

Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 36-43

Original Article

Mosquito-Borne Diseases Related Knowledge and Perception among Residents of Semi Urban Region of Eastern Nepal

Alok Acharya*, Amar Kumar Yadav, Priya Upadhyay and Surendra Kumar

Department of Community Medicine, Nobel Medical College Teaching Hospital, Biratnagar, Nepal
Received: 28th February, 2017; Revised after peer-review: 30th March, 2017; Accepted: 26th May, 2017

Abstract

Background

Mosquito borne diseases are endemic in most part of the country. While public health efforts are placed towards the elimination of major vector borne diseases like malaria and filariasis, climatic and manmade environmental changes has led to threats of reemergence of mosquito borne diseases like dengue and chikungunya in new regions. There are needs of studies among community people regarding knowledge and perception of vector borne diseases to change the attitudes of people towards vector control and avoid risky behavior by application of behavior change communication tools.

Material & Methods

A cross sectional study was done among households from 2 wards of Tankisinwari VDC in semi-urban region near Biratnagar sub-metropolitan city. The study duration was of 3 months from November 27 2014 to February 27 2015. Study population was 566 and 654 households from 2 wards. Among them, 57 from one ward and 65 from other ward, a total of 122 households were taken proportionately from both wards. Data was entered into excel sheet and analysis was done using SPSS 16.

Results

People who heard of filariasis as disease transmitted by mosquito bite were 23.8% and malaria (89.3%), Dengue (19.6%). Among the participants, 85% responded that mosquito borne disease can be prevented in their area while 4.9% and 6.6% only heard of indoor residual spraying and insecticide treated bed nets respectively. Among those who did not know about breeding places of mosquito, 29.2% were illiterates, who were significantly more than literates 5.1% ($p < 0.05$). Among those who were aware of environmental vector control measure, closed drainage was preferred by 52.5% and disposal of waste by burial or burning was practiced by 64.4%.

Conclusion

There is need of public health intervention with interactive tools of behavior change communication in the community to enhance perception about mosquito and mosquito borne diseases

Key Words: *Attitudes, Community, Mosquito, Perception, Public health*

Introduction

One of the best-known disease vectors are mosquitoes. Most prevalent mosquito

borne diseases in South East Asia Region include Malaria, Dengue, Chikungunya, Japanese Encephalitis and Lymphatic

Filariasis. In SEAR malaria is endemic in all countries except Maldives. [1]. In Nepal, there is confirmation of all four serotypes of Dengue viruses (DEN-1-4). Hence, there has been sudden resurgence of more severe dengue diseases in Nepal. To prevent the future outbreaks of dengue there is need of health care providers to become familiar with the disease [2]. To overcome the challenges posed by mosquito borne diseases and to prevent humans from infections, there is requirement of effective public health response.

The important interacting drivers to set the novel stage for vector borne diseases are globalization, environmental change, social and demographic change and health system capacity. Disease and vector surveillance as well as monitoring infectious disease drivers like environmental conditions can help to counteract and to respond to emerging vector-borne diseases [3]. Behavior Change Communication (BCC) is an important component of malaria prevention and control strategies. BCC uses tools such as targeted messages and approaches, thus promotes healthy behaviors and reduce risk taking [4]. According to report of micro-stratification of 2012, approximately 13.02 million population of Nepal that is 47.9% live in malaria endemic VDCs [5].

The objective of this study is to assess knowledge and perception regarding mosquito vector borne diseases and its association with selected preventive practices among local community people.

Material & Methods

This cross-sectional study was done in Tankisinwari VDC of Morang District near to Biratnagar Sub-Metropolitan city. The study duration was of 3 months from November 27 2014 to February 27 2015. Study population was 566 and 654

households from 2 wards. Among them, 57 from one ward and 65 from other ward, a total of 122 households were taken proportionately from both wards. The first house was selected randomly, and then every third house was selected from each ward for interview.

For data collection, structured questionnaire was used in Nepali language and face to face interview was conducted with one member of each household, preferably literate member that is 18 years or above. If more than one member were literate and 18 years or above then elder member of household was given the priority. If no one in the household was found literate, elder among 18 years and above was chosen. Study tools were questions regarding demography, knowledge and information regarding prevention of mosquito borne diseases and breeding places of mosquito; questions regarding source of knowledge and measures /practices regarding control of mosquito and activities taken by the government in the region. Written permission was taken from ward office for the study. Verbal consent was taken from the participants after explaining the purpose of the study. In case of absence of consent, the next household was chosen for data collection.

