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# A Study on Knowledge and Attitude on Vector-Borne Diseases among Secondary School Students in Rural Setup

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**ABSTRACT**

**Background:** In India, Vector-Borne Diseases (VBD) account for the majority of communicable illnesses. They account for 17% of the projected worldwide burden of all infectious illnesses, posing serious public health issues and impeding the country's socio-economic growth. To make a significant change in society, it is vital to increase the knowledge and attitudes of school students who serve as effective whistle-blowers between community and health educators. Hence the present study was undertaken. **Methodology:** Descriptive cross-sectional study including 194 secondary school students of rural Mandya. Students who were present and willing to participate were included. A pre-tested structured questionnaire was used to obtain their knowledge and attitude towards VBD. The data obtained before and after the health education was analysed using the McNemar $X^2$ test and Wilcoxon signed-rank test. **Results:** In the pre-test, 6.2% and 93.8% of the participants have obtained average and poor knowledge scores respectively. A statistically significant improvement in the knowledge score was seen after the health education ($Z=-11.91$, $p<0.001$). About attitude, 89.2% had a very good attitude, 9.8% had good and 1.0% had a poor attitude towards vector-borne diseases. However, after health education, it was observed that betterment in the attitude of the students. ($Z= -2.63$, $p=0.009$). **Conclusion:** A significant improvement in the knowledge and attitude towards VBD among the study population was observed after the health education.

**KEY WORDS:** Vector-Borne diseases, School students, Health education, Knowledge, Attitude.

## Introduction

Vector-borne diseases (VBD) constitute a major part of communicable diseases in India. They account for 17% of the estimated global burden of all infectious diseases.[1] The Vector-borne diseases viz., Malaria, Dengue, Chikungunya, Kala-azar, Lymphatic filariasis and Japanese Encephalitis (JE) constitute major public health problems and impede socio-economic development of the country. Generally, the people living in rural, tribal and urban slum areas are high-risk groups who are more prone to develop VBDs as they belong to a low socioeconomic group.[2]

Malaria as such is a major health concern among all VBD, since the majority of population resides in malaria-endemic areas and 80% of malaria reported in the country is confined to areas such as tribal, hilly, difficult and inaccessible areas. The annual report data recorded 844,558 cases and 194 deaths in 2017.[3,4] Dengue, the major VBD, with a 30-fold increase in disease incidence over the last 5 decades.[5] In the year 2006, the resurgence of Chikungunya was observed with 1.39 million cases in 13 states, after 1973.[6]Kala-azar another wild spread disease which is endemic in 31 states had 9241 cases with 11 deaths in 2014.[7]Filariasis has also been a major public health problem in India next only to malaria. It is endemic in 255 districts (in 21 States/UTs).[7] About15 states and Union Territories

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of India reported incidence of JE so far. In 2014, the incidence was reported to be 1661 cases with 293 deaths.[7]

The VBD has caused an enormous loss of productive man-days. It has a major impact on agriculture, industrial development and the national economy. The direct and indirect economic costs of malaria and dengue itself are very high as reported in India. Considering the burden and impact, World Health Day 2014 was focused on VBD. The theme for world health day 7$^{th}$ April 2014 was "Small bite: Big throat" highlighting the priority area of public health. In India "National Vector Borne Disease Control Programme" (NVBDCP) under the aegis of "National Rural Health Mission" (NRHM) is an umbrella programme for prevention and control of VBD'.[5]

In particular, severe VBD more likely manifests among people belonging to extreme ages. Creating awareness by providing health education to school children helps to prevent VBD related childhood mortality and morbidity and thus to educate their families.

Even though an effective national programme on VBD has been implemented, it's not enough to tackle this problem. It is crucial to have community participation, for this awareness about VBD among individuals in a community is important; however, educational approaches with community participation are still below expectation.[5]

Thus, in an attempt to find out the current knowledge and attitude of secondary school students before and after health education regarding different VBD, the present study was undertaken in the study area. This may be helpful in further designing community-based, evidence-based prevention and control strategies.

