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An Analysis of the Ttitude of People towards Prevention and Control of Dengue in District Bhakkar Punjab Pakistan

Professor Dr. Ghulam Muhammad Kundi
Qamar Affaq Qureshi
Dr. Muhammad Pervaiz Iqbal

Master in Public Health Management
Department of Public Administration, Gomal University, DIKhan, KP, Pakistan
E-mail: kundi@gu.edu.pk* (corresponding)

Robina Akhtar
IER, Gomal University, DIKhan, KP, Pakistan

Najam Affaq Qureshi
Assistant Professor
Department of Pharmacy, SARHAD University Peshawa

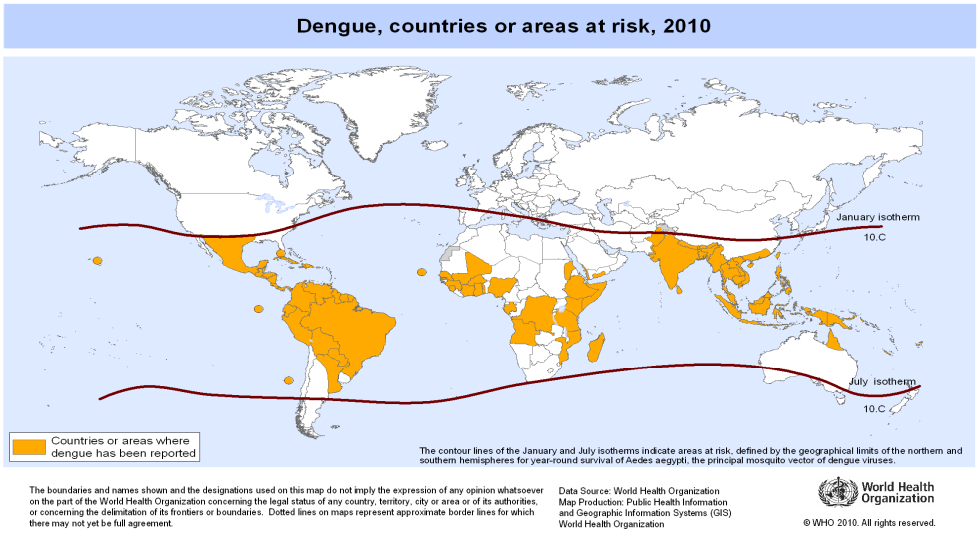
Abstract
Dengue fever took hundreds of precious lives in the last two years in Pakistan in general and Punjab province in particular, which is caused by infection from a virus namely Flavi virus and this disease is transmitted by the mosquito Aedes aegypti, rarely the Aedes albopictus. This study was conducted to analyze the attitude of people towards prevention and control of Dengue in District Bhakkar of Punjab Province of Pakistan. The study has found that poor awareness of the people and ignorance is the major reason besides government failure to educate people and to take preventive measures ahead of the breeding of mosquito Aedes aegypti, the Aedes albopictus especially after rainy season during summer. A structured questionnaire was used to collect primary data, which was feeded to SPSS 16 for data analysis. Cronbach's alpha was calculated for reliability analysis. Descriptive and inferential analyses were done to find the fact. χ^2 test was used to test the hypotheses on ordinal scale for environmental, personal and chemical control as major variables of the study. There was no difference of attitude between literate and illiterate people towards environmental control. The study further identified that literate were more aware about the environmental and personal control then the illiterate, but both having no information regarding chemical control, however, people living in cities were more aware about the environmental and personal control yet, they know how to use chemicals for control of Dengue. The study concludes that government must take measures ahead of dengue season by educating the people through intensive awareness campaign to control environmental contamination besides use of chemicals to prevent the breeding of dengue as an epidemic to save the precious lives.
Keywords: Dengue Fever, Environmental Control, Personal Control, and Chemical Control.

1. INTRODUCTION

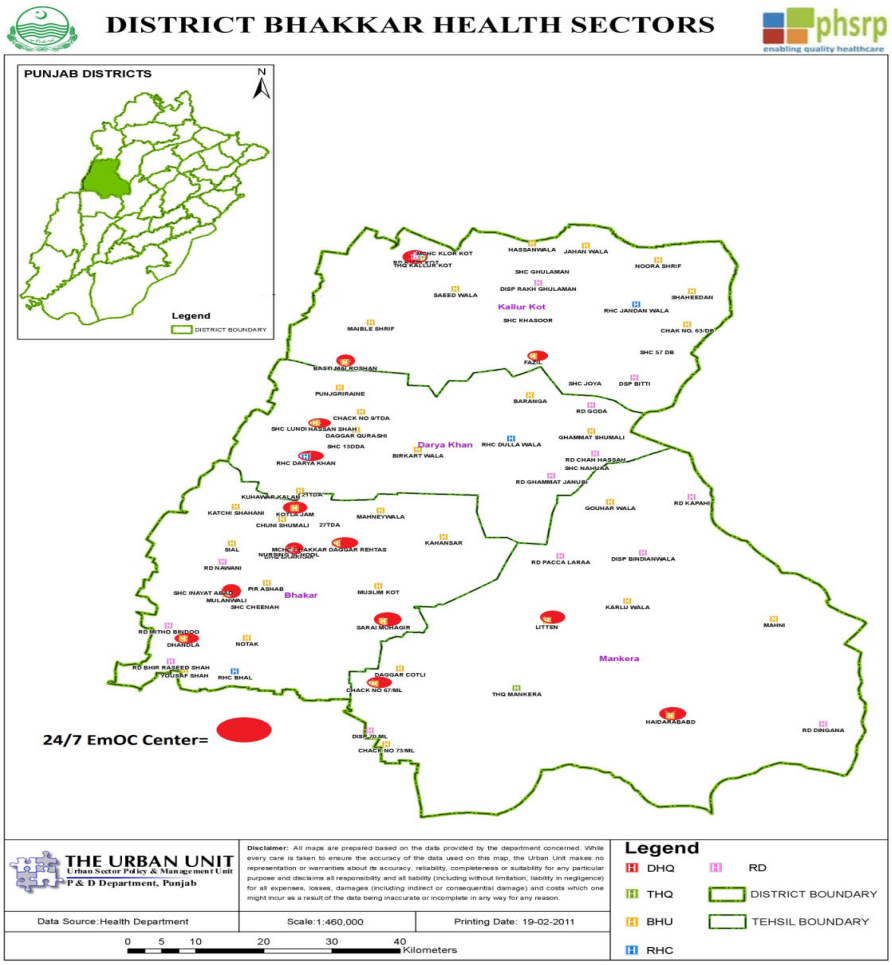
The rate of deaths due to dengue fever is a serious health issue in developing countries of Asia in general and Pakistan is particular. The problem got the attention of government and researchers since 2001, when initially few cases were identified, yet it become serious issue and headache for the government and health authorities when it got shape of an epidemic and took hundreds of precious lives in the last four to five years particularly in the Punjab province of Pakistan.

