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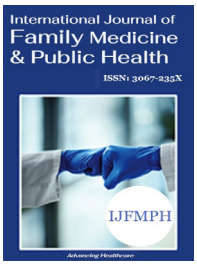

Community Perception and Preparedness Prevention of Vector-borne Disorders in the Selected Coastal Districts of East India

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A B S T R A C T

Vector-borne illnesses are a prevalent and growing medical issue. Climate change has a significant effect on a population's susceptibility to vector-borne illnesses. Infectious diseases known as vector-borne diseases are those that spread to people and animals when bitten by infected arthropods, including sandflies, ticks, fleas, and mosquitoes. These arthropods behave as vectors by transporting and transferring infections, including bacteria, parasites, and viruses, from one host to another. Vector-borne illnesses can cause a variety of ailments, ranging from mild to severe and even fatal disorders, making them a major global public health concern. A total of 514 people participated in this cross-sectional study on their perceptions of and readiness for the prevention of vector-borne diseases in the chosen coastal regions of Odisha. The data collection was completed and documented. Frequency and percentage were used in the analysis to determine the relationship between the variables and perception of vector-borne illnesses. According to the study results, 42% of people knew of the anopheles mosquito and 54% were ignorant of the vector-borne illnesses that occurred during and after the monsoon. It is imperative that residents of various epidemic areas with vector-borne diseases become more knowledgeable about mosquito management and vector-borne disease prevention in designated locations.

Introduction

Climate change has a massive impact on public and environmental health, including certain major health problems such as communicable and non-communicable disorders, along with vector-borne diseases. In states like Odisha, mosquito borne disorders are a major concern in health care practices [1]. The lack of effective therapy and vaccination against these disorders is leading towards a bad dream. According to the different government schemes to date, reducing the mosquito vector population is the main strategy for controlling the transmission of mosquito-borne disorders [2]. This is evidenced by the increasing number of outbreaks of mosquito borne disorders during the early stages of monsoon in coastal regions such as the Puri, Khordha, Baleshwar, Bhadrak, and Kendrapada districts of Odisha. This study focuses on the Perception and Preparedness of community dwellers in coastal areas for the prevention of mosquito borne disorders such as malaria, filaria, dengue, chikungunya [3]. Vector borne disorders result in avoidable health and death, which has been emphasized in the National Health Policy and Millennium Development Goals in India. The national vector-borne control program under the National Health Mission is one of the most comprehensive public health activities in India, and includes the prevention, treatment, and eradication of mosquito borne disorders. In recent years, vector-borne disorders have become a serious health problem in Southeast Asia, including India [4]. Odisha typically receives approximately 71.43 millimeters of precipitation and has a minimum of 109.64 rainy days annually (Google search). According to the evidence, seasonal outbreaks are prone during the monsoon and post-monsoon periods due to climactic changes, water pollution, poor drainage systems, and stagnation of water. In 2022, as per the report of the National Vector Borne Disease Control Programme (NVBDCP), the total number of dengue cases reported in India was 23,3251, with 303 deaths. In Odisha, the total number of cases reported was 7063 but 0 mortality; likewise, the number of malaria cases recorded 20.7 thousand approximately. Scientific evidence shows that climate change impacts the public health sector, which leads to the causation and spread of vector borne disorders. Evidence shows that during the early stages of the monsoon, due to heavy rainfall in some portions of the coastal belt of Odisha, there is a high incidence of vector-borne diseases such as dengue and Japanese Encephalitis Chikungunya. Some of the results indicate that a significant reduction in mosquito borne disorders can be achieved by various health educational programs, environmental measures, control of mosquito breeding areas, and community participation [5].

Methodology

A cross-sectional, computer-based survey was conducted. In total, 514 respondents were included in the survey. The sample size calculation was performed by taking a 95% Confidence Interval with a 5% margin error and the population size from the selected rural coastal regions of Odisha. A semi-structured questionnaire was developed for the study. Content validity (0.74) was checked by experts from the concerned specialized fields of the Department of Community Medicine.

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Data were collected between February 2023 and June 2023. This survey was conducted using a Google Form-based questionnaire in the computer-assisted Web Interview method to determine community perceptions towards vector borne disorders and the preparedness of localities against vector-borne disorders.