## Materials and Methods

A descriptive cross-sectional study was conducted in the rural field practice area of Adichunchanagiri Institute of Medical Sciences (AIMS), Mandya, Karnataka, after getting clearance from the institutional ethical committee. In the practice area, we had two secondary schools with a population of 216. However, on the day of the pre-test, those who were present, wished to participate and gave informed consent were enrolled in the study. Subjects who were absent on the day of the study were excluded. The study sample size was 194 and the duration of the study period was 2 months from Jun 2019 to Jul 2019.

All subjects enrolled in the study were thoroughly interviewed using pre-tested structured proforma. The data was collected regarding socio-demographic profile, knowledge and attitude on vector-borne diseases. On the first day, pre-test proformas were provided to students to look into their knowledge and attitude on VBD. The same study subjects after a week of health education using role-play, pictorial charts and lectures using a local language were subsequently asked to fill up the post-test proformas.

There were 26 knowledge questions; each correct answer to the knowledge question was given a score of one and each incorrect answer, a score of zero. The score ranged from 0-26. The score >19 (75%) were considered as good knowledge, 19-13 (75%-50%) as average knowledge and <13 (<50%) as poor knowledge. The attitude of the study population was measured using a 5-point Likert scale as Strongly agree-(5), agree-(4), don't know-(3) Strongly disagree-(2), disagree-(1). There were 10 attitude questions, so the score ranged from 10-50. The score >37(75%) were considered as very good attitude, 37-25(75%-50%) as a good attitude and <25(<50%) as poor attitude. However, for the convenience of the descriptive statistics, strongly agree with agree and strongly disagree with disagree has been combined.

Data was entered in Microsoft excel sheet 2016 and analysed using descriptive statistics like mean, percentages, etc. The pre-test and post-test values were compared using the McNemar $\chi 2$ test and the mean scores of pre-test and post-test values were interpreted using Wilcoxon signed-rank test. The above statistical analysis and interpretations were performed by using IBM SPSS statistics - 20 package. The p-value less than or equal to 0.05 ($p \leq 0.05$) was considered statistically significant.

## Results

A total of 194 students participated in the study. Amongst 95(49.0%) were males and 99(51.0%) were females. Majority were from Nagamangala Taluk, Mandya district. Of 194 students, 47(24.2%), 61(31.4%), and 86(44.3%) were of 8, 9, 10$^{th}$ grade respectively. Concerning religion, 185(95.4%) were Hindus, 59(2.6%) were Muslims, 1(0.5%) was Christian and 3(1.5%) were others. As per modified

BG Prasad classification of socio-economic status, 41 majorities of them belong to lower class (32.0%) followed by lower middle class (28.4%), middle class (27.8%), with few upper middle class (10.3%) and very few upper class (1.5%) respectively. (Table 1)

**Table 1: Socio-Demographic Profile of the Study Subjects**

| Variables | Category | Frequency | Percentage |
|---|---|---|---|
| Sex | Male | 95 | 49.0 |
| | Female | 99 | 51.0 |
| Age | 12 years | 1 | 0.5 |
| | 13 years | 39 | 20.1 |
| | 14 years | 63 | 32.5 |
| | 15 years | 77 | 39.7 |
| | 16 years | 14 | 7.2 |
| Standard | $8^{th}$ grade | 47 | 24.2 |
| | $9^{th}$ grade | 61 | 31.4 |
| | $10^{th}$ grade | 86 | 44.3 |
| Religion | Hindu | 185 | 95.4 |
| | Muslim | 5 | 2.6 |
| | Christian | 1 | 0.5 |
| | Other | 3 | 1.5 |
| Type of family | Nuclear | 119 | 61.3 |
| | Joint family | 38 | 19.6 |
| | Three generation family | 34 | 17.5 |
| | Broken family | 3 | 1.5 |
| Socio-economic status (modified BG Prasad classification) | Upper | 3 | 1.5 |
| | Upper middle | 20 | 10.3 |
| | Middle | 54 | 27.8 |
| | Lower middle | 55 | 28.4 |
| | Lower | 62 | 32.0 |

In terms of parental educational status, the majority of them were educated up to secondary school, with mothers accounting for 106 (54.6%) and fathers accounting for 93 (47.1%) respectively. About the occupational status of mothers of participants, the majority 101(52.1%) were household workers/housewives whereas agriculture was the major occupation practiced by fathers of participants and being professional was least among both of them. (Table 2)

