

Spatial Patterns of Hepatitis C Disease in Ghadezai Tehsil District Buner, Khyber Paktunkhwa, Pakistan

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Abstract

This study was carried out to investigate the spatial patterns of Hepatitis C and its prevalence in males and females in Ghadezai Tehsil District Buner Khyber Paktunkhwa. The patients' data i.e. residential addresses were taken from the district head quarter Dagger Buner. This data was used for the analysis of the Hepatitis C disease. All the patients' locations were marked correctly through GPS in the form of x y co-ordinates. These co-ordinates were used to performed spatial analysis, mapping and other quarries of this disease by using GIS software. The results show that the spatial pattern of Hepatitis C in Ghadezai Tehsil was random and uneven. Four areas were identified the hotspots of Hepatitis C in which Dokaddah was in the extreme north Kalakheela in the center while Bazargai and Geraray was in the west of Ghadezai Tehsil. High prevalence of HCV was observed in males (51%) and females (49%) patients. Most number of infections was found in married people (87%) as compared to unmarried people (13%). The age group of 31-45 years was the most affected in the entire study area. Sharing of items among the family members, barbers shops of the area, general practitioners, dental technicians and infected parents were identified the risk factors of HCV in the study area.

Keywords: Hepatitis C; Spatial analysis; GIS; Buner; Khyber paktunkhwa

Introduction

The relationship between the disease and location is not a new concept if we look in the history of epidemiology since in the ancient Greek era, Hippocrates (5th-4th centuries BC) was aware and recognized the effect of location on one's health. Early physicians found that the people living at high and low elevation experienced differences in diseases. The earlier spatial and temporal studies of this virus suggested that the spread of this virus started in the early twentieth century and potentially increased a lot up to 1980. According to the WHO's epidemiological data, the prevalence of HCV is less than 1% in northern Europe, Canada, Australia and USA. While in different regions of Latin America, Central Asia, South East Asia and Africa the HCV prevalence rate is more than 2% and the prevalence of this disease is reported between 5 to 10% [1]. The world epidemiological data suggested that about 130 to 180 million people that make 2 to 3% of the entire world population are victim of HCV and more than 4 million people are chronically infected by HCV in Oceania, 16 million in the Arabian countries and Middle East region. The infections are high as 83 million in the continent Asia. The infection caused by HCV in Africa is 28 million and America and Europe have 16 and 17.5 million respectively [2,3].

Disease maps provide a rapid visual summary of complex geographic information's and may identify delicate patterns in the data that are missed in tabular presentations [4,5]. They are used for different descriptive purposes, to make hypotheses as to etiology, for surveillance to show areas at high risk, and to aid policy formation and resource allocation. They are also useful to help place specific disease

clusters and results of point-source studies in proper context [3,6]. Medical Geography deals the distribution of disease and analysis of geographically indexed health data with respect to demographic, environmental, behavioral, socioeconomic, genetic, and infectious risk factors [7,8]. In the 19th century the geographers also took interest to study systematically the geographic aspects of health and disease. Today, with the emerging world-wide occurrence of some infectious diseases the importance of place in understanding health and disease seems stronger than ever [9].

Spatial patterns indicate where the hot spots of the disease are found and provide the possibility that whether the disease is related to specific source are not. Disease maps typically show standardized mortality or morbidity ratios (SMRs) for geographic areas such as countries, counties, or districts. Clusters are also useful to find those areas which require more health facilities as compared to facilities already existing. This is helpful for planning in future and policy making for disease control. According to an estimate about 130 to 180 million of HCV infections are found presently in the world. The record of some medical data suggests that HCV spread in a tremendous manner throughout the world after world war second [10,11]. A significant diversity in the rate and prevalence of HCV is found in different regions of the world. Beside from this great variations occur in various parts and areas of a country at the same time. In Pakistan one out of every ten persons is a carrier of hepatitis virus. In Pakistan the knowledge and awareness about the Hepatitis C is very low among the people especially in women due to illiteracy and poverty. In the study area Buner the high prevalence of HCV is the result of low level of knowledge about this disease, lack of awareness, unhygienic conditions, remoteness and the unavailability of quality health facilities. In this alarming situation it is foremost to make an attempt to examine the spatial pattern of Hepatitis C by using mapping

techniques and some statistical methods. The research primarily aimed to study the distribution, patterns, demographic structure, gender gap and risk factors of Hepatitis C in Upper Buner District [1,12].

