



## Variation in Community Perception on Mosquito-Borne Diseases between Urban and Rural Communities in Gombe State, Nigeria

Ezra Abba<sup>1\*</sup>, Tabitha Paul<sup>2</sup>, Kennedy Poloma Yoriyo<sup>1</sup>  
and Blessing Chinwendu Emmanuel<sup>2</sup>

<sup>1</sup>Department of Zoology, Faculty of Science, Gombe State University, Gombe, Nigeria.

<sup>2</sup>Department of Biological Science, Faculty of Science, Gombe State University, Gombe, Nigeria.

### Authors' contributions

This work was carried out in collaboration among all authors. Authors EA and TB designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors KPY managed the analyses of the study. Author BCE managed the literature searches. All authors read and approved the final manuscript.

### Article Information

DOI: 10.9734/AJOB/2020/v10i430114

#### Editor(s):

(1) Bilal Muhammad Khan, Pir Mehr Ali Shah Arid Agriculture University, Pakistan.

#### Reviewers:

(1) Ivana Škrlec, Josip Juraj Strossmayer University of Osijek, Croatia.

(2) Deepak Sethi, Rabindra Nath Tagore Medical College, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/63051>

Original Research Article

Received 10 September 2020

Accepted 17 November 2020

Published 09 December 2020

### ABSTRACT

**Aims:** This work is aimed at knowing the variation in community perception on mosquito-borne diseases between urban (Gombe) and rural (Filiya) of Gombe State.

**Study Design:** Each of the two communities was sectioned into longitudinal zones and 150 houses were then randomly selected from the zones in each of the communities for the administration of questionnaires. The data were analyzed using descriptive statistics

**Place and Duration of Study:** The study was conducted between April and June 2018 in Gombe and Filiya communities of Gombe state.

**Methodology:** Quantitative data were collected utilizing open-ended questionnaire covering 300 respondents.

**Results:** In Gombe (urban community) 98% of respondents had knowledge about mosquitos' existence unlike Filiya (rural community) with 74%. Concerning mosquito-borne diseases, up to 92%

of urban dwellers are aware of one or more mosquito-borne diseases compared to the rural respondent with 46% awareness. 68% of the urban respondents agreed that the frequent breeding places for mosquitoes are drains and polluted waters. On the other hand, 28% of the respondents from the rural community shared this view about the frequent breeding sites of the mosquitoes with the urban dwellers. More so, up to 34% of the rural respondent does not know mosquito breeding sites. Majority of the respondent in the urban areas relied on Nets for protection against mosquito bites while the rural respondent majorly uses coils. Only 36% of respondents in urban community source their treatment from Government health facility against 12% in the rural community. Half of the respondent in the rural community sought treatment from one source or the other.

**Conclusion:** The popular Mosquito-Borne disease is malaria. Most people have a fair knowledge about malaria prevention and control and see malaria as a threat to their lives and community but the majority had poor practices towards malaria prevention and control. The government should intensify the campaign against malaria.

*Keywords: Mosquito-borne diseases; variation; community perception; prevention and control.*

## 1. INTRODUCTION

Mosquito-borne diseases are the most important public health problem for many years and still represent constant and serious risks to a large part of the world's population [1]. Mosquitoes are successful in their transmission not only because they can survive in different habitat but also for their ability to rest indoor which tend to increase their chances of eggs development and also disease transmission. Mosquitoes vary in habit from one region to another. Some species of mosquitoes never bite humans while others prefer birds or domestic animals [2].

These insects are responsible for the transmission of pathogens causing some of the threatening and debilitating diseases of man, such as malaria, yellow fever, Dengue fever, chikungunya, filariasis, encephalitis etc. [3]. Different species of mosquitoes act as a crucial vector for many arboviruses (arthropod-borne viruses) and parasites that causes many dreadful diseases and produces a huge burden on world's population in terms of morbidity and mortality and also causes social, cultural, environmental and economic loss of the society.

Despite the huge investment and intensive research in the development of malaria vaccine, science is yet to record a breakthrough. However, several effective preventive methods are currently utilized to combat malaria. The policies and prevention strategies used are defined by the available resources and epidemiological setting of the diseases [4]. The use of appropriate methods for mosquito control is a promising way in which these diseases can be prevented or controlled. There are several possibilities for controlling immature life stages and adult mosquitoes, such as environmental

control, chemical control, physical control, biological control, among others. The success rate of the above-mentioned control methods singly or in combination depends upon the knowledge and perception of the community people living in the applied area. Mass education and campaign provide community knowledge in the local people. Despite many mass communication and educational programs arranged by the government and some non-governmental organizations, community participation is far below the expectation in almost all regions of the world [5]. Community participation in turn depends on peoples' general awareness, education, knowledge, socio-economic status and attitude [6]. The most effective way to control the mosquito population is to get rid of their breeding sources [7]. Three primary prevention strategies are currently utilized for the prevention of malaria. The first is drug treatment, the second is indoor residual spraying to eradicate mosquitoes, and the third is mosquito nets to prevent bites [8].