Studies have been conducted as Dengue virus infection causes significant morbidity and mortality in most tropical and sub-tropical countries of the world (Simmons et al., 2012; Statler et al., 2008). Dengue fever which is also called as break bone fever is an illness that is caused by infection with a virus, namely Flavi virus, and the disease is transmitted by the mosquito namely Aedes aegypti, rarely the Aedes albopictus. One of the distinct physical features of this mosquito is that it has black and white stripes on its thorax and legs, which mosquito bites during the day. She lays eggs in clean and stagnant water. Only the female Aedes mosquito feeds on blood. This is because, they need the protein found in blood to produce eggs. Male mosquitoes feed only on plant nectar (Simmons et al., 2012). On average, a female Aedes mosquito can lay about 300 eggs during her life span of 14 to 21 days (Guy et al., 2011**)**. According to Chen & Wilson (2010) the mosquito bites and sucks blood containing the virus from an infected person and virus is carried in its body, thus it transmits the virus to healthy people when it bites them. The global statistics shows that about 50 million new infection cases are reported annually, where some 24000 deaths occurs due to dengue annually. Likewise, 2.5 to 3 billion people are risk, and some 500,000 cases are registered and hospitalized per year, however, 90 % of those affected are children, and 5% cases are reported leads to death. This means that about half of the world lives in "HOT ZONE" (WHO,

2011).



District Bhakkar is the western city of Punjab located near river Indus at the start of Khyber Pakhtunkhwa border city Dera Ismail Khan as shows in the below map.



In year 2011, total 47 cases of dengue were reported in the whole district, out of which 30 cases were found alone in Tehsil Bhakkar, including 10 in Tehsil Darya Khan, 02 in Tehsil Kallur Kot and 05 in Tehsil Mankera, while, in year 2012 and 2013, no cases has been reported.

The basic principle in the prevention of dengue is to prevent Aedes from breeding, which needs remove of all sources of stagnant water (Tomlinson et al., 2009) to deny the Aedes mosquito of any chance to breed (Bhatt et

al, 2013). Personal prevention involves, the use of mosquito nets, repellents, cover exposed skin, bed nets and avoiding endemic areas.

This research will highlight problems/issues faced by the people regarding the prevention and control of dengue and suggests some measures to address these problems/issues. The study will help the public health authorities to formulate policies about the prevention of dengue. The study will be helpful for the authorities to become aware of the deficiencies in the prevention and control of the present mechanism of dengue. This study will provide guidelines for the future researchers who want to conduct research on similar topics.

1.2 Problem Statement

This academic research was basically aimed at measuring the attitude of people towards prevention and control of dengue. The research was conducted among the people in the Union Councils of Tehsil Mankera District Bhakkar. This research was done in connection with environmental control, personal control and chemical control.

1.3 Research Hypothesis

H_0: Predictors determine that the attitude of people that dengue prevention is not dependent on the demographic attributes of the people (literate, illiterate, local and Non- local).

2. LITERATURE REVIEW

The existing sources of the literature were exhausted to understand the whole scenario in the light of which research variables were extracted, defined, operationalized, theoretical framework was developed and hypotheses were proposed.

2.1 Health System of Pakistan

Health plays the key role in determining the human capital. Better health improves the efficiency and productivity, ultimately contributes to the economic growth and leads to human welfare. To attain more skillful, efficient and productive human capital, governments subsidies the health care facilities for its people. In this regard, the public sector bears handsome proportion of health cost in order to provide health care services. The size and distribution of the financial share in health sector differs from country to country but the fundamental question is how much these expenditures are productive and effective? Yet, it very much depends on the volume and the distribution of these expenditures among the people of different areas of the country. Besides the nature of the existing circumstances of the human resource, any marginal change in public sector spending on health services may have positive impact on the human capital and economic growth (Annual Progress Report of RMC & Allied Hospitals, 2008).