Around 8.6 million Hepatitis C patients are found in the country with a 4.8 percent prevalence rate, one out of every ten persons is a carrier of hepatitis virus [13]. The area Buner selected for this research is due to the high prevalence of Hepatitis C, its remoteness, unavailability of quality health facilities and existing conditions created by Taliban in which the government and non-governmental agencies and organizations cannot work properly to disclose and uncover the reality about Hepatitis C disease which is spreading as an epidemic manner in the study area. HCV disease was highest in Punjab (6.7%) followed by Sindh (5.0%), Balochistan (1.5%) and KPK (1.1 %), [1,14]. In Pakistan one out of every ten persons is a carrier of hepatitis virus. In Pakistan the knowledge and awareness about the Hepatitis C is very low among the people especially in women due to illiteracy and poverty. In the study area Buner the high prevalence of HCV is the result of low level of knowledge about this disease, lack of awareness, unhygienic conditions remoteness and the unavailability of quality health facilities. In this alarming situation it is foremost to make an attempt to examine the spatial pattern of Hepatitis C by using mapping techniques and some statistical methods. The research primarily aimed to study the distribution, patterns, demographic structure, gender gap and risk factors of Hepatitis C in Upper Buner District [9,15,16].

Study Area

Buner was a part of district Swat in the beginning but it has given the status of a separate district in 1991. The total area of Buner is 1865 Sq.Km. Buner lies between 34-9 and 34-43 N latitude and 72-10 and 72-47 E longitude. It is situated at a distance of 120 km from provincial capital Peshawar. Swat district lie in the north, Malakand in the North West Mardan in the west, Sawabi in the south and river Indus in the east of Buner district. District Buner is divided in different tehsils like Daggar, Gadezai, Chagharzai, Totalye, Chamla and Gagra. There are total 27 union councils. The population of Buner is 506048 (1998 Census). The males and females ratio is exactly equal i.e 50% males and 50% females with an average annual growth of 3.9%, having a population density of 271 persons/ Sq.Km. Muslims are 95% of the total population while the remaining 5% are Sikhs and Hindus minorities. Daggar is the district headquarter and main administrative town of Buner [1,14] (Figure 1).

Methodology

The research was based on primary as well as the secondary data. The primary data was collected directly from the patients through structured questionnaire, while the secondary data was obtained from the Hepatitis C Control Cell of District Headquarter Hospital Daggar Buner, Khyber Pakhtunkhwa for the period of three years 2011 to 2014. The research was conducted in the Buner District of Khyber Pakhtunkhwa. Ghadezai Tehsil of Upper Buner was taken as the study area. A survey of 21 villages was performed in which the Hepatitis C patients were found.

The field survey was conducted and the data were collected through structured questionnaires. A total number of 254 questionnaires were filled and the data from 160 males and 94 female respondents were collected. The questions were translated into Pashto language. From males and old women the questionnaires were filled directly while from young females the indirect method was used through a third

person of her family. The patient's locations were captured through GPS in the form of x-y coordinates. As the secondary data lack the proper addresses so the local people of each village were enquired to find out the house of each patient. The coordinate's data were used for spatial analysis of the disease and disease mapping. The data of registered hepatitis C patients were obtained from the Hepatitis C Control Cell of District Headquarter Hospital Daggar Buner. This data contains the patient's names and the relative address. Different GIS techniques were used like spatial analyst tool and Kernel Density analysis was performed to identify the hotspots of the disease. The Kernel Density calculates the density of features in a neighborhood around those features. It can be calculated for both point and line features [17-21] (Figure 2).

