CHAPTER – IV

Incidence of vector borne diseases & Knowledge, Attitude and Practice (KAP) study

The incidence of vector borne diseases (VBD) has been continuously monitored in most of the states, in order to assess the magnitude of the disease burden in the country. The past history showed that the constant appearance of the VBD in various states in India. In this connection, the incidence and possibility of reoccurrence of VBD was reviewed in selected area, Tiruppuvanam Block in Tamil Nadu. For this purpose, three aspects were studied in the study area:
• by reviewing the health monitoring system and collection of secondary health data regarding the incidence of VBDs from state health department,
• by obtaining opinions from local private medical practitioners (PMPs) and
• by conducting knowledge, attitude and practices (KAP) study among a selected sample of individuals in the study area during the study period 2006 - 2008.

**Surveillance of vector borne diseases**

**The health surveillance network system:**

The effective control of VBD mainly depends on the efficient surveillance system in an area. The organized structure of the surveillance system helps in periodic execution of vector control strategies and the disease management. The trained manpower is also an integral part of the effective surveillance system. The established surveillance network in Tamil Nadu state has been considered as a successive model health network system in the country. The network system helps in conducting effective disease surveillance activities and to implement various government’s welfare schemes among the public both in the urban and rural areas. The well organized disease surveillance system of Tamil Nadu reaches the public even up to the hamlet level. In
this context, an attempt has been made to study the impact and structure of the health surveillance system in the Tiruppuvanam Block.

The information about the health surveillance system network of Tamil Nadu has been obtained from the Tiruppuvanam panchayat office, Tiruppuvanam and from the District collectorate, Sivagangai. Based on the collected data, the illustration defining the health network system operating in the study area has been made.

The study area, Tiruppuvanam Block comes under the Sivaganga district along with the other blocks. Tiruppuvanam Block includes four primary health centers (PHC) namely; Tiruppuvanam PHC, Poovanthi PHC, Konthagai PHC and Palayanur PHC. Each PHC comprises of several health sub centers (HSC). These centres were under the control of trained persons. The overall schematic description of the health surveillance system of Tamil Nadu, Sivaganga district and Tiruppuvanam Block has been shown in Fig. 48. The Tiruppuvanam PHC consists of T. Kottai, T. Pudur, T. Palayur, Amblathadi and Manalur HSCs. The Poovanthi PHC consists of Theli, Kilathari, Pappakudi, Kalloorani, Thoothai, Ladanendal and Piramanur HSCs. Palayanur, Odathur, Alingaram, Keelarangium, Muthuvanthidal, Maranadu and Thirupacheti HSCs are grouped under the PHC Palayanur. The PHC Konthagai includes Konthagai, Melavellur, Mukudi, Kanchirangulam, Puliyur and
Keeladi HSCs. Each HSC includes several Panchayat villages. A total population of 20,536 persons has been covered under the different HSCs of the Konthagai PHC. Tiruppuvanam PHC covers a population of 31,311 under different HSCs. Poovanthi PHC covers a population of 30,372 under various HSCs. A population of 24839 has been covered under different HSCs of the Palayanur PHC. A total population of 1,07,058 have been covered by the different HSCs under 4 PHCs in the Block Tiruppuvanam, Sivaganga district.

To execute various health schemes in Tamil Nadu state, health department divided the state in to 42 Health Unit Districts (HUD) for operational convenience. To monitor the various health surveillance programmes in Tamil Nadu state, Director public health (DPH) gets the assistance of Additional directors (Addln.Directors). Under the control of Additional Directors, Joint Directors (JD) execute the programmes through Deputy Directors Health services (DDHS). District malaria officers (DMO) carry out the surveillance activity under the DDHS. DMOs assign duties to the entomological assistants (EAs). Health inspectors (HI) supervise the activities of laboratory assistants. Field assistants works under HI and execute various field operations by the help of field workers (FW).
This type of organized structure and its effective functioning reduced the incidence of mosquito borne diseases and the outbreak of any one of the diseases has been immediately assessed and contained in the study area.

Established vector borne surveillance system plays a major role in the effective control of VBDs among the community. The study area has a well organized health surveillance network system to implement various health schemes of the government at the district level, block level, primary health centre (PHC) level, health sub centre (HSC) level and village level. The trained laboratory and field workers efficiently execute the job. Recently, the PHC’s of Tamil Nadu got international recognitions. The disease reporting system from PHC’s has been recognized system to monitor the disease prevalent in the state.

