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Original Research Article

Knowledge, attitude and practice of vectors and vector-borne diseases with special reference to dengue at metropolitan Chennai, Tamil Nadu, India

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ABSTRACT

Background: Infectious diseases transmitted by insects and other animal vectors have long been associated with significant human illness and death.
Methods: The study design was a descriptive cross-sectional study concerning knowledge, attitude and practices about mosquito breeding sources, mosquito density period, mosquito spreading diseases, protection from mosquito bites, awareness on vector-borne diseases, usage of chemical and natural products among the people in selected areas of metropolitan Chennai by accurate random sampling covering one thousand respondents based on age group, education and gender.
Results: The overall respondents were analyzed about the breeding sources and it was found that water (40%) was its main source. In average, the majority of respondent's observation (57%) on mosquito breeding season was during monsoon. In overview of the public health concern, majority (54%) of the people answered that they had been infected with mosquito-borne diseases. The results also indicated that the respondents of the study area used liquidator (40%), coil (31%), repellent cream (9%) and indoor spraying repellents (17%) to protect themselves from mosquito bites. In response to the knowledge on herbal products, 54% of the respondents were aware about it.
Conclusions: The study documented that majority of respondents were unaware rather than knowing the facts with regard to mosquito-borne diseases and its details. Therefore, from the present survey, it can be stated that KAP surveys access communication processes and sources that are key to defining effective activities and messages in vector-borne diseases prevention and control.

Keywords: Chennai, Dengue, KAP, Vector-borne diseases

INTRODUCTION

Infectious diseases transmitted by insects and other animal vectors have long been associated with significant human illness and death. From 17th to early 20th centuries, human morbidity and mortality due to vector-borne diseases showed a predominant role of mosquito to transmit the disease when compared to other vectors.[1]

Vector-borne diseases, *viz.*, malaria, dengue fever, chikungunya, Japanese Encephalitis and filarial fever cause a significant fraction of the global infectious disease burden and approximately half of the world's population is infected with at least one type of vector-borne pathogen.[2] Considerable economical, ecological, and public health impacts of vector-borne diseases are expected to continue, given limited domestic and international capabilities for detecting and identifying epidemics. Much remains to be discovered about knowledge and practices of the vector-borne diseases, and in particular about the complex biological and ecological relationships that exist among pathogens, vectors, hosts, and their environments. Such knowledge is essential for the development of novel and more effective interventional and mitigational measures for vector-borne diseases. Mosquito-borne diseases were initially prevented by draining the breeding source of mosquito and eventually to the use of pesticides, leading to the reduction in the population of these disease vectors by conducting regular vector control programs in metropolitan cities. However, outbreaks of vector-borne diseases especially dengue fever suggests the lack of knowledge regarding vector and vector control.

Dengue fever is the most common human arboviral infection globally and is responsible for more illness and deaths than any other arboviral disease.[3] The incidence and geographical distribution of dengue have greatly increased in recent years with varying degrees of severity of the disease.[4] With the growing incidence of severe dengue epidemics since the 1970s, the World Health Organization has reported cases across the Americas, South-East Asia, and the Western Pacific.[5] As with many community health problems, the knowledge, attitudes, and practices (KAPs) of the population play a major role in implementation of control measures. However, little is known of the KAPs in the control and prevention of vector-borne diseases (VBDs). The goal of this study was to assess KAPs of selected areas in metropolitan Chennai city regarding management and control of VBDs with special reference to dengue. Although studies have been done on mosquito-borne diseases in other parts of India, not an iota has been done in metropolitan Chennai, Tamil Nadu, India, owing to the tense increase in number of cases of vector-borne diseases. This study will certainly help the authorities of Greater Chennai Corporation to fill the gap in their endeavor against mosquito/vector-borne diseases.

METHODS

Study area

The metropolitan city of Chennai is the capital of the state of Tamil Nadu, India, located on the Coromandel coast of the Bay of Bengal. The urban industrial areas, on account of poor water management, inadequate sustainable environmental management programmes, demographic behavior, presence of non-degradable tyres and long lasting plastic container garbage's, as well as increasing public agglomerations, prove ideal environment for breeding site for mosquitoes, especially the dengue vector *Aedes aegypti*. The above said conditions are prevailing in the region of Chennai metropolitan, facilitating the breeding of vectors leading to increase in the number of vector-borne diseases. Alandhur and Pallikaranai places at Chennai was selected as the study area owing to past positivity of dengue cases which was based on a pilot study conducted by the King Institute of Preventive Medicine and Research, Chennai, Tamil Nadu, India during their periodical visit for larval and adult surveillance for positivity of dengue vector population area and breeding sources availed.

