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Assessment of Awareness Regarding Dengue and Dengue Haemorrhagic Fever through Cognitive, Affective and Behaviour (CAB) Model in Eastern India

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Abstract **Background:** Dengue is a vector borne disease transmitted by the infective bite of *Aedes aegypti* mosquito and causative agent is dengue virus. Man develops sign and symptoms of disease after 5-6 days of an infective bite. It occurs in two forms dengue fever which is a severe flu-like illness and dengue haemorrhagic fever (DHF) which is a more severe form causing death. **Objective:** To assess awareness regarding Dengue and Dengue Haemorrhagic Fever among common people through cognitive, affect, behaviour (CAB) model. **Methods:** This is a community-based cross-sectional study carried out during the period November 2021 to April 2022. Sample size calculated was 384 and the OPD register was taken as a sampling frame. A semi-structured pretested questionnaire was used as a study instrument. Descriptive and inferential statistics are used for analysis. **Results:** A total of 390 patients were interviewed. Among those, 43% belonged to the age group of 18-29yr. The female participants were 50.3%. Regarding knowledge about dengue, 77% of participants had heard about it and 69% opined mosquitoes as a causative vector. Only 18% of participants knew the daytime biting nature of mosquitoes. Overall, the respondents had a good attitude as 65% of respondents considered that dengue could be a serious illness. Nearby 83% said that they had no risk of getting dengue. As preventive practice against mosquito bites, the majority (59%) used mat/coil. **Conclusions:** As there is no specific treatment for dengue, everybody should be aware of the early diagnosis, hospitalization for treatment and preventive practices against breeding mosquitoes.

Keywords Dengue, Mosquito, Fever, Dengue Hemorrhagic Fever

1. Introduction

The causative agent of dengue fever is dengue virus and transmission occur due to the bite of infective *Aedes aegypti* mosquito. The usual incubation period is 5-6 days. There are two spectrums of this disease, one is dengue fever which is a severe flu-like illness and the other form is dengue haemorrhagic fever (DHF) which is a more fatal form that may cause death [1]. Dengue is known to be endemic in most of the states of India and it is one of the major reasons for hospitalization [2]. The incidence of dengue has increased dramatically around the world in

recent times because of industrialization and a lack of proper water drainage systems. The actual numbers of dengue cases are underreported and many cases are misdiagnosed. Global estimates in 2017 indicate 104 million dengue infections per year which is gradually reduced from 232 million in 1990 [3]. Moreover, in World Health Organization, the total reported cases of dengue have increased over eight-fold in the last two decades from 505,430 cases in 2000, to over 2.4 million in 2010 and 4.2 million in 2019. An estimated 500,000 people with severe dengue require hospitalization each year, among whom large proportions are children. About 2.5% of those affected die [4]. In India, the risk of dengue has shown an increase in recent years due to rapid urbanization, lifestyle changes and improper water storage practices leading to proliferation of mosquito breeding sites. All the four serotypes of dengue virus are isolated in India; hence, it belongs to category A as a hyper-endemic country in the South-East Asia Region. Dengue is endemic in 31 states [5]. Although the number of dengue cases in India has shown a steady rise with every passing year, the mortality has reduced. The case Fatality rate which was 3.3% in 1996 has come down to 0.11 in 2019 [6]. During the time period from 2006 to 2012, there was a wide variation of officially reported 20,477 confirmed cases to a yearly estimated 33 million apparent dengue cases [7]. In 2014, out of 40473 dengue cases reported from India, 137 were death cases. In the state of Odisha, 8380 cases were also reported and among them 11 were death cases by 2016, 5198 cases in 2018, 3758 cases in 2019 [8]. Hence, prevention of spread of dengue by increasing awareness about the control measures for the vector *Aedes aegypti* and Dengue is the mainstay for control of Dengue. With this background, this study aimed to assess the awareness of common people through cognitive, affective and behavioral (CAB) model regarding dengue fever and its preventive measures among the residents in rural areas of Bhubaneswar.

