



Knowledge, Attitudes and Practices on Malaria Prevention and Control Among Private Security Guards Within Kaduna Metropolis, Kaduna State-Nigeria

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Abstract: An understanding of knowledge, attitudes and practices among different populations such as security guards temporarily outside the home due to occupational reasons are key determinants for policy makers in designing malaria prevention and control interventions. A survey on knowledge, attitudes and practices (KAP) on malaria prevention and control was conducted among two hundred and sixty-one (261) private security guards in Kaduna Metropolis, Kaduna State-Nigeria using a structured questionnaire. Data were analysed using SPSS version 20 while associations between variables were tested using a Chi-Square test with the level of statistical significance set at 5%. There were 253 (96.94%) respondents with a high knowledge score about malaria, 201 (78%) of respondents with a positive attitude and there were 192 (74%) of respondents with good malaria practices score. The majority (97.7%) of the respondents have heard about malaria before while 96.9% of respondents correctly associated mosquito as malaria vector. The radio serves the majority (93.1%) as their source of information about malaria. Wearing long-sleeved shirts, trimming of bushes and use of ITNs are the leading malaria prevention methods practised by the respondents. Statistically significant association between malaria practice scores and respondent's age (p-value = 0.022), gender (p-value = 0.002) and level of education (p-value = 0.006) was reported. Respondent's knowledge about malaria (p = 0.008) and attitude towards malaria (p = 0.020) were found to significantly influence their practices towards malaria. For sustainable implementation of malaria intervention programmes, good malaria practices in conjunction with high level of awareness by the respondents are quite significant. One of the methods for malaria control that leads to morbidity and mortality reduction is educational based teachings on understanding individual knowledge, attitudes and practices on malaria.

Keywords: Knowledge, Attitudes, Practices, Malaria, Guards

1. Introduction

Malaria is the most common protozoan parasitic disease in the tropical and subtropical regions of the world and is transmitted to man through the bites of infected female anopheline mosquito [1, 2]. The vector borne parasitic infection is caused by *Plasmodium* species namely *Plasmodium falciparum*, *P. ovale*, *P. vivax*, and *P. malariae* [3]. However, infections due to *P. falciparum* is the most common and deadly [4].

Malaria is a major public health problem in 97 countries and territories in the tropics and subtropics. Globally, nearly

214 million cases of malaria occur annually with about 3.2 billion people at risk of infection [5]. Approximately 438,000 deaths were attributed to malaria in 2015, particularly in sub-Saharan Africa, where an estimated 90% of all malaria deaths occur [5].

Nigeria is a high endemic country for malaria but tremendous gains have been made in the fight against malaria in the past few years. Notwithstanding, the disease still remains a major health challenge in Nigeria with high morbidity and mortality which has enormous consequences on the economy. The etiology of the disease which is the sum total of all the factors contributing to the occurrence of the

disease depends on the interaction of the agent, the host, and the environment which determines whether or not a disease develops. The contribution of the host has a distinct role in the transmission process, based on its capacity to affect the reservoir base of parasites [6, 7].

The scope of malaria control is changing worldwide with emphases placed on community and individual participation in malaria control and prevention measures rather than exclusive use of insecticides leading to the rapid rise of health education based on understanding knowledge, attitudes and practices (KAP) towards malaria control [8, 9]. Novel reports about knowledge, attitudes, and practices relating to malaria and its control are not lacking but these reports concluded that misconceptions on malaria transmission and risk factors still exist with negative impact on malaria control programmes [10-14].

Extensive public health promotional programs which focus on modern and established methods of malaria prevention and management is needed to achieve sustainable control of the disease. The importance of human behaviour in malaria transmission has not been extensively evaluated even though much is known about vector biology. Malaria control programmes must therefore consider the broad, complex and interrelated factors that influence human behaviour. The importance of information on KAPs in designing and improving malaria control activities has been emphasised [8]. Studies on KAP are also essential in establishing epidemiological and behavioural baselines useful to identify indicators for monitoring malaria control programmes.

