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Knowledge, Attitudes, and Practices Towards Malaria Elimination in Botswana: A Case Study of Shakawe Village, Okavango District

Collen Saudu[1], Simon Chihanga[2], Victory Effiom[3], Davies Ntebela[4]

[1]Department of Epidemiology, Bloomberg School of Public Health, Johns Hopkins University, USA
[1]Researcher Fellow, Operational Research Unit, Young Leaders Organization, Botswana
[2]North West Provincial Government, Ministry of Health, South Africa
[3]Medical Student, Faculty of Medicine, University of Calabar, Nigeria
[4]Entomologist, National Malaria Elimination Program, Ministry of Health & Wellness, Botswana

Corresponding Author: Collen Saudu

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ABSTRACT

Background: In Botswana, Okavango Delta and Ngami suffer from endemic malaria due to persistent swamps that provide the breeding sites for the vector. The Government of Botswana prioritize endemic regions, as a model to foster malaria elimination. This study was carried out in Shakawe village in Okavango District, Botswana, to establish knowledge, attitudes, and practices (KAP), towards malaria prevention. The results of this study will help inform the government to eliminate malaria in Botswana.
Materials & Methods: Purposive mixed-methods cross-sectional study was carried out on 113 subjects (63 survey and 50 focused group discussions) aged ≥ 18 years in the endemic village of Shakawe for three days. Frequencies, table, graph and descriptive were used to communicate the findings of this study.
Results: Respondents understood that malaria was transmitted through a mosquito bite (80.1%) and threatened life (96%). We found that 75% of respondents owned mosquito nets, but 33% do not use them because they associated them with breathing difficulties. We also found that 60% of men in Shakawe do not wear long-sleeved clothing to protect themselves from mosquito bites as a sign of strength.
Conclusions: Knowledge of malaria was found to be indirectly proportional to prevention and control practices in Shakawe Village, Botswana. Misconceptions and misperceptions surrounding effective malaria prevention measures must be corrected to foster efforts by the Ministry of Health and Wellness to achieve a goal of zero malaria cases in Botswana by 2023.

Keywords: Elimination, attitudes, practices, Shakawe, Okavango District, Botswana

INTRODUCTION

Malaria remains one of the leading health challenges in Botswana with 37% (~1 million people of 2.6 million) of residents at risk [1, 2]. The Government of Botswana was motivated by an overall decline of malaria prevalence (4.2% in 2000 to 1% in 2008) to start a malaria elimination project. The National Malaria Program (NMP) reduced cases from 17,886 (43 cases/1000 individuals) to 311 (0.02/1000 population) (98% reduction), and malaria-related deaths from 12 to 3 between 2008 and 2012 [3]. In most parts of Botswana, Southern Africa, malaria transmission is seasonal; however, parts of the Okavango Delta and Ngami suffer from endemic malaria due to persistent swamps providing vector breeding sites. In 2014, Okavango district reported 883

cases of malaria out of a total of 1296 cases in Botswana which account for 68% of cases in the entire country [3].

In Botswana, six elimination strategies were adopted: 1) program management and coordination 2) vector control and personal protection 3) case management and chemoprophylaxis 4) information, education, communication, and advocacy, including community mobilization, monitoring and evaluation 5) surveillance and research 6) epidemic preparedness, response, and control [1,2].

Currently, Botswana's national malaria program emphasizes parasite and vector control while neglecting operational research and targeted populations knowledge, attitudes, and practices [4]. Malaria control programs must consider the broad, complex, and interrelated factors that influence human behavior as malaria perceptions are heterogeneous, even between communities and individual households [5, 6].

