



International Journal of Nursing and Medical Investigation

International Peer Reviewed Journal

ISSN No: 2456-4656

Research article

To determine the effectiveness of structured teaching programme on prevention of Chikungunya among adults and to find out the association between the pre-test levels of knowledge score among adults with their selected socio-demographic variables.

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Abstract

Aim: To determine the effectiveness of structured teaching programme on prevention of Chikungunya among adults. To find out the association between the pre-test level of knowledge score among adults with their selected socio-demographic variables. **Methods:** In order to achieve the objective of the study, a quasi experimental one group pre-test post test without control group design with evaluative approach was adopted and for that simple random sampling technique (lottery method) was used to select the subject for the study. The data were collected by using structured questionnaire from 60 adults (40-50 years) before and after the administration of structured teaching programme on knowledge regarding prevention of chikungunya among the adults (40-50 years) in selected rural areas at Maharashtra. **Results:** Highly significant difference found between the pre-test and post-test Knowledge Scores at the level of ($P < 0.05$). Structured teaching programme is proved to be effective in improving the knowledge of adults (40-50 years) at selected rural areas regarding prevention of chikungunya. The analysis of mean, S.D. and mean percentage of the knowledge score in pre-test and post-test revealed that the mean percentage in pre-test was 10.28% where as in post-test mean percentage was 17.38%. This shows the effectiveness in structured teaching programme on knowledge regarding prevention of chikungunya. **Conclusion:** The comparison of pre-test and post-test knowledge score showed that there was a significant gain in knowledge scores of adults (40-50 years) after structured teaching program at $p < 0.05$ level ($t = 24.02$, at $p < 0.05$). This shows that structured teaching program was effective.

Keywords: Chikungunya, Prevention, Pre-test, Post-test, Adults, Rural area.

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1. Introduction

Aedes aegypti is the common vector responsible for transmission in urban areas whereas *Aedes albopictus* has been implicated in rural areas. The *Aedes* mosquito breeds in domestic settings such as flower vases, water-storage containers, air coolers, etc. and peri-domestic areas such as construction sites, coconut shells, discarded household junk items. The adult female mosquito rests in cool and shady areas in domestic and peri-domestic settings and bites during

day time [1]. Chikungunya is characterised by an abrupt onset of high fever usually accompanied by joint pains (arthralgia). Other common symptoms include headache, muscle pains, nausea, fatigue and rash. Occasionally, more severe complications such as heart and nervous system conditions can occur, particularly in older people who have other pre-existing medical conditions. Sometimes the symptoms in infected people are mild and may go unrecognised, or the disease may be misdiagnosed as, for example, dengue [2].

The two principal mosquitoes involved in the spread of the Chikungunya virus *Aedes aegypti* and *Aedes albopictus* can also spread dengue viruses. *Aedes aegypti* only occurs in Australia in north Queensland, and *Aedes albopictus* is only found in a few locations in the Torres Strait. *Aedes aegypti* is a very domesticated urban mosquito found in the tropics and sub-tropics; it usually breeds in man-made containers and the preferred resting sites of adults are indoor sheltered dark spaces. Humans are the preferred source of blood-meals for female *Aedes aegypti* [2].

Chikungunya fever is known to primarily affect both human and non-human primates, e.g. monkeys and baboons. Monkeys are the common reservoirs. Other *Aedes* mosquito's namely *A. furcifer-taylori* group, *A. luteocephalus*, and *A. africanus* are responsible for the non-human primate infection. Besides, *A. furcifer-taylori* group and *A. luteocephalus* have also been implicated in human outbreaks in Africa [3].

Mosquitoes acquire lifelong infection when they feed on a viraemic person or animals infected with chikungunya virus. Unlike dengue fever, transovarial transmission of this virus in mosquitoes has not been documented so far. Apart from being reported as a vector-borne disease, vertical transmission of chikungunya virus from infected pregnant women to the foetus has been documented in cases of the recent Indian Ocean epidemic. Besides, direct contact with viraemic blood was postulated as a possible mode of transmission in an autochthonous chikungunya fever case reported in France [3].