Pakistan's public health delivery system functions as an integrated health complex that is administratively managed at a district level. In this structure, primary health care units called Basic Health Units (BHUs) serve 10,000 to 15,000 population; five to ten BHUs in the catchment area are linked to a Rural Health Center (RHC) serving 25,000 to 50,000 populations, while the Tehsil or Taluka (THQ) and the District Headquarters (DHQ) hospitals, provide secondary care services, serving 100,000 to 300,000 and 1-2 million persons respectively. Maternal and Child Health Centers (MCHCs) are also a part of the integrated health system; however, the number of MCHC remains limited. The MCHCs, BHUs and RHCs are primary level care facilities and are expected to provide basic obstetric care with community outreach programs offered through lady health workers. The THQ and DHQ hospitals have specialists, serve as referral centers and are expected to provide comprehensive obstetric care (WHO, 2011)

2.2 Public Health Care System

Under the constitution of the Islamic Republic of Pakistan, health is primarily the responsibility of provincial governments except in FATA. Health care facilities in Pakistan are an integrated system. BHUs, RHCs and MCHCs are primary level facilities. They also reach communities through programs which are offered by lady health workers. THQs and DHOs have specialists and serve as referral centers, however, in Pakistan health care system is controlled at district level. The Combined Military Hospitals (CMHs) are base hospitals of Pakistan Armed Forces situated in various cantonments. These hospitals are run by the doctors of Pakistan's Army Medical Corps. The administration is carried out by the General Duty Medical Officers (GDMOs) while the patients' management and care is primarily the responsibility of the doctors of specialist cadre (WHO, 2011).

2.3 Perspective on Dengue

According to Varatharaj (2010), dengue is fast emerging pandemic-prone viral disease in many parts of the world, mostly flourishes in poor urban areas, suburbs and the countryside but also affects more affluent neighborhoods in tropical and subtropical countries.

Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue (Webster et al., 2009). The incidence of dengue has increased 30-fold over the last 50 years. Up to 50-100 million infections are now estimated to occur annually in over 100 endemic countries, putting almost half of the world's population at risk (Guy et al., 2011; Guzman et al., 2010). The severe dengue, which was previously known as dengue haemorrhagic fever, was first recognized in the 1950s during dengue epidemics in the Philippines and Thailand (Bhatt et al (2013). Today it affects Asian and Latin American countries and has become a leading cause of hospitalization and death among children and adults in these regions. The full life cycle of dengue fever virus involves the role of mosquito as a transmitter (or vector) and humans as the main victim and source of infection (Guzman et al., 2010). The dengue virus (DEN) comprises four distinct serotypes (DEN-1, DEN-2, DEN-3 and DEN-4) which belong to the genus *Flavivirus*, family Flaviviridae. Distinct genotypes have been identified within each serotype, highlighting the extensive genetic variability of the dengue serotypes. Among them, the Asian genotypes of DEN-2 and DEN-3 are frequently associated with severe disease accompanying secondary dengue infections (Guzman et al., 2010). The *Aedes aegypti* mosquito is the main vector that transmits the viruses and cause dengue. The viruses are passed on to humans through the bites of an infective female *Aedes* mosquito, which mainly acquires the virus while feeding on the blood of an infected person **(**Webster et al., 2009). Within the mosquito, the virus infects the mosquito mid-gut and subsequently spreads to the salivary glands over a period of 8-12 days (Knoop et al., 2010; Guzman et al., 2010**)**. After incubation period, the virus can be transmitted to humans during subsequent probing or feeding. The immature stages are found in water-filled habitats, mostly in artificial containers closely associated with human dwellings and often indoors.

Flight range studies suggest that most female *Ae. aegypti* may spend their lifetime in or around the houses where they emerge as adults and they usually fly an average of 400 meters (Webster et al., 2009). This means that people, rather than mosquitoes, rapidly move the virus within and between communities and places. Dengue infection rates are higher outdoors and during daytime, when these mosquitoes (*Stegomyia*) bite most frequently (Noble et al., 2010; Webster et al., 2009). However, *Ae. aegypti* breed indoors and are capable of biting anyone throughout the day. The indoor habitat is less susceptible to climatic variations and increases the mosquitoes' longevity. Dengue outbreaks have also been attributed to *Aedes albopictus*, *Aedes polynesiensis* and several species of the *Aedes scutellaris* complex (Knoop et al., 2010; Noble et al., 2010). Each of these species has a particular ecology, behavior and geographical distribution. *Ae. albopictus* is primarily a forest species that has become adapted to rural, suburban and urban human environments. In recent decades *Aedes albopictus* has spread from Asia to Africa, the America and Europe, notably aided by the international trade in used tyres in which eggs are deposited when they contain rainwater. The eggs can withstand very dry conditions (desiccation) and remain viable for many months in the absence of water and the European strain of *Aedes albopictus* can undergo a period of reduced development (diapause) during the winter months (Knoop et al., 2010; Webster et al., 2009).

Once attacked and infected, humans become the main carriers and multipliers of the virus, serving as a source of the virus for un-infected mosquitoes, thus, this way the virus circulates in the blood of an infected person for 2-7 days, at approximately the same time that the person develops a fever. Patients who are already infected with the dengue virus can transmit the infection via *Aedes* mosquitoes after the first symptoms appear (during 4-5 days; maximum 12). In humans recovery from infection by one dengue virus provides lifelong immunity against that particular virus serotype (Webster et al., 2009). However, this immunity confers only partial and transient protection against subsequent infection by the other three serotypes of the virus (Bhatt et al., 2013; Chen & Wilson, 2010). Evidence points to the fact that sequential infection increases the risk of developing severe dengue. The time interval between infections and the particular viral sequence of infections may also be of importance.