At the state and district levels, the target has been achieved through dedicated public health officers and with further improvement of quality of infrastructure and services (Padmanaban et al. 2009).

The laboratory based dengue surveillance network in Tamil Nadu has been reported by Victor et al. (2007). The schematic illustration has clearly depicted the dengue surveillance network in Tamil Nadu, in which the role of PHC’s, private practitioners, taluk and non-taluk hospitals
has been well defined. The report clearly indicated the prompt service of several agencies in laboratory based surveillance system in reporting the dengue case incidence throughout Tamil Nadu and helps in assessing the magnitude of dengue incidence.

a) Incidence of vector borne diseases during 2004 – 2008 in the study area:

The case incidence of vector borne diseases in the study area during a particular point of time gives background information about the prevalence of the diseases. Such data would complement the future vector control strategies and to prioritize the resources during the vector control operations especially during the control of epidemics and to assess the development of insecticide resistance problem. The strong surveillance network programme helps to continuously monitor the activity of mosquito vectors and the vector transmitted diseases. The best source to collect the disease incidence data on certain important VBDs in an area is from the health records maintained at the PHC levels and also at the district level. Hence, incidence data on the vector borne infections in the study area Tiruppuvanam Block villages and the Sivaganga district of Tamil Nadu state was collected during the period 2004 – 2008 and analyzed.
To asses the vector borne disease incidence in the study area during the year 2004 – 2008, human case incidence data for some of the important vector borne diseases such as dengue, malaria, JE and chikungunya fever in Sivaganga district and Tiruppuvanam Block area has been collected from Sivaganga collectorate office. All the cases were confirmed by the local health department through their peripheral diagnostic laboratories.

The analysis of the data on vector borne diseases obtained from collectorate, Sivagangai showed that only one case of malaria was recorded in Tiruppuvanam area in 2004 (Tiruppuvanam PHC). The incidence of other mosquito borne diseases, i.e. dengue, JE, Chikungunya fever and lymphatic filariasis were not reported from the block during the year 2004.

Two cases of malaria were reported from Tiruppuvanam and Kanchirangulam of Tiruppuvanam PHC and Konthagai PHC respectively. But, the other mosquito borne diseases were not reported in the block in 2005.

One case of malaria from Kanchirangulam (Konthagai PHC) and one case of dengue from Tiruppuvanam area (Tiruppuvanam PHC) were recorded in 2006. Five cases of Chikungunya fever (3 cases from Keeladi
(Konthagai PHC) and 2 cases from Vadakari (Poovanthi PHC) were recorded. JE and filariasis cases were not reported in 2006.

Only one case of malaria was noted in 2007 in Kanchirangulam area, which comes under the control of Konthagai PHC. No case of any mosquito borne diseases, i.e. JE, dengue, Chikungunya and lymphatic filariasis was reported in Tiruppuvanam Block. Figure 49 showed the case incidence of VBD in Tiruppuvanam Block during the study period. The comparative picture of the case incidence of VBD in the Sivaganga district and the Tiruppuvanam Block was given in Fig.50.

The findings clearly indicated that the circulation of malarial, dengue, filariasis and Chikungunya pathogens in the study area during the period, i.e. 2004 – 2008 was low off and this may be due to the continuous monitoring of this area against the vector borne diseases to keep the vector population under control in order to prevent outbreak and resurgence of vector borne diseases. Keeping the incidence of VBDs at very low level is mainly due to the better surveillance system and the efficient management of diseases through rapid diagnosis and treatment.

Information on the incidence of vector borne diseases is useful in assessing the health status of a community by comparing with the entomological data. The present survey analyzed the incidence of
important vector borne diseases such as malaria, dengue, Chikungunya, JE and lymphatic filariasis at the district level as well as Block level. The incidence data clearly reveal the prevalence of dengue, Chikungunya, malaria and filariasis both at the district and block levels during the study period. Human cases of different mosquito borne diseases such as dengue since 1970 (Myers et al. 1970) to 2006 (Paramasivan et al. 2006 b), malaria (Sharma 1999), Chikungunya (Ravi 2006) and Filariasis (Das et al. 2001) had been documented in many districts in Tamil Nadu, southern India.

b) Opinions of the Private Medical Practitioners (PMPs) about the prevalence of vector borne diseases:

The contribution of private medical practitioners (PMPs) in monitoring the health status of local public particularly at the time of outbreaks of vector borne diseases is very important. In many instances, PMPs bring out the unusual emergence of a particular disease to the notice of the Government Public Health Department. Hence, the private medical practitioners act as “whistle blowers” of health status of the community. The availability of easy health care facility in many places with an affordable cost and the increased awareness among the rural and semi-urban public encourage them to approach the private medical practitioners more frequently than the government PHCs for medical
treatment. Hence, an attempt has been made to obtain the opinions from private medical practitioners about the incidence of vector borne diseases and the facility available for the diagnosis in Tiruppuvanam area during the study period 2006 – 2008 by using an interview schedule.