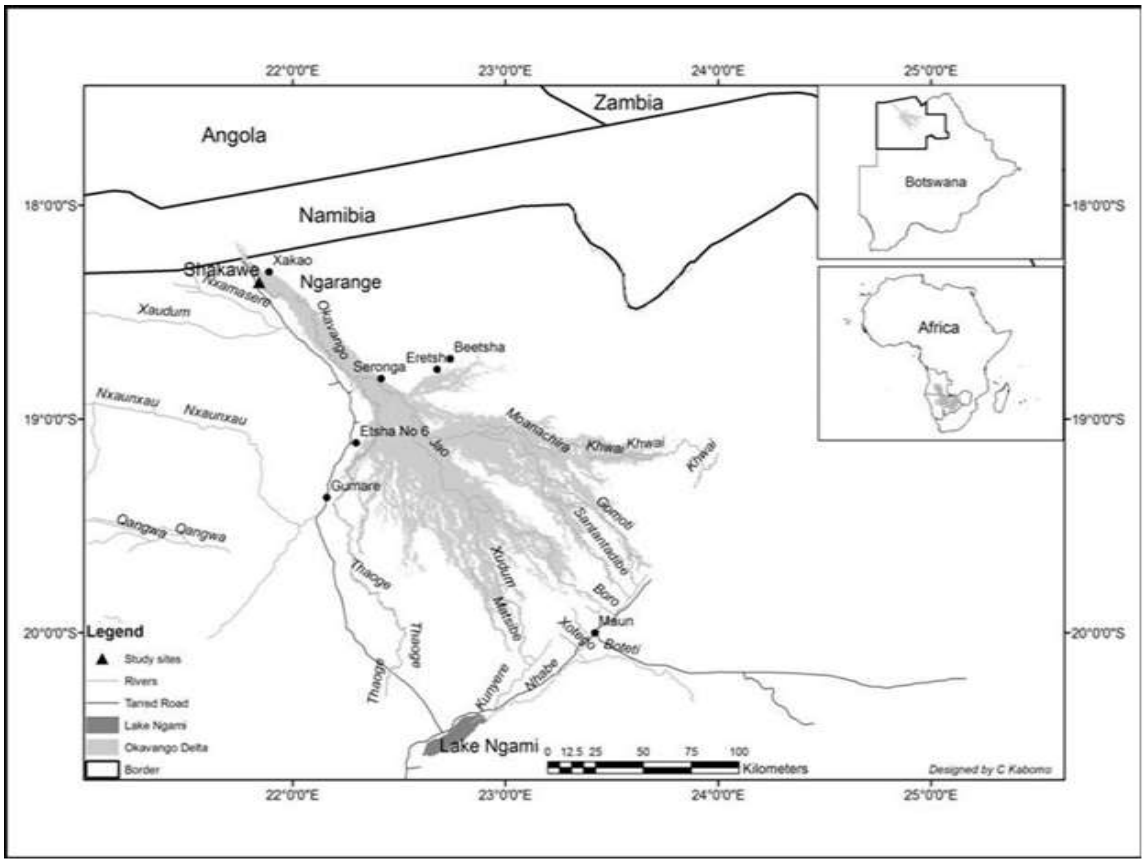

Figure 1: Map of the study area showing the study village of Shakawe, Okavango District

This study focuses on how attitudes influence behaviors surrounding anti-malaria efforts, such as why men think long sleeves are problematic.

Other regions that once had endemic malaria can be used as models for malaria elimination, which is defined as zero local transmission. Two regions of interest are Mauritius and Sri Lanka. Mauritius, which struggled with high malaria morbidity and mortality and has a similar gross domestic product to Botswana, offers a uniquely informative history of eliminating malaria in 1969, reemergence in 1975 and second elimination in 1998[7,8,9]. Sri Lanka, an island country in South Asia, also struggled to eliminate malaria. Malaria-

related knowledge, preventive methods and treatment seeking behaviors provided a framework for Mauritius and Sri Lanka to eliminate malaria in 1998 and 2012, respectively, and guided developments of malaria interventions and future programme evaluation [8,9]. Mauritius demonstrated that reduction of mosquito bites within and around homes can decrease case number, as well as reduce mosquito breeding sites [8]. In India, malaria preventive measures were intertwined with the knowledge and beliefs of residents [10]. Therefore, malaria spread can be minimized through behavioral change.

Although there have been extensive medical advancements, elimination is still far off, and many health strategies now focus on moving from control to pre-elimination and towards elimination of malaria. While the original goal in Botswana was to achieve elimination by 2015, this has not occurred. Malaria awareness alone cannot prevent outbreaks but should be seen as a foundation through which a range of malaria issues could be taught, including malaria transmission, signs and symptoms, prevention, and treatment [11,12,13].

The results of this study can be useful to policy makers, malaria program managers, health educators and health promotion organizations by informing and empowering targeted populations to fight malaria through changes in policies and attitudes.

MATERIALS AND METHODS

Study area

In December 2018, a pre-tested mock exercise was carried out in Shakawe Village, Okavango district in northern Botswana prior to data collection for validity. It covered 63 households through random sampling to minimize human error.

