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Original Article

Knowledge, awareness and practice study for mosquito borne diseases among school children of Malwa region of India

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ABSTRACT

Background: Mosquito borne diseases pose significant burden to the community which can be prevented through right knowledge, attitude and practice of it. **Objective:** To study the knowledge, awareness and practices of school children about mosquito borne diseases. **Materials and Methods:** A predesigned, semi structured proforma was filled out from 261 students of 9th to 12th standard of Malwa region. Data was entered in Microsoft excel and percentage of answers were calculated. **Results:** All students knew something about the mosquito borne diseases. Most of the students (>80%) knew about the malaria and dengue. Very few students were having knowledge that Japanese encephalitis, yellow fever and filariasis are spread though mosquito. 68.2% of students knew fever with chills as symptoms of mosquito borne diseases. More than 85% of students told that mosquito borne diseases can be prevented either through individual protection or through community level protection, supported by government. **Conclusion:** The awareness regarding malaria was good among students of Malwa region but same was lacking about other mosquito borne diseases.

Key words: *Awareness and practices study, Knowledge, Malwa, Mosquito borne disease, Students*

Since centuries back, malaria is one of the most important and prevalent mosquito borne diseases. In recent years mosquito borne diseases have emerged as serious public health problem in countries of South East Asian region, including India. About 3.2 billion people – nearly half of the world's population – are at risk of malaria. In 2015, there were roughly 214 million malaria cases and an estimated 438,000 malaria deaths. Increased prevention and control measures have led to 60% reduction in malaria mortality rates globally since 2000 [1]. India alone contributes 77% of total cases of malaria of SEAR countries [2]. In India, 91% malaria cases and 99% malarial deaths are reported from eleven high disease burden states which include Madhya Pradesh also [3].

The mosquito borne diseases result in avoidable ill health-death which also has been emphasized in National Health Policy and Millennium Development goals. National Vector Born Disease Control Program under the aegis of NHRM is one of the most comprehensive and multifaceted public health activities in India [4]. In spite of mass communication and educational approaches community participation is far below the expectation in India. Community participation in turn depends on people's knowledge, awareness and attitude towards these diseases which in turn depends on the introduction of knowledge at right age [5].

According to the Census 2011, adolescent constitute 20.9% of total population in India and in Madhya Pradesh itself, this proportion is >21%. In our country, whose major proportion of population consists of youth, if we target this particular group our half of the work is done. Therefore current study was planned on school children of 9th to 12th standard for assessing their knowledge, awareness and practices (KAP) about mosquito borne diseases.

MATERIALS AND METHODS

This cross sectional questionnaire based KAP study was conducted in four private sector schools of Indore city (urban area) in the year 2016. Consent was taken from school authorities in advance. Out of total 300, only 261 students between 9th and 12th standard who completed the proforma were included in the study. A semi-structured, predesigned and pretested proforma containing various aspects of the mosquito borne diseases was used. The proforma consisted of multiple choice questions with more than one correct answer and students were instructed to mark as many answers as they found correct. The students were explained in detail about filing proforma. The proforma were collected by trained volunteers and author covering one school in one day. The results were charted in Microsoft Excel and same was used for statistical analysis. After collecting

proformas, correct answers were given to participants as well as information was provided about mosquito borne diseases through audio-visual aids and queries of the participants were also solved.

RESULTS

Out of total 300 students, only 261 had filled proforma and rest were excluded from the study. Among these 261 students, 173 were male and 88 were female. 83 (31.8%) students were between 12 and 14 years of age and 178 (68.2%) were between 15 and 17 years of age. The students were of three different streams of education that is 86 (32.9%) were belonging to commerce group, 47 (18.0%) mathematics and biology group was 50 (19.1%), 78 (29.88%) students have not given their stream of education. Out of total 261 student, 85 (32.5%) lived in joint family and 161 (61.6%) in single family, 15 students have not answered. Since we included only urban area school, only 4 (1.5%) students lived in kachcha house, rest all were residing in pacca house.