Chikungunya fever: A re-emerging disease in Asia

Chikungunya fever is a re-emerging viral illness that is spread from human-to-human by the bite of virus-carrying mosquitoes. The disease is mostly confined to people living in tropical Africa and Asia and is characterised by a sudden and severe fever, skin rash and joint and muscle pain. That is, until 2005, when Chikungunya made a surprise jump to the Indian Ocean island of Reunion. There, it infected nearly 1/3rd of the island's 770,000 reside in just a matter of months [4].

Chikungunya virus has been imported to Europe and the USA by infected travellers returning from areas with high incidence rates, and an *albopictus* has been introduced into several European countries (Belgium, Bosnia, Croatia, France, Greece, the Netherlands, Serbia, Spain, and Switzerland) and also to Central America, Brazil, and the USA. Some authors have suggested that if viraemic patients were to arrive in southern Europe during the summer they could cause a European outbreak [5, 6].

Indian scenario

Chikungunya virus is no stranger to the Indian sub-continent. Since its first isolation in Calcutta, in 1963

[7] there have been several reports of chikungunya virus infection in different parts of India [8-10]. Subsequently, there has been no active or passive surveillance carried out in the country and therefore, it 'seemed' that the virus had 'disappeared' from the subcontinent [11]. However, recent reports of large scale outbreaks of fever caused by chikungunya virus infection in several parts of Southern India have confirmed the re-emergence of this virus [12, 13]. It has been estimated that over 1, 80,000 cases have occurred in India since December 2005. Andhra Pradesh (AP) was the first state to report this disease in December 2005, and one of the worst affected (over 80,000 suspected cases). Several districts of Karnataka state such as Gulbarga, Tumkur, Bidar, Raichur, Bellary, Chitradurga, Davanagere, Kolar and Bijapur districts have also recorded large number of chikungunya virus related fever cases. Over, 2000 cases of chikungunya fever have also been reported from Malegaon town in Nasik district, Maharashtra state, India between February-March 2006. During the same period, 4904 cases of fever associated with myalgia and headache have been reported from Orissa state as well [13]. Apart from India, several small countries in the southern Indian Ocean such as the French Reunion Islands, Mauritius, Seychelles and other countries have also been reporting large scale outbreaks of chikungunya virus infection this year [14]. In Kerala, outbreak of chikungunya began for the first time in 2006 affecting nearly 70,000 persons from 14 districts¹¹. In May 2007, another outbreak surfaced affecting almost all the districts. Clinical investigations carried out during 2007 epidemic in the four severely affected districts of Kerala, viz., Pathanamthitta, Idukki, Kottayam and Thrissur to understand the magnitude of the problem caused and the clinical signs and symptoms of chikungunya fever are reported by The National Vector Borne Diseases Control Programme, Delhi, and National Institute of Communicable Diseases (NICD), Delhi, confirmed the outbreak by testing blood samples [15].

Chikungunya virus is no stranger to the Indian subcontinent. Since its first isolation in Kolkata [16, 17] in 1963, there had been reports from different parts of India viz. Vellore, Chennai, Nagpur, Barsi, and Solapur [18-21] respectively District. In India; the infection re-emerged in seven states in 2005 and 2010, has spread to more than 18 states/Union Territories within the country affecting more than 3.7 million individuals. According to the report of times of India dated on 25 august 2010, Vapi, Kutch, Ahmedabad of Gujarat reported Chikungunya [22].

In 2006 year, totally 1,390,322 suspected cases were reported by 16 states in the country [23]. Out of these suspected cases, 15,961 samples were tested and 2001 were found to be positive [24]. From Maharashtra, 152,086 suspected cases were reported and 6467 samples were sent to National Institute of Virology, Pune, and 804 were diagnosed serologically as Chikungunya viral fever. More than 1.25

million suspected cases have been reported from the country, which 7, 52,245 were from Karnataka and 258,998 from Maharashtra provinces. In some areas reported attack rate have reached 45% [25]. An outbreak of fever cases accompanied with joint pains, occurred in rural field practice area of a Medical College in Pune in the months of June-July 2010 [26].