Shakawe is close to Namibia and Angola, which is home to 6693 inhabitants. The region is a rural area with a perennially high transmission of malaria [14]. Between October 2012 and December 2014, Okavango District reported 1090 cases of malaria through Integrated Diseases Surveillance and Response (IDSR) [3].

Study design and procedures

A standardized structured questionnaire with closed and open-ended questions was translated from English to Setswana by a translator from the University of Botswana. Through the Tribal Administration Authority of Botswana, the local Chief mobilized community members and clarified the purpose of this study. Both qualitative and quantitative methods were used to collect data. In qualitative questionnaires, a recorder was used to collect data face-to-face, and a non-probability sampling method was used to compensate for out-of-date or unavailable household lists.

Demographic information questions were identical to the survey and focused group discussions (FGDs). To unearth attitudes and practices, the FGDs probed cultural norms and myths such as:

- If there are people resistant to malaria or those that do not get malaria
- How mosquitoes enter houses and where they reside
- If the district has a health plan and how it supports the community, as well as the prevention and control strategies employed
- Why some men do not wear long sleeve clothing.

When the head of the house was absent, an 18-year-old who lived in Shakawe for more than six months was interviewed. FGDs were randomly selected and included a health personnel, community leaders, pregnant women, traditional healers, and health educators. Group discussion clarity was ensured by comparing the survey data with the FGDs data. FGDs were conducted with ten participants by CS, each with a local translator and note recorder.

Four research assistants from the Okavango Research Institute, selected because they were Shakawe natives, collected data.

Ethical considerations

At an elevated level, clearance and approval was obtained from the Office of the President (OP 5/59/8 XIV (28)), the Ministry of Health & Wellness (DPH 20/4 XIII), the University of Botswana and Roll Back Malaria as well as local leaders. Verbal consent was received from each participant, who received a detailed description of the research and confidentiality provisions before data collection. A copy of the consent form used is included in the appendix section. Principles of privacy and confidentiality were upheld.

RESULTS

Qualitative findings

Socio-demographics of the study respondents

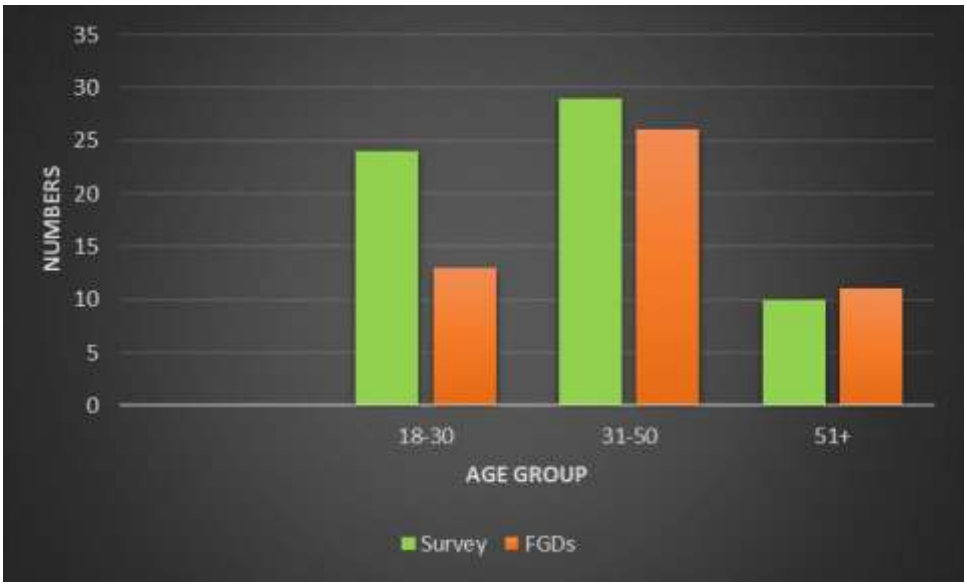

Figure 1: comparison of survey and FGDs data

In both the survey and FGDs, independent variables are directly proportional with elevated poverty levels and high score of knowledge on malaria.

Knowledge on malaria

Shakawe is a rural village with few people holding degrees or formal jobs and elevated levels of poverty. Fifty-nine respondents (93.6%) demonstrated good knowledge on malaria including an awareness of how malaria spreads, the specific names of malaria causing parasites (*plasmodium falciparium, p. oval, p. vivax, p. malaria* and *p. knowlesi*), and even the species of the vector mosquito unprompted. Despite this, the number of malaria cases in Okavango.