Statistical analysis

Data entry was done using Microsoft excel. Data were analyzed using SPSS version 16. Chi-square test was used to find associations among different variables. A p-value 0.05 was used to indicate statistical significance.

Result

Out of the 122 respondents, male and female respondents were equal in number while 57.4% were of age group 30-60 years. Among respondents, 80.3% knew

to read or write. 66.4% were above poverty line and 63.1% were employed. When it is asked about diseases transmitted by mosquito bite in multiple response questions, 89.3% have heard of Malaria as disease transmitted by mosquito bite, but only 37.7% said heard of Japanese Encephalitis followed by Filariasis by 23.8 %, Dengue by 19.7%. Among the participants, 16.4% also said that Kala-azar is transmitted by mosquito bite. In this study, 94.3% people said that mosquito bite is necessary for transmission of mosquito borne diseases. When asked if mosquito borne disease can be prevented in your area, 85.2% responded positive but only 77.9% said that mosquito borne disease is serious problem in their area. When asked about the prevention and control measures of vector borne diseases in multiple response questions, 87.7% knew about Chemical vector control method, 48.4% knew environmental vector control method and 27% knew about biological vector control method but only 4.9% and 6.6% heard of indoor residual spraying and insecticide treated bed nets respectively. Source of their knowledge as in multiple responses were 95.1% from mass media, 94.3% from friends and neighbor followed by governmental and institutional programs 29.5% and health personals 18.9%.

When specifically asked on multiple responses question 73.8% male and 70.3 % female said mosquito breeds in dirty water. Among those who did not know about breeding places of mosquito, 29.2% were illiterates, who were significantly more than literates 5.1% ($p < 0.05$). Similarly, 37.7% female said mosquito breeds in stagnant water which was significantly lower than male 59% ($p = 0.02$). Similarly, 90.4% of age group 18-30 years said that mosquito breeds in dirty water, which was significantly less among those above 30 years 58.6% ($p < 0.05$).

Similarly, 40% above 30 years said mosquito breeds in stagnant water, this was significantly higher among 18-30 years age group 59.6% ($p = 0.03$). Similarly, knowledge of mosquito breeding in dirty water was found 79.6% among literate, which was significantly more than illiterate 41.7% ($p = 0.001$). Those from below poverty line, 58.5% had significantly less knowledge regarding breeding places as dirty water than that of above poverty line 79% ($p = 0.02$). Also, Knowledge of stagnant water as breeding site was lower among people below poverty line 36.6% than that of above poverty line 54.3% ($p = 0.06$).

Table 1. Demographic characteristic of respondent (n = 122)

Characteristics	N	%
Age group (years)		
18-30	52	46.2
31-60	70	57.4
Gender		
Male	61	50
Female	61	50
Literacy Status		
Literate	98	80.3
Illiterate	24	19.7
Economic status		
Above poverty line	81	66.4
Below poverty line	41	33.6
Employment status		
Employed	77	63.1
Unemployed	45	36.9

Similarly, among people living in pakka houses, 80.8% had more knowledge regarding breeding places as dirty water than those living in kachha house 65.7% ($p = 0.06$). Similarly, knowledge of stagnant water as breeding site was significantly more among those living in pakka houses 63.5% than those living in kachha house 37.1% ($p = 0.004$). Similarly, knowledge regarding breeding places of mosquito as thrown bottles and plastics and others were significantly less among

people below poverty line 17.1% than those above poverty line 33.3% ($p=0.05$). Among the group of people who had knowledge of environmental vector control measure, closed drainage was preferred significantly more (52.5%) than open drainage preference by 47.5 % ($p=0.01$). Disposal of waste by burial or burning was practiced by 64.4% among those who knew environmental control method.

Among those who knew biological measure, disposal of waste by burial or burning was practiced by 63.6%. Similarly, among those who knew chemical measure, closed drainage was preferred by 38.3 % and disposal of waste by burial or burning was practiced by 57.9% while indiscriminately throwing of waste was practiced by 42.1%.

