%)		
No		39 (24%)	3 (9%)		
Any mosquito net in the house	196			-	0.57
Yes		144 (88%)	27 (84%)		
No		20 (12%)	5 (16%)		
Travel time to health facility, minutes	188	80 (65.8)	98 (83.9)	-0.93	0.35

§Mothers were considered married when they were either married or cohabitating with a partner; $SES was determined by a multidimensional poverty index containing nine components in three categories (education, health, and living standards), dichotomous poverty variable created based on weighted count of deprivation; *Comprehensive malaria knowledge was a composite of the three preceding knowledge indicators, those who answered all three correctly were designated as having comprehensive malaria knowledge, those who did not answer all three correctly were designated as not having comprehensive malaria knowledge

The MPI is broken down into its various indicators, by section and care seeking group in Table 3. Frequencies and percentages illustrate differences in deprivation between the two groups. Trends for the entire study population are discussed here. Most households had at least one person who completed five years or more of schooling. The majority of households had all school-aged children enrolled in school, although approximately 38% had at least one school-aged child not enrolled. Relatively few (5.6%) households in the study had at least one member who was malnourished. The living conditions section showed that 100% of households who sought care promptly did not have electricity. In the delayed care seeking group, this figure was 97%. In contrast to these statistics, most households had access to clean water (92.3%) and adequate sanitation (97.4%). Sixty-four percent of households had a roof made of inadequate material, which was anything but concrete, sheets of metal, or clay tile. One alarming statistic was that 99.5% of the study population use “dirty” cooking fuel, including coal, dung, or

firewood. Thirty-one percent of households in the study were categorized as having few possessions.

Table 3. Break down of MPI, with data for all nine deprivations by care seeking group, expressed as frequencies and percentages (n = 196 unless otherwise indicated)

Deprivation	Prompt (care in ≤ 24h)	Delayed (care in > 24h)
Education		
No one has completed 5 years of schooling (n = 193)		
Present	45 (28%)	8 (25%)
Absent	116 (72%)	24 (75%)
At least one school aged child not enrolled in school		
Present	59 (36%)	15 (47%)
Absent	105 (64%)	17 (53%)
Health		
At least one person is malnourished*		
Present	8 (5%)	3 (9.4%)
Absent	156 (95%)	29 (90.6%)
Living conditions		
No electricity		
Present	164 (100%)	31 (97%)
Absent	0 (0%)	1 (3%)
No access to clean drinking water (n = 195)		
Present	11 (6.75%)	4 (12.5%)
Absent	152 (93.25%)	28 (87.5%)
No access to adequate sanitation		
Present	3 (2%)	2 (6.25%)
Absent	161 (98%)	30 (93.75%)
House has rooftop made of inadequate material**		
Present	108 (66%)	18 (56.25%)
Absent	56 (34%)	14 (43.75%)
Household uses “dirty”		

cooking fuel[§]		
Present	163 (99.4%)	32 (100%)
Absent	1 (0.6%)	0 (0%)
Household has no car and owns at most one of the following (radio, bicycle, motorcycle, refrigerator, telephone, or television)		
Present	55 (33.5%)	6 (18.75%)
Absent	109 (66.5%)	26 (81.25%)

[*]Malnourished defined as less than three meals a day; [**]Inadequate roofing defined as anything but concrete, metal sheeting, or tile; [§]Dirty cooking fuel is firewood, charcoal, or dung

As mentioned above, 95% of participants sought care in either a public or private stationary or mobile health facility, with 70.4% seeking care in a government-run hospital or clinic. One family sought care from a relative or friend and two families sought care at pharmacies. These three families all sought care within 24 hours of their children's fever onset.

Malaria was the diagnosis in approximately 70% of cases, while pneumonia was diagnosed in 2.6% of cases. The common cold was diagnosed in 5.6% of cases and 4.6% of children in the sample were diagnosed with an upper respiratory infection. A lower respiratory infection was diagnosed in 3.1% of cases. One child in the sample was diagnosed with influenza. A portion (4.6%) of respondents did not know what their child's final diagnosis was and 8.2% of families named diagnoses that fell into the category of "other." Often these responses were not medical diagnoses, but rather symptoms, such as cough or stomachache.