Vector-borne diseases such as malaria are easily preventable, curable and treatable, but it remains a big health threat to many communities in the world, most especially in Sub-Saharan Africa. However, very few studies were carried out to compare the knowledge between rural and urban inhabitants of a particular area. Fifty-five per cent of the world's populations are at risk of mosquito-borne disease according to Amul *et al.* [9].

Community participation is essential for the prevention and control of an outbreak of mosquito-borne disease [10]. Understanding the biology of mosquitoes and knowing the variance in community perception on mosquito-borne diseases and knowing the control measures that

should be applied will play a vital role in fighting and eradicating these deadly vectors that serve as an agent of diseases transmission, thereby forming the basis for mosquito control policy. This work is therefore aimed at investigating the rural and urban communities' perception of mosquito-borne diseases in Gombe state, Nigeria.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was conducted from April to June 2018 in Gombe (urban), and Filiya (rural) communities of Gombe State. Located at Latitude 9°52'4" and longitude 11° 24'4" land area of Gombe town is 52km<sup>2</sup>, with an estimated population of 268,000 as at 2006 census. The land area of Shongom is 922km<sup>2</sup>, with an estimated population of 151,520 as at 2006 census. Both the communities have an average rainfall and relative humidity. The major occupation of the people is farming.

### 2.2 Methodology

The study was conducted by interviewing people of each area using a set of open-ended questionnaire. The community was interviewed based on random sampling technique without bias. The questionnaires were answered orally by interviewing the people. The answer collected from each person was recorded in a data sheet for analysis.

### 2.3 Data Analysis

Data were analyzed using SPSS version 17 and represented in tables.

## 3. RESULTS AND DISCUSSION

### 3.1 Results

The present study shows the observation-based upon responses received from 300 respondents. In the urban community, there were more males (52%) than females (48%). Likewise, the rural community respondent constitutes 60 and 40% males and females respectively. Table 1 shows the demographics of the respondents from the two communities.

Regarding the knowledge about mosquito existence, the urban respondents have more knowledge about mosquitoes than the urban community (Table 2).

Table 3 shows that the urban respondents are more knowledgeable regarding different types of mosquito-borne diseases than the rural respondents. When the respondents were asked about the symptoms of mosquito-borne disease, in both the communities, fever emerged as most likely symptoms, followed by shivering which reflects that probably the people experienced malaria more than any other mosquito-borne disease.

The general perception of the community people about the most frequent breeding places of mosquitoes differ from the urban and rural community. In the urban area, the frequent breeding places for mosquitoes were identified as drains/polluted water as indicated by 68% of respondents. But in the rural area, 34% of the respondents do not know the breeding places of mosquitoes (Table 4).

In the urban community, mosquito bed net was the most frequently used personal protection measures as indicated by 62% of respondent. On the other hand, 56% of the respondents from the rural community depend coils (Table 5).

Regarding the source of malaria treatment, only 36% of respondents in urban community source their treatment from Government health care systems against 12% in the rural community. Just half of the respondent in the rural community sought treatment from one source or the other.

### 3.2 Discussion

The behaviour of the susceptible community plays an important role in the ecology and spreading of infectious diseases. Also, community participation is essential for the prevention and control of mosquito-borne diseases. Community perception study is essential to understand the level of knowledge of the community, their attitude and practices regarding mosquito-borne diseases [11]. In the present study, it was noticed that remarkable differences in opinion are present between rural and urban people in terms of use of bed nets, source of treatments, knowledge about the mosquito-borne diseases and sources of mosquito breeding places. The level of knowledge with regards to disease transmission varies, and this study shows that people may not understand that mosquitoes spread many diseases other than malaria. A similar study by Ravi Kumar and Guraraj shows a similar outcome [12]. The reason for the disparity

between the perceptions of the sample population maybe because of the difference in the demography. Both communities have more male and the age range is between 19-45 years but there are more students in the urban communities than the rural community which have more farmers and speak other languages other than English. There is a fair general knowledge about mosquitoes and mosquito-borne diseases in both communities but the urban community responses indicated they are well informed. This might be the urban dwellers are more oriented and are closer to the source of information regarding mosquitoes. More so, the level of literacy might be a factor. Similar results were found in other developing countries [13]. The variation in the perception of people about different types of mosquito-borne diseases between urban and rural communities in this study agrees with a study carried out in India, where it was reported that rural people have limited knowledge of mosquito-borne diseases. They only see mosquito as an insect [14]. Among people who understand that mosquito causes illness, there is a hesitation to use proper methodologies to prevent mosquito bites. Bed nets can reduce cases of malaria by 31% [15]. In a community study in Nigeria, it was found that the community people widely believed that mosquito nets are the best way to prevent transmission of mosquitoes [16]. In this present study, it was noticed that people of urban area use more of bed nets (62%), than other means