Population Sampling and Sample Size Calculation

The survey was conducted using a web-based platform with the help of a Google Forms questionnaire. It was conducted in the rural areas of the four coastal districts of Odisha, Bhadrak, Baleswar, Puri, and Ganjam. Participants' consent was obtained prior to data collection. The sample size was calculated using software. The total sample size of the study was 514. the wise120 respondents were from Bhadrak, 145 were from Puri, 134 were from Balasore, and 115 were from Ganjam.

Location of Districts (Study Conducted) in Odisha

Data Collection and Analysis

A semi-structured tool was used to collect the survey data. The tool was validated by experts from the community health department. A multiple-choice questionnaire with a one-time response was developed in Google Forms, and link generation was completed. Total 10 nos. of questions were formulated in order to collect information on the perception and preparedness of the rural community towards the prevention of vector-borne disorders during the monsoon and soon after the monsoon period. The data responses were fed into Microsoft Excel for 385 samples, and statistical calculations were performed using SPSS software (Figure 1).

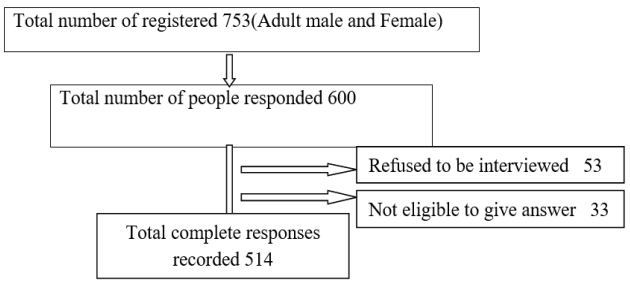

Figure 1: Enrolment of respondents for the survey.

As per the survey based on the awareness of vector-borne disorders during the monsoon period, 235 (45.70%) of respondents were recorded as yes, whereas 279 (54.20%) of respondents gave their response as no (Table 1).

Table 1: Awareness for vector borne disorders during monsoon.

Awareness for Vector Borne disorders during monsoon	Respondents	Percentage
Yes	235	45.70%
No	279	54.20%
Total	514	

Sreedevi A, *et al*., 2016 in their study on awareness of vector borne diseases reported that 50(32%) respondents had knowledge of the diseases spread by mosquitoes before their intervention and 145(93%) of respondents gained knowledge regarding vector-borne disorders after the educational intervention for one week [6].

Similarly, the study conducted by Thang Nguyen-Tien, *et al*., on knowledge and practice on prevention of mosquito borne diseases reported that that the participants possessed basic knowledge on MBDs with an average score of 18.3 out of 35, of which non-livestock-keeping households had a better knowledge than households keeping livestock ($p<0.05$) [7] (Figure 2).

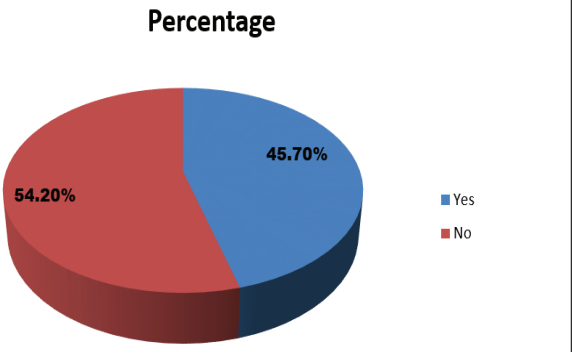

Figure 2: Percentage of awareness among the respondents for vector borne disorders during and after the monsoon.

As per the current study awareness of common species that cause vector-borne disorders, 42% of respondents were aware of the anopheles mosquito, whereas in yellow fever, 24% of respondents, 16% of respondents were on Culex mosquito, and 17% were on mansonia (Table 2).

Table 2: Awareness related to common species of mosquitoes causing vector borne Disorders.

Awareness related to common species of mosquitos causing vector borne Disorders	Respondents	Percentage
Yellow Fever (*Aedes aegypti*)	124	24.10%
Anopheles Mosquitos	216	42.00%
Culex Mosquito	86	16.70%
Mansonia	88	17.10%
Total	514	

Mir *et al*. conducted a study on knowledge, attitudes, and practices in relation to Mosquito-Borne Diseases in Bangladesh and found that 97.1% knew about dengue, 81.4% knew about chikungunya, 85.2% knew about malaria, and 53.3% knew about filaria. Aedes is the most well-known mosquito (90.9%), followed by Anopheles and Culex [8].