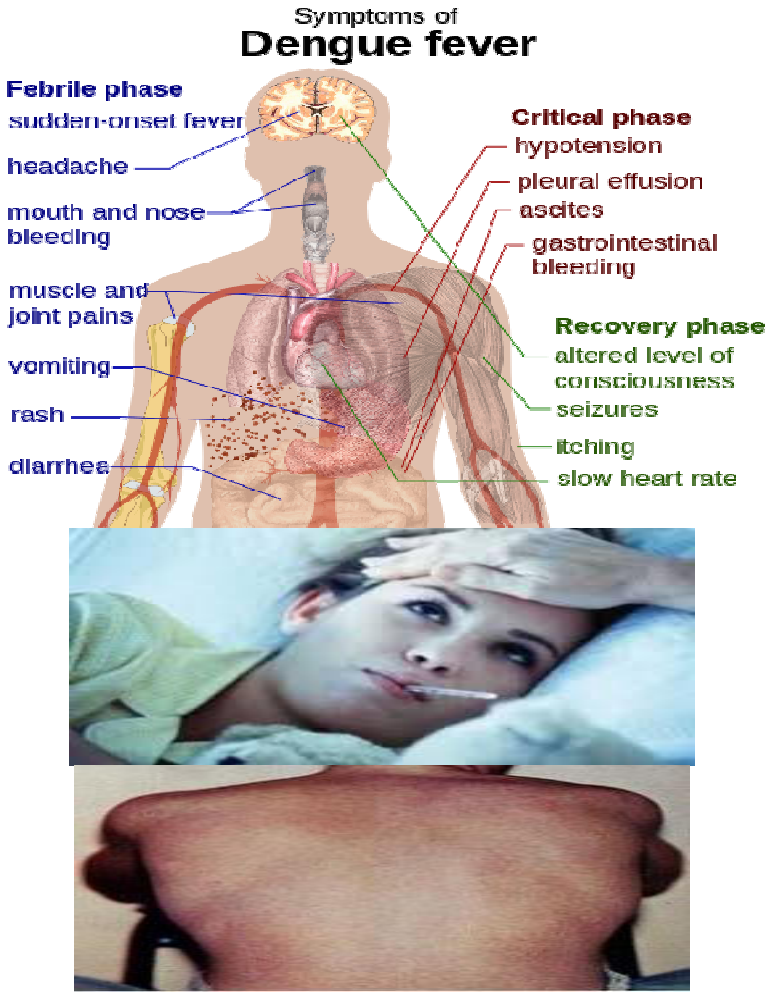
2.3.1 Causes & Symptoms of Dengue Fever

There are four Dengue viruses (DENV) that cause Dengue fever, all of which are spread by a species of mosquito known as the *Aedes aegypti* mosquito, and more rarely by the *Aedes albopictus* mosquito (Normile,

2013). *Aedes aegypti* originated in Africa, but nowadays is found in all the tropical areas around the world and prospers in and close to areas of human population (Normile, 2013; Panpanich et al., 2006). The virus is transmitted from an infected mosquito to human (Wilder-Smith & Gubler, 2008). The process begins when a person who is infected with the Dengue virus is bitten by a mosquito; the virus is then passed on when someone else is then bitten by the infected mosquito ((Reiter, 2010; Restrepo et al., 2008; Wilder-Smith & Gubler, 2008). If anybody is suffered from dengue fever previously it is still possible to contract it again, because of the number of different types of viruses that cause the fever. If you were infected again and became ill, there is a greater risk of developing a harsher form of the disease, such as dengue hemorrhagic fever (particularly in children). This is unusual because, normally, previous exposure to a virus causes the body to carry antibodies that allow the body to fight off the virus more easily the second time (Normile, 2013).

A person infected by the dengue virus develops severe flu-like symptoms. The disease, also called 'break-bone' fever affects infants and adults alike and could be fatal. The clinical features of dengue fever vary according to the age of the patient (Normile, 2013). Individuals should suspect dengue when a high fever (40°C/ 104°F) is accompanied by the symptoms like, severe headache, pain behind the eyes, nausea, vomiting, swollen glands, muscle and joint pains, and rash. These symptoms usually last for 2-7 days, after an incubation period of 4-10 days after the bite from an infected mosquito. Severe dengue is a potentially deadly complicated due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment (Wiwanitkit, 2010). The warning signs to look out for occur 3-7 days after the first symptoms in conjunction with a decrease in temperature (below 38°C/ 100°F) i.e. severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums, blood in vomit, fatigue, and restlessness.

The next 24-48 hours of the critical stage can be lethal. Therefore, proper medical care is advised to avoid complications and risk of death (Bhatt et al., 2013; Chen & Wilson, 2010).



2.3.2 Dengue Hemorrhagic Fever (DHF)

Symptoms during onset may be mild, but gradually worsen after a number of days. DHF can result in death if not treated in time (Bhatt et al., 2013). Mild dengue fever symptoms may occur in DHF, like, bleeding from your mouth/gums, nosebleeds, clammy skin, considerably damaged lymph and blood vessels, internal bleeding,

which can result in black vomit and feces (stools), lower number of platelets in blood - these are the cells that help clot your blood, sensitive stomach, small blood spots under your skin and weak pulse (Zhang et al., 2007).

2.3.3 Dengue Shock Syndrome & Complications

This is the worst form of dengue which can also result in death, again mild dengue fever symptoms may appear, but others likely to appear include the intense stomach pain, disorientation, sudden hypertension (fast drop in blood pressure), heavy bleeding, regular vomiting, blood vessels leaking fluid and death (Bhatt et al., 2013; Chen & Wilson, 2010). The majority of people suffering from dengue fever get better within 2 weeks; however, some individuals can suffer fatigue and depression for months after the infection. Dengue fever can develop to harsher forms of the disease i.e. Dengue hemorrhagic fever and Dengue shock syndrome etc. (Chen & Wilson, 2010).

2.3.4 Diagnosis of Dengue Fever

The signs and symptoms of Dengue fever are similar to some other diseases, such as typhoid fever or malaria, which can sometimes complicate the chances of a prompt and accurate diagnosis. In order for a doctor to properly diagnose dengue fever, doctor will take into account all the symptoms to properly diagnose when the patients have dengue. Howevr, according to Ranjit & Kissoon (2011) some tests may be ordered to determine whether it is a dengue infection, or something else. Likewise, blood sample can be tested in a number of ways to find the signs of dengue virus (Bhatt et al., 2013). This means that if dengue virus is detected diagnosis will be straightforward; if fails, other blood tests may be ordered to identify antibodies, antigens and nucleic acids, including ELISA (enzyme-linked immunosorbent assay), HI assay (hemagglutination inhibition assay), and RT-PCR (reverse transcriptase-polymerase chain reaction). Further, the doctor will need to know the patient's travel history and medical history, especially if it involves mosquito exposure.