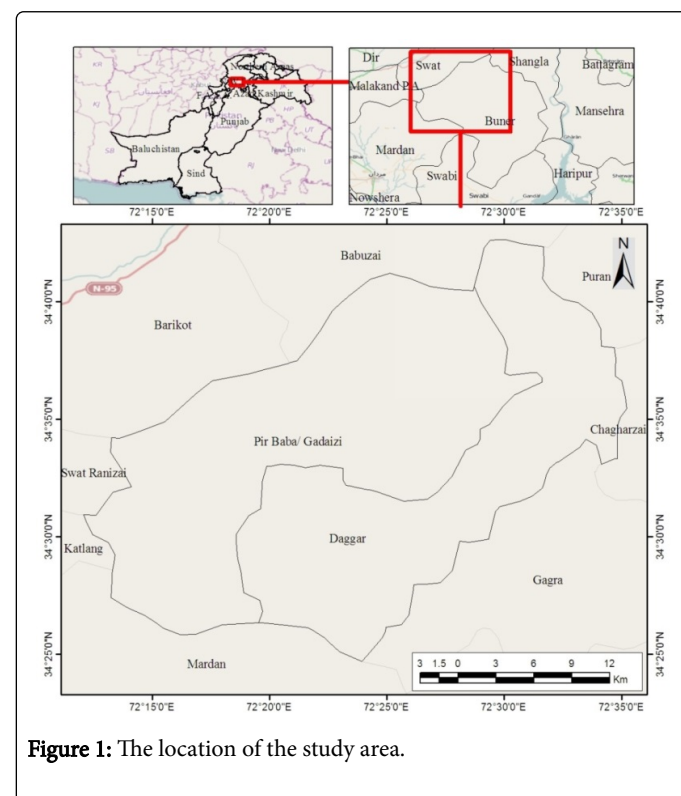


Figure 1: The location of the study area.

Results and Discussions

The total number of patients in the study area was 844; these patients are found in 29 different villages fall in two tehsils Daggar and Ghdeyzai tehsil. The residential addresses of all these patients were taken from the district head quarter Daggar Buner (Table 1).

The Figure 3 shows the prevalence of Hepatitis C disease in various villages of Ghadezai Tehsil. In some villages like in Nansir, Bahiaikalay, Leganay, Ghazikhanay and Sultanwas has high prevalence of Hepatitis C in Males. While villages like Narbatawal, Peerbaba, Geraray, Jowar and Katkala has more Hepatitis C cases in males than females. The prevalence of HCV disease in females are more in the villages like Bazargai, Bampoha, Geraray etc of Salarzai tribe because the females of these villages are more exposes to the risk factors as they are working not only in the houses but also in the agriculture fields. They also bring fodder for animals from the nearby hills. The role of the females in these villages is very active in indoor and outdoor activities as compare to the males. While in villages like Peer baba, Pacha kalay and Bhai

kalay etc. males are more affected because in these villages the men have active role in the society. In Ghadezai tehsil both the males and females are highly affected and are at high risk to this disease. The high illiteracy rate and low level of awareness about this disease in the people of this area are the important factors behind the prevailing situation.

Name of the village	Male	Female	Married	Unmarried
Jowar	13	19	26	6
Bazargai	46	47	78	15
Geraray	24	34	52	6
Bampoha	22	22	40	4
Leganay	8	3	10	1
Kinger gali	10	8	16	2
Nansir	9	2	10	1
Kohi	6	7	12	1
Charay	7	8	13	2
Katkala	5	12	16	1
Char	6	3	9	0
Shoprang	3	3	5	1
Salarzomira	5	6	10	1
Kalakheela	21	27	40	8
BhaiKalay	22	10	27	5
Pachakalay	12	10	18	4
Sultanwas	6	3	8	1
Dokaddah	62	53	99	16
Pir baba	4	7	9	2
Batay	11	5	13	3
Narbatawal	2	10	10	2
Ghazikhanay	16	7	20	3

Table 1: Hepatitis C Patients detail in the study Area. Source: District Headquarter Hospital Daggar Buner, 2014.

The Figure 4 shows the affected age groups of Hepatitis C patients Ghadezai tehsil. The most affected age group is 31-45. The age group 46-60 is second most affected. The group 16-30 is moderately and other is less affected. This is clear from the graph that mostly young and mature people are the victim of this disease while children and old persons are safe. Both the mature and young people are working groups and are more exposed to their life activities and risk factors in different places like in houses, bazar, play grounds, work places and other gathering places etc. The low level of awareness of this disease in the people of this area is main cause of spreading of this disease. The young and mature males mostly prefer shave in barber shops than at home which is one of the important reason of this disease in these two age groups. The join family system of the area and marriages in its own

families are the causes of vertical and horizontal transmission of this disease.