In the majority (97.4%) of cases, children took some form of medication, regardless of when their families sought care. Antimalarial medications taken by the children in the sample included Sulfadoxine/Pyrimethamine (Fansidar), Quinine, or Lumefantrine/Amodiaquin. No child was given Chloroquine. Some children were given antibiotics, although it was not specified

which types. In some cases, children were given Aspirin, Ibuprofen, or Acetaminophen to treat their fevers, either in conjunction with another medication or alone.

Discussion

Findings

This study found that the great majority (84%) of families sought care within 24 hours of their child's fever onset. Families who promptly sought care were similar to those who delayed care seeking in terms of household size, maternal age, maternal level of education, and mother's marital status. SES was also similar for people in both care seeking groups. Both groups were equally likely to own at least one mosquito net and this did not appear to influence timing of care seeking for families. Although the mean travel time was longer for those who delayed seeking care, this difference was not statistically significant. There was no difference in median number of minutes spent traveling to the health facility between groups (*Median* = 60, Interquartile range 30 - 120).

Only one variable approached significance, based on a chi-squared test: naming fever as a sign of malaria ($p = .06$). The null hypothesis in this case is that there is no relationship between knowing that fever is a sign of malaria and timing of care seeking. While the null hypothesis cannot be rejected based on this *p*-value, this result suggests that there may be a relationship between when families seek care and their knowledge of fever as a sign of malaria. Based on the results, it appears that knowing fever is a sign of malaria makes families more likely to delay care seeking. Other studies have shown the opposite to be true (Lindblade et al., 2000; Oyekale, 2015).

It should also be noted that 78% of the total study population had comprehensive malaria knowledge. This and the high percentage of mosquito net ownership (87%) suggest that people

have been exposed to public health interventions. This makes sense in light of the fact that the Malawian government is currently working to scale up malaria elimination efforts through their National Malaria Control Programme and corresponding National Malaria Strategic Plan 2011-2016 (Malawi Ministry of Health, 2015). The government's approach to accomplishing their mission of freeing all Malawians from the burden of malaria is to implement improved diagnostics; provide appropriate treatment; manage vectors; support supply chain management; focus on behavior change, communication, and advocacy; and maintain a high-quality surveillance system. In the introduction to its 2014 Malaria Indicator Survey, the government stated that distribution of long-lasting insecticide treated nets and public health education are key components to preventing the spread of malaria (Malawi Ministry of Health, 2015).

One possible explanation for why people delayed care seeking, despite having a high level of comprehensive malaria knowledge, is that the fever was not perceived as being severe enough to be malaria or warrant care seeking. In a study from Sudan, 350 mothers were asked about fever episodes in their children under age five in the previous two weeks and their choices around timing and type of care (Salah, Adam, & Malik, 2007). These women commonly referred to fever as either mild or severe and belief about cause, treatment practices, and preferred anti-malarial drugs depended on the "type" of fever their child had. Only 41.4% of the respondents said they would consult a health care provider as their first option if their child had a "mild" fever. If the fever episode became more severe, the perceived need for treatment services changed, with 91.1% of respondents saying that they have sought care in this case. Overall, this was a population of mothers who were found to have adequate malaria knowledge, but who made decisions on care seeking based on perceived severity of their child's fever (Salah, Adam, & Malik, 2007). Other studies have also found severity of disease to be a determining factor for

families as they decide whether and when to seek care for their children under five with fever (Chibwana, Mathanga, Chinkhumba, & Campbell, 2009; Geldsetzer et al., 2014; Lindblade et al., 2000; Yadav, 2010; Yewhalaw et al., 2010).