2. Materials & Methods

2.1. Study Design & Study Setting

This is a type of cross-sectional study was carried out in rural areas under the Rural Health and Training Centre (RHTC), Jamujhari, Department of Community Medicine, IMS & SUM Hospital, Bhubaneswar, Odisha from November 2021 to April 2022. The study population were the patients attending Out Patient Department (OPD) of RHTC.

2.2. Sample Size and Sampling Technique

As per 2011 census data, the total population of it was 1,226,000 which was taken as representative population of Bhubaneswar city for sample size calculation [9]. Based on the study by A Taksande et al. [10] where prevalence of knowledge, attitude on Dengue was 50%, and assuming absolute precision with finite population correction as 5% & confidence interval at 95% sample size calculated was 384. Nearly more than 30 patients visited the OPD daily, on an average basis, it was calculated that nearly 5000 patients had visited within a six-month period. Applying systematic random sampling, the sampling interval was calculated as 13 where OPD register was taken as a sampling frame. So, every 13^{th} patient was taken as a subject for the study. Address of the patient was collected from the OPD register, sorted according to the village name. For this particular study, data were collected from 390 patients in their homes by the field staff who attended our OPD within the 6-month study period.

2.3. Study Instrument

A pretested and structured questionnaire was used as a study instrument. It contained 4 parts. Part 1 contained questions pertaining to socio demographic profile of the patients, and part 2 was about the questions on cognitive aspects regarding signs, symptoms and mode of transmission of dengue. Questions pertaining to affective or attitude towards dengue were in part 3 and in part 4 about preventive practice and behavioral adoption against dengue and sources of information regarding Dengue. Prior to use of this questionnaire, it was transliterated to local language odia by the investigator and back transliterated to English by an assistant. Then both the English and odia, the local language formats were compared by a third person to resolve any discrepancies. Finally, the Odia format was used for data collection.

2.4. Methodology

The field staff under Rural Health and Training Centre (RHTC) work 6 days in a week except Sundays and govt. Holiday. Data was collected on every working day by the field staff and only 2-3 interviews could be completed per day in house to house visits. The seriously ill patients who were unable to talk or listen and who did not agree to participate in this study were excluded. All the communications were made in local language i.e Odia. Informed consent (verbal) was taken from all respondents and confidentiality was ensured throughout the study. Collected data were entered in SPSS version 16.0 and analyzed. The socio-demographic profile parameters were compared with the knowledge and attitude towards dengue by using chi-square test and p value less than 0.05 was taken to be statistically significant. The Ethical committee of the institution had approved the study proposal.

3. Results

A total of 390 patients were interviewed for various components including socio-demographic characteristics (Table 1), among them 43% belonged to the age group of

18-29 years, followed by 23% who were more than 59 years. The proportion of female patients (50.3%) was marginally higher than that of the male patients (49.7%) and 61% of all study participants were married. The educational status of respondents was as follows: illiterate (12%), primary (12%), middle school (8%) high school (24%), post-high school (31%), graduates/post graduates (11%) and only 2% attained professional educational courses. Among the study population, 39% were semiskilled by occupation and 4% were unemployed. Majority (35%) of the study population belonged to the lower middle socioeconomic status as per the modified Kuppuswami scale 2017 [11] and 12% belonged to lower socioeconomic status.

Regarding cognitive component (Table 2) about dengue, 77% of participants had heard about it and 69% opined mosquitoes as a causative vector for dengue. Human-to-human spread occurs in dengue was expressed by 48% of participants. Around 43% were aware that fever was a common symptom of dengue and only 29% knew that joint pain could accompany fever. Nearby 49% were aware of the fact that they had to do a blood test for the diagnosis of dengue. Regarding the treatment option, 37% were of the opinion that dengue was treatable on early diagnosis and 55% had no idea about it. Out of 271 participants who knew mosquitoes as a vector of Dengue, only 18% were aware of the day-biting habit of the mosquito. The common breeding sites of mosquito narrated by patients were as follows: artificial water (21%), garbage & trash (40%), cooler & Tyre (20%), dirty water (8%) and plants with vegetation (11%).