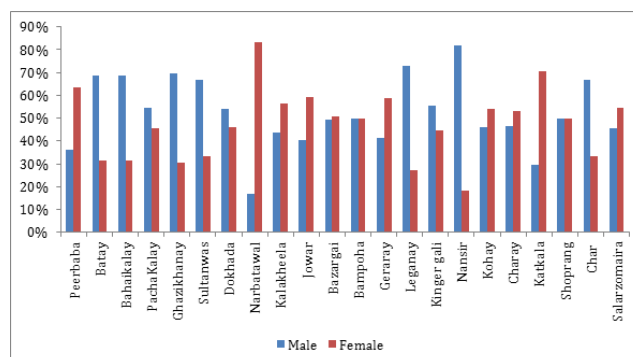


Figure 2: Comparative Analysis of the Hepatitis C Patients in Ghadezai Tehsil.

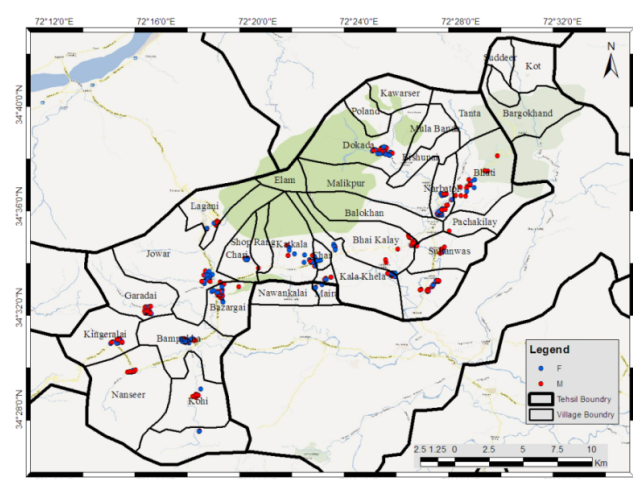


Figure 3: Distributions of Patients in terms of Gender.

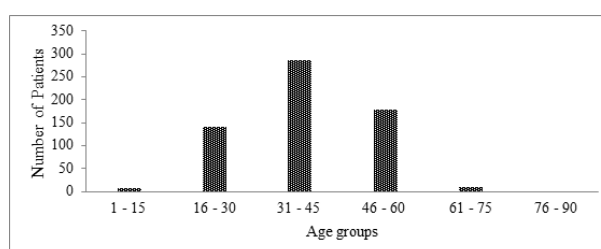


Figure 4: Hepatitis C Patients by Age in Ghadezai Tehsil.

In all the villages of Ghadezai Tehsil the HCV cases were mostly found in married people than in unmarried people as shown in Figures 5 and 6. Over 80% married people were the victim of this disease in each village. Some villages like Bampoha (91%), Dokaddah (87%), Ghazikhanay (86%), Kalakheela (83%), Bazargai (83%) and Pachakalay (82%) etc. have high proportion of married HCV patients. The reason

is that the married people are at more risks like infected life partner and their exposure to a variety of life activities due to greater responsibilities. The tradition of early marriages in their own families is also one of the important factors of high prevalence of HCV in married people of this area.

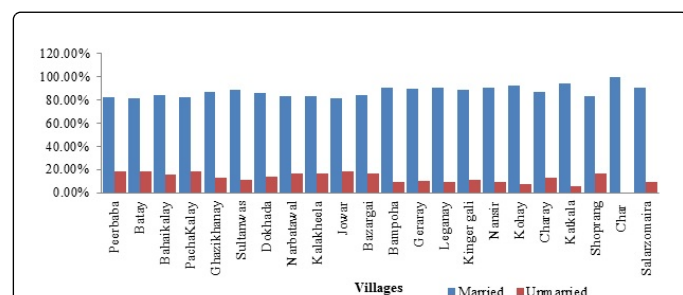


Figure 5: Village base HCV prevalence in terms of Marital Status in Ghadezai Tehsil.