whereas people of rural area that use coils against mosquitoes are (56%); this result does not agree with Petal and Tenglikar [17-18] whose result shows that mosquito repellants (57.49%) are mostly used followed by mosquito nets (30.77%) then screening of doors and windows (14.17%). In Gombe (urban), the majority of the people depend on government health system against only 12% of rural respondents. This is probably because there are several health institutions situated in Gombe town, but limited and ill-equipped in the rural community. Nonetheless, level of awareness and poverty level of the rural dwellers might be another factor preventing the rural dwellers seeking treatment from government health facilities. It is also noticed that rural community dwellers are not using government health service properly. If people do not seek treatment from the government health facility, then it would be a very difficult task for the government to reduce the burden of mosquito-borne diseases [19]. The perception of the majority of the respondent from the urban area in this study as regards the mosquito breeding sites is dissimilar with the findings in Karnataka, India, where it was found that the breeding sites of especially *Anopheles* mosquitoes are relatively clean waters in domestic water containers [20]. Respondents in this study sought their malaria treatment from diverse sources. In another study in Nigeria, the majority of respondents prefer orthodox medicine [21].

**Table 1. Demographics of the sample population from Gombe and Filiya communities**

Characteristics	Respondents	
	Urban No (n=150)(%)	Rural No (n=150)(%)
<b>Gender</b>		
Male	78(52)	90(60)
Female	72(48)	60(40)
<b>Age (Yrs)</b>		
12-18	36(24)	42(28)
19-45	96(64)	75(50)
46-75	15(10)	24(16)
Others	3(2)	9(6)
<b>Occupation</b>		
Student	93(62)	36(24)
Businessman	33(22)	18(12)
Farming	18(12)	90(60)
Others	6(4)	6(4)
<b>Language</b>		
English	75(50)	39(26)
Hausa	33(22)	48(32)
Others	42(28)	63(42)

**Table 2. Knowledge about mosquito existence in Gombe and Filiya communities**

Response	Respondents	
	Urban	Rural
	No (n=150)(%)	No (n=150) (%)
Yes	147(98)	111(74)
No	3(2)	39(26)

**Table 3. Knowledge about mosquito-borne diseases in Gombe and Filiya communities**

Responses	Respondents	
	Urban	Rural
	No (n=150)(%)	No (n=150)(%)
Malaria	120(80)	51(34)
Yellow fever	12 (8)	18(12)
Filariasis	6 (4)	0 ( 0)
No knowledge	12 (8)	75 (50)
Others		6 (4)

**Table 4. Knowledge about Breeding Sites of Mosquitoes among Gombe and Filiya communities**

Responses	Respondents	
	Urban	Rural
	No (n=150) (%)	No (n=150) (%)
Drains/Polluted Water	102 (68)	42 (28)
Garbage	6 (4)	36 (22)
Plant	6(4)	18(12)
No Knowledge	21 (14)	51 (34)
Others	15 (10)	3 (2)

**Table 5. Personal Protection Measures against Mosquito in Gombe and Filiya communities**

Responses	Respondents	
	Urban	Rural
	No (n=150)(%)	No (n=150) (%)
Repellent	24 (16)	18(12)
Fan	18 (12)	12 (8)
Screening of windows and doors	6 (4)	9 (6)
Nets	93(62)	27(18)
Coils	9 (6)	84(56)

**Table 6. Source of treatment of malaria infection in Gombe and Filiya communities**

Responses	Respondents	
	Urban	Rural
	No (n=150) (%)	No (n=150) (%)
Government Health System	54(36)	18(12)
Private Hospitals	30(20)	6 (4)
Self Medication	42(28)	27(18)
Home Remedy	15(10)	12 (8)
Others	3(2)	11(7.3)
None	6(4)	75(50)

#### 4. CONCLUSION

The study revealed that most people in the urban community have a fair knowledge about mosquito-borne diseases' prevention and control. On the other hand, there is limited knowledge on the mosquito vector prevention and control and treatment, especially in the rural community. This poses a great threat to vector control strategies in Nigeria especially the current goals on National Malaria Elimination Program in Nigeria. There is a serious need for introduction/strengthening of mass education through Government and Non-Governmental Organization and social media, especially in rural communities.