Private security guards consisting of abled men and women are usually trained to provide day and night watch over private and public properties such as companies, banks, schools, hospitals and homes. These guards are exposed to vector borne diseases such as malaria due to the fact that many at times they spent the night on duty. Documented information on the KAPs associated with malaria transmission among different populations such as security guards temporarily outside the home due to occupational and recreational reasons in Kaduna State like many other States in Nigeria is lacking.

This study is aimed at assessing the KAP on malaria prevention and control among private security guards within Kaduna metropolis, Kaduna State-Nigeria. The outcome of this study will contribute towards designing basic, effective and sustainable malaria control strategies.

2. Materials and Methods

2.1. Study Area

Kaduna metropolis is the capital of Kaduna State and is located in the North-West geopolitical zone of Nigeria. It lies between latitude 10°20' N and 10.33° N, and longitude 7°45' E and 7.75°E. The state shares borders with Kano, Katsina and Zamfara states to the North, Plateau and Bauchi states to the East, Nasarawa state and the Federal Capital Territory (FCT) to the South and Niger state to the West [15]. Kaduna

State have distinct dry and wet seasons and is characterised by Guinea savannah type of vegetation [16].

2.2. Study Population/Sample Size

The study population was made up of 234 male and 27 female private security guards keeping watch on private and public properties in Kaduna Metropolis, Nigeria. The study population consists of guards who have voluntarily consented to participate in the study.

2.3. Ethical Permission

The study protocol was approved by Kaduna State Ministry of Health Ethical Committee before data collection commenced among the security guards. The aim of the study was also clearly explained to the guards in order to get their informed consent while guards who do not consent were excluded from the study. The security guards were also reminded of their right to decline to take part in the study as well as to withdraw any time during the interview. Confidentiality was assured and maintained throughout the study. Code of ethics on the use of human subjects in research as outlined in the NDA Research and Development Policy, 2016 was also adhered strictly.

2.4. Questionnaire Administration

Well-structured questionnaire was administered to obtain information that sought to gain insight into the guard's knowledge, attitudes and practices (KAP) towards malaria. It also covered demographic characteristics of respondents as well as bed net ownership and use, sources of information about malaria and treatment seeking behaviours. Each questionnaire was assigned a code to enable tracking of respondents. The questionnaire was interpreted in local language for those who do not understand English. This study used similar principles to generate multiple-choice questions, each of which was scored one point for a correct response and zero for the rest. An overall knowledge score was calculated by adding up the scores for each respondent across the scaled questions. Respondents answered a combination of positive and negative statements to help gauge their attitude towards malaria using a 3-point scale ranging from —Yes (score 3) to I don't know (score 1). The questions that indicated malaria practices were scored for each respondent. If a respondent indicated that they —"always" performed a good practice i.e. sleeping under a mosquito net, they were given a score of two points. If they indicated that they —"sometimes" performed a good practice, they were given a score of one point. If on the other hand, they indicated they —"never" performed a good practice, they were given a score of zero. An overall practices score was determined for each respondent by adding up the scores across the malaria practices questions [13].

2.5. Statistical Analysis

Data collected was processed using EpiData version 3.1 and each dataset subsequently exported to SPSS version 20

for analysis. Datasets were analysed and interpreted using descriptive statistics. Chi-Square test was used to test association between variables. Five (5%) level of probability was considered significant ($p < 0.05$).

3. Results

3.1. Demographic Characteristics of the Respondents

The demographic characteristics of the respondents are summarised in Table 1. The majority of the respondents were male (89.7%). Most respondents either fell in the 21-30 (31.8%) age category or 31-40 (23.8%) category, while the least were aged 15-20 (3.4%). Based on the level of education, the majority of the respondents (47.5%) have complete secondary school education while only 3.4% respondents reported having university degrees or equivalent qualifications. Family sizes are large with the majority (34.5%) reporting having seven or more household members.

Table 1. Distribution of respondents by demographic characteristics.