Regarding attitude of respondents towards dengue (Table 3), 65% of respondents agreed that dengue could be a serious illness but surprisingly 83% perceived that they had no risk of getting dengue. Nearly 82% believed that dengue could be preventable whereas 85% opined that controlling mosquito breeding sites was the responsibility of the Government.

Table 1. Association of Socio demographic characteristics with Gender

Characteristics		Number	Percentage (%)	Male	Female	P
Age group	18-29	168	43	83	85	>0.05
	30-44	70	18	33	37	
	45-59	62	16	30	32	
	>59	90	23	43	47	
Marital status	Married	238	61	116	122	>0.05
	Unmarried	152	39	74	78	
Education	Illiterate	47	12	23	24	>0.05
	Primary	47	12	22	25	
	Middle school	31	8	15	16	
	High school	93	24	45	48	
	Post high school	121	31	59	62	
	Graduate/Postgraduate	43	11	21	22	
	Profession	8	2	5	3	
Occupation	Unemployed	15	4	7	8	>0.05
	Unskilled	78	20	38	40	
	Semiskilled	153	39	75	78	
	Skilled	55	14	27	28	
	Clerical/shop owner	62	16	30	32	
	Semi profession	19	5	8	11	
	Profession	8	2	3	5	
Family Income in 2017 (INR)	≤2101	8	2	3	5	>0.05
	2102 - 6297	31	8	14	17	
	6298 - 10495	113	29	55	58	
	10496 - 15705	137	35	67	70	
	15706 - 20991	62	16	30	32	
	20992 - 41984	31	8	15	16	
	≥41985	8	2	4	4	

Table 2. Cognitive component regarding Dengue

Knowledge regarding dengue: Statements	Response category	Frequency(N)	Percentage (%)
Heard about dengue disease	Yes	301	77
	No	89	23
Cause of dengue	Mosquito bite	271	69
	Other (house flies, dirty water etc)	119	31
Human to human spreads	yes	187	48
	No	47	12
	Do not know	156	40
Symptoms	Fever	168	43
	Fever with Joint pain	114	29
	Fever with Nausea/ vomiting	15	4
	Fever with Bleeding	15	4
	Do not know	78	20
Is there any diagnostic blood test	Yes	192	49
	No	15	4
	Do not know	183	47
Dengue is treatable	yes	144	37
	No	31	8
	Do not know	215	55
Common breeding site of mosquito	Artificial water (Storage jar, coconut shell, bamboo stick)	82	21
	Garbage & trash	156	40
	Cooler &tyre	78	20
	Dirty water	31	8
	Plant & vegetation	43	11
Biting time of mosquito	Daytime	70	18
	Evening	15	4
	Night	16	4
	Do not know	289	74

Table 3. Attitude of Respondents towards Dengue

Attitude towards dengue: statement	Response category	Frequency(N)	Percentage (%)
Dengue is a serious illness?	Agree	253	65
	Disagree	137	35
Are you at risk of getting dengue?	Agree	66	17
	Disagree	324	83
Dengue fever can be prevented?	Agree	320	82
	Disagree	70	18
Government responsibility for controlling breeding of mosquito	Agree	331	85
	Disagree	59	15

Concerning preventive practices against mosquito bites (Figure 1), 59% of respondents commonly use mat/coil followed by mosquito net (45%). RHTC was the most preferred health-seeking place (59%) among the patients followed by private clinics. Regarding sources of knowledge about dengue; 65% got the information from TV followed by newspaper 16% (Figure 2).

Studying the association of various variables (Tables 4, 5) it was observed that knowledge level as well as the attitude of the participants had significantly associated with different socio- demographic characteristics like gender, marital status and level of education. Males as well as married participants and respondents from the higher education group ($P < 0.05$) had more knowledge and had heard about Dengue. Similarly, Males, married participants and respondents from the higher education group ($P < 0.05$) had a more favourable attitude towards dengue as they had agreed that dengue is a serious illness.