#### CONSENT

Prior to the administration of the questionnaire, consent of the participant were sought.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Denise N, Grant D, David G, Kate K, Bryan G, Stephen M, Moses RK. Urban Malaria: primary caregivers' knowledge, attitudes, practices and predictors of malaria incidence in a cohort of Ugandan children. *Tropical Medicine and International Health*. 2003;8(8):685-698.
2. Awolola W, Gillet HR. Health-seeking behaviour and the health system's response. *DCPP Working Paper no. 14*; 2013.
3. Chander A, Coetzee B. Malaria treatment in Northern Ghana: What is the cost per case to households. *African Journal of Health Sciences*. 2014;14(1-2):70-79.
4. Nehjla J, Kitara D, Garimoj CO. Knowledge misconceptions about Malaria among pregnant women in a post-conflict internally displaced person' camps in Gulu. *Malaria Research and Treatment*. 2011;1-7.
5. Erhun WO, Agbani EO, Adesanya SO. Malaria prevention: Knowledge and practice in southwestern Nigerian community. *African Journal of Biomedical Research*. 2005;8:25-29.
6. Aggarwal DA, Foss A. Knowledge on the transmission, prevention and treatment of Malaria among two endemic populations of Bangladesh and their health-seeking behaviour. *Malaria Journal*. 2013;8(1).
7. World Health Organization. The Abuja Declaration on Roll Back Malaria in Africa. African Heads of States and Governments; 2016.
8. World Health Organisation. The World Malaria Report-2010. Washington DC: World Health Organization; 2015.
9. Amul BP, Hitesh R, Pankil S, Viren P, Jignesh G, Rasmi S. Perceptions regarding mosquito borne diseases in an urban area of Rajkot city. *National Journal of Medical Research*. 2011;1(2): 45-47.
10. GOG. Enhanced Malaria control project Gujarat state Malariology course for Medical officers of PHCs, Learner's guide part-I, 2002-2003. State Malaria control society, Gandhinagar, Gujarat.
11. Patel AJ, Smith DL. International population movements and regional Plasmodium falciparum Malaria elimination strategies, *Proceedings of the National Academy of Sciences*. 2011;(1)07(27).
12. Ravikumar K, Gururaj G. Community Perception Regarding Mosquito-borne Diseases in Karnataka State, India. *Dengue Bulletin – Vol 29*; 2005.
13. Egedus VL, Ortega JM, Obando AA. Knowledge, Perceptions, and Practices concerning the Prevention of Dengue in a Mid-Pacific Coastal Village of Costa Rica. *Revistade Biologia Tropical*. 2014;62:859-867. DOI.ORG/10.15517/RBT.V62I3.14065
14. Avit M, Debsmita C, Suvendu P, Biplab M, Anupam G. Differences in community perceptions on mosquito-borne diseases between rural and urban localities of Bankura district, West Bengal, India, *Journal of Mosquito Research*. 2015;5(1): 1-5. DOI:10.5376/jmr.2015.05.0001
15. Goodman CA, Mnzava AE, Dlamini SS, Sharp BL, Mthembu DJ, Gumede JK. Comparison of the cost and cost-effectiveness of insecticide-treated bednets and residual house-spraying in Kwazulu-Natal South Africa. *Tropical Medicine and International Health*. 2001; 6(4):280-295.
16. Patel BA, Rathod H, Shah P, Patel V, Garsondiya J, Sharma R. Perceptions regarding Mosquito-borne diseases in an

- urban area of Rajkot city. National Journal of Mosquito Research. 2011;1(2):45-47.
17. Tenglikar PV, Hussain M, Nigudgi SR, Ghooli S. Knowledge and Practices Regarding Mosquito-Borne Disease among People of an Urban Area in Kalaburgi, Karnataka. National Journal of Community Medicine. 2016;7(3):223-225.
  18. Onwujeke SJ, Grimason AM, Morse TD, Ferguson NS, Kazembe L.N. Community knowledge variation, bed-net coverage and the role of a district healthcare system, and their implications for malaria control in southern Malawi. South African Journal of Epidemiological Infection. 2014;27(3):116-125.
  19. Patel AJ, Smith DL. International population movements and regional Plasmodium falciparum malaria elimination strategies. Proceedings of the National Academy of Sciences. 2011;107(27).
  20. Ravikumar K, Gururaj G. Community Perception Regarding Mosquito-borne Diseases in Karnataka State, India. Dengue Bulletin; 2006;30:270-77.
  21. Babamale OA, Adenekan TA, Ugbomoiko US. Community Knowledge on Transmission of Malaria and its Management Practice in Oorelope Local Government, Southwestern Region, Nigeria. Animal Research International. 2015;12(2):2203 – 2211.

© 2020 Abba et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:  
<http://www.sdiarticle4.com/review-history/63051>*