Demographic Characteristics	Responses	Frequency	Percentage (%)
Gender	Female	27	10.3
	Male	234	89.7
	Total	261	100.0
Age	15-20	9	3.4
	21-30	83	31.8
	31-40	62	23.8
	41-50	57	21.8
	51-60	37	14.2
	Above 60	13	5.0
Education	Total	261	100.0
	No formal schooling	16	6.1
	Primary school dropouts	10	3.8
	Complete Primary school	47	18.0
	Secondary school dropouts	13	5.0
	Complete secondary school	124	47.5
	Post-secondary	42	16.1
	Degree and above	9	3.4
Household size	Total	261	100.0
	None	14	5.4
	One or two	33	12.6
	Three or four	44	16.9
	Five or six	80	30.7
	Above seven	90	34.5
Total	261	100.0	

3.2. Respondents' Knowledge on Malaria

Respondents answered a number of questions to gauge their knowledge about malaria ranging from basic information about malaria to sources of information, signs and symptoms as well as transmission and prevention of malaria. The majority (97.7%) of the respondents have heard about malaria before while 96.9% of respondents correctly associated mosquito as malaria vector as shown in Table 2. Sources of information varied amongst respondents. Radio is the main source (93.1%), followed by the clinic (71.26%) and co-workers (49.81%) were the most

common sources of information about malaria as indicated in Table 3. Other common sources include family members (45.98%), neighbours (32.57%), and church/mosque (29.5%).

Table 2. Knowledge about malaria.

Question	Frequency (correct responses)	Percentage (%)
Have you ever heard about malaria?	255	97.7
Which vector can transmit malaria to humans?	253	96.9
Malaria can be transmitted to humans by?	251	96.2
Do you think malaria can kill if it is not treated?	243	93.1

Table 3. Respondents' sources of information about malaria.

Responses	Frequency	Percentage (%)
Family member	120	45.98
Neighbour	85	32.57
Radio	243	93.10
Television	56	21.46
Newspapers	24	9.20
Church/Mosque	77	29.50
Clinic	186	71.26
Co-worker/Colleague	130	49.81
I don't Know	11	4.21
Other	49	18.77

Note: Frequencies and Percentages add up to more than 261 and 100% respectively due to multiple responses.

In addition, the guards responses to questions on malaria signs and symptoms coupled with malaria prevention methods practised were summarised in Table 4 and Table 5. Both questions permitted respondents to select multiple answers from a range of answers and most respondents (98.85%) associated malaria with high temperature/fever.

Table 4. Respondents' knowledge on signs and symptoms of malaria.

Responses	Frequency	Percentage (%)
High temperature/Fever	258	98.85
Vomiting	15	5.75
Headache	220	84.29
Itching	5	1.92
Chills	8	3.07
Loss of energy	35	13.41
Sweating	20	7.66
Body pains	128	49.04
Loss of appetite	140	53.64
Dizziness	25	9.58
I don't Know	4	1.53

Note: Frequencies and Percentages add up to more than 261 and 100% respectively due to multiple responses.

Table 5. Malaria prevention methods practised by the respondents.

Malaria prevention methods	Frequency	Percentage (%)
When Off-duty Insecticide-treated nets (ITNs)	180	68.97
Repellents	48	18.39
Mosquito coil	129	49.43
Spraying Insecticides	57	21.84
Wearing long-sleeved shirts	240	91.95

Malaria prevention methods	Frequency	Percentage (%)
Making fire and smoke	17	6.51
Trimming of bushes	193	73.95
Others	38	14.56
When On-duty Insecticide-treated nets (ITNs)	114	43.68
Repellents	25	9.58
Mosquito coil	153	58.62
Spraying Insecticides	31	11.88
Wearing long-sleeved shirts	255	97.70
Making fire and smoke	12	4.60
Trimming of bushes	261	100.00
Others	21	8.05

Note: Frequencies and Percentages add up to more than 261 and 100% respectively due to multiple responses.

3.3. Respondents' Overall Knowledge, Attitude and Practices Score Towards Malaria Prevention and Control

There were 253 (96.94%) respondents with a high knowledge score about malaria, 4 (1.53%) of them had medium and low knowledge score about malaria each. The highest and lowest score of 7 points and 2 points was recorded respectively amongst the guards. The mean knowledge score for all respondents was 5.332 out of a possible 7 points as highlighted in the Table 6.