An interview schedule (Annexure– I) was used to get the opinion from the local medical practitioners, who run their private clinics/dispensaries in the study area. Their opinions were obtained on the availability of diagnostic facility in the study area. The opinions of the PMPs were given in a tabulated form.

The opinions obtained from the local private medical practitioners, which help to assess the current health situation in the Tiruppuvanam Block area. The results of the study was shown in Table. 11. The survey revealed the observation of malaria cases, which were reported to be migrant cases from Rameshwaram, Chennai and Trichy, which were known to be the malaria endemic areas. Clinically suspected cases suggestive of dengue and dengue hemorrhagic fever has been observed in the Tiruppuvanam Block area, which had been reported to be referred to the Government Rajaji hospital, Madurai. Adult cases with suspected Chikungunya fever were noticed from the Tiruppuvanam block during 2006-2007. However, fresh cases were not observed by the practitioners. From their opinions, it was noticed that, a few suspected lymphatic
filariasis cases were there. These cases were reported to be migrated from the endemic areas of the state. No fresh case of Japanese encephalitis was recorded in the Tiruppuvanam Block area by the medical practitioners during the study period (Table. 12 and Fig. 51). According to the opinions, the occurrence of dengue, malaria, Chikungunya and lymphatic filariasis cases in Tiruppuvanam Block area was in a sporadic way. The diagnostic facility was not adequate in the study area and the cases were sent to Government general hospital and super speciality hospitals in Madurai.

While assessing the availability of diagnostic facility for the detection of mosquito borne diseases in Tiruppuvanam Block, it was understood that except for malaria, diagnostic facility was not available for other diseases like dengue, chikungunya and JE in the study area and majority of the cases were referred to Madurai Government hospital for confirmation of the cases. Moreover, most of the cases directly approach the super-speciality hospitals located in Madurai for the diagnosis and treatment. Community participation complements the successive vector control efforts in a community. It also helps to sustain the vector control strategies to bring down the disease incidence rate in the community.
C) Knowledge, Attitude and Practice (KAP) survey

Vector control plays a major role in the prevention of many mosquito borne diseases to achieve an effective vector control program in a sustainable manner the local community participation is essential. For the effective community participation, the basic data on the (i) knowledge level of the community about the VBDs and vectors biology, breeding, feeding and control methods of the vector mosquito; (2) the attitude of the community and (3) the practices carried out by the community must be studied. The KAP study will bring about the lacunae and thereby the programme manager could identify, prioritize and focus the areas needs to be improved with appropriate information education campaign (IEC) programmes.

Transmission of certain mosquito borne infections is the consequence of human behavior and therefore its control requires strong community participation. The best example is dengue; a virus infection, primarily transmitted by *Ae. aegypti*, which breeds in clean water containers in close association with human. Since no commercial vaccine is available yet, vector control methods are the only option available to prevent and control the virus infection. The knowledge of the population, perception of the problem, willingness to undertake efforts, availability of ways and means of prevention and control are considered as the important factor in the epidemiology of dengue.
KAP studies have been found very useful in controlling many vector borne diseases in different countries such as the community based vector control was proved to be an emerging new strategy for the prevention of VBD such as dengue fever and other mosquito borne diseases in Vietnam (Vu et al. 2005) and in Singapore (Goh 1997). KAP study is becoming more important to design and improve malaria control activities, to establish epidemiological and behavior baselines and to identify indicators of monitoring programs (Schultz et al. 1994). KAP has been successfully exploited to asses the acceptability of mass drug administration and the knowledge, attitude and practices of the community regarding the poor man’s disease, lymphatic filariasis (Krentel et al. 2006). The KAP study will unearth the common misbelieves and malpractice concerning malaria which are still existing through out the country. To achieve sustainability of an integrated vector control program, community participation ownership need to be emphasized (Gubler 1989).