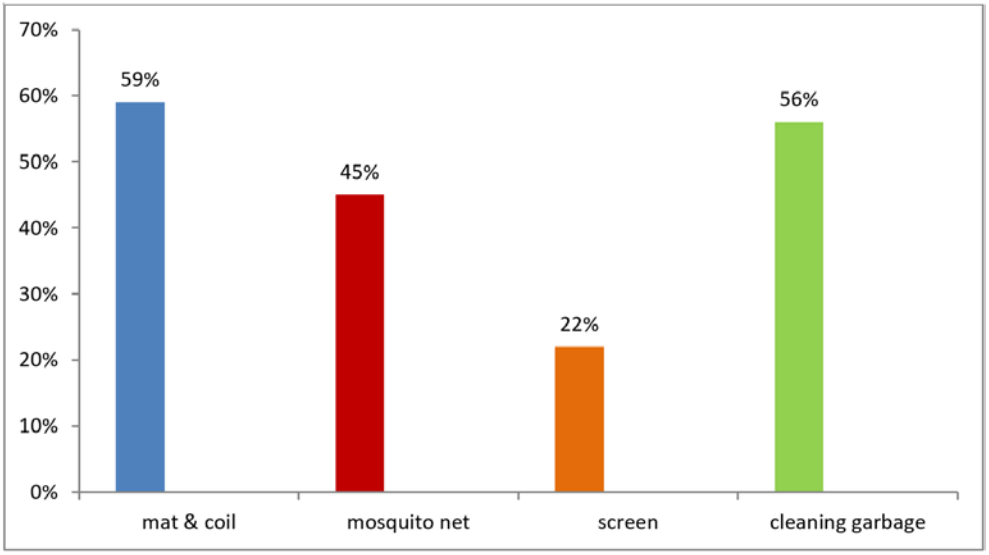

Figure 1. Preventive practice against mosquito

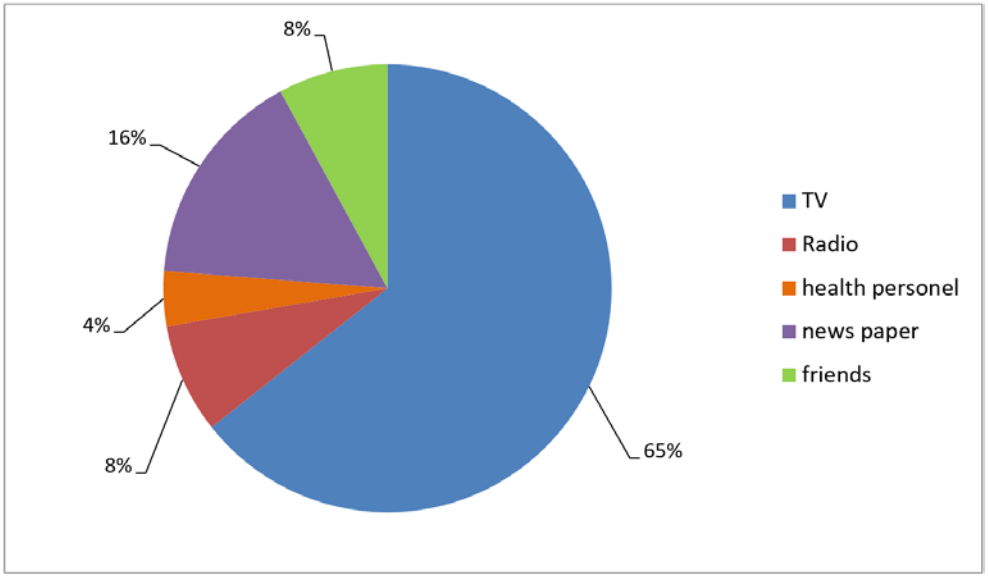

Figure 2. Source of knowledge (multiple response)

Table 4. Association of socio demographic characteristics with knowledge of dengue