Knowledge that mosquito can cause diseases in human beings was present in all students. On asking which sex and stage of mosquito bites human beings, 211 (80.5%) students rightly answered that it was female mosquito, 35 (13.4) students answered male mosquito (Table 1), 8 (3.1%) have also said that both male and female mosquito bite and 5 (1.91%) students said all male, female and larva bite. When compared to male students, significantly higher numbers of female students gave the correct answer for this question ($p<0.05$). We also enquired about which mosquito species is causing diseases to humans; 178 (68.1%) answered *Anopheles*, 44 (16.8%) said *Culex*, 37 (11.8%) marked *Aedes*, 23 (8.8%) students answered all three species cause diseases in humans. There was a significant difference of knowledge of different species of mosquito between males and females students ($p<0.05$).

The diseases which can occur due to mosquito bite, malaria was in the top ranking as 250 (95.7%) student knew about it, second common was dengue 199 (76.2%), followed by yellow fever 34 (13.0%), Japanese encephalitis 17 (6.5%), chikunguniya 58 (22.2%) and 47 (18.0%) also knew about Zika virus, as recent epidemic episode highlighted by media. There were 10 (8.3%) student who wrongly answered that human immunodeficiency virus (HIV) can also occur due to mosquito bite.

Awareness about symptoms which can occur due to any of mosquito borne diseases, are given in Table 1. Fever with chills was the most commonly known symptom among students. Female students were more aware about the symptoms associated with mosquito borne diseases ($p<0.05$). 212 (81.2%) student knew that mosquito borne diseases can lead to death.

226 (86.5%) students were aware that mosquito borne diseases can be prevented while 25 (9.5%) students answered it as no and 10 (3.8%) students did not know about it. According to students, the best methods of prevention of malaria was only mosquito control 41 (15.7%), only personal protection from bite 34 (13.0%), both method 182 (69.7%) and 42 (16.1%) said cannot say. Knowledge about different breeding places of mosquito is provided in Table 1. Dirty stagnant water and

Table 1: Knowledge about mosquito borne diseases

Knowledge about mosquito born disease	Female 88 (100)	Male 173 (100)	Total 261 (100)
Type of mosquito			
Male mosquito	9 (10.2)	26 (15.0)	35 (13.4)
Female mosquito	80 (90.9)	131 (75.7)	211 (80.8)
Larva	4 (4.5)	16 (9.2)	20 (7.7)
Species of mosquito			
Culex	15 (17.0)	29 (16.8)	44 (16.9)
Aedes	12 (13.6)	25 (14.5)	37 (14.2)
Anopheles	72 (81.8)	106 (61.3)	178 (68.2)
Other	10 (11.4)	39 (22.5)	49 (18.8)
Type of disease			
Malaria	85 (96.6)	165 (95.4)	250 (95.8)
Filaria	6 (6.8)	10 (5.8)	16 (6.1)
Yellow fever	12 (13.6)	22 (12.7)	34 (13.0)
Zika virus	10 (11.4)	37 (21.4)	47 (18.0)
JE	4 (4.5)	13 (7.5)	17 (6.5)
chikunguniya	20 (22.7)	38 (22.0)	58 (22.2)
Dengue	70 (79.5)	129 (74.6)	199 (76.2)
HIV	2 (2.3)	8 (4.6)	10 (3.0)
Symptoms			
Fever with chill	69 (78.4)	109 (63.0)	178 (68.2)
Rigors	3 (3.4)	13 (7.5)	16 (6.1)
Vomiting	43 (48.9)	77 (44.5)	120 (46.0)
Fits	6 (6.8)	15 (8.7)	21 (8.0)
Loss of consciousness	16 (18.2)	41 (23.7)	57 (21.8)
Rashes	37 (42.0)	46 (26.6)	83 (31.8)
Bleeding	3 (3.4)	14 (8.1)	17 (6.5)
Paleness	21 (23.9)	37 (21.4)	58 (22.2)
Yellowish eye	9 (10.2)	25 (14.5)	34 (13.0)
Lethargy	12 (13.6)	12 (6.9)	24 (9.2)
Fatal	69 (78.4)	143 (82.7)	212 (81.2)
Breeding places of mosquito			
Clean storage water	13 (14.8)	38 (22.0)	51 (19.5)
Dirty storage water	84 (95.5)	144 (83.2)	228 (87.4)
Sand	1 (1.1)	5 (2.9)	6 (2.3)
Mud	21 (23.9)	39 (22.5)	60 (23.0)
Garbage	63 (71.6)	99 (57.2)	162 (62.1)
On the well	16 (18.2)	29 (16.8)	45 (17.2)
Don't know	0 (0.0)	1 (0.6)	1 (0.4)