Of 194 students, 4(10.5%) of them suffered from malaria, 24(63.2%) suffered from chikungunya, and 13(34.2%) suffered from dengue. About correct

**Table 2: Socio-Demographic Profile of the Study Subjectsconcerning Education and Occupation**

| Variables | Category | Mother | | Father | |
|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage |
| Educational status | Illiterate | 24 | 12.4 | 40 | 20.6 |
| | Primary school | 35 | 18.0 | 43 | 22.2 |
| | Secondary school | 106 | 54.6 | 93 | 47.9 |
| | Pre-university | 28 | 14.4 | 18 | 9.3 |
| | Graduate& above | 1 | 0.5 | 0 | 0 |
| Occupation status | Agriculture | 56 | 28.9 | 115 | 59.3 |
| | Business | 13 | 6.7 | 31 | 16.0 |
| | Gov/ private service | 09 | 4.6 | 2 | 1.0 |
| | Labor | 14 | 7.2 | 18 | 9.3 |
| | Professional | 01 | 0.5 | 0 | 0 |
| | Other | 101 | 52.1 | 28 | 14.4 |

identification of the vector-borne diseases, 92(47.4%) of them correctly identified malaria, 116(59.8%) of them as dengue, 92(47.4%) as chikungunya, 40(20.6%) as kala-azar, 12(6.2%) as lymphatic filariasis and 6(3.1%) of them as japanese encephalitis, in the pre-test. Whereas during post-test, 160(82.5%) of them correctly identified malaria, 141(72.7%) as dengue, 148(76.3%)) as chikungunya, 75(38.7%) as kala-azar, 42(21.6%) as lymphatic filariasis, and 40(20.6) of them as japanese encephalitis. (Table 3)

## Knowledge about vector-borne diseases among respondents

In the present study after health education to the study participants, there was a statistically significant increase in the awareness about causative agents of VBD, (malaria, dengue, chikungunya, lymphatic filariasis, kala-azar), breeding and biting habits of (Anopheles, Aedes mosquito and Culex) mosquitoes, age group affected by JE and availability of JE vaccine p-value(<0.0001). **(Supplementary Table)**

In the present study, there was a significant increase in the knowledge score after the health education. In

**Table 3: Distribution of the Study Subjects about the type of VBD they suffered, correct identification of VBD and its vectors**

| VBD | | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Number of students suffered from VBD among study subjects No-156, Yes -38 (n) | Malaria | 4 | 10.5 |
| | Chikun-gunya | 24 | 63.2 |
| | Dengue | 13 | 34.2 |
| | | **Pre-test frequency (%)** | **Post-test frequency (%)** |
| Correct Identification of the vector-borne diseases | Malaria | 92(47.4) | 160(82.5) |
| | Dengue | 116(59.8) | 141(72.7) |
| | Chikun-gunya | 92(47.4) | 148(76.3) |
| | Kalaazar | 40(20.6) | 75(38.7) |
| | Lymphatic filariasis | 12(6.2) | 42(21.6) |
| | Japanese Encephali-tis | 6(3.1) | 40(20.6) |
| Correct Identification of the vectors which can cause vector-borne diseases | Sand-fly | 9(4.6) | 32(16.5) |
| | Mosquito | 159(81.9) | 173(89.2) |

Multiple response*

the post-test, 72(37.1%) of the study subjects showed good scores (score> 19) when compared to the pre-test. 101(52.1%) showed average score (score = 13 - 19) and 21(10.8%) showed poor knowledge (score < 13). (Figure 1)

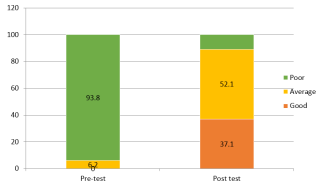


**Figure 1: Bar chart showing the difference in Knowledge between pre and post health education programme (n=194)**

In the present study, students showed statistically significant improvement in their attitude towards vector-borne diseases after the health education. 170(88%) agreed to fact that it is possible to get rid of mosquito-borne diseases p-value(<0.0001), 166(86%) answered that vector-borne diseases are more commonly seen during the rainy season p-value(<0.0001). 180(93%) agreed to fact that stagnant water encourages the breeding of mosquitos p-value (0.021) and 131(68**%)** answered that presence of bushes encourages the spread of vector-borne diseases p-value (<0.0001). (Table 4)