Table 2. Knowledge on mosquito borne diseases (n = 122)

Characteristics	N	%
Source of Knowledge*		
Mass Media	116	95.1
Friends/Neighbor	115	94.3
Health personnel	23	18.9
Heard of measures taken by Government		
Yes	36	29.5
No	86	70.5
Knows that mosquito bite is necessary for disease transmission	115	94.3
Knowsthatmosquitobornediseasecanbeprevented	104	85.2
Knowsthatmosquitobornediseaseis a seriousproblem.	95	77.9
Disease Transmitted by Mosquito Bite*		
Malaria	109	89.3
Japanese Encephalitis	46	37.7
Filariasis	29	23.4
Dengue	24	19.7
Kalazar	20	16.4
Knowledgeonvectorcontrolmeasure*		
Biological control measure	33	27
Environmental control measure	59	48.7
Chemical control measures	107	87.7
HeardofIndoorResidualSpraying	6	4.9
HeardofInsecticidetreatedbednets	8	6.6

Knowledge regarding breeding sites of mosquito*		
Dirty water	88	72.1
Stagnant water	59	48.4
Animal shed	38	31.1
Discarded tires	17	13.9
Bottles/plastics/other	34	27.9
Don't know	12	9.8

*Multiple response

Table 3. Perception on breeding places of mosquito (n = 122)

Characteristics	Mosquito breeds in dirty water		P value	Mosquito breeds in stagnant water		P value	Mosquito breeds in Animal shed		P value	Mosquito breeds in Discarded tires		P value	Mosquito breed in thrown Bottles/Plastics /Other		P value
	Yes	No		Yes	No		Yes	No		Yes	No		Yes	No	
Sex															
Male	45 (73.8)	16 (26.2)	0.6	36 (59)	25 (41)	0.02	24 (39.3)	37 (60.7)	0.05	7 (11.5)	54 (88.5)	0.4	18 (29.5)	43 (70.5)	0.6
Female	43 (70.5)	18 (29.5)		23 (37.7)	38 (62.3)		14 (23)	47 (77)		10 (16.4)	51 (83.6)		16 (26.2)	45 (73.8)	
Age group (years)															
18-30	47 (90.4)	5 (9.6)	0.00	31 (59.6)	21 (40.4)	0.03	19 (36.5)	33 (63.5)	0.2	8 (15.4)	44 (84.6)	0.6	23 (44.2)	29 (55.8)	0.01
>30	41 (58.6)	29 (41.4)		28 (40)	42 (60)		19 (27.1)	51 (72.9)		9 (12.9)	61 (87.1)		11 (15.7)	59 (84.3)	
Literacy status															
Literate	78 (79.6)	20 (20.4)	0.001	48 (49)	50 (51)	0.7	33 (33.7)	65 (66.3)	0.3	14 (14.3)	84 (85.7)	0.5	30 (30.6)	68 (69.4)	0.2
Illiterate	10 (41.7)	14 (58.3)		11 (45.8)	13 (54.2)		5 (20.8)	19 (79.2)		3 (12.5)	21 (87.5)		4 (16.7)	20 (83.3)	
Economic status															
Above poverty line	64 (79)	17 (21)	0.02	44 (54.3)	37 (45.7)	0.06	26 (32.1)	55 (67.9)	0.7	12 (14.8)	69 (85.2)	0.6	27 (33.3)	54 (66.7)	0.05
Below poverty line	24 (58.5)	17 (41.5)		15 (36.6)	26 (63.4)		12 (29.3)	29 (70.7)		5 (12.2)	36 (87.8)		7 (17.1)	34 (82.9)	
Type of House															
Kachha	46 (65.7)	24 (34.3)	0.06	26 (37.1)	44 (62.9)	0.04	20 (28.6)	50 (71.4)	0.4	8 (11.4)	62 (88.6)	0.3	17 (24.3)	53 (75.7)	0.3
Pucca	42 (80.8)	10 (19.2)		33 (63.5)	19 (36.5)		18 (34.6)	34 (65.4)		9 (17.3)	43 (82.7)		17 (32.7)	35 (67.3)	

Table 4. Association of selected practices and knowledge on control of vectors (n = 122)