JE: Japanese encephalitis, HIV: Human immunodeficiency virus

Table 2: Practice about mosquito borne disease

Practice about mosquito borne disease	Female	Male	Total
Water storage			
Fully closed	57	129	186
Partially closed	25	28	53
Open	1	12	13
Not answered	5	4	9
Paradomestic drain			
Closed	65	129	194
No drain	6	14	20
Open	7	21	28
Breeding places in and around house			
Dirty water	17 (19.3)	35 (20.2)	52 (19.9)
Clean water	23 (26.1)	43 (24.9)	66 (21.3)
Flowing water	8 (9.1)	29 (16.8)	37 (14.2)
Muddy water	8 (9.1)	16 (9.2)	24 (9.2)
Drain uncovered	8 (9.1)	22 (12.7)	30 (11.5)
Grass field	29 (33.0)	59 (34.1)	88 (3.7)
Garbage	30 (34.1)	65 (37.6)	95 (36.4)
Individual protection method			
Mosquito net	72 (81.8)	114 (65.9)	186 (71.3)
Coil	62 (70.5)	103 (59.5)	165 (63.2)
Cream	47 (53.4)	76 (43.9)	123 (47.1)
Spray	30 (34.1)	74 (42.8)	104 (39.8)
Racket	52 (59.1)	82 (47.4)	134 (51.3)
Liquid vaporizer	63 (71.6)	109 (36.0)	172 (65.9)
Smoke	40 (45.5)	74 (42.8)	114 (43.7)
Screening	19 (21.6)	44 (25.4)	63 (24.1)

garbage were thought to be the most common breeding places. Garbage (95, 36.3%), and grass field (88, 33.7%), were the common breeding places which students found near their houses (Table 2). The details of source of water supply, water storage system and paradomestic drain are mentioned in Table 2. The protective measures used against mosquito among the families of these students are mentioned in Table 3. Maximum families were using more than one method.

Enquiring about the various methods of making water free of mosquito larvae and breeding; maximum students answered covering water storage tanks 135 (51.7%), rest methods in decreasing frequency of knowledge were as follows: Chloride tablets 94 (36.01%), General cleanliness measures 88 (33.7%), larvicidal fish 30 (11.5%) and oil preparation 22 (8.4%) (Table 3).

Out of total 261 students only 140 (53.6%) students were aware of the government program against vector borne diseases. 121 (46.3%) has no idea. Students had gained this knowledge by

Table 3: Attitude towards mosquito borne disease

Attitude towards mosquito borne disease	Female	Male	Total
Preventive	84 (95.5)	142 (82.1)	226 (86.6)
Individual protection	80 (90.9)	149 (86.1)	229 (87.7)
Community level	79 (89.8)	152 (87.9)	231 (88.5)
Government program	54 (61.4)	86 (49.7)	140 (53.6)
Community level protection methods			
Scrubbing of container	16 (18.2)	31 (17.9)	47 (18.0)
General cleaning	40 (45.5)	48 (27.7)	88 (33.7)
Larvicidial fish	7 (8.0)	23 (13.3)	30 (11.5)
Edibile oil preparation	6 (6.8)	16 (9.2)	22 (8.4)
Chloride tab	32 (36.4)	62 (35.8)	94 (36.0)
Covering container	52 (59.1)	83 (48.0)	135 (51.7)
Don't know	10 (11.4)	39 (22.5)	49 (18.8)
Source of information			
News paper	73 (83.0)	114 (65.9)	187 (71.6)
Course book	43 (48.9)	58 (33.5)	101 (38.7)
TV	53 (60.2)	101 (58.4)	154 (59.0)
Radio	27 (30.7)	43 (24.9)	70 (26.8)
Internet	56 (63.0)	84 (48.6)	140 (53.6)
Social media	29 (33.0)	76 (43.9)	105 (40.2)

multiple sources like – 187 (71.6%) by newspaper, 154 (59.0%) by television, 140 (53.6%) by internet, 105 (40.2%) by social media, 101 (38.6%) by books, 74 (28.3%) health care persons and 70 (26.8%) by radio (Table 3).

