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Evaluation of hepatitis b and c related to oral health and other risk factors: a population-based, study in karachi, pakistan.

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ABSTRACT

Background: Patients chronically infected either with hepatitis B (HBV) or hepatitis C virus (HCV) are at increased risk of developing cirrhosis, end stage liver disease and hepatocellular carcinoma (HCC). Different risk factors were found to be associated with the transmission of these viruses in various settings. HBV and HCV transmission seems to be also acquired by non-parenteral and non-sexual routes. A large number of patients infected with HCV might have non-identical routes of viral acquisition. Pre-exposure hepatitis B vaccination and the use of standard precautions to prevent exposure to blood are the most effective strategies for preventing dental health-care personnel (DHCP) from occupational exposure to occupational infection with HBV, or HCV. **Objective:** The aim of this study was to identify risk factors associated with the spread of hepatitis B and C in the rural areas of the upper Sindh Province, Pakistan. **Materials and Methods:** A total of 496 samples were collected with the history form and all the question related to risk factors were asked and data was collected. The blood samples were collected from individual and was tested for hepatitis B surface antigen and for hepatitis C virus antibodies by ELISA. **Results:** Overall, 262 samples were which met the selection criteria were evaluated. During the study we assessed different dental procedures, blood transfusion, and other risk factors and we found that, besides all-time risk of HBV and HCV infection, the dental clinic is at high risk where the rate of hepatitis infected individuals is higher. **Conclusion:** Dental clinic are main culprit for spreading HBV and HCV besides that there are other risk factors also by which helps in spreading HBV and HCV infection. This risk can easily be eliminated using standard precautionary measures

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1. Introduction

At the beginning of the third millennium, hepatitis B virus (HBV) remains a major public health problem globally; more than two billion people have been infected worldwide, and of these, 350-400 million suffer from chronic infection [1, 2].

According to WHO figures, worldwide, about 2 billion people have been infected with HBV, 240 million have a chronic infection, and about 600,000 die every year due to its consequences [3]. Similarly, around 3-4 million people are infected with HCV annually, 150 million have a chronic infection, and around 350,000 die due to the liver related diseases caused by it [4]. HBV and HCV are the leading causes of hepatocellular carcinoma and cirrhosis related end stage liver disease [5].

Pakistan, ranking 146th on the Human Developmental Index [6] happens to be one of the most seriously afflicted countries. Unfortunately due to a limited number of studies, the prevalence

for HBV at the National level is not available [7], however according to WHO, Pakistan has one of the highest rates of chronic HCV infections (4.8%) [3].

Many studies have been done on the prevalence and risk factors of HBV and HCV, in various areas of the four provinces in order to gauge the situation across the country. For instance a study done in the villages of Taluka Tharo Shah and Jalabani District Nausheroferoz in Sindh, showed that 7 % of the subjects were HbsAg positive and 28.6% were Anti Hcv reactive [8]. Similarly a study done in Punjab to check for HBV DNA in patients suffering from Chronic Liver Disease, using Real Time PCR, showed that out of 4890 patients, 3143 were positive for HBV [9].

A vaccine for HBV was developed in the year 1982 and more than 1 billion doses have been used world over [3]. This has definitely reduced the burden however we are still far from global eradication. There is no known vaccine for HCV to date [4]. Hence it makes sense to perform studies on the various risk factors of HBV and HCV in order to make people aware of these diseases, their risk factors and the various routes of transmission in order to stop the problem at its source. The aim of this study was to learn about the different risk factors predisposing the residents in different areas of catchment center in Gadap Town, Karachi, Pakistan, to HBV and HCV.

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MATERIALS AND METHODS

Geographical division

The study was conducted between the months of October 2011 and May 2012. Blood samples were collected from 4 centers of catchment area near Baqai Medical University. These 4 centers were further subdivided into smaller towns or 'Goths'.

The first center, Konkar area was divided into 9 towns; Faqir Sohrab Goth, Khamso Goth, Harbil Goth, Kuto Khan Goth, Moulvi Goth, Hindu Goth, Meva Goth, Sher Mohammad Goth and Ahmed Goth. A total area of 17 kilometers square was covered and a total of 1821 residents were found to reside in that area.. The second center, C/M Sain Rakhio Goth, was subdivided into 6 towns; Kadho Goth, Mangio Goth, Rozi Gonder Goth, Bachal Murred Goth, Ganwar Goth and Allah Bachayo Goth. Over here an area of 10 kilometers square was covered with population coverage of 2649. The third area covered was Radho Jokio Goth and this was subdivided into the following 7 towns: Dost Mohd Goth, Mulla Arzi Bagh , Ishaq Bagh, Sher Muhammad Bagh, M. Abdul Hakeem Goth, Kadho Goth and Murreed Goth. The area covered was 14 Kilometer square having total population of 2577. The fourth catchment center was Haji Karim Goth which was sub-divided into Doda Goth, Pir Buksh Goth, Faiz Muhammad Goth, Nazar Muhammad Goth, Baksh Ali Goth, Rahim Bakhs Goth, Wahid Bux Goth and Aleem Adil Bagh. The area covered was 7 Kilometer square having a population of 847 people. [9]