A study was conducted at Mahatma Gandhi Institute of Medical science, Sevagram, Wardha, reveals that chikungunya fever, caused by chikungunya virus, and recently emerged as an important public health problem in the Indian Ocean, islands. Researcher speculate that mutation of the virus, absence a herd immunity, lack of vector control, and globalization of trade and travel might have contributed to the resurgence of the infection. The disease is a self limiting febrile illness and treatment is symptomatic. As no effective vaccine or antiviral drugs are available, mosquitoes control by evidence based interventions is the most appropriate strategy to contain the epidemic and future outbreak [27].

A study was conducted at, Lady hardinge Medical College, New Delhi, India, reveals the cause of epidemic of chikungunya fever. The data collected published scientific literature on Chikungunya virus was searched to understand the natural history of this disease, reasons for the current outbreak and the causes behind re-emergence of the virus in India. They concluded that the paucity of the scientific information on various epidemiological aspects of chikungunya virus was insufficient and if it continues will threaten an epidemic of spread of virus. Which suggest an immediate need of the research on chikungunya virus, for an effective vaccine besides strengthening the existing diagnostic laboratory facilities. They suggested knowledge imparting interventions to combat the situation [28].

Problem statement

To assess the effectiveness of structured teaching programme on knowledge regarding prevention of chikungunya among adults (40-50 years) in selected rural areas.

Aim

1. To determine the effectiveness of structured teaching programme on prevention of Chikungunya among adults.
2. To find out the association between the pre-test level of knowledge score among adults with their selected socio-demographic variables.

Hypothesis

H2: There will be a significant association between pre-test levels of knowledge with their selected socio-demographic variables.

Limitation:

1. The study will be limited to only adults of rural areas at Maharashtra.
2. The study will be limited to adults between 40-50 years of age.
3. The study will be limited to 60 samples at selected rural areas at Maharashtra.

2. Methods

This study was conducted in selected rural areas of Maharashtra. In this study the population was adults of rural areas of Maharashtra. The population distinguishing as target and accessible population. The target population for the study includes adult's men and women with age group of 40-50 years in selected rural areas of Maharashtra. The accessible population for this study was of selected adults with age group of 40-50 years in selected rural areas of Maharashtra. The sample for the study consists of 60 adults (male & female) age group between 40-50 years in selected rural areas, Maharashtra. Simple random sampling technique is a strategy in which investigator's knowledge of the population and its elements are used to select samples which are typical of the population. Simple random sampling technique was found to be appropriate to select the sample.

Criteria for selection of the sample

Inclusion Criteria

- Adults of 40-50 years of age group.
- Adults those who are willing to participate in the study.
- Adults who are the residents of rural area.
- Adults who are available at the time of data collection period.

Exclusion Criteria

- Adults those who are not able to provide informed consent.
- Adults those who are mentally challenged.
- Adults who cannot speak, understand, read and / or write Marathi, and/or English.

Structured Questionnaire:

A knowledge questionnaire was developed for assessing the level of knowledge regarding prevention of chikungunya among adults of rural areas of Maharashtra. This tool was developed in order to attain

the objectives of the study. The investigator adopted following steps in the development of the instruments:

1. Extensive review of literature
2. Opinion and suggestions were taken from experts.
3. Development of a blue print of the questionnaire
4. Construction of demographic Performa and questionnaire on prevention of chikungunya
5. Development of structured teaching programme on prevention of chikungunya among adults of rural areas of Maharashtra.
6. Content validity
7. Pre testing the instruments.
Reliability

Preparation of structured teaching programme:

The structured teaching programme was prepared by the investigator based on the following steps:

1. Referred through the literature regarding prevention of chikungunya.
 2. Organization of the contents of the structured teaching programme.
- General introduction regarding prevention of chikungunya among adults of rural areas of Maharashtra.
 - Meaning of chikungunya.
 - Causes of chikungunya.
 - epidemiology of chikungunya
 - Modes of transmission of chikungunya.
 - Sign and symptoms of chikungunya.
 - Complications of chikungunya.
 - Diagnostic measures of chikungunya.
 - Treatment of chikungunya.
 - Strategies for control and prevention of chikungunya.
 - Facts to be remembered regarding chikungunya.
 - Role of adults in control and prevention of chikungunya.

Preparation of the final draft of the structure teaching programme

The final draft of the structured teaching programme was prepared after testing the validity.