DISCUSSION

In our study, most commonly known mosquito species was *Anopheles* (68.5%) followed by *Culex* and *Aedes*. Tyagi et al. [6] in their study reported that 80% of primary school teacher were knowing about female *Anopheles*, very few percentage were knowing about *Culex* and *Aedes* mosquito which is similar to our study.

On enquiring disease specific knowledge in our study malaria and dengue were well known. Patel et al. [7] reported that malaria perceived as the most common disease transmitted by mosquito (87.96%) which is similar to our study but knowledge regarding dengue is quite high in our study and was low in their study. Study done by Dhaduk et al. [2] shows that 100% of the urban population knew that malaria is transmitted by mosquito. 21% respondent also answered typhoid as mosquito born disease in Dhaduk et al. study [2], so wrong knowledge is also prevalent among people in both the studies as students in our study also reported HIV as mosquito borne disease. Similarly Matta et al. [8] reported that 96% urban population had heard of malaria and 92% knew that it is transmitted by mosquito bite.

Dhaduk et al [2] in their study demonstrated awareness regarding symptoms of mosquito borne diseases - 89% urban population knew about fever while 73% knew chills and rigors. It is quite high as compared to our study. Among Malwa region students, 62.7% student had miscoception about garbage as breeding place of mosquito. Pandit et al [9] from Gujarat reported that 19.3% of people know garbage as breeding places of mosquito. Kumar et al. [10] had similar results indicating incorrect knowledge about breeding places of mosquito.

Maximum number of students in our study think prevention of these diseases can be done by both individual and community level action. Similarly in a study by Tyagi et al. [6], 60-83% of people from different communities were thinking that malaria control should be done by both government and public participation, i.e., community level protection. In our study, more than half of the students had heard of government program. Kumar et al. [10] reported that 40.8% of urban population did not know about government program. Patel et al. [7] showed that 21.09% of persons were aware about existing various government measure for prevention and control of mosquito borne diseases.

Similar to our study, Patel et al. [7] reported that the most common personal protection method taken by urban families were use of liquid repellent vaporizer (75.46%) and the least commonly used method was screening of houses 14.81%. However, use of mosquito net (9.26%) in this study was quite lower than our study (71.2%). Pandit et al. [9] in their study showed that 97% of the people were using one or other personal protection method, and the most common were mosquito net (38.9%) and coil (53.7%).

Since the study was conducted In Urban area, living condition in maximum families was good. Most of the families had closed or partially closed water storage and paradomestic drain. In spite of this the prevalence of mosquito borne diseases is high at Malwa region. It may be because most families had one or the other breeding places in and near their houses. There were hardly any efforts being done to reduce them. Study emphasizes need for larvicidal action and reduction of breeding places both at personal level and at large scale.

The source of information for most of the students was newspaper, television and internet. We recommend that Government of India should utilize these methods of communication for educating general public about mosquito borne diseases. Government can also use school as platform for spreading knowledge/awareness as a mandatory activity. Adolescent age is the best age because seeding right knowledge at right age can altogether change the future scenario. After collecting questionnaire, we also provided information about mosquito borne diseases with help of audio-visual aids, so as to increase their awareness.

Limitation of our study was that we have to rely on the students' answer for living condition, water storage, drainage and mosquito breeding place etc that is indirect source of information.

CONCLUSION

The awareness regarding malaria and its vector was fairly good among students but same was lacking about other mosquito borne diseases. Awareness and knowledge was more in female students for few things. There were certain myths about Mosquito borne diseases, breeding places of mosquito and their preventive methods. These need to be clarified by mass education and communication.

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