2.3.5Treatment options for Dengue Fever?

Because dengue is a virus, so there is no specific treatment or cure, however there are things the patient or the doctor can do to help, depending on the severity of the disease. For milder forms of dengue the treatment methods could be:

- **Prevent dehydration** - high fever and vomiting can dehydrate the body. Make sure you drink clean (ideally bottled) water rather than tap water. Rehydration salts can also help replace fluids and minerals
- **Painkillers** - this can help lower fever and ease pain. As some NSAIDs (non-steroidal anti-inflammatory drugs), such as aspirin or ibuprofen can increase the risk of internal bleeding, patients are advised to use Tylenol (paracetamol) instead (Bhatt et al., 2013; Chen & Wilson, 2010).

The following treatment options are designed for the more severe forms of dengue fever (Ranjit & Kissoon, 2011):

- **Intravenous fluid supplementation (IV drip)** - in some harsher cases of dengue the patient is unable to take fluids orally (via the mouth) and will need to receive an IV drip.
- **Blood transfusion** - a blood transfusion may be recommended for patients with severe dehydration.
- **Hospital care** - it is important that you be treated by medical professionals, this way you can be properly monitored (e.g. fluid levels, blood pressure) in case your symptoms worsen. If the patient is cared for by physicians and nurses experienced with the effects and complications of hemorrhagic fever, lives can be saved.

2.3.6 Prevention & Control of Dengue

The only current method of controlling or preventing dengue virus transmission is to effectively combat the vector mosquitoes. For more information, please see "Control Strategies". Vector control is implemented using Integrated Vector Management (IVM) approach, which is a rational decision-making process for the optimal use of resources for vector control (Reiter, 2010; Restrepo et al., 2008). IVM requires a management approach that improves the efficacy, cost-effectiveness, ecological soundness and sustainability of vector control interventions given the available tools and resources. Proper solid waste disposal and improved water storage practices, including covering containers to prevent access by egg-laying female mosquitoes are among methods that are encouraged through community-based programs (Rodenhuis-Zybert et al., 2010; Schmidt, 2010).

2.3.7 Control Strategies: *Vector, Environmental & Biological Control*

Preventing or reducing dengue virus transmission depends entirely in controlling the mosquito vectors or interruption of human–vector contact (Rodenhuis-Zybert et al., 2010; Schmidt, 2010). WHO promotes the strategic approach known as Integrated Vector Management (IVM) to control mosquito vectors, including those of dengue? IVM is defined as a 'rational decision-making process for the optimal use of resources for vector control (Reiter, 2010; Restrepo et al., 2008)." The aims are to improve efficacy, cost effectiveness, ecological soundness and sustainability. Transmission control activities should target *Ae. aegypti* (or any of the other vectors depending on the evidence of transmission) in its immature (egg, larva, and pupa) and adult stages in the household and immediate vicinity. This includes other settings where human–vector contact occurs, such as schools, hospitals and workplaces (Restrepo et al., 2008). *Ae. aegypti* uses a wide range of confined larval habitats, both man-made and natural. Some man-made container habitats produce large numbers of adult mosquitoes, whereas others are less productive. Consequently, control efforts should target the habitats that are

most productive and hence epidemiologically more important rather than all types of container, especially when there are major resource constraints. Vector transmission is reduced through the use or combination of these three methods:

Environmental management seeks to change the environment in order to prevent or minimize vector propagation and human contact with the vector-pathogen by destroying, altering, removing or recycling non-essential containers that provide egg/ larval/ pupal habitats. Such actions should be the mainstay of dengue vector control. Three types of environmental management are defined (Restrepo et al., 2008):

- Environmental modification – long-lasting physical transformations to reduce vector larval habitats, such as installation of a reliable piped water supply to communities, including household connections.
- Environmental manipulation – temporary changes to vector habitats involving the management of "essential" containers, such as frequent emptying and cleaning by scrubbing of water-storage vessels, flower vases and desert room coolers; cleaning of gutters; sheltering stored tyres from rainfall; recycling or proper disposal of discarded containers and tyres; management of plants close to homes that collect water in the leaf axils.
- Changes to human habitation or behavior – actions to reduce human–vector contact, such as installing mosquito screening on windows, doors and other entry points, and using mosquito nets while sleeping during daytime.

Improvements in, and maintenance of, urban infrastructure and basic services contribute to the reduction in available larval habitats since large *Ae. aegypti* populations are often associated with poor water supply and inadequate sanitation and waste disposal services (Rodenhuis-Zybert et al., 2010; Schmidt, 2010).

Improving water supplies is a fundamental method of controlling *Aedes* vectors, especially *Ae. Aegypti* (Restrepo et al., 2008). Water piped to households is preferable to water drawn from wells, communal standpipes, rooftop catchments (rain water harvesting) and other water-storage systems. However, potable water must be supplied reliably so that water-storage containers that serve as larval habitats – such as drums, overhead or ground tanks and concrete jars – are not necessary. The installation of reliable piped water supplies to houses should be accompanied by a communication strategy that discourages traditional storage practices.