Behavior seeking

Respondents associated mosquito nets with breathing difficulties, possibly irritated by the insecticide coating. As noted in the FGDs, most men do not wear long sleeves as a sign of strength regardless of location or work-status. In contrast, many women wore long sleeves to protect themselves from mosquito bites. Poor choices, defined as irrational decisions people make based on their situations, are often associated with low income and are picked up by this study. Poorly constructed housing, which participants associated with regional identity as the building materials were exclusive to the Okavango Delta swamps, possessed eaves which contributed to malaria prevalence. When probed, as to why they

cannot change their housing structure participants responded:

"This is what we can afford because the materials are locally available."

When asked to consider changing housing structure for mosquito bite prevention, participants responded:

''..... It is expensive.''

Since 76.2% of the respondents are classified poor based on this data, malaria is not only a tropical disease, but a disease associated with poverty.

Malaria prevention

Among the participants, it was established that 67% used bed nets, and in FGDs, it was noted bed nets were associated with breathing difficulties. The 23.8% of men and 10% of women not using bed nets must be identified, enrolled, and educated about the part they can play in assisting the government achieve its goal of zero transmission by 2023. This goal is within reach if the Government of Botswana can enact strategy changes.

Even though the DHMT boasts of a regional plan to promote prevention and spread of malaria, the community of Shakawe says a different story:

"I do not know anything about the strategic plan and health activities at a community level.'' (Community Health Worker, Shakawe)

Most respondents reported that there are no indigenous NGOs/CBOs. It was also mentioned that the main responsibility was with the Ministry of Health & Wellness. Moreover, the government was praised for training Community Health Workers and provisioning mosquito nets to pregnant mothers.

Quantitative findings

Socio demographic characteristics

Table 1: Socio demographics characteristics of the survey & FGDs

Socio-demographic Information		Survey (n=63)		FGDs (n=50)	
Characteristics		**No.**	**%**	**No**	**%**
Gender	Female	48	76.2	37	74.0
	Male	15	23.8	13	26.0
Age	15-21	7	11.1	3	6.0
	21-30	17	27.0	10	20.0
	31-40	22	34.9	21	42.0
	41-50	7	11.1	5	10.0
	51-60	6	9.5	10	20.0
	Above 60	4	6.3	1	2.0
Education	No formal School	9	14.3	7	14.0
	Incomplete Primary Schooling	8	12.7	3	6.0
	Complete Primary Schooling	5	7.9	9	18.0
	Incomplete Secondary School	7	11.1	5	10.0
	Complete Secondary School	24	38.1	7	14.0
	Post-Secondary e.g., certificate, diploma, Degree	10	15.9	19	38.0
Source of Income	Formal Employment	6	9.5	16	32.0
	Trading, commerce, selling.	3	4.8	3	6.0
	Agriculture, Livestock, forestry, fisheries	19	30.2	11	22.0
	Craft/creative workers	2	3.2	3	6.0
	Transport Industries	10	15.9	5	10.0
	Casual or wage labour	18	28.6	9	18.0
	Support from friends/family	2	3.2	2	4.0
	Support from Institution	3	4.8	1	2.0
Poverty level	Poor	48	76.2	34	68.0
	Non-Poor	15	23.8	16	32.0
Household size	Six or more	29	46.0	31	62.0
	Four or five	14	22.2	19	38.0
	Three	8	12.7	17	34.0
	Two	8	12.7	5	10.0
	One	4	6.3	3	6.0
History of Malaria in the last six months	Yes	54	85.7	40	80.0
	No	8	12.7	9	18.0
	I do not know	1	1.6	1	2.0

Table no 1 Continued….					
LLINs (bed net usage)	Yes	42	67.0	35	70.0
	No	6	10.0	5	10.0
	Do not know	15	23.8	10	20.0
Malaria transmitted by	Mosquito bite	51	80.1	42	82.0
	Drinking contaminated water	4	5.6	7	14.0
	Contact with infected person	4	5.5	4	8.0
Symptoms of malaria	Chill & fever	42	66.7	35	70.0
	Vomiting	35	56.3	30	60
	Sweeting	30	47.6	25	50
	Elevated temperature	42	66.7	35	70
	Loss of appetite	9	14.3	10	20
	Dizziness	21	33.3	16	32
	Itching	6	9.5	5	10
Bed net ownership	Sleeping under bed nets	47	75.0	31	62.0
	Do not use bed nets	15	25.0	19	38.0