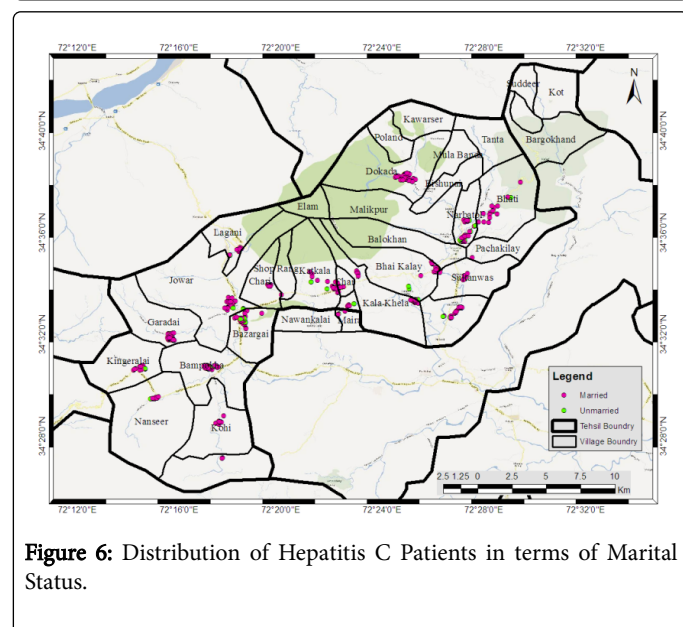


Figure 6: Distribution of Hepatitis C Patients in terms of Marital Status.

Hot spot are those areas where the presence of affected patients is high than average and high from rest of the area. The cases in the hotspots like in Dokaddah, Bazargai, Geraray, Torwasak, Anghapur, Kalakheela, Shanay and Bampoha are in cluster manner. The cases in these villages are found closely with each other and mostly concentrated in the center or the core area of the villages. While in other villages the cases are found in random and scattered manner. In small villages like Kingergali, Nansir, Leganay, Charay, Char, Salarzomaira, Ashezomaira, Newaykalay, Elay, sultanwas, Ghazikhanay, Batay, Narbatawal and Pacha kalay the distribution of HCV cases are random and scattered. In large villages the houses are wall to wall attached and this is why the cases are found closely with each other. Over all eight villages are found the hot spots of hepatitis c in the entire study area. These hot spots are Dokaddah, Bazargai, Geraray, Torwasak, Anghapur, Kalakheela, Shanay and Bampoha. The spatial distributions of these hot spots are as Dokaddah and Kalakheela having 115 and 48 cases respectively in the north east, Bazargai,

Geraray and Bampoha having 93, 58 and 44 cases respectively and are in the northwest of Ghadezai tehsil (Figures 7 and 8).

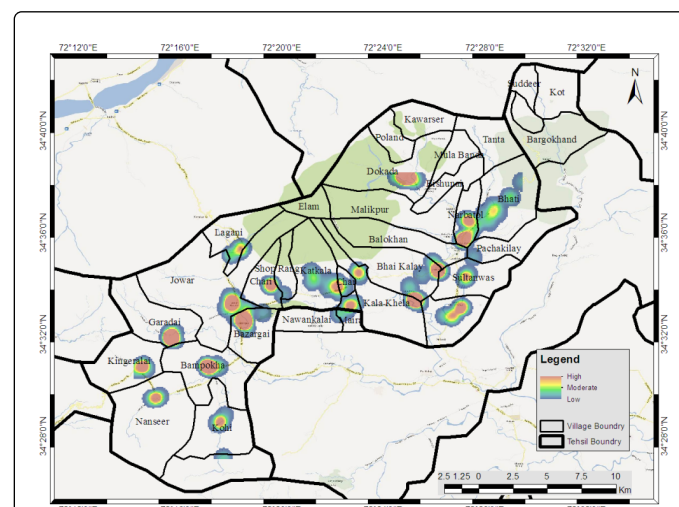


Figure 7: Hotspots of Hepatitis C Disease in the Study Area.

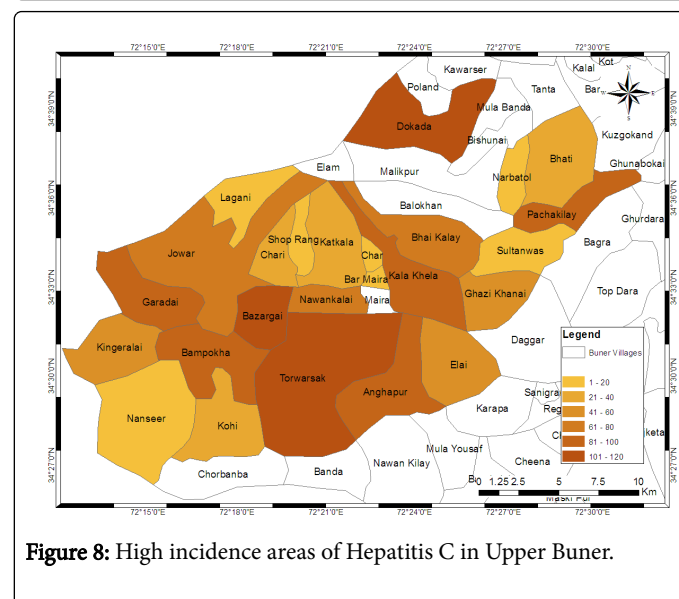


Figure 8: High incidence areas of Hepatitis C in Upper Buner.