In the study the attitude score after the health education showed that 91.8% of them had a very good attitude (score>37), 7.7% had a good attitude (score=25-37), and 0.5% had a poor attitude (score<25) towards vector-borne diseases. (Figure 2)

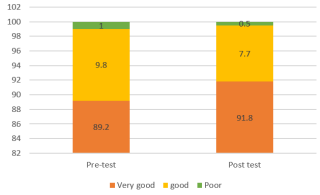


**Figure 2: Bar chart showing the difference in attitude between pre and post health education programmes (n=194)**

### Effect of health education programme

The mean ±2SD scores of knowledge and attitude of pre and post education are 9.05±2.18 & 17.34±3.87 and 42.95±5.19 & 44.41±5.18 respectively. After the health education, there was a significant improvement in the study subjects regarding the approach towards vector-borne disease. (p-values are <0.001 and 0.009 respectively). (Table 5)

## Discussion

Students, teachers, school principals play a pivotal role in prevention and inculcation of health-promoting behaviour. As students act as a mediator between teachers and parents, so educating students regarding VBD at the school level plays a major effective role in preventing them at a community level. In a semiliterate society, the schoolchild may be the first member of the family to receive an education. The information he/she brings home may be regarded as modern, trustworthy, and credible.

In our study, students baseline knowledge about vector-borne diseases was lacking in areas such as mosquito breeding sites, symptoms of vector-borne diseases, and environmental protection

**Table 4: Attitude about vector-borne diseases among respondents**

| Sl No | Variables | | Pre - test | Correct response | Post -Test | Correct response | p value* |
|---|---|---|---|---|---|---|---|
| 1. | Vector borne diseases are a serious illness. | Agree (%) | 170(88) | 170(88) | 166(86) | 166(86) | 0.28 |
| | | Neutral (%) | 14(7) | | 11(6) | | |
| | | Disagree (%) | 10(5) | | 17(9) | | |
| 2. | It is possible to get rid of mosquito borne diseases. | Agree (%) | 143(74) | 143(74) | 170(88) | 170(88) | <0.0001 |
| | | Neutral (%) | 21(11) | | 14(7) | | |
| | | Disagree (%) | 30(15) | | 10(5) | | |
| 3. | People staying around open drainages commonly suffer from these diseases. | Agree (%) | 171(88) | 171(88) | 169(87) | 169(87) | 0.416 |
| | | Neutral (%) | 8(4) | | 10(5) | | |
| | | Disagree (%) | 15(8) | | 15(8) | | |
| 4. | Vector borne diseases are more commonly seen during rainy season. | Agree (%) | 156(80) | 156(80) | 166(86) | 166(86) | <0.0001 |
| | | Neutral (%) | 17(9) | | 18(9) | | |
| | | Disagree (%) | 21(11) | | 10(5) | | |
| 5. | Stagnant water encourages breeding of mosquitos. | Agree (%) | 168(87) | 168(87) | 180(93) | 180(93) | 0.021 |
| | | Neutral (%) | 7(4) | | 5(3) | | |
| | | Disagree (%) | 19(10) | | 9(5) | | |
| 6. | Draining of water from pots and drums is necessary. | Agree (%) | 178(92) | 178(92) | 175(90) | 175(90) | 0.417 |
| | | Neutral (%) | 8(4) | | 6(3) | | |
| | | Disagree (%) | 8(4) | | 13(7) | | |
| 7. | Covering water jar at home is must. | Agree (%) | 176(91) | 176(91) | 180(93) | 180(93) | 0.123 |
| | | Neutral (%) | 3(2) | | 7(4) | | |
| | | Disagree (%) | 15(8) | | 7(4) | | |
| 8. | Presence of bushes encourages the spread of vector borne diseases. | Agree (%) | 97(50) | 97(50) | 131(68) | 131(68) | <0.0001 |
| | | Neutral (%) | 35(18) | | 27(14) | | |
| | | Disagree (%) | 62(32) | | 36(19) | | |
| 9. | Bed nets are effective method to control mosquito bites at night. | Agree (%) | 166(86) | 166(86) | 165(85) | 165(85) | 0.614 |
| | | Neutral (%) | 5(3) | | 9(5) | | |
| | | Disagree (%) | 23(12) | | 20(10) | | |
| 10. | Vector borne diseases can be controlled by educating the people. | Agree (%) | 178(92) | 178(92) | 178(92) | 178(92) | 0.986 |
| | | Neutral (%) | 6(3) | | 7(4) | | |
| | | Disagree (%) | 10(5) | | 9(5) | | |