Table 6. Distribution of knowledge score about malaria amongst guards.

Level of Score	Frequency	Percentage (%)
High (score 7)	253	96.94
Medium (score 5-6)	4	1.53
Low (0-4)	4	1.53
Total	261	100.00%

Minimum Score=2; Maximum Score=7; Mean=5.332

An overall attitude score was determined for each respondent by adding up the scores across the 13 attitude questions. There were 201 (78%) of respondents with a positive attitude, 31 (12%) of them had a neutral attitude, while 26 (10%) had a negative attitude towards malaria prevention and control as summarised in Table 7. The mean attitude score for all respondents was 24.89 out of a possible 39 points.

Table 7. Distribution of malaria attitudes score of guards towards malaria prevention and control.

Level of Score	Frequency	Percentage (%)
Positive (score > 33)	204	78%
Neutral (score 25-32)	31	12%
Negative (< 24)	26	10%
Total	261	100%

Minimum Score=0; Maximum Score=39; Mean Score=24.89

There were 192 (74%) of respondents with good practices score, 50 (19%) of them had fair practices score, while 19 (7%) had poor practices score towards malaria prevention and control. The highest and lowest score of 37 and 0 points was recorded respectively amongst the guards in relation to malaria practices score. The mean practices score for all

respondents was 14.57 out of a possible 22 points. Table 8 summarises the distribution of malaria practices score across all respondents.

Table 8. Distribution of practices score by guards towards malaria prevention and control.

Level of Score	Frequency	Percentage (%)
Good (score >16)	192	74%
Fair (score 10-15)	50	19%
Poor (<9)	19	7%
Total	261	100%

Minimum Score=0; Maximum Score=18; Mean=14.57

3.4. Comparison of Malaria Practices Across Independent Variables

To explore association between demographics characteristics and various variables, different characteristics were categorized into groups. Related studies on malaria (Masangwi *et al.*, 2012; Thanabouasy, Pumpaibool and Kanchanakhan. 2009) have used similar grouping principles to determine associations. In this study, respondent age was categorized into 3 groups- youth were aged between 15 and 30, adults were aged between 31 and 50, while mature respondents were taken as those aged 51 years or more. Proportion of each category are summarised in Table 9.

Table 9. Distribution of respondents by age.

Age (yr)	Frequency	Percentage (%)
Youth (15-30)	92	35.2%
Adult (31-50)	119	45.6%
Elderly (51+)	50	19.2%
Total	261	100.0%

The comparison of malaria practice scores to demographic characteristics, knowledge about malaria and attitudes towards malaria across all respondents are summarised in Table 10, 11 and 12 respectively.

Comparing malaria practice scores to different demographic characteristics (gender, age, and educational level) using the Chi-Square test indicated that there was statistically significant association between malaria practices and the respondent's age (p -value=0.022) as well as between malaria practices and the respondent's gender (p -value=0.002) and again malaria practice significantly associate with the level of education (p -value=0.006) as shown in Table 10.

Table 11 shows the comparison of malaria practice scores to malaria knowledge scores. Chi-Square test indicated that there was statistically significant association between respondent's knowledge about malaria and their practices towards malaria (p =0.008). This finding implies that the more informed the respondents about malaria ethics, the more he/she puts it into practice consciously.

Comparing malaria practice scores to malaria attitude scores using the Chi-Square test indicated that there is statistically significant association between respondent's attitude towards malaria and their practices towards malaria (p =0.020) as revealed in Table 12.

Table 10. Association between age, gender, education and malaria practices.

Factor	Category	Good practice	Fair practice	Poor practice	Total	p-value
Age	Youth	102	36	16	154	0.022
	Adult	79	12	03	94	
	Elderly	11	02	00	13	
Total		192	50	19	261	
Gender	Male	134	55	45	234	0.002
	Female	25	01	01	27	
Total		181	63	17	261	
Educational Level	Not schooled	08	05	03	16	0.006
	Schooled halfway	12	08	03	23	
	Schooled	91	107	24	222	
Total		111	120	30	261	

Table 11. Association between malaria practices and malaria knowledge.