Another explanation for delayed care seeking, despite high levels of malaria knowledge, is self-treatment. In malaria-endemic regions, it is not uncommon for families to try treating their child's possible malaria at home before seeking care at a health facility (Nonvignon et al., 2010; Yadav, 2010; Yewhalaw et al., 2010). The decision to self-treat is influenced by perceived severity and the existence of barriers to care, like travel time to the health facility (Chibwana et al., 2009; Lindblade et al., 2000; Nonvignon et al., 2010; Yadav, 2010).

Looking at these possible explanations in light of the HBM suggests that previous knowledge and experience may, in fact, give families a greater sense of self-efficacy as well as lessen the sense of urgency they feel around their child's fever. Eventually, if the child's illness becomes more "severe," families may perceive it as a greater threat and seek care at that time. It is also important to consider self-efficacy in the context of poverty and the remote low-resource settings, where malaria is often found. Low SES and lack of infrastructure have the potential to lower families' self-efficacy and inhibit prompt care seeking.

The MPI provided a way to understand the SES, not only of the individual households in the study population, but also of the study population as a whole and in relation to the rest of the baseline survey participants (Khalid, 2013). The MPI value is the mean of deprivation scores and is the product of the multidimensional headcount ratio and the breadth (or intensity) of poverty. The multidimensional headcount ratio is the proportion of the population who are multi-dimensionally poor divided by the total population. The breadth of poverty is found by taking the sum of the deprivation scores for poor households only, that is, households that have a WCD less

than three, and dividing it by the number of poor persons. The MPI for the study population is .173, compared to an MPI of .226 for the baseline population. This means that the study population is better off than the baseline population. While there is no way to test the statistical relationship between MPI values, it is interesting to note that the group who promptly sought care was better off (*MPI* = .168) than the group who delayed care seeking (*MPI* = .202). Again using the interpretation from the UNDP Human Development Report (2013), those in the delayed care seeking group would not be considered multi-dimensionally poor, but they would be considered at greater risk of becoming multi-dimensionally poor than those in the prompt care seeking group (Khalid, 2013). These findings appear to support what has been found in other studies about low SES being a barrier to prompt care seeking for children under age five with fever (Bedford & Sharkey, 2014; Deressa, Ali, & Berhane, 2007; Mathanga & Bowie, 2007; Rutebemberwa et al., 2009; Yadav, 2010).

Limitations

The primary limitation of this study was the small sample size (*N* = 196). Missing data points further decreased data for certain variables. In addition, the study population was fairly homogenous when it came to many of the explanatory variables, including maternal age and education level, household size, SES, and possession of a bed net. This homogeneity made it difficult to identify variables that may have a statistically significant relationship with timing of care seeking. In addition, the majority of families did seek care for their children within 24 hours of fever onset. The lack of variability in the outcome reduced the ability to detect differences in explanatory variables. However, the fact that families tended to seek care within 24 hours is encouraging, as this is considered best practice for minimizing morbidity and mortality in febrile children with possible malaria (Breman et al., 2006). Finally, because families were asked about

fever episodes in the prior three months, it is possible that recall bias may have affected the results.

Conclusion and implications for nursing practice

Given the prevalence of malaria in rural Malawi and because people do tend to promptly seek care in health facilities for their febrile children, people will likely come into contact with the health care system fairly frequently. In fact, 100% of the respondents in the study population had ever been to a health facility in their lifetime. This finding presents nurses working in health centers with an opportunity to reinforce the notion that care should be sought promptly for young children with fever, regardless of its apparent severity. Nurses can also educate those who have delayed coming to the health facility on the importance of seeking care within 24 hours of fever onset in the future. Nurses working in the community can play an important role in discovering what barriers to care exist for families. Because malaria knowledge is so high, there are likely other reasons for why families delay care.

Nurses not only have the potential to play a pivotal role in conveying the importance of prompt care seeking, but they also have the expertise and power to advocate for systems change that promotes health. Nurses can recommend improvements to the country's infrastructure and health care delivery system so that the burden of seeking care is reduced for families. This is important, given that for many families, delays in care seeking are related to financial, geographical, time, and access barriers, and these delays can impact child morbidity and mortality.

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