Response mode: The subjects responded to each item by choosing one of the four options for structured questionnaire. Only one option was true for the asked question and respondents had to tick what they consider the right option.

Scoring mode: Each correct response was given a score of one & incorrect response a score of zero. The maximum scoring possible was 30 & minimum 0 in the

knowledge questionnaire. The scoring was categorized as

- 0– 10 = Poor knowledge.
11 – 20 = Average knowledge.
21 –30= Good knowledge.

Pilot Study

The pilot study was conducted in selected rural areas of Maharashtra, from 16th to 23rd December 2013 on 6 adults of age 40-50 years from rural area, to assess feasibility of the study and to decide the plan for data analysis. On the 1st day the investigator approached the subjects, informed them regarding the objectives of the study and obtained the consent after assuring the subjects about the confidentiality of the data. The investigator administered a self-structured tool. Structured teaching programme was taught to the subjects. On the 7th day post test was taken. The data was analyzed by statistical tests. Pilot study results indicated that tool is feasible and practicable.

Procedure for data collection

A formal permission was obtained from authorities of selected rural areas at Maharashtra. The period of data collection was from 23-12-2013 to 07-01-2014. The final study was conducted from 27/12/2013 to 17/01/2014. Actual data collection was done on 60 adults meeting the criteria for the study.

The following schedule was followed for data collection:

On the 1st day the investigator approached the subjects, informed regarding the objectives of the study and obtained the consent after assuring the subjects about the confidentiality of the data. The investigator administered a self-structured tool. Structured teaching programme was taught after the pre test. On 7th days post test was taken.

Plan for data analysis

- Frequency distribution was plotted to compare the distribution of pre-test and post-test knowledge score.
- Mean, Standard deviation of pre and post test knowledge scores was computed.
- “t” test was applied to determine the significance of mean difference between mean pre-test and post-test knowledge scores.
- Data related to effectiveness of structured teaching programme was analyzed in terms of frequency, proportion, mean and standard deviation of pre and post test knowledge scores.

- The significance was calculated by using mean, standard deviation and 'P' value. Chi-square was used to find the association of knowledge score with demographic variables & the findings were documented in tables, graphs & diagram

3. Result and Discussion

Assessment of knowledge regarding prevention of chikungunya among adults at selected rural areas.

Knowledge of 60 adults (40-50 years) was assessed using a structured questionnaire analyzed using descriptive statistics.

Table 1: General assessment with pre-test

SN	Level of pre test knowledge regarding prevention of chikungunya	Score	Frequency N	%
1	Poor	0-10	31	52
2	Average	11-20	29	48
3	Good	21-30	0	0
	Total		60	100

Data in Table 1 shows before giving structured teaching programme (pre-test), majority 31 (52%) of the subject had poor knowledge regarding prevention of chikungunya, 29 (48%) had average knowledge and 0 (0.0%) had good knowledge regarding prevention of chikungunya.

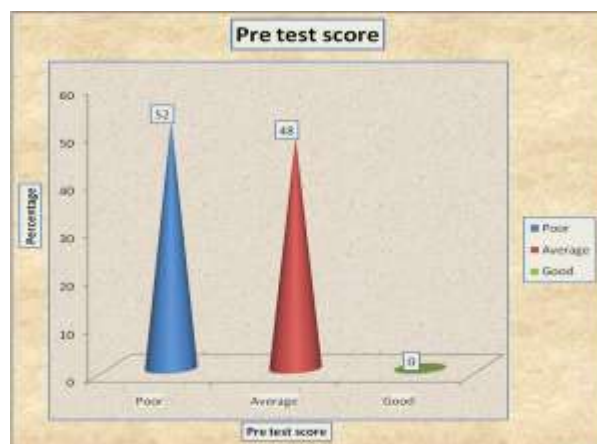


Figure 1: Showing Pre Test Score

Section I

Assessment of post test knowledge scores of adults (40-50 years) regarding prevention of chikungunya by using frequency and percentage of post test knowledge scores.