As per the survey record, 55.25% of respondents were aware of mosquito bites during midnight, 10.50% of respondents knew about mosquito bites during the day time.15.95% of respondents were reported as mosquito bites some hours after sunrise, and 9.92% were reported as mosquito bites some hours after sunset. Of the respondents, 8.17% reported being aware of mosquito bites in the late afternoon, and 4.08% reported in other categories (Table 3).

Table 3: Awareness regarding mosquito bites.

Awareness Regarding Mosquito Bites	Respondents	Percentage
During mid of the day	54	10.50%
During mid of the night	284	55.25%
Some hours after sunrise	82	15.95%
Some hours after sunset	51	9.92%
Late Afternoon	42	8.17%
Others	21	4.08%
Total	514	

Laxmikant *et al*., in their study reported that 71% of people responded that mosquito bites occurred in the evening, 88% of respondents reported mosquito egg laying habitat, 50% of people were dependent on artificial methods for precautions against mosquito bites, and 30% were aware of the dry day celebration [9] (Figure 3).

As per the response recorded on adapting practices for the prevention of mosquito bites, 59.53% of respondents responded that they used an effective repellent (mosquito coil, Liquid Vaporizer, Oil, etc.), 16.53% responded that they used a window screen, 14.98% using mosquito nets during sleeping, 3.89% are staying indoors during peak biting hours, and 5.05% responded that they were poor out of any standing water (Table 4).

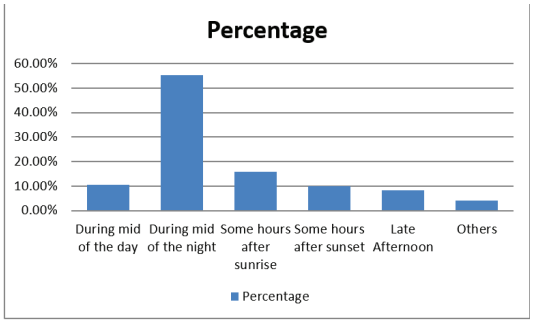

Figure 3: Percentage of awareness among the respondents awareness regarding mosquito bites.

Table 4: Adapting Practices for the prevention of mosquito bites.

Adapting Practices for the Prevention of Mosquito Bites	Respondents	Percentage
Use of effective repellent (Mosquito coil, Liquid Vaporizer, Oil, etc.)	306	59.53%
Stay Indoor during peak biting hours	20	3.89%
Use window screening	85	16.53%
Use mosquito net during sleeping	77	14.98%
Poor out any standing water	26	5.05%
Nothing	0	0.00%
Total	514	

Nguyen, *et al*., conducted a study on knowledge and practice regarding the prevention of mosquito-borne diseases and found that 90.5% of respondents used mosquito nets 51.3% of respondents used electric rackets, and 49.3% used antimosquito products to kill mosquitoes. Preventive methods include mosquito repellent cream, mosquito coils, elimination of breeding sites, use of fish in water containers, and the use of lids in water tanks [7] (Figure 4).

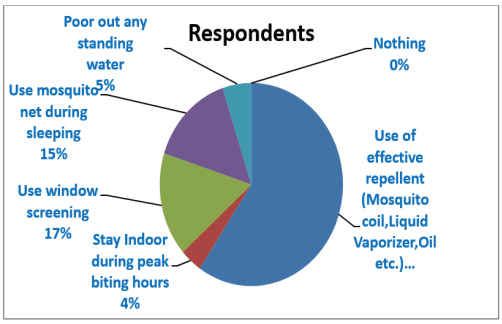

Figure 4: Percentage of adapting Practices for the prevention of mosquito bites.

This study reveals that 43.96% of respondents have recorded that they do not take any measures to clean their surroundings, while 31.50% keep the grass short and make it weed-free prior to the monsoon, 19.06% have responded about the safe disposal of used containers and objects that can accumulate water, and 5.44% are used to clean the household surroundings (Table 5).

Table5: Measures adapting to clean their surroundings clean.

Measures Adapting to Clean Their Surroundings Clean	Respondents	Percentage
Safety dispose of any used containers and objects that can accumulate water	98	19.06%
Keep grass short and weed free prior to monsoon	162	31.50%
Clean the household surrounding drains and dutters	28	5.44%
Nothing	226	43.96%
Total	514	

Wilson M. Alobuia BS, *et al*., found that 24.9% of respondents are using bleaching in drinking water to reduce vectorborne disorders, 79% are served by garbage collection trucks, and 30.6% of the population are emptying other water containers, whereas 48.8% of the population are taking measures for emptying the flower pots and vases in and around the house [10] (Figure 5).