*Wilcoxon Signed Ranks test

**Table 5: Mean score difference between pre and post health education programmes on VBD**

| Variable | Pre education Mean (2SD) | Post-education Mean (2SD) | Test statistics* (Z) | p-value |
|---|---|---|---|---|
| Knowledge | 9.05(2.18) | 17.34(3.87) | -11.91 | <0.001 |
| Attitude | 42.95(5.19) | 44.41(5.18) | -2.63 | 0.009 |

*Wilcoxon signed-rank test statistics

measures. The mean pre-test knowledge score was 9.05±2.18 which improved to 17.34±3.87 after the health education and the difference was statistically significant. Similarly, a mean pre-test attitude score was 42.95±5.19 which improved to a post-test score of 44.41±5.18. In the present study, the health education was given using local used terminologies which might have helped them to understand in a better way. In a similar study, it was reported that the number of participants having low, medium, and high pre-test knowledge scores (<50%, 50%-74% and ≥75% respectively) were 6.6%, 42.5%, and 50.9% respectively. A significant improvement was seen in the knowledge score after the intervention workshop ($X^2=23.6$, $p<0.001$).[8] In another study by Al-Zurfi B. M. N. et al., reported a significant difference in the pre and post health education programme with a mean score difference of -0.66, t -statistic -6.2 and p-value <0.001. However, the study was done only on dengue fever.[9] A similar observation was found in a community-based assessment of knowledge among adults in India.[10] In a study by Thakor N.C, also observed significant improvement in the knowledge among health workers of Patan district, Gujarat about malaria, dengue, and chikungunya.[11] A study, on the effectiveness of school health education programs on selected mosquito-borne diseases reported statistically significant improvement in their personal protection measures.[12] Another study involving school children of city Pune, observed a significant change in knowledge and attitude amongst family members of school children towards vector elimination was observed. However, the study was done on Chikungunya only.[13] These studies prove that health education act as an important tool in bringing change in the knowledge and attitude towards vector-borne diseases.

Students can act as health change agents by imbibing and passing on health knowledge to their families and in turn to the community. School acts as an important platform to impart health education to a large population. Health teaching institutes should arrange awareness programs frequently in order to prevent an epidemic of these diseases and to ensure effective preparedness for future events.

WHO collaborates with other organisations to give education and raise awareness about mosquitoes, ticks, bugs, flies, and other vectors so that people may protect themselves and their communities.[14] An effective public health education is possible only with appropriate disease knowledge among students and healthcare workers.[15]

Despite many efforts by the government to control VBD, these diseases still have a huge impact on the health, well-being, and economy of the people and country as a whole. The key success for vector-borne diseases control depends not only on services provided by health authorities but also on improving an existing knowledge and attitude regarding such diseases within the community.

From the observation made in the present study, we urge the government to take more initiatives like campaigns and mass media to increase health education activities towards vector-borne diseases. This would help to inculcate positive attitudes and cultivate better preventive practices among the public to eliminate VBD's in the country.

Furthermore, creative approaches such as actively incorporating school kids in the classroom to convey health education messages must be pursued more aggressively in order to increase community knowledge and attitudes, which in turn helps to lower the disease burden.

## Conclusion

Children act as a connecting link between the teachers and parents hence educating children about Vector-Borne Diseases (VBD) is pivotal. Providing them education at the school level helps to create awareness about VBD at a community level. The present study has shown that, even though the students had a good attitude, the knowledge about vector-borne diseases was low. However, health education helped to improve significantly in the knowledge score and betterment in the attitude of the students even furthermore.

## Declarations

### Funding

Received funds from Indian Council of Medical Research for the study.

### Conflict of interest

Nil

### Ethical approval

Clearance from the Institutional Ethical Committee was obtained prior to the study.

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