Table 2: General assessment with post test

SN	Level of post test knowledge regarding prevention of chikungunya	Score	Frequency N	P %
1	Poor	0-10	5	8.33
2	Average	11-20	38	63.33
3	Good	21-30	17	28.33
	Total		60	100

Data in Table 2 shows after giving structured teaching programme (post-test), only 5 (8.33%) had poor knowledge regarding prevention of chikungunya, 38 (63.33%) had average knowledge and 17 (28.33%) of the subject had good knowledge regarding prevention of chikungunya. In the post-test there was marked improvement in the knowledge of the subject with majority (63.33%) gained average knowledge regarding prevention of chikungunya.

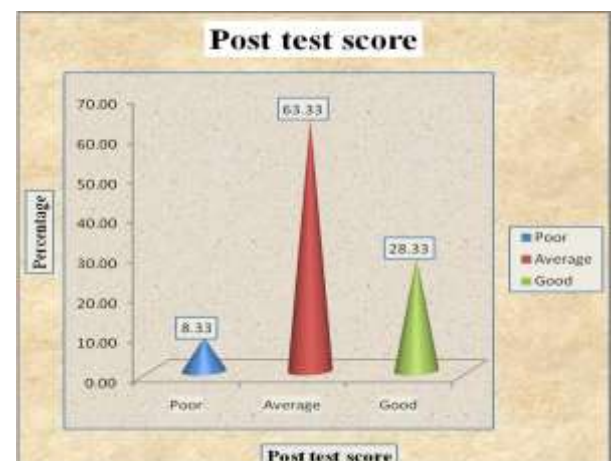


Figure 2: Showing Post-Test Score

Section II

Evaluation of effectiveness of structured teaching programme on knowledge regarding prevention of chikungunya among adults at selected rural areas.

This section deals with evaluation of effectiveness of structured teaching programme on knowledge regarding prevention of chikungunya among adults of selected rural areas. The hypothesis was tested

statistically with area wise distribution of pre test and post test mean and standard deviation and means score percentage. The levels of knowledge during the pre test and post test are compared to prove the effectiveness of structured teaching programme. Significance of difference at 5% level of significant is tested with paired 't' test and tabulated 't' value is compared with the calculated 't' value. Also the calculated 'p' values are compared with acceptable 'p' value i.e. 0.05.

Table 3: Comparison of knowledge in pre-test and post- test

Level of knowledge score	Score range	Pre test score		Post test score	
		Frequency	(%)	Frequency	(%)
Poor	0-10	31	52	5	8.33
Average	11-20	29	48	38	63.33
Good	21-30	0	0	17	28.33

Above Table 3 shows that in pre test scores, 52 % of subjects were having poor knowledge, 48 % were having average knowledge and none of the subjects i.e. 0 % were having good knowledge. But in post test scores 28.33% of subjects were having good knowledge, 63.33% were having average knowledge and only 8.33% were having poor knowledge.

Table 4: Significance of difference between knowledge scores in pre and post test among adults (40-50 years)

N=60

Paired t values of pre test and post test knowledge score

Item	Good N (%)	Average N (%)	Poor N (%)	Mean	S.D	S.E of mean	"t" value	P value
Pre test score	0	48.0	52.0	10.28	3.18	0.412	24.02	0.000
Post test score	28.0	63.0	8.0	17.38	4.38	0.567		

Significant- $p < 0.05$, t table value = 2.002 paired t value = 24.02

The Table 4 shows the pre-test and post-test knowledge scores of adults (40-50 years) regarding prevention of chikungunya. Mean, standard deviations mean percentage values are presented. Means knowledge scores of pre and post tests are compared using paired 't' test at 5% level of significance. The tabulated 't' value for n-1, i.e. 59 degrees of freedom is 2.002. The calculated value is 24.02 for knowledge of adults (40-50 years) regarding prevention of chikungunya. The calculated value is more than the

tabulated value at 5% level of significance which is statistically significant. In addition the 'p' value for all the areas of knowledge regarding prevention of chikungunya among the adults (40-50 years) is 0.000 (less than 0.05). Hence it is statistically interpreted that the structured teaching programme on knowledge regarding prevention of chikungunya among the adults (40-50 years) was effective. So the H_1 is accepted.