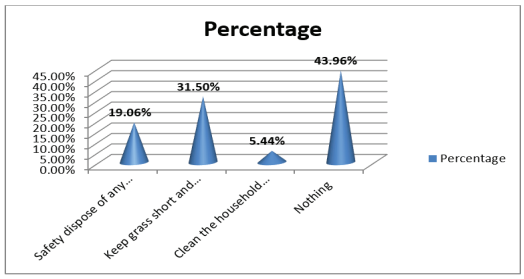

Figure 5: Percentage of respondents taking measures to clean their surrounding clean.

In the context of the source of information for control and prevention of vector-borne disorders, it has been found that 63% of the population is getting information related to mosquito breeding and control from mass media such as television, newspapers, magazines, and advertisements, followed by personal experience (18.67%) and Internet and Social media (18.28%) (Table 6).

Table 6: Source of information for control and prevention of Vector borne disorders.

Source of information for control and prevention of Vector borne disorders	Respondents	Percentage
Mass Media (TV, Radio, Newspaper, Magazines and Advertisement	324	63.03%
Personal Experience	96	18.67%
Internet and Social Media	94	18.28%
Total	514	

WHO, *et al*. change plays a crucial role in reducing vector-borne disorders. The WHO plays a vital role in providing education and increasing awareness of community belongings [11] (Figure 6).

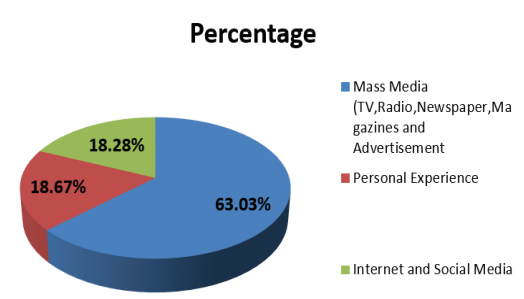

Figure 6: Percentage of sources of information for the percentage of vector control programmes.

In this survey about the Awareness of any programme launched for the prevention of Vector borne diseases the researcher found that 403(78.40%) were in the category of Yes and 111(21.59%) were in the category of No (Table 7).

Table 7: Awareness of any programme launched for the prevention of Vector borne diseases.

Awareness of any programme launched for the prevention of Vector borne diseases	Respondents	Percentage
Yes	403	78.40%
No	111	21.59%
Total	514	

Wilson M. Alobuia *et al*., 1645 people (95.6%) agreed that all citizens should work toward prevention, whereas 659 (38.3%) disagreed that the government is doing enough to do so. The two biggest barriers to the prevention of MBDs were ignorance (94.7%) and a lack of government action (48.1%). The majority of respondents—nearly three fourths—thought that mosquitoes would breed nearby [8] (Figure 7).

As per this research on the question practice adapting to protect kids from mosquito bites, 62.45% of respondents replied that they covered up with long-sleeved shirts and long pants, 20.42% of respondents replied that they applied protection that is a safe baby mosquito repellent, 12.25% replied about spraying insecticides indoors, and 4.86% respondents replied that they stayed inside at dawn, dusk, and after a rain shower (Table 8).

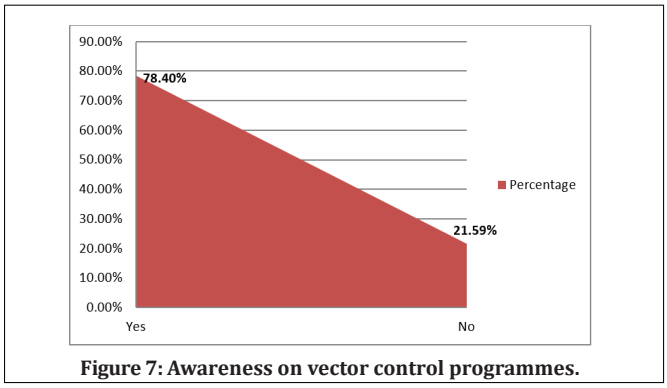

Figure 7: Awareness on vector control programmes.

Table 8: Practice adapting to protect kids from mosquito bites.