Malaria practice	Malaria Knowledge			Total
	High	Medium	Low	
Good practice	178	1	0	179
Fair practice	58	0	3	61
Poor practice	19	1	1	21
Total	255	2	4	261

$\chi^2=13.888$; $p=0.008$

Table 12. Association between malaria practices and attitude.

Malaria practice	Malaria Attitude			Total
	Positive	Neutral	Negative	
Good practice	174	6	1	181
Fair practice	58	3	2	63
Poor practice	14	1	2	17
Total	246	10	5	261

$\chi^2=11.695$; $p=0.020$

4. Discussion

In relation to knowledge about malaria, majority of respondents correctly associated mosquitos with malaria transmission (96.9%) and acknowledged that malaria kills if it is not treated (93.1%). The outcome from this study have been supported by other studies affirming that improved community knowledge of malaria and its source of transmission promote preventive and personal protection practices amongst the affected community which gives an opportunity for any malaria prevention and control intervention to utilise [17, 18]. An overall knowledge score was calculated by adding up the scores for each respondent across the scaled questions. There were 96.94% of respondents with high knowledge about malaria, 1.53% of them had medium and low knowledge about malaria each, indicating that the distribution of knowledge about malaria across all respondents is highly significant. Most respondents associated malaria with high temperature/fever which was in agreement with other studies [7, 19]. This finding agrees with the submissions of Adegun *et al.* (2011) and, Oyewole and Ibidapo (2007) [20, 21] who showed that the general knowledge about malaria prevention was good but varies with the conclusion of Adebayo *et al.* (2015) and, Onyeaso and Fawole (2007) [14, 22] who reported poor knowledge of

malaria preventive strategies.

The majority (60.2%) of the respondents stated they would seek treatment within 24 hours of onset of malaria symptoms while 30.8% seek treatment between 2-3days implying that majority of the respondents seek for treatment within 1-3days after suspecting symptoms. This is in line with the Abuja summit on malaria, which says, "at least 60% of those suffering from malaria should seek treatment within 24 hours of the onset of symptoms" [23]. However, this is far below the percentage of another study in Swaziland [24] which reported that 90% of respondents would seek treatment within 24 hours of seeing the first symptoms of malaria. This indicates that there is still sufficient room for improvement in Nigeria's efforts to encourage positive malaria treatment seeking behaviours.

Attitude, "a compound of affect, cognition and behaviour" is an important component in malaria control although it has not been adequately considered in the design of interventions such as health education promotion messages, hindering sustainable control [7]. On the whole, respondents do recognize the threat posed by malaria as most (94.5%) agreed with the statement that "I think that malaria is a serious and life-threatening disease" while 90.8% agreed that their present job increases their risk level of getting malaria while self-medication is on the low side as can be inferred from the respondents responses (35.6%). It therefore implies that the buying of anti-malaria drugs from the pharmacy is based on Doctor's prescription being that one cannot recover spontaneously from the disease except when placed on medication as indicated by 79.7% of the respondents. The majority of the respondents (78%) had positive attitude towards malaria prevention and control.

In relation to practices, sleeping under bed nets was the most prevalent method of malaria prevention and control. On a general look, the majority of the respondents owns and uses the bed net. Given the prominent role already played by bed nets in the fight against malaria, control programmes can build on this opportunity to fight malaria. Even though, it is fine to have mass campaigns that distribute free bed nets, but care must be taken to teach people how to effectively use them and create ownership or pride that prevents misuse because bed nets were free hand-outs.

5. Conclusion

This study has shed light on the level of understanding about knowledge, attitudes and practices on malaria prevention and control among private security guards within Kaduna metropolis, Kaduna state-Nigeria. It has generated information useful to health education promoters and policy makers for guidance towards malaria elimination campaigns. Data from this study shows the respondents have high knowledge, attitude and practice scores against malaria which further calls for continuous and relentless control measures with enlightenment campaigns to further educate people on malaria, because it is entirely preventable and curable.

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