The KAP survey was carried out in the rural areas of selected panchayat villages of Tiruppuvanam Block, Sivaganga district, Tamil Nadu. The total population of the Tiruppuvanam Block, comprising 4 primary health Centers (PHC) was 1,07,058. The total number of respondents that were selected for this KAP study was 200. The selected
rural areas are as follows; Odathur (n-29 [390]), Thirupacheti (n-34 [1656]), Mukudi (n-29 [738]), Puliyur (n-42 [1013]), Tiruppuvanam (n-46 [1716]) and Melarangium (n-20 [1060]. The KAP questionnaire was prepared and it consisted of 45 questions addressed in the following major categories; (i) demographic conditions, (ii) knowledge and perceptions about mosquito borne infections, (iii) knowledge about the breeding, feeding behavior of mosquitoes, (iv) attitude of the community towards mosquito elimination, control and involvement, (v) practices followed by the respondents to reduce mosquito nuisance. These questions were asked face to face method. The questionnaires were originally prepared in English language and were translated in to Tamil language in order to make the local population to understand the questions. All the age group of the population was included in the study. The interview was carried out during day time by door to door survey. Before starting the survey, necessary permissions from the village presidents was obtained. Informed consents were obtained from the adult participants.

The demographic conditions of the respondents participated in the study were given in the Table 13. The survey included 143 (71.5%) adult male and 57(28.5%) adult female respondents who were residing in the study area (Fig. 52). Though the respondents were with various age groups, middle age group (18 – 45) was a dominant group among the
sample respondents (Fig. 53). The overall literacy rate of the respondents was remarkably high [87% (n=174)] and only twenty six (13%) respondents were illiterate (Fig. 54). Regarding the vocational status, farmers were the dominant respondents [(52% (n=104)] among the persons interviewed. A low rate of [1.5% (n=3)] unemployment was noticed among the respondents surveyed (Fig. 55). The survey showed the prevalence of better living conditions [51% (n=102)] of the rural and suburban residents with concrete houses in the study area (Fig. 56). The residents were supplied with protected drinking water in the study area (Fig. 57). The close association of the people with cattle, fowl and pet animals was expressed by them (Fig. 58).

The knowledge about the role of mosquitoes in the transmission of diseases was very much accepted by the respondents [166 (83.3%)]. However, the knowledge on role of specific mosquito species in the transmission of a particular disease was not effectively understood by them (Table 14 and Fig. 59). Media contributed a lot in the dissemination of knowledge of vector borne diseases among the rural and suburban respondents (Fig. 60). Among the different media sources, television [83 (26%)] was the major contributor, which disseminated information very efficiently. In addition, health personnel were also played a vital role [15.5% (n=31)] in transmission of the knowledge. Personal interactions
[9.5% (n=19)] among themselves was also found disseminating the information in a remarkable manner (Table 14).

Around 118 (60%) of the respondents considered sewage water bodies including ditches and drainage water, as the major and preferred breeding sites of mosquitoes. Only 11 (5.5%) of them were aware that mosquitoes could breed in the paddy field. Garbage was also considered as the breeding places of mosquitoes by an eight percentage of the respondents. Twenty seven respondents (13.5%) were aware of the breeding of mosquitoes in clean water. The awareness of the breeding of mosquitoes in multiple breeding grounds [22 (11%)] was noticed (Fig. 61). One hundred and sixty two (81%) respondents were aware that water bodies and stagnant water were responsible for the abundance of mosquitoes in the study area (Table 15).

The awareness of respondents about the feeding of mosquitoes for food and egg development was very high [187 (93%)] (Table 16 and Fig. 62). Zoophilic feeding pattern of mosquitoes were reported by 73 (36%) of the respondents. However, 94 (47%) of the people reported the anthropophilic feeding pattern of mosquitoes in the study area (Table 18 and Fig. 63).
The peak biting of mosquitoes during night \( [74 \ (37\%)] \) and dusk hours \( [104 \ (52\%)] \) was reported by majority of the respondents (Fig. 64). The awareness about the biting of mosquitoes on cattle \( [183 \ (91.5\%)] \) was higher. Similarly, the preferable feeding of mosquitoes on birds \( [101 \ (50.5\%)] \) was reported by them (Table 16 and Fig. 65). This showed that respondents were aware of preferential host selection and habitat selection behaviour of mosquitoes.