Practice adapting to protect kids from mosquito bites	Respondents	Percentage
Cover up with long sleeved shirts & long pants	321	62.45%
Apply Protection (Baby safe mosquito repellents)	105	20.42%
Spraying insecticides indoors	63	12.25%
Staying inside at dawn, dusk and after a rain shower	25	4.86%
Total	514	

Wear long sleeves, long pants, and socks to keep mosquitoes off exposed skin. To close any openings in your clothing where mosquitoes could enter and bite you, tuck shirts into pants and pants into socks. When possible, stay inside, especially if a warning for disease spread by mosquitoes is in effect. When necessary, use EPA-registered insect repellents and carefully adhere to all warnings and instructions regarding the product. If you go to locations with many mosquitoes, such as salt marshes, wear head coverings, long sleeves, and long pants. Replace your outdoor lights with yellow "bug" lights instead of regular lights, because they tend to draw fewer mosquitoes. However, yellow light is not a deterrent. (Source: United States Environmental Protection Agency) (Figure 8).

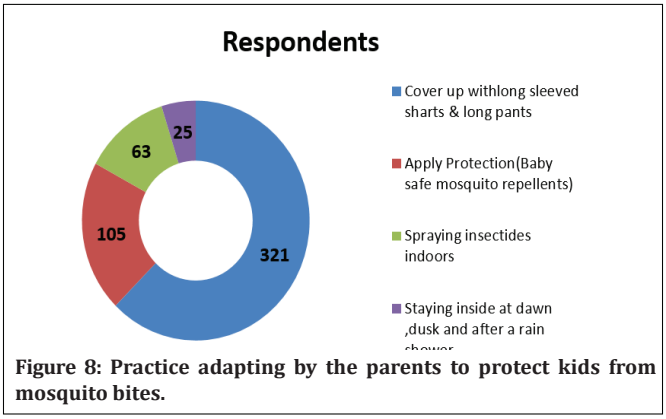

Figure 8: Practice adapting by the parents to protect kids from mosquito bites.

The survey report stated that in the practice of natural methods for the prevention of mosquito bites, 47.66% of the responses recorded the use of neem oil, 26.84% responded the use of camphor, 15.95% responses recorded the use of Aloe Vera, and 10% did not use any things for this (Table 9).

Table 9: Practice of natural methods for prevention of mosquito bites.

Practice of Natural Methods for Prevention of Mosquito Bites	Respondents	Percentage
Aloe Vera	82	15.95%
Neem Oil	245	47.66%
Camphor	138	26.84%
Nothing	52	10.11%
Any Others	0	0.00%
Total	514	

Polymer microcapsules containing citriodiol oil (Citrefine International Ltd.) demonstrated controlled-release of the repellant and were effective against Ae. aegypti larvae for more than 30 d. DEET-based polymer microcapsules showed delayed release of DEET over an extended period of time and reduced skin permeation [12] (Figure 9).

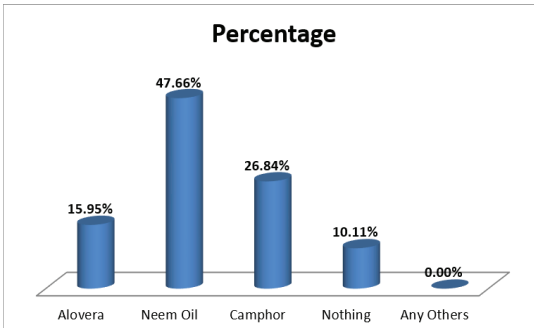

Figure 9: Practice of natural methods for prevention of mosquito bites.

Statistical Analysis

Data were collected and recorded in Google Forms for statistical analysis. The variables were recorded and analyzed using SPSS. In the present study, the perception and preparedness of individuals were independently studied based on the questionnaire. Statistical analysis was performed to ensure a correlation between various attributes. With the attributed awareness programs launched by Govt. In India and the knowledge score, the p-value is 0.001433, which indicates a strong association. The strength of association (C) of 0.72443 indicates a high association between the perception and sources of information in the prevention and control of vector-borne disorders.

Conclusion

The current study found that respondents had little information about how to protect children from vector-borne diseases. Building upon the interagency 2020 Vector-Borne Disease National Public Health Framework Published by CDC this brief report can set a benchmark to progress towards achieving goals such as prevent, detect and respond to the VBD threats. The current brief report will help the researchers to develop, evaluate and improve tools, methods and guidance to diagnose the VBDs and their possible causing pathogens.

Conflict of Interest: There is no Conflict of Interest in conducting this research.

Ethical Consideration: None

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