Material collected

The sample consisted of 496 subjects coming from 472 familial clusters. Out of these 396 (79.8%) were females, age range 11-60 years, median age 28 years and 52 (10.4%) were males with age range 22-60 years and the median age being 30 years. All the blood samples were collected along with the history forms. All samples were then centrifuged within two hours of vein puncture. Sera were frozen till the analysis. [7 & 9]

Serological markers used

The serum was tested for Hepatitis B surface antigen (HB s Ag) by ELISA and Hepatitis C virus antibodies (HCV Ab) by third generation ELISA. All the samples were evaluated by Monolisa HB s Ag ULTRA, and Monolisa HCV Ag-Ab ULTRA, respectively (Bio-Rad Laboratories, CA, USA). [7, 8, 9 & 10]

Risk factors considered

During sample from history form it was found out that there were major 6 risk factors which were taken into account: dental treatment, blood transfusions, shaving at the barber's shop (this one being specific to men), use of the injections, tattoos and the delivery of a baby at home.

RESULTS

During this study a detailed history showed that all the patients belonged to the Sindhi ethnic group. 65% of the sample populations were illiterate. [9] 38 people (7.66%) had received the hepatitis B vaccine. 15.9 % of the sample population were positive for HBsAg, 31.8% were positive for HCV Ab, and 5.2% were positive for both as shown in the following table 1,2 & 3

Table 1

Sex	No. of Samples	Positive	Percentage
Male	124	41	33.06
Female	372	38	9.94
Total	496	79	15.92

This shows positive HB s Ag results by ELISA in Male & Female patients (n=496)

Table 2

Sex	No. of Samples	Positive	Percentage
Male	124	55	44.35
Female	372	103	20.76
Total	496	158	31.85

This shows positive anti HCV results by ELISA in Male & Female patients (n=496)

Table 3

Sex	No. of Samples	Positive	Percentage
Male	124	8	6.45
Female	372	18	4.71
Total	496	26	5.24

This shows positive HB s Ag and anti HCV by ELISA as coinfection in both the sex (n=496)

This shows positive HB s Ag and anti HCV by ELISA as coinfection in both the sex (n=496)

Male to female ratio for HBsAg was 1.08:1, for HCV Ab was 0.53:1 and for both was 0.44:1. Starting with the risk factors, 34.2% of the infected population had a positive history of previous dental treatment, as shown in table 4.

Table 4

Sex	Dental Treatment	Blood Transfusions	Shaving at Barbers	Injections	Tattoos	Delivery at Home	Total
Male	38	13	27	23	3	0	104
Female	52	28	0	39	17	23	159
Total	90	41	27	62	20	23	263

This shows the different risk factors for causing HBV and HCV infection.

DISCUSSION

Hepatitis, more particularly Hepatitis C, has been associated with the decline or worsening of the oral health condition of patients infected with the diseases. As such, these patients experience problems not just pertaining to the health of their teeth and mouth, but also with their quality of life as manifested by their reluctance to interact with other people in society due to their very poor oral health.

Before we further discuss the state of the oral health of people with hepatitis, let us first understand what hepatitis is especially hepatitis C.

Hepatitis is the overall term used to describe an inflammation or infection of the liver. The most common variation of this is the hepatitis C. Hepatitis C is caused by a virus (HCV or Hepatitis C Virus) that infects the liver.

A large number of people may not be aware that they are infected with the hepatitis C virus mainly perhaps because of the lack of symptoms and also due to a mild infection. The problem with this is that it may take years before the symptoms start to show in which case it means the liver is already heavily infected and perhaps even damaged.

A big part of viral hepatitis affected patients are infected with either HBV or HCV [11, 12]. The identification of patients, with an unknown route of viral transmission, only few studies have been done on the prevalence and risk factors of HBV and HCV in Pakistan and all around the world.

When compared to other studies held in different countries, the risk factors in Pakistan vary slightly. For instance in Pakistan reused syringes (therapeutic injections and otherwise), in dental treatments, for transmission [13 14-16]. However according to a study done in Morocco, some of the important risk factors identified for HCV are age, dental treatment, use of glass syringes, and surgical history, and for HBV are gender and sexual risk behavior [17].

Even though a slight variation in the order of importance exists, some factors are common across the globe. Intravenous drug use, unprotected sexual contact with multiple partners, viral exposure during medical procedures such as dialysis and surgery, accidental exposure such as needle stick injuries and vertical transmission from mother to child are the common routes of infection with both HBV and HCV. [11].

Now in relation between hepatitis C and oral health of infected patients, these people are more prone to having tooth decay and other tooth abnormalities. And in a society wherein the aesthetics of any body part is highly regarded, having an unattractive smile due to poor teeth has caused great loss of self-esteem to hepatitis C patients. They are generally uncomfortable with their appearance and thus they prefer not to interact with other people especially with strangers