One hundred and nineteen respondents \( (60\% \) stated that the vaccine was available in order to prevent mosquito borne diseases. Application of adulticides for the control of mosquitoes government was expressed by the respondents \( [146 \ (73\%)] \) in mosquito control. At the same time, 15\% of the respondents opinioned that larvicidal application was also another mode by which the Government can promote vector control. Fourteen participants \( (7\% \) expressed that the health awareness programmes and information education campaign (IEC) programmes was the mode of the government to disseminate vector control strategies (Fig. 66). The role of public in the control of mosquitoes was very essential and it was expressed by the majority \( [117 \ (58.5\%)] \) of the respondents. The collective role of both the public and the government has been supported by a considerable number \( [64 \ (32\%)] \) of the respondents (Fig. 67). It was worthwhile to note that about 92\% \( (n=184) \) of the respondents
expressed willingness to participate in the government’s vector control programmes (Table 17 and Fig. 68).

While assessing the perception of the respondents on the effectiveness of the repellents in the study area, it was found that, 137 respondents (68.5%) reported the effectiveness of the currently used repellents against mosquitoes. On the other hand, 63 (31%) expressed the ineffectiveness of the repellents against mosquitoes in the study area (Fig. 69). The extensive use [23 (11.5%)] of the recently available electronic bat as mosquito repellent was not fully utilized by the participants (Table 18 and Fig. 70). Though (42%) the respondents used the commonly available coils/mat/liquid vaporizer etc. for the control of mosquitoes, a significant number of people use [28.5% (n=57)] bed net in the rural and suburban areas (Table 18 and Fig. 71).

The KAP study clearly indicated the better knowledge, attitude and practices of people in the study area. Probably this would have led to the reduction in the vector borne diseases during the study period.

Vector borne diseases cause a serious public health threat to human, since World Health Organization (WHO) estimates that half of the world’s population, i.e. nearly 3.3 billion people are at risk of malaria,
among which, 1.2 billion population are at high risk and they live in Africa/South east Asia (WHO 2008). Moreover, malaria is reported to claim the life of approximately 700,000 to 2.7 million globally >75% of them are African children and expectant mothers. In India, as per WHO SEARO estimates, 19,500-20,000 deaths occur annually (Kumar et al. 2007). Dengue has been considered as the rapidly spreading mosquito borne infection in the world and is reported to be endemic in more than 100 tropical and subtropical countries (Gubler 2002). Two-fifths of the world’s population, i.e. about 2.5 billion people are estimated to be at risk with 100 million cases occurring annually in over 100 countries (CDC 2005; WHO 2002). Chikungunya, another mosquito borne virus infection, pose a significant threat to the global community. The disease affected many countries and severely affected Reunion and India during 2005-2006. India alone had millions of suspected cases during the episode (Ravi 2006).

Community participation helps to maintain a sustainable vector control strategies. The present study had interviewed a total of 200 respondents including 143 (71.5%) males and 57 (28.5%) females. Majority of the respondents belongs to middle age group. Most of them completed their school education (61.5%) and only 13% of them were illiterate.
The positive effects of community education and the community participation in vector control programmes have been documented by various studies. The education campaign (EC) carried out door-to-door followed by an intensive extension work of inter-sectorial integration with community has shown to have effect on the reduction of breeding places of *Ae. aegypti* control and the risk of dengue virus transmission (Espinoza-Gomez et al. 2002).

Though the study site was dominated by the rural areas, the survey identified better living conditions of the respondents in the rural areas, which also indicated the conversion of typical rural settings into suburban settlements since, about half of the respondents (51.0%) have been living in the concrete houses and 41.5% of the remaining is living in the tiled roofed houses. The survey revealed the supply of protected drinking water in the study area. The prevalence of cattle and fowls indicated the availability of vertebrate hosts for feeding of both vector and non-vector mosquitoes.

It is interesting to note that, the respondent’s broad knowledge about the role of mosquitoes in the transmission of vector borne diseases was found high (83% (n=166). Similarly, another study reported that 71% of the respondents living in the rural areas having the knowledge of mosquito’s role in disease transmission (Gupta et al.1998). However, the
specific knowledge about the transmission of brain fever/JE by mosquitoes (38.5%). A significant difference was observed between the educated and uneducated groups (p value = 0.0001).

Among the surveyed respondents, 35% (70) and 43.5% (87) were aware that the day biting mosquitoes transmit dengue virus and Chikungunya virus respectively. Only 20 - 24% respondent were aware that malaria and filariasis were not transmitted by day biting mosquitoes. The survey also identified that about 55% of the rural residents were unaware of the fact that the role of pigs and birds in the multiplication of brain fever virus (Japanese encephalitis virus). The study clearly indicated that more programmes should be conducted to educate the rural population about the role of the amplifying (pig) and maintenance (birds) hosts, which could help the residents to avoid the close contact with them during the virus transmission season.