DISCUSSION

Gathered demographic data revealed elevated poverty levels with residents depending heavily on casual work and subsistence through donors. Surveyed behavior seeking practices are embedded into cultural norms and must be changed if anti-malaria programs are to succeed. To motivate more men to wear long sleeves during peak malaria seasons, behaviour change initiatives should provide incentives, such as social developments. These programs could alleviate poverty to fast track the malaria elimination. In 1955, countries that eradicated malaria had strong economies such as United States of America. The survey and FGDs datasets are directly proportional across all the key indicators with small variances in figures. Poverty levels were more than 50% in survey (76.2%) and FGDs (68.0%). Chilling and fever were noted symptoms of malaria in survey (66.7%) and FGDs (70.0%).

Economically linked attitudes and behaviors noted in FGDs included:

- Why do some men think long sleeves are problematic?
- Why do some people do not use mosquito nets?
- Why do some people associate bed nets with breathing difficulties?

Previous studies have shown traditional grass thatched houses with open eaves and no ceiling provided a more favorable resting place for mosquitoes and put the occupants more at risk of contracting malaria than houses with closed eaves, iron corrugated covered roofs and a ceiling [2]. Shakawe village residential house structures contribute to malaria spread, as their houses have big eaves and lack gauze. For this reason, the malaria department must meet with other government departments such as buildings, council, and infrastructure to discuss a policy where building gauze, eave sizes and roofing materials are considered to minimize mosquito movement. Even huts can be reinforced with gauze to keep insects outside the house. Because building designs are culturally influenced, exposure coupled with education can influence a change in culture. Adequate housing costs cannot be compared to the value of life.

Our findings indicate that the community is equally exposed to mosquito bites anytime of the night by eaves of any size. Therefore, closing doors early in the evening did not protect residents since mosquitoes could still enter the dwellings.

Some respondents associated bed nets with breathing difficulties, which resulted in them not being used. In total, it was found that 75% owned bed nets and only 67% use them (25+8 =33% of respondents not using nets).

This crisis did not emerge in a vacuum. Malaria is a systemic issue embedded into our social, cultural, political, and economic fabric, as such it is an issue that will not be solved until we change the system that keeps people trapped. We cannot deny the short term good that an individual can do by donating bed nets,

money or their time, but in the scope of sustainable change we are talking about band-aids for bullet holes.

Recommendations

A study should be carried out to establish if the bed nets contribute to breathing difficulties.
Behavior changes should have incentives such as social developments to motivate attitude change and to alleviate poverty in Shakawe.
Behavior changes, and basic information about malaria should be taught in basic schools to enlighten communities.
Further, a study should be carried out to establish if poor choices can be linked to poverty or if anyone can make them based on circumstance.

CONCLUSIONS

The study demonstrated extensive knowledge of malaria with negative attitudes towards prevention, control of malaria and treatment seeking behaviors among the participants of the Shakawe village in the Okavango District.
Change in the attitudes of Okavango district men can lower malaria case number and aid the Botswana Government in their efforts to eliminate malaria by 2023. Malaria was associated with poverty due to irrational behaviors, including improper bed net use and not wearing protective clothing during peak malaria season.
To eliminate malaria, policies must be reformed. For example, housing structure alterations can be funded and enforced.
In all, positive attitude with good community practices can drive malaria elimination by ensuring individuals are effectively reached, educated, engaged, and supported. Imagine an army of thousands growing into tens of thousands, connected, informed, and unwilling to take no for fighting malaria.

Abbreviations

BCC: Behavior Change Communications
CBOs: Community-Based Organizations
DHMT: District Health Management Team
DPH: Department of Public Health
FGDs: Focused Group Discussions
IDSR: Integrated Diseases Surveillance and Response
ITNs: Insecticide Treated Nets
KAP: Knowledge, Attitudes and Practices
KIIs: Key Informant Interviews
MOH&W: Ministry of Health & Wellness
NGOs: Non-Governmental Organizations
NMP: National Malaria Program
OP: Office of the President
WHO: World Health Organization

Declaration by Authors

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Competing Interests: No interests to declare.

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