Water-storage containers can be designed to prevent mosquitoes from laying eggs on the surface of the water. Containers can be fitted with tight lids or, if rain-filled, tightly-fitted mesh screens can allow for rainwater to be harvested from roofs while keeping mosquitoes out. Removable covers should be replaced every time water is removed and should be well maintained to prevent damage that permits mosquitoes to get in and out. Expanded polystyrene beads used on the surface of water can prevent mosquitoes from laying eggs on the surface (Rodenhuis-Zybert et al., 2010; Schmidt, 2010). However, these are only applicable in storage containers with an installed pipe to draw water from the bottom.

In the context of dengue vector control, "solid waste" refers mainly to non-biodegradable items of household, community and industrial waste. The benefits of reducing the amount of solid waste in urban environments extend beyond those of vector control. Applying many of the basic principles can contribute substantially to reducing *Ae. aegypti* larval habitats (Restrepo et al., 2008). Proper storage, collection and disposal of waste are essential for protecting public health. The basic rule of "reduce, reuse, recycle" is highly applicable. Efforts to reduce solid waste should be directed against discarded or non-essential containers, particularly if they have been identified in the community as important mosquito-producing containers. Solid waste should be collected in plastic sacks and disposed of regularly. The frequency of collection is important: twice per week is recommended for housefly and rodent control in warm climates. Integration of *Ae. aegypti* control with waste management services is possible and should be encouraged. A reliable and regular street cleansing system that removes discarded water-bearing containers and cleans drains to ensure they do not become stagnant and breed mosquitoes will both help to reduce larval habitats of *Ae. aegypti* and remove the origin of other urban pests (Rodenhuis-Zybert et al., 2010; Schmidt, 2010).

During the planning and construction of buildings and other infrastructure, including urban renewal schemes, and through legislation and regulation, opportunities arise to modify or reduce potential larval habitats of urban disease vectors, including *Ae. aegypti*, *Culex quinquefasciatus* and *An. Stephensi* (Restrepo et al., 2008). For example, under revised legislation in Singapore, roof gutters are not permitted on buildings in new developments because they are difficult to access and maintain. Moreover, property owners are required to remove existing gutters on their premises if they are unable to maintain them satisfactorily.

Biological control is based on the introduction of organisms that prey upon, parasitize, compete with or otherwise reduce populations of the target species. Against *Aedes*, a selection of larvivorous fish species and predatory copepods (small freshwater crustaceans) are effective against the immature larval stages of vector mosquitoes. The biological control organisms are bred and distributed into water-storage containers or wells (Bhatt et al., 2013; Chen & Wilson, 2010). Small-scale projects have shown that the success of biological control is mainly reliant on the organization of the project e.g. breeding of fish/copepods, community mobilization and participation (willingness to accept the introduction of organisms into water containers) and distribution system

for fish/copepods (regular restocking and monitoring).

A variety of fish species have been used to eliminate mosquitoes from larger containers used to store potable water in many countries, and in open freshwater wells, concrete irrigation ditches and industrial tanks. Commonly, guppies adapt well to these types of confined water bodies and have been most commonly used. Only native larvivorous fish should be used because exotic species may escape into natural habitats and threaten the indigenous fauna. WHO has published further information on the use of fish for mosquito control? (WHO, 2011) More information is available from the WHO i.e. Standard Operating Procedures on breeding and dissemination, and WHO Use of fish in mosquito control. Various predatory copepod species (small crustaceans) have also proved effective against dengue vectors in operational settings (WHO, 2011; Shah, 2008). However, although copepod populations can survive for long periods, as with fish, reintroductions may be necessary for sustained control. A vector control programme in northern Viet Nam using copepods in large water-storage tanks, combined with source reduction, successfully eliminated *Ae. aegypti* in many communes and has prevented dengue transmission for a number of years. To date, these successes have not been replicated in other countries (Shah, 2008).

2.4 *List of the Working Concepts (Variables)*

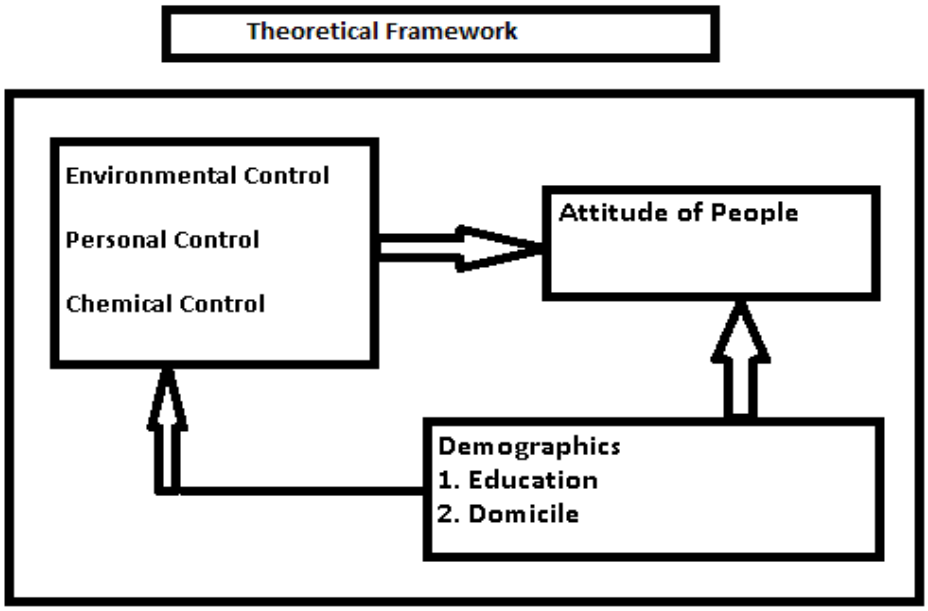
Variables	Brief Descriptions
Environmental Control	Responses (positive or negative) towards proper supply of water, mosquito proofed water tanks, measures to avoid water leakages and regular inspection of drainage pipes etc….
Personal Control	Responses (positive or negative) towards proper usage of clothes to reduce mosquito bite, use of insecticide-controlling nets and extensive use of house-hold insecticidal etc.
Chemical Control	Responses (positive or negative) towards the application of air- sprays to kill mosquitoes by the authorities, distribution of larvicide by the Govt. use of portable spray units etc.