From the KAP survey, it is evident that mass media (Television, Newspaper & Radio) play a major role in the dissemination of knowledge about the mosquito borne infections among the respondents. The community’s knowledge about the breeding habitats of mosquitoes was observed to be moderate. Nearly 59% (118) were aware that mosquito breeds in ditches and drainage water. However, only 13.5% of the respondents were aware that mosquito can breed in clean water
containers. Hence, the knowledge on clean water containers as breeding habitats and further the method of preventive measures such as addition of Abate (temephos), frequent change of water, covering the containers should be improved. This would help in implementing effective vector control strategies by the health authorities with the better community participation, as it has been practiced in the case of dengue vector control programmes.

Almost 140 (70%) respondents agreed that mosquito’s role in the disease transmission. Most of the respondents (52%) stated that they did not know about the mosquito life cycle. The finding stressed the need to improve the knowledge of the rural population about the life cycle of the mosquitoes with suitable means, which would help the government’s vector controls operation in combining with the community.

Fifty four percent (109) of the respondents knew that mosquito bite to human for food and 39% of them stated that they bite human for breeding purpose. While assessing the knowledge on the blood feeding of mosquitoes, 47% of the respondents knew that human was the primary host of mosquito. The maximum bites of mosquitoes were reported to be during evening time (52%), which indicated the better knowledge of the community about the biting rhythm of mosquitoes that helped to avoid/reduce the man-vector contact by the community during the peak
biting hours. The moderate awareness (44.5%) about the breeding of mosquitoes in water bodies has been considered as a plus point, which would be exploited during the vector control programmes in future.

As the “Zooprophylaxis” is a proposed mode of reducing the mosquito borne infections such as JE, where the vector mosquito preferably bites cattle. The availability of more cattle in the rural area would comparatively reduce the man-vector contact than cattle vector contact (Arunachalam et al. 2005), thereby the virus transmission to human could be reduced.

At this juncture, the community’s knowledge on the host feeding preference of mosquito species was found very essential in reducing the vector borne disease transmission. About 92% of the respondents were aware that mosquito preferably bites cattle. Fifty percent of the respondents aware that mosquitoes feeding preference towards birds. Majority of the population (73.5%) were aware that mosquito needs blood for egg laying.

Of the 200 population surveyed, 70% of them agreed that mosquito transmit diseases and around sixty percent (59.5%) agreed about the availability of vaccine to prevent mosquito borne infections. This knowledge could help in planning vector control policies by the
government for the control of vector borne diseases in the country. At the same time, only 5% of the respondents disagreed that mosquito lays eggs in only dirty/drainage water.

As far as the community’s knowledge about the vector control measures, 44% of the respondents expressed that fogging is the main method practiced by the government to control mosquitoes, which indicated the awareness of the population about the various activities of the government in controlling the vector borne diseases. The effectiveness of the mosquito repellants particularly mosquito coil and mat, used at the study area was found to be satisfactory, which was expressed by 68.5% of the respondents. This indicated the necessity of undertaking appropriate and systematic studies to assess the usefulness of the available mosquito repellants in the market on the control of mosquito menace. Only 11% of the population expressed that the electronic bat is effective in repelling mosquitoes.

Fifty eight percent of the respondents believed that the control of mosquito nuisance was the public responsibility. This attitude would be very useful for the health authorities to implement future vector control operations in rural areas with the community participation. Almost all the respondents (92%) said that they were willing to participate in vector control programme organized by the government.
Usage of mosquito repellants (coil/mat/liquid vaporizer) was the practice of around 42% of the respondents in order to prevent mosquito bite. The practice of cleaning the water holding containers were accepted by only 11% of the population surveyed, which needs to be improved.

Birgit et al. (2006) found that the knowledge on malaria was very high in the endemic areas than the non-endemic areas. The study also stressed the need for education campaign in the non-endemic areas where malaria cases may reappear. Since the persons with knowledge will practice preventive measures with more frequently than the rest of the populations.

It may be concluded from the study that, though the knowledge of the rural communities regarding the role of mosquitoes in disease transmission, availability of vaccine to prevent mosquito borne diseases and the role of public responsibility for the control of mosquitoes were found high, the knowledge about some of the key points such as; the knowledge regarding breeding habitat of mosquitoes, role of the amplifying and maintenance hosts in the support of JE virus multiplication etc. must be taught. Systematic dissemination of information enabling the community to participate in the control of vectors and management of diseases could be considered as a valuable step in controlling and prevention of malaria, dengue and Chikungunya at least until effective vaccines are available.