Risk factors of Hepatitis C in the study area

Four significant factors were observed in our study that responsible in the transmission of Hepatitis C disease in the upper Buner. These factors are as under.

Sharing of items: About 60% patients share items like needle, Meswak, Dandasa (the bark of wall nut use by local people for cleaning teeth), and tooth brush. Sharing of items is one of the reasons of Hepatitis C disease in the area. They not only share items of daily use with the family members but also the neighbors as well. The sharing of the needle is almost very common during the piercing of ears and nose within the family members especially the females. The same thing happen when the needle is used to come out the sticking spike from the body. They share these items due to unawareness and low level of education.

Barbers shops: Among the participants 78% make their shaves at barber shops. It means that they are involved in the spreading of this disease. In these shops mostly the people are at high risk in the sense that at rush time the barbers not change the used water of the first shave and use it for the next one and the use of Phtkari (Alum) piece as a common antiseptic material during cut. Beside from this they used a common razor for armpit shave.

General practitioners clinics: When the patients inquired about the choice of doctor for treatment during illness 85% of patients go to General practitioners for treatment during illness. These practitioners reuse the syringe especially at evening and night time when the disposable syringe are used and nothing remain. The same thing happened during the rush time as well. The dental instruments are not sterilized properly by the dental technicians. These instruments are only put in boil water for an hour or two hours and then dried it with cotton or cloth and reused. Besides from ignorance and unawareness the technicians do so to save time and money.

Hepatitis C positive life partner: The present study shows that 17% of the patients has their positive Hepatitis C life partners. The role of this mode of transmission is also very significant. Because the infection can directly transmits from the infected to the healthy life partner and indirectly into their babies through vertical transmission. This is why this mode of transmission is also one of the major risk factor of high prevalence of HCV in the area.

Conclusion

HCV is one of the major health problems throughout the world. However the prevalence rate of this disease varies from region to region and from country to country. In these 844 patients 435 were males and 409 female patients. Most number of the patients were married i.e. 731 and 113 were unmarried. Our study revealed that Ghadezai tehsil is the most affected tehsil in the area, in which total of 626 cases were found in which 320 were male and 306 were female patients. The married were 542 and unmarried patients were only 84. The large number of cases in this area is due to low level of education and awareness among the people. In all the villages of this tehsil the HCV cases were found in which some villages like Bazargai, Geraray and Bampoha villages were quite notable. Among these three villages Bazargai village has 93 cases and most severely affected. It is noted that the join family system and marriages in its own families are their causes. The threat of infection to healthy persons can be reduced by conducting test of both the life partner before marriage and not sharing the items like needle, meswak, dandasa, and tooth brush among the family members. In Geraray total numbers of cases were 58 in which 41% males and 59% females were infected by HCV. In Bampoha village 44 cases were founded here the ratio of males and females was 50% each. Over all the gender analysis of Ghadezai tehsil shows that males (51%) are more affected than females (49%). But greater numbers of infections in females (49%) of this tehsil are due to their low level of education and awareness of this disease. They are exposed to a variety of risk factors at different places, as they play a vital role not only inside their houses but also working in the fields bring drinking water and fodder for the animals from the nearby hills. Most numbers of cases were found in married people (87%) of this tehsil. While two age groups i.e. 31-45 and 46-60 were the most affected in all the villages of Ghadezai tehsil. High frequency of patients was found in the age group 31-45. Dokaddah is the severely affected village in the entire study area where 115 patients was found in which 53% males and 47% females' patients. The cases here were very

close to each other and mostly in single house three to five cases were found. Kalkheela village have total of 48 cases in which 43% males and 57% females patients. The cases here mostly concentrated in the central part of the village and also in close proximity. As a whole in Ghadezai tehsil males (51%) are more victim of this disease than females (49%). The age group 31-45 was much highly affected. The high prevalence of Hepatitis C in both the genders is the result of the careless attitude and unawareness of this disease among the people of this tehsil.

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