Characteristics	Knows Biological control		P value	Knows Chemical control		P value	Knows Environmental control		P value
	Yes	No		Yes	no		Yes	No	
Type of preferred drainage									
Open	16 (48.5)	56 (62.9)	0.1	66 (61.7)	6 (40)	0.1	28 (47.5)	44 (69.8)	0.01
Closed	17 (51.5)	33 (37.1)		41 (38.3)	9 (60)		31 (52.5)	19 (30.2)	
Type of preferred method of waste disposal									
Indiscriminately throwing out of house	12 (36.4)	39 (43.8)	0.4	45 (42.1)	6 (40)	0.5	21 (35.6)	30 (47.6)	0.1
burial or burning method	21 (63.6)	50 (56.2)		62 (57.9)	9 (60.0)		38 (64.4)	33 (52.4)	

Discussion

According to WHO, there has been some improvements in combating against some vector borne diseases like malaria and Filariasis but Dengue has emerged and has increased its score at an alarming pace. Environmental changes have big role in spreading this disease in rural areas. The limited health system resources have been highly strained by this cause in many developing countries [6]. Active community participation and organized vector control strategies is required to achieve the best results in malaria control [7]. In this study 94.3 % said that mosquito bite transmit disease, which is similar in study done by Joseph et al. in Mangalore [7] where 90.7% were aware that mosquito bite transmit diseases. In this study, 77.9% said that mosquito borne disease is a serious problem; similarly, Khanal et al. [8] found 72.8% who reported mosquito borne diseases as a serious health problem. In this study 9.8% had no knowledge regarding breeding sites of mosquito. Consistent with this study, other study done by Joshi et al. [9] showed that there was absence of knowledge of breeding site among 20.4%. In this study only 29.5% respondent said that they have heard about government programs for control of mosquito vector borne diseases which is consistent with

the study done by Khanal et al. [8] which showed that awareness about government measure was 37.7%.

Despite of the fact that due to the use of mass drug administration (MDA), elimination program of Lymphatic Filariasis (LF) by 2020 is on the road, LF is endemic in 60 out of 75 districts with 25 million people at risk by early 2000 [4].

In this study people who heard of disease transmitted by mosquito bite as Filariasis (23.8%) was similar with study of Boratne et al. [10] in Punducherry 36.91% but contrasted with the study of Khanal et al [8] in Eastern Nepal which showed 62.7% awareness of Filariasis as transmitted by mosquito bite. However, in this study the knowledge regarding Japanese Encephalitis (37.7%) and Dengue (19.7%) as transmitted by mosquito bite is very low which is similar to the study done by Khanal et al [8] and Boratne et al. [10]. Also, in this study, people who heard of diseases transmitted by mosquito bite as malaria was 89.3%, which were consistent with study [8] which showed 94% people heard of malaria as transmitted by mosquito bite. In this study 48% knew about breeding site as stagnant water and in contrast to this study Khanal et al. [8] found knowledge of stagnant water as breeding site in 83%. However, Boratne et al. [10] showed knowledge of stagnant

water as breeding site among 59.79% of study group, which is consistent with this study. Also in other study done by Joshi et al. in Nepal [9] 59.8% responded stagnant water as breeding places of mosquito which is consistent with this study.

In this study knowledge of breeding habits of mosquito as stagnant water was seen significantly more among males (59%) than in females (23%). There is significant difference in gender in knowledge regarding breeding habit as stagnant water in this study while the other study done by Boratne et al. [10] stated that more than half respondents (60.69%) stated stagnant water as commonest breeding place in Pondicherry, with more in females (61.9%) than males (59.7%). Similarly, in this study, people above poverty line had significantly more knowledge regarding breeding site as dirty water (79%) and stagnant water (54.3%) than the people above poverty line which is also consistent with the finding of study by Boratne et al. [10] and Khanal et al. [8] among total population. Also in this study, people living in pakka houses had significantly more knowledge regarding breeding site as dirty water (80.8%) and stagnant water (63.5%) than that of people living in kachha houses which is consistent with the study done by Boratne et al. [10] and Khanal et al. [8] on total population. Also, this study found significantly more knowledge regarding breeding place as dirty water among literates 58.3%, which is consistent with study done by Boratne et al. [10] among the total population. However, in this study, Knowledge regarding breeding sites as discarded tires was more among the female respondents (11.5%) with no significant difference than males (29.5%). Similar to this study Boratne et al. [10] showed 19.59% male and 23.95% female knew discarded tires as breeding places of mosquito. This shows there is need of public health

intervention to increase the awareness about breeding places of mosquito among community people to control mosquito vector.