Table 5: Comparison of pre-test and post-test knowledge scores of samples regarding prevention of chikungunya

Test	Pre test	Post test
Grade	Percentage	
Poor	52	8
Average	48	63
Good	0	28
Total	100	100

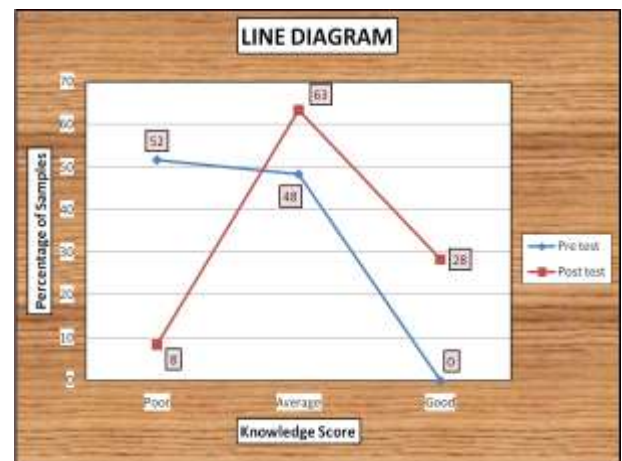


Figure 3: General assessment with pre and post test knowledge scores

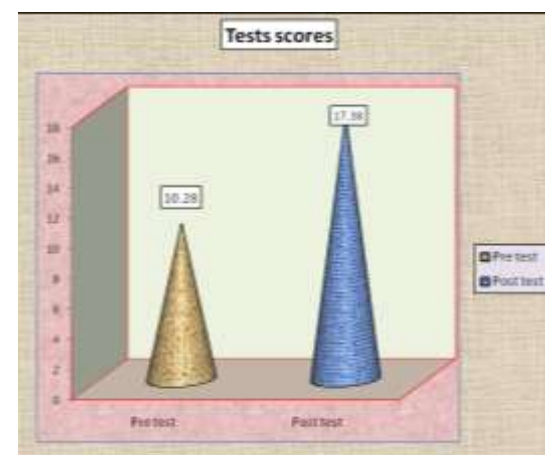


Figure 4: Significance of difference between knowledge score in pre and post test in adults at

selected rural areas in relation to average scores of knowledge of prevention of chikungunya.

Section-III

Association between the levels of pre-test knowledge with the demographic variables

N=60

Table 5: Association of knowledge of adults (40-50 years) regarding prevention of chikungunya with their selected demographic variables

SN	Chart	Category	Average	Poor	Chi-square	Chi Square Table	P value	Significance
			Frequency					
1	Age	40-45 yrs	18	16	0.051	3.84	0.821	Not Significant
		46-50 yrs	13	13				
2	Gender	Male	22	24	1.164	3.84	0.281	Not Significant
		Female	9	5				
3	Religion	Hindu	19	20	0.536	7.814727764	0.765	Not Significant
		Muslim	5	3				
		Christian	0	0				
		Any Other	7	6				
4	Education	No formal education	4	0	20.607	7.814727764	0.000	Significant
		Primary education	14	3				
		Secondary education	13	17				
		Graduate	0	9				
5	Occupation	Service	21	23	2.5	5.991464547	0.287	Not Significant
		Business	2	3				
		House wife	8	3				
6	Drainage system	Open	23	12	6.638	3.84	0.01	Significant
		Closed	8	17				
7	Any source of Information	Television	11	16	14.208	9.487729037	0.01	Significant
		School Teacher	2	0				
		Relatives	5	7				
		Health Personnel	3	6				
		None	10	0				

Significant- $P < 0.05$

Chi-square value was calculated to find out the association. The result shows that the calculated value is less than (at 0.05 levels) tabulated value for demographic variables such as age, gender, religion, occupation. So there is no association between pre test level of knowledge about prevention of chikungunya and above mentioned demographic variables. The

This section deals with the association of pre test knowledge level with selected demographic variables of the study participants. Chi square and unpaired 't' test were used for within group comparisons categorically

demographic variables such as education, drainage system and source of information are having association with the pre test level of knowledge about prevention of chikungunya as the result shows that the calculated value is greater than (at 0.05 level) tabulated value for these demographic variables.

Testing of hypothesis

H₂: There will be a significant association between pre-test levels of knowledge with their selected socio-demographic variables.