Socio demographic characteristics		Have you heard about dengue:		Chi –square, p value
		Yes	No	
Age group (yrs.)	18-29	129	39	0.016, p>0.05
	30-44	54	16	
	45-59	48	14	
	>59	69	21	
Gender	male	157	34	5.35. p< 0.05
	female	144	55	
Marital status	Married	193	45	5.30, p<0.05
	Unmarried	108	44	
Education	Up to high school	159	61	4.79, p<0.05
	Post high school	139	31	

Table 5. Association of socio demographic characteristics with attitude towards dengue

Socio demographic characteristics		Dengue is a serious illness?		Chi –square, p value
		Agree	Disagree	
Age group (yrs.)	18-29	121	47	6.36, p >0.05
	30-44	42	28	
	45-59	41	23	
	>59	51	37	
Gender	male	115	75	4.29, p<0.05
	female	141	59	
Marital status	Married	143	96	7.62, p<0.05
	Unmarried	111	40	
Education	Up to high school	132	86	4.56, p<0.05
	Post high school	122	50	

4. Discussion

In the present study 43% belonged to 18-29yr age group and 61% were married which was similar to a study conducted by Faisal Shuaib et al. [12] in Westmoreland, Jamaica where 40% belonged to 18-30yrs age group and 57% were married. Around 12% were illiterate in this study and 68% had completed their high school education. As this was conducted in the hospital situated in the Urban slum, majority 34% of participants belonged to Lower middle and 12% to lower class socioeconomic status as per Modified Kupuswamy scale 2017 [11]. There was an average Knowledge regarding dengue predicted in our study as approximately 69% were aware that mosquito is the vector for dengue and 80% considered fever as a common symptom. Whereas in a study conducted by Mohapatra S et al. [13] at Sasaram Bihar, majority (93%) of respondents were able to recognize fever as the most significant symptoms. Community participatory activity needs to be strengthened and information related to dengue symptomatology should be disseminated through a robust communication strategy.

Arthralgia is a very common characteristic of Dengue fever but in our study, only 29% were revealed the same. Similarly, knowledge regarding few dangerous complications like bleeding was minimal among the participants as only 4% of respondents were conscious of the complication. Though a diagnostic blood test for dengue confirmation is attainable in current health care practices, 47% did not know about the availability of services. Majority (63%) of the respondents were not aware that dengue is a treatable disease on early diagnosis. The biting habit of mosquitoes in relation to Dengue was not known to many people and many had opined that it was the government responsibility to control the breeding of mosquitoes where as individual responsibility to keep the surroundings clean is very important to control mosquito breeding.

In this study, dengue is a fatal health problem was opined by 65% of study subjects, whereas in a study conducted by Marta Castro et al. [14] dengue was fatally opined by 91% of respondents. On preventive practice, in present study 59% use mat/coil and 56% gave importance on cleaning garbage/ thrash where as in a study conducted by Meghnath Dhimal et al. [15] in Nepal use of mat & mat/coil and cleaning garbage was 69%, 92% respectively. Most important role was played by media including TV and radio regarding the source of information. In the present study, TV was quoted as the most important source of information by 65% of respondents, which is similar to the study done by Phuyal, P. et al. [16] in central Nepal where it was 71%.

5. Conclusions

The management of dengue virus infection is essentially supportive and symptomatic. The first approach in a clinically diagnosed dengue patient is fluid balance and platelet count monitoring which is mainly available at tertiary care level. As there is no specific treatment is available at primary care level and the dengue transmission rate is very high, so it is very much essential to educate the people regarding prevention aspects. Dengue is one of the major public health problems that can be controlled by active participation of the community. The awareness regarding prevention, early diagnosis and hospitalization for treatment should be achieved through sensitization programmes, health education. Also, preventive practice against mosquito breeding should be encouraged by effective awareness programmes in line with the recommended strategy of NVBDCP implementation guidelines and information should be given regarding modalities of investigation and its availability to the public. The results of the study finding unquestionably will assist the program managers to take public health action at local level and similar research may be carried out in other parts of eastern India that will help in substantiating the perceived knowledge regarding preventive aspects of dengue.

Ethical Clearance

This study has been approved by IEC with reference letter no. Ref. No.DMR/IMS.SH/SOA/190982 dated on 13.12.2019.

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