In the study of Mangalore, South India, it was said that even though thousands of free insecticides treated nets were distributed in Mangalore and penalty was imposed on the people who created breeding grounds for mosquitoes, there was no suppression of cases of malaria in the city [7] In our study only 6.6% have heard of insecticide treated bed nets which is consistent with findings of other similar study in Nepal done by Joshi et al. [9] which showed 3.6%.

Vectors of Dengue fever breed in the man-made environment of human settlements while irrigation projects has significant role in breeding vectors of Malaria, filariasis and Japanese encephalitis [11]. In this study, among the group of people who had knowledge of environmental vector control measure, closed drainage was preferred significantly more (52.5%) than open drainage preference by 47.5 % ($p=0.01$). In this study, among the group of people who knew environmental vector control measure, waste disposal by burial or burning method was also higher (64.4%) than indiscriminately throwing out of house tendency by 35.6%. In a different study [12], environmental measures like disposing of water holding containers such as tires, parts of automobiles, plastic bottles, cracked pots, etc. was found in 91%, preventing any stagnant water was found in 90% in central Nepal.

Conclusion

This study found that due to lack of information and knowledge, there was low perception about mosquito as well as mosquito control measures in the community and mostly among people above 30 years, illiterates and people below poverty line. The success of vector

control measures relies on acceptance, participation and appropriation by community members as well, which depends on their knowledge and perceptions of both the disease and the vector. Hence it is recommended to make improvements in materials of health education while dissemination of information through various channels.

References

- [1] Bhatia R, Ortega L, Dash AP, Mohamed AJ, Vector-borne diseases in South-East Asia: burdens and key challenges to be addressed, WHO South-East Asia Journal of Public Health. 3:1 (2014) 2-4.
- [2] Pun SB. Dengue: An Emerging Disease in Nepal, J Nepal Med Assoc. 51 (2011) 203-8
- [3] Semenza JC, Zeller H, Integrated surveillance for prevention and control of emerging vector-borne diseases in Europe, Euro Surveill. 19:13 (2014) 20757.
- [4] Roll Back Malaria Partnership, Malaria BCC Indicator Reference Guide. 2014
- [5] DOHS (2012) Annual Report 2069/70 (2012/2013) Kathmandu: Department of Health Services, Ministry of Health and Population, Government of Nepal.
- [6] WHO, A global brief on vector-borne diseases. 2014
- [7] Joseph N, Nelliyanil M, Kotian SM, Mohammed O, Aswin RS, Donkena S, Jugnu S, Chabra P, Awareness, practices and expenditure towards mosquito bite prevention methods in urban and semi-urban areas of South India. International Journal of Mosquito Research 2 :1(2015) 53-59.
- [8] Khanal VK, Pyakurel P, Uprety S, Rayamajhi RB, Gupta PP, Ghimire A, Singh SB, Pokharel PK, Budhathoki SS, Mosquito borne diseases related knowledge, practice and behavior of people in rural and peri-urban areas of Eastern Nepal, Health Renaissance 12:2 (2014) 92-98.
- [9] Joshi AB, Banjara MR, Malaria related knowledge, practices and behavior of people in Nepal, J Vector borne Dis 45 (2008) 44-50.
- [10] Boratne AV, Jayanthi V, Datta SS, Singh Z, Senthilvel V, Joice YS, Predictors of knowledge of selected mosquito-borne diseases among adults of selected periurban areas of Puducherry, J Vector Borne Dis. 47(2010) 249-256.
- [11] World Health Organization. Environmental Management for Vector Control: Training and informational materials, Slides set series. 1988.
- [12] Dhimal M, Aryal KK, Dhimal ML, Gautam I, Singh SP, Knowledge, Attitude and Practice Regarding Dengue Fever among the Healthy Population of Highland and Lowland Communities in Central Nepal, PLoS ONE 9:7 (2014).