In that variable like education, drainage system and source of information were significantly associated with pre test knowledge (H₂ Accepted)

4. Discussion

The present study was conducted with the purpose to evaluate the effectiveness of structured teaching programme on knowledge regarding prevention of chikungunya among the adults (40-50 years) in selected rural areas at Maharashtra. In order to achieve the objective of the study, a quasi experimental one group pre-test post test without control group design with evaluative approach was adopted and for that simple random sampling technique (lottery method) [29] was used to select the subject for the study. The data were collected by using structured questionnaire from 60 adults (40-50 years) before and after the administration of structured teaching programme on knowledge regarding prevention of chikungunya among the adults (40-50 years) in selected rural areas at Maharashtra. The analysis of the findings was done according to the study objectives by using descriptive and inferential statistics.

Evaluation of effectiveness of structured teaching programme in terms of level of knowledge regarding prevention of chikungunya among adults at selected rural areas.

The analysis of mean, S.D. and mean percentage of the knowledge score in pre-test and post-test revealed that the mean percentage in pre-test was 10.28 % where as in post-test mean percentage was 17.38 %.This shows the effectiveness in structured teaching programme on knowledge regarding prevention of chikungunya.

A finding of another study was conducted on effectiveness of structured teaching programme on chikungunya fever. The sample is selected by using purposive non random sampling method and data were collected by interview method. The study results shown that the pre-test mean score is 42.8% and the post-test mean is 85.48 the 't' test signifies the comparison of the pre-test level of knowledge and post-test level of knowledge which shows significance in all the knowledge variables. It is evident from the calculated 't' value which is 9.61 for overall at p<0.001 level of significance. The study concludes that the structured teaching programme is proved to be effective in improving knowledge regarding chikungunya [30].

Conclusion

One of the factors contributing to chikungunya is carelessness, lack of knowledge regarding its prevention.

The comparison of pre-test and post-test knowledge score showed that there was a significant gain in knowledge scores of adults (40-50 years) after structured teaching program at p<0.05 level (t=24.02, at p<0.05). This shows that structured teaching program was effective.

The study findings concluded that adults (40-50 years) had poor knowledge regarding prevention of chikungunya. The structured teaching program had great potential for accelerating the awareness regarding prevention of chikungunya.

References

- [1] Epidemiology and prevention of chikungunya fever in Hong Kong, Scientific committee on vector-borne diseases, 2008.
- [2] Mosquito Borne Diseases–The American Mosquito Control Association. Retrieved 2008-10-14.
- [3] A Queensland health factsheet Version: 9. 10th March, 2010
- [4] M. Kariuki Njenga, et al., Tracking epidemic Chikungunya virus into the Indian Ocean from East Africa, *J Gen Virol.* 2008 Nov; 89 (Pt 11): 2754–2760.
- [5] Knudsen, A. B. (1995). Global distribution and continuing spread of *Aedes albopictus*. *Parassitologia*, 37(2-3), 91-97.
- [6] Parola, P., De Lamballerie, X., Jourdan, J., Rovey, C., Vaillant, V., Minodier, P. ... & Charrel, R. N. (2006). Novel chikungunya virus variant in travelers returning from Indian Ocean islands. *Emerging infectious diseases*, 12(10), 1493-9.
- [7] Shah, K. V., Gibbs Jr, C. J., & Banerjee, G. (1964). Virological Investigation of the Epidemic of Haemorrhagic Fever in Calcutta: Isolation of Three Strains of Chikungunya Virus. *The Indian journal of medical research*, 52, 676-683.
- [8] Dandawate, C. N., Thiruvengadam, K. V., Kalyanasundaram, V., Rajagopal, J., & Rao, T. R. (1965). Serological survey in Madras city with special reference to chikungunya. *The Indian journal of medical research*, 53(8), 707.
- [9] Jadhav, M., Namboodripad, M., Carman, R. H., Carey, D. E., & Myers, R. M. (1965). Chikungunya disease in infants and children in Vellore: a report of clinical and haematological features of virologically proved cases. *The Indian journal of medical research*, 53(8), 764.
- [10] Thiruvengadam, K. V., Kalyanasundaram, V., & Rajgopal, J. (1965). Clinical and pathological