2.5 Demographic Variables

Two demographic variables were used i.e. Education (D1) and Domicile (D2).

2.6 Schematic Diagram of the Theoretical Framework

The theoretcal framework of the study is based on the previous studies and variables extracted from the exisiting research.



2.7 List of the Sub-Hypotheses

H_1: There is no difference of attitude of literate and illiterate people upon Environmental Control.
H_2: There is no difference of attitude of literate and illiterate people upon Personal Control.
H_3: There is no difference of attitude of literate and illiterate people upon Chemical Control.

H_4: There is no difference of attitude of Local and Non-Local People upon Environmental Control.
H_5: There is no difference of attitude of Local and Non-Local People upon Personal Control.
H_6: There is no difference of attitude of Local and Non-Local People upon Chemical Control.

3. RESEARCH METHODOLOGY

A research design or research methodology is set up to decide on among other issue how to collect further data, analyze and interpret those data and, finally to provide an answer to the problem (Sekaran:1999). The descriptive and cross sectional design was used in the study to understand the attitude of People towards Prevention and Control of Dengue in Tehsil Mankera District Bhakkar. Research shows that survey approach to data collection is the most frequently used mode of observation in the social sciences (Babbie: 1993). Given the human and social nature of the topic, we have used survey approach since surveys are 'excellent vehicles for measuring attitudes and orientations in a large population (Sekaran: 1999).

The population of this study consists of all individuals who are residing in Tehsil Mankera District Bhakkar. We have used a sample of 100 respondents through random and convenience sampling techniques. Primary data was collected through structured questionnaire of 5-point Likert scale while secondary data was collected from all available material on internet, books and journals. The data collected was analyzed using different descriptive analytical method particularly chi square test of significance.

4. DATA ANALYSIS

4.1 Demographic Profile of the Respondents

Data analysis is a process of gathering, modeling, and transforming data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. Below is the education and location-wise breakdown of the respondents:

The education -wise breakdown of the respondents

Status	Frequency	% age
Literate	62	62
Illiterate	38	38
Total	100	100

The location -wise breakdown of the respondents

Status	Frequency	% age
Local	83	83
Non-Local	17	17
Total	100	100

4.2 Hypotheses Testing

The evidence in the favor of or against the hypotheses pinpoints the reality of the survey study. One main hypothesis and six sub hypotheses have been developed and tested through the application of chi square test. The results and their interpretations are discussed below.

H_{01}: There is no difference of attitude of literate and illiterate people upon Environmental Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	Status
63	6	57	Literate
37	14	23	Illiterate
100	20	80	TOTAL(CT)

EXPECTED FREQUENCIES

TOTAL	NO	YES	Status
63	12.60	50.40	Literate
37	7.40	29.60	Illiterate
100	20	80	TOTAL

CHI-SQUARE TEST- STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
0.86	43.56	6.60	50.40	57	
3.45	43.56	-6.60	12.60	6	
1.47	43.56	-6.60	29.60	23	
5.88	43.56	6.60	7.40	14	
11.66	174.24	0	100	100	TOTAL(GT)

∑11.66

Analysis

Since both the variables are nominal hence the chi-square test was used to check the association between the Literate and Illiterate. Using the level of significance of 0.05, the tabulated value of X^2 for 1 degree of freedom is 3.84. The calculated value of X^2 is 11.66. Since the calculated value is greater than the tabulated value. Hence H_{01}: is rejected which shows that there is a difference of attitude of Literate and Illiterate People upon Environmental Control.

H_{02}: There is no difference of attitude of literate and illiterate people upon Personal Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	Status
62	24	38	Literate
38	23	15	Illiterate
100 - (GT)	47	53	TOTAL(CT)

EXPECTED FREQUENCIES

TOTAL(RT)	NO	YES	Status
62	29.14	32.86	Literate
38	17.86	20.14	Illiterate
100	47	53	TOTAL(CT)

CHI-SQUARE TEST STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
0.80	26.42	5.14	32.86	38	
0.90	26.42	-5.14	29.14	24	
1.31	26.42	-5.14	20.14	15	
1.48	26.42	5.14	17.86	23	
4.49	105.68	0	100	100	TOTAL(GT)

∑4.49

Analysis

Since both the variables are nominal hence the chi-square test was used to check the association between the Literate and Illiterate. Using the level of significance of 0.05, the tabulated value of X^2 for 1 degree of freedom is 3.84. The calculated value of X^2 is 4.49. Since the calculated value is greater than the tabulated value. Hence H_0: is rejected which shows that there is a difference between Literate and Illiterate people upon personal control.

H_{03}: There is no difference of attitude of literate and illiterate people upon Chemical Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	Status
62	52	10	Literate
38	34	4	Illiterate
100	86	14	**TOTAL(CT)**

EXPECTED FREQUENCIES

TOTAL(RT)	NO	YES	Status
62	53.32	8.68	Literate
38	32.88	5.32	Illiterate
100	86	14	TOTAL(CT)

CHI-SQUARE TEST STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
0.20	1.74	1.32	8.68	10	
0.03	1.74	-1.32	53.32	52	
0.32	1.74	-1.32	5.32	4	
0.05	1.74	1.32	32.68	34	
0.60	6.96	0	100	100	TOTAL(GT)

∑ 0.60

Analysis

Since both the variables are nominal hence the chi-square test was used to check the association between the Literate and Illiterate with 0.05 level of significance, the tabulated value of X^2 for 1 degree of freedom is 3.84. The calculated value of X^2 is 0.60. As the calculated value is less than the tabulated, so we accept H_0, that there is no difference between Literate and Illiterate People upon Chemical Control.