Study design and period

The study design was a descriptive cross-sectional study conducted during the period of May 2012 to June 2012, concerning KAPs about mosquitoes breeding sources, mosquito density period, mosquito spreading diseases, protection from mosquito bites, awareness on vector borne diseases, usage of chemical and natural products among the people in metropolitan Chennai. The study did not require ethical approval as it did not involve any human sample. Accurate random sampling was followed and one thousand respondents were covered from the residents of Alandhur and Pallikarnai residing there for at least one year and of the age group between 18-75 years. Respondents under 18 years of age were not included as they would not have been able to provide answers to all questions. Considerable care was taken in designing the KAP questionnaire to avoid ambiguity. Awareness of the respondents on the breeding source, breeding season, mosquito-borne diseases, control and natural products on the basis of age, education and gender was assessed. The questionnaire in an objective form was divided into three sections, section A dealt with questions related to personal details of the residents; and section B with the knowledge and practices about mosquitoes and mosquito-borne diseases; whereas section C dealt on attitude. The questionnaire was designed with a battery of questions for all types of residents and others questions focusing on the three different categories, namely, the breeding sources of mosquitoes, diseases transmitted by them and their control and prevention. The objective of increasing awareness was aimed at promoting attitudes that encourage health service seeking behaviour and to increase community participation in mosquito population by way of source reduction, the occurrence of prevalent species, and habitats of mosquitoes related to the possibility and probability of outbreak forecasting, control and preventive activities thus empowering the community to determine their own destiny. The questionnaire covered the demographic information (gender, age, education and occupation, source of water supply, and mode of waste disposal), knowledge about mosquito-borne diseases, attitude towards mosquito-borne diseases and preventive practices.[6]

Checking of the questionnaires was done at the end of each day and in this process, based on observation and

surrounding maintenance of respondents and accordingly surveyors were instructed to practice hygienic atmosphere, importance of covering the stored containers to avoid for the breeding sources of the selected houses.

Inclusion criteria

Individual of both sexes between 18 and 75 years of age were included.

Exclusion criteria

Those who are not willing to participate and who are not able to produce appropriate information were excluded from the study.

The information given by each respondent was checked for correctness before entering into worksheet. Data validation checks were performed at regular interval. Collected data was fed in Microsoft Excel 2010 and results were tabulated; the frequency and respective percentage were calculated.

RESULTS

The collected information were understood and analyzed with age, educational status and gender on breeding source, breeding season, mosquito-borne diseases, usage of mosquito control products and knowledge traditional practices. Among the two different age groups, the observation indicated, 17% and 23% of respondents of age group 18-40 were more aware of the breeding source, and breeding season respectively; while it was 13% and 19% for their counterparts; whereas on the other hand, 27% and 21% of people of age group 18-40 and 43% and 37% of respondents of the age group 40 and above were unaware. Twenty per cent and 34% of respondents were aware of mosquito-borne diseases of the age group between 18 and 40; and 40+ respectively; while 40% and 22% were unaware. The result documented that the knowledge of respondents (44% for age group 18-40; and 56% for age group 40 and above) on the usage of commercial products for the control of mosquito menaces was significantly high.

In response to usage of natural products, 22% and 54% were aware for age groups less than 40 and above 40 respectively; whereas it was 22% and 2% respectively who were unaware. With regard to education based; 34%, 24%, 40%, 24% and 14% of literates were aware of breeding source, breeding season, mosquito-borne diseases, usage of commercial and natural products respectively; whereas 48%, 58%, 42%, 58% and 68% were unaware respectively. In the case of illiterates, 48%, 6%, 14%, 18% and 9% were aware, and 9%, 12%, 4%, 0% and 9% were unaware respectively. With regard to gender based; 23%, 41%, 36%, 60% and 31% of males; and 17%, 16%, 18%, 40% and 20% of females were aware respectively; while 37%, 19%, 24%, 0% and 29% of males, and 23%, 24%, 22%, 0% and 20% of females were unaware (Figure 1). The overall respondents were analyzed about the breeding sources and it was found that water (40%) was its main source (Figure 2). In average, the majority of respondent's observation (57%) on mosquito breeding season was during monsoon (Figure 3). In overview of the public health concern, majority (54%) of the people answered that they had been infected with mosquito-borne diseases (Figure 4). The results also indicated that the respondents of the study area used liquidator (40%), coil (31%), repellent cream (9%) and indoor spraying repellents (17%) to protect themselves from mosquito bites (Figure 5). In response to the knowledge on herbal products, 54% of the respondents were aware of it (Figure 6).

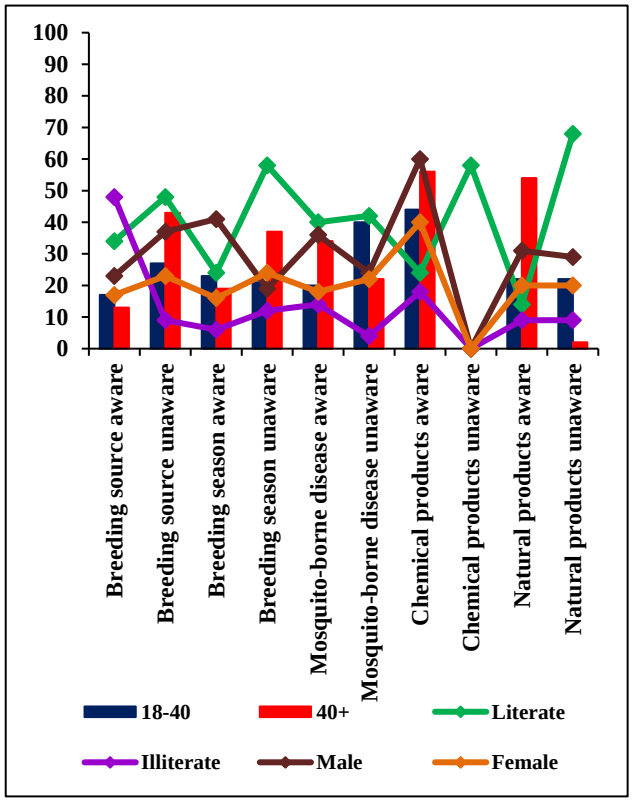

Figure 1: Particulars from respondents in the study area based on age, education and gender.

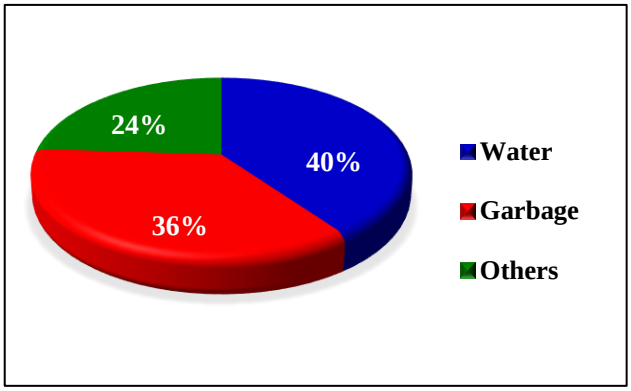

Figure 2: Breeding sources of vectors in the study area.

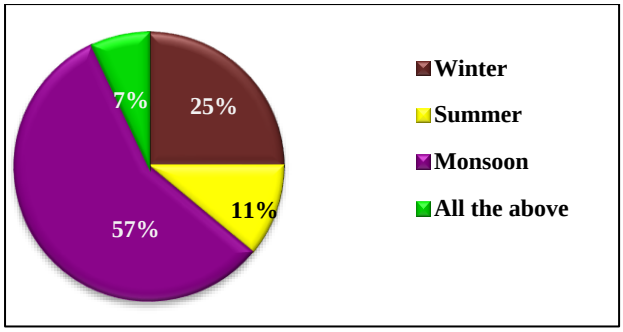

Figure 3: Breeding season for vectors in the study area.

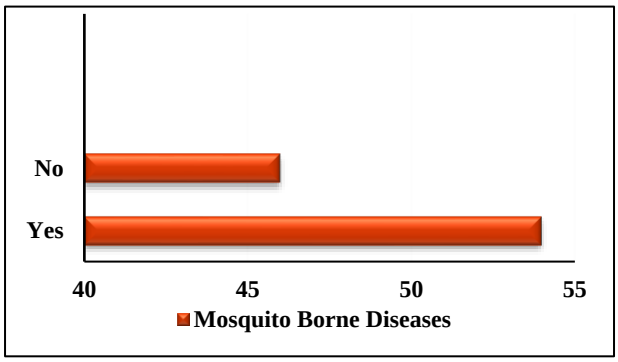

Figure 4: Knowledge on mosquito-borne diseases from respondents of the study area.

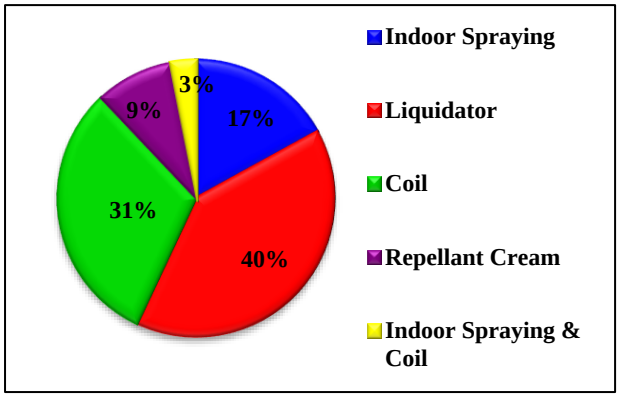

Figure 5: Usage of preventive measures from mosquito bites in the study area.

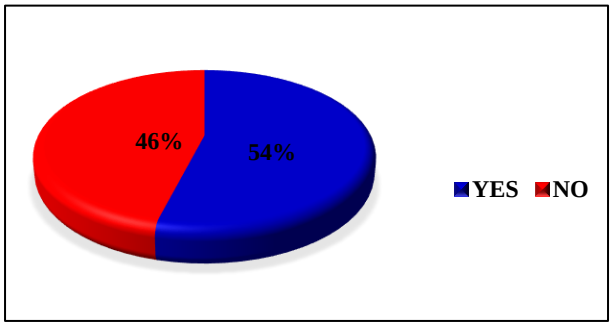

Figure 6: Knowledge about herbal products in the study area.

DISCUSSION

Vector is an important link in transmission of vector-borne diseases and thus, protection from vector serves as one of the best strategies for prevention. Environmental pollution, public health hazard, and insecticide resistant vector population indicate that the insecticides are no longer a sustainable control method of vectors and vector-borne diseases. Personal protection measures have become an important tool against vector-borne diseases.[7]

Vector-borne diseases of public health importance are complex and their occurrence depends on the interaction of various biological, ecological, social and economic factors.[8] The world's fastest growing vector-borne disease is dengue, with a 30-fold increase in disease incidence over last 50 years. This disease is common in tropical and subtropical regions and places where access to safe drinking water and sanitation system is problematic and are on the rise, because of failure of these existing methods of control of vector and vector-borne diseases, and the climate change. A steep rise of vector-borne diseases, especially dengue fever is due to several factors such as selection of insecticide resistant vector population, drug resistant parasite population, and lack of effective vaccines against vector-borne diseases.[9]

With dense population and conducive habitats for mosquito breeding, India is considered to be one of the most disease prone country with incidence of vector-borne diseases except where preventive measures are applied. Knowledge of the faunal composition and seasonal variation of mosquitoes of a particular region is essential for controlling the mosquitoes as well as for a proper understanding of the part they play in disease transmission. In addition, the composition and seasonal variation of important vectors in different parts of the world also play a major role. Dengue had been reported regularly in Tamil Nadu state and Chennai city was the major contributor, and dengue cases have been reported throughout the year but more number of cases were recorded from September to December which falls during the north east monsoon season.[10] The environmental and social changes were closely associated with the emergence of dengue as public health issues in the past years. Factors involved in the exacerbation of dengue cases are unprecedented and unplanned urbanization, increased mobility, growth in Aedes breeding habitats, climate change, lack of effective mosquito control, and deterioration of public health infrastructure.[11] With such a variation, variety of habitats can be observed for favourable mosquito breeding.

The failure to cap the resurgence of vector-borne diseases and the continuing increased incidence of them is warranting a more proactive approach for their prevention. Emerging insecticidal resistance and lack of expertise in vector-borne diseases is an important reason behind insurgent of these various diseases. Despite chemical, biological, mechanical or integrated vector

management programmes, the incidence of mosquito-borne diseases is still increasing, part of which can be attributed to lack of community participation in many places. National Vector-Borne Disease Control Program (NVBDCP) under the aegis of National Rural Health Mission includes preventions and control of mosquito-borne diseases wherein people's awareness and knowledge play an important role in controlling vector-borne diseases.[12] Community participation and full involvement in turn depends on peoples' awareness, knowledge and attitude towards the disease. For developing a suitable and effective health education strategy, it is crucial to understand the level of knowledge of the community, their attitude and practices regarding mosquito-borne diseases.

Studies of such sort assessing vector-borne diseases in a selected/particular study area are of great importance.[13] Kulkarni et al. in their study conducted at Udupi district of Karnataka reported that among 451 families surveyed, 84% of respondents knew that stagnant water was the major source for mosquito breeding and 47% and 40% of respondents protected themselves from mosquito bites by usage of mosquito coils and liquid vapourizers respectively.[14] Poyyamozhi in the year 2017 surveyed 329 people about vector-borne diseases of which 88%, 59% and 15% were aware of malaria, dengue and chikungunya respectively, and 47% of respondents considered dirty stagnant water as the breeding source for mosquitoes, and 40% used liquid vapourizers and 36% mosquito coils and mats for protection from mosquito bites.[15] Sharma et al surveyed 966 respondents of which 88% were aware of mosquito-borne diseases.[6] A recent study conducted by Shinde et al reported that 877 respondents from Jalna, Maharashtra stated that majority of people knew about mosquito biting time, mosquito-borne diseases and protection from mosquito bites.[16]

The results of the present study documented that majority of respondents were unaware rather than knowing the facts with regard to mosquito-borne diseases and its details. This study was found to be contradictory to the study conducted by Kumar et al. and Malhotra et al.[17,18] However, the present study corroborated to the study by Mane et al who reported that the general public do not have enough knowledge regarding vector-borne diseases and its preventive practices.[19]

KAP survey data are essential to help plan, implement and evaluate outbreak situation. A KAP survey gathers information about what respondents know in relation to the objective of a study/survey. KAP surveys can identify knowledge gaps, cultural beliefs, or behavioural patterns that may facilitate understanding and action, as well as pose problems or create barriers. They can identify information that is commonly known and attitudes that are commonly held. To some extent, they can identify factors influencing behaviour that are not known to most people, reasons for their attitudes, and how and why people practice certain health behaviours.

KAP surveys can also access communication processes and sources that are key to defining effective activities and messages in vector-borne diseases prevention and control. Further, these surveys may be used to identify needs, problems and barriers in programme delivery, as well as solutions for improving quality and accessibility of services.

KAP is one of the main factors to improve vector control program by assessment of KAP's of people who live in regions that are vulnerable to vector-borne diseases and to find the gaps in the vector control program. Community education is a key factor to improve vector control program as it suggests strengthening the vector control education program at different levels of the community.[20] KAP survey is a representative study of a specific population to collect information on what is known, believed and done in relation to a vector and vector-borne diseases. These data then can be analysed quantitatively or qualitatively depending on the objectives and design of the study. KAP surveys explore respondents' KAPs towards a particular topic. They are typically used for documenting community characteristics, knowledge, attitudes and practices that may serve to explain health risks and behaviors. Rattanarithikul et al. stated that KAP surveys can be useful to obtain general information about public health knowledge and sociological variables.[21]

Though they are very useful for obtaining general information about sociological and cultural variables, they are of limited validity if not grounded upon an initial qualitative research study or survey. However, if the objective was to study health-relevant field of vector causing diseases, KAPs in context, there are suitable ethnographic methods available, including focus group discussions, in-depth interviews, participant observation, and various participatory methods.

In this present KAP survey on vector and vector-borne diseases, it was observed that the breeding sources of mosquitoes, with special reference to *Aedes aegypti* were plastic barrels, cement tanks, house hold utensils, etc. This situation was due to the irregular water management, which is a factor that indirectly supports the vector population and vector-borne diseases.

CONCLUSION

The present study documented that majority of respondents were unaware rather than knowing the facts with regard to mosquito-borne diseases and its details. Therefore, from the present survey, it can be stated that KAP surveys access communication processes and sources that are key to defining effective activities and messages in vector-borne diseases prevention and control. Further, these surveys may be used to identify needs, problems and barriers in programme delivery, as well as solutions for improving quality and accessibility of services.

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REFERENCES

1. Gubler DJ, Roehrig JT. Arboviruses (Togaviridae and Flaviviridae). In: Mahy BWJ, Collier L, editors. Topley and Wilsons Microbiology and Microbial Infections. Virology. New York: Oxford University Press; 1998: 579-600.
2. WHO. World Health Report. Communicable disease surveillance and response. In: WHO. Dengue haemorrhagic fever: Diagnosis, treatment, prevention, and control. 2nd ed. Geneva, Switzerland. 1997.
3. WHO 2004. Global strategic framework for integrated vector management. Geneva: World Health Organization, Available at http://www.emro.who.int/rbm/PDF/GlobalStratFrameIVM.pdf. Accessed on 12 January 2020.
4. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504-7.
5. WHO. 2015. Media center fact sheets. Available at http://www.who.int/mediacentre/factsheets/fs117/en/. Accessed on 12 January 2020.
6. Sharma A, Gupta V, Khandelwal A. The knowledge, attitude and practices regarding commonly occurring mosquito-borne diseases among people in catering area of urban health and training centre. Int J Community Med Public Health. 2017;4(8):2864-9.
7. Pandit N, Patel Y, Bhavasar B. Knowledge and practice about preventive method against mosquito bite in Gujarat. Health Line. 2010;1:16-20.
8. Boratne AV, Jayanthi V, Datta SS, Singh Z, Senthilvel V, Joice YS. Predictors of knowledge of selected mosquito-borne diseases among adults of selected peri-urban areas of Puducherry. J Vector Borne Dis. 2010;47:249-56.
9. Gupta JP, Shyma KP, Ranjan S, Gaur GK, Bhushan B. Genetic manipulation of endosymbionts to control vectors and VBDs. Vet World. 2012;5(9):571-6.
10. Padmapriya P, Kumar SV, Raja RS, Sheriff AK, Uma TS, Mohana S, et al. Dengue scenario: Chennai perspective - a six year study (2009-2014). Archives Virol. 2017;162(1):273-9.
11. Gubler DJ, Clark GG. Dengue/dengue hemorrhagic fever: the emergence of a global health problem. Emerging Infect Dis. 1995;1:55-7.
12. NVBDCP, National vector borne disease control program. India, 2010.
13. Alobuia WM, Missikpode BSC, Aung M, Jolly PE. Knowledge, attitude, and practices regarding vector-borne diseases in Western Jamaica. Ann Glob Health. 2015;81(5):654-63.
14. Kulkarni MM, Jacob GP, Kamath A, Guha S, Ramireddy M. Knowledge, attitude and practices regarding mosquito-borne diseases among adults in Udupi district, Karnataka. Indian J Forensic Commu Med. 2017;4(3):158-63.
15. Poyyamozhi JS. A study on knowledge and practices regarding mosquito borne diseases. J Commu Health Managem. 2017;4(3):106-8.
16. Shinde L, Bayas R, Harde S, Goyal M, Phalke G. Knowledge awareness and practices regarding mosquito-borne diseases among people of Jana, Maharashtra. Int J Health Sci Res. 2019;9(8):419-25.
17. Kumar BA, Madhavi KVP. Knowledge and practice regarding vector borne diseases among urban slum dwellers of Guntur district, Andhra Pradesh. J Evol Med Dental Sci. 2013;2(26):4756-62.
18. Malhotra V, Kaur P. The community knowledge, attitude and practices regarding dengue fever. Int J Res Development Health. 2014;2(1):19-26.
19. Mane ASR. Knowledge, attitude and practice of general public and nursing staff of hospitals regarding the dengue fever. Annals Int Med Dental Res. 2016;2(5):21-4.
20. Nikookar SH, Pashaeei T, Nikzad D, Kazemi SH, Davari MB. Assessment of knowledge, attitude and practice toward vectors control programs among managers of the schools in Neka, Iran. Iranian J Health Sci. 2015;3(3):58-62.
21. Rattanarithikul R, Linhicum KJ, Konshi E. Seasonal abundance and parity rates of *Anopheles* species in Southern Thailand. J Am Mosq Cont Assoc. 1996;12(1):75-83.

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