- studies on chikungunya fever in Madras city. *The Indian journal of medical research*, 53(8), 729.
- [11] Pavri, K. (1986). Disappearance of chikungunya virus from India and South East Asia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 80(3), 491.
 - [12] CDC. Chikungunya Fever in India. *Travelers' Health Outbreak Notice* April 21, 2006.
 - [13] Enserink, M. (2006). Massive outbreak draws fresh attention to little-known virus. *Science*, 311(5764), 1085a-1085a.
 - [14] Ravi, V. (2006). Re-emergence of chikungunya virus in India. *Indian journal of medical microbiology*, 24(2), 83.
 - [15] M. Kannan. A study on chikungunya outbreak during 2007 in kerala, south India. *Indian Journal Medical Reseach*. 2009, March; 129, (311-315).
 - [16] Chatterjee, S. N., Chakravarti, S. K., Mitra, A. C., & Sarkar, J. K. (1965). Virological investigation of cases with neurological complications during the outbreak of haemorrhagic fever in Calcutta. *Journal of the Indian Medical Association*, 45(6), 314-16.
 - [17] Shah, K. V., Gibbs Jr, C. J., & Banerjee, G. (1964). Virological Investigation of the Epidemic of Haemorrhagic Fever in Calcutta: Isolation of Three Strains of Chikungunya Virus. *The Indian journal of medical research*, 52, 676-683.
 - [18] Jadhav, M., Namboodripad, M., Carman, R. H., Carey, D. E., & Myers, R. M. (1965). Chikungunya disease in infants and children in Vellore: a report of clinical and haematological features of virologically proved cases. *The Indian journal of medical research*, 53(8), 764.
 - [19] Thiruvengadam, K. V., Kalyanasundaram, V., & Rajgopal, J. (1965). Clinical and pathological studies on chikungunya fever in Madras city. *The Indian journal of medical research*, 53(8), 729.
 - [20] Rodrigues, F. M., Patankar, M. R., Banerjee, K., Bhatt, P. N., Goverdhan, M. K., Pavri, K. M., & Vittal, M. (1972). Etiology of the 1965 epidemic of febrile illness in Nagpur city, Maharashtra State, India. *Bulletin of the World Health Organization*, 46(2), 173.
 - [21] Padbidri, V. S., & Gnaneswar, T. T. (1978). Epidemiological investigations of chikungunya epidemic at Barsi, Maharashtra state, India. *Journal of hygiene, epidemiology, microbiology, and immunology*, 23(4), 445-451.
 - [22] Times of India dated, Chikungunya, on 25 August 2010.
 - [23] Ministry of Health and Family Welfare, Government of India. National Vector Borne Disease Control Programme, Directorate General of Health Services; chikungunya fever: Facts.
 - [24] Ministry of Health and Family Welfare, Government of India. National Vector Borne Disease Control Programme, Directorate General of Health Services; State-wise Status of Chikungunya Fever in India, 2006.
 - [25] Clement I., Basic concepts of community health nursing, 225th ed.: Jaypee brother's medical publishers (P) ltd; 2009.
 - [26] Bhawalkar, J., Gupta, R., Darade, S., & Thorat, R. (2012). Localized outbreak of chikungunya fever in rural field practice area of a medical college in Pune, India. *Medical Journal of Dr. DY Patil University*, 5(2), 167-167.
 - [27] Kalantri, S. P., Joshi, R., & Riley, L. W. (2006). Chikungunya epidemic: an Indian perspective. *National Medical Journal of India*, 19(6), 315.
 - [28] Lahariya, C., & Pradhan, S. K. (2006). Emergence of chikungunya virus in Indian subcontinent after 32 years: a review. *Journal of vector borne diseases*, 43(4), 151.
 - [29] Narayan S. o The Prevalence of Arboviral diseases mainly Dengue, Chikungunya and Japanese B Encephalitis in and around Bellary d. *Journal of Pharmaceutical and Biomedical Sciences*. 15(15).
 - [30] Dharshan S. Effectiveness of structured teaching programme on knowledge regarding chikungunya fever among the community of Kaiwara, Chinthamani Taluk, Kolar District. In relation to the epidemic outbreak in May 2006. *Nightingale Nursing Times*. (2, 60-62).