H_{04}: There is no difference of attitude of Local and Non-Local People upon Environmental Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	Status
83	19	64	**Local**
17	4	13	**Non-Local**
100	23	77	**TOTAL(CT)**

EXPECTED FREQUENCIES

TOTAL(RT)	NO	YES	Status
83	19.09	63.91	**Local**
17	3.91	13.09	**Non-Local**
100	23	77	TOTAL(CT)

CHI-SQUARE TEST STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
0.00013	0.0081	0.09	63.91	64	
0.00042	0.0081	-0.09	19.09	19	
0.00061	0.0081	-0.09	13.09	13	
0.0021	0.0081	0.09	3.91	4	
0.0032	0.1296	0	100	100	TOTAL(GT)

∑0.0032

Analysis

Since both the variables are nominal hence the chi-square test was used to check the association between the

Local and Non-Local People. Using the level of significance of 0.05, the tabulated value of X^2 for 1 degree of freedom is 3.84. The calculated value of X^2 is 0.0032. Since the calculated value is less than the tabulated value. Hence we accept the H_0, which shows that there is no difference between Local and Non-Local People upon Environmental Control.

H_{05}: There is no difference of attitude of Local and Non-Local People upon Personal Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	DOMICILE
83	42	41	LOCAL
17	5	12	NON LOCAL
100	47	53	TOTAL(CT)

EXPECTED FREQUENCIES

TOTAL(RT)	NO	YES	DOMICILE
83	39.01	43.99	LOCAL
17	7.99	9.01	NON LOCAL
100	47	53	TOTAL(CT)

CHI-SQUARE TEST STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
0.203	8.94	-2.99	43.99	41	
0.229	8.94	2.99	39.01	42	
0.992	8.94	2.99	9,01	12	
1.118	8.94	-2.99	7.99	5	
2.54	35.76	0	100	100	TOTAL(GT)

$\sum$2.54

Analysis

The chi-square test was used to check the association between Local and Non-Local. Using the level of significance of 0.05, the tabulated value of X^2 for 1 degree of freedom was 3.84 and calculated value of X^2 is 2.54. Since the calculated value is less than tabulated, so we accept H_0, which shows no difference between Local and Non-Local People upon Personal Control.

H_{06}: There is no difference of attitude of Local and Non-Local People upon Chemical Control.

CONTINGENCY TABLE

OBSERVED FREQUENCIES

TOTAL(RT)	NO	YES	DOMICILE
83	77	6	LOCAL
17	9	8	NON LOCAL
100	86	14	TOTAL(CT)

EXPECTED FREQUENCIES

TOTAL(RT)	NO	YES	DOMICILE
83	71.38	11.62	LOCAL
17	14.62	2.38	NON LOCAL
100	86	14	TOTAL(CT)

CHI-SQUARE TEST STATISTICS

(Fo-Fe)2/Fe	(Fo-Fe)2	(Fo-Fe)	Fe	Fo	
2.71	**31.58**	**-5.62**	**11.62**	**6**	
0.442	**31.58**	5.62	71.38	77	
13.26	**31.58**	5.62	2.38	8	
2.16	**31.58**	-5.62	14.62	9	
18.57	126.33	0	100	100	TOTAL(GT)

∑ **18.57**

Analysis

The chi-square test was used to check the association between the Local and Non-Local. Using the level of significance of 0.05, the tabulated value of X^2 for 1 degree of freedom is 3.84. The calculated value of X^2 is 18.57. Since the calculated value is greater than the tabulated value. Hence we reject the null hypothesis (H_0), which shows that there is difference of attitude between Local and Non-Local People upon Chemical Control.

5. MAJOR FINDINGS

This research was conducted to measure the attitude of people towards prevention and control of dengue in Tehsil Mankera District Bhakkar. The quantitative data was collected about the different variables such as Environmental Control, Personal Control and Chemical Control of dengue. Based on the review of the literature and the results of the primary data collected from the samples of the study, below is the summary of the major findings of the study.

The study reveals that there is a difference of attitude between Literate and Illiterate people upon Environmental Control. This study also points that there is a difference of opinions between Literate and Illiterate people about Personal Control, however, the results of the Chi-square test highlighted no difference between the views of literate and illiterate people about Chemical Control. It was evident from the study that there is no difference of perceptions between Local and Non-Local people about Environmental Control. Results of the Chi-square highlighted that there is no difference of views between Local and Non-local people about Personal Control. This research also explains that there is a difference of opinions between Local and Non-Local people about Chemical Control.

6. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

Chi-square test was used to measure the impacts of the demographic variables upon the research variables. To achieve the study objectives, six hypotheses were developed. The results show that there are differences of attitude between Literate and Illiterate people upon Environmental and Personal Control. But there is no difference of attitude between Literate and Illiterate people upon the Chemical Control. Further it is projected from the result of Chi-square test that there is no difference of attitude between Local and Non-Local people upon Environmental and Personal Control. But there is a difference of attitude between Local and Non-Local people upon the Chemical Control.

6.2 Recommendations

Public Health authorities must try to develop awareness about dengue control via different programs for example, LHWs and School Health and Nutrition Supervisors should be given the task to do/perform Health Education Sessions in the community. To enhance the Knowledge about dengue, further refresher courses may be conducted in DHDC Bhakkar for uplifting the knowledge of Health Care Providers. Cleanliness measures may be adopted for improving the Environmental Control regarding dengue prevention. Remove all sources of stagnant water for eradication of mosquitoes. Fogging and residual spray for the eradication of mosquitoes must be applied by the local authorities of the area. Use of chemical and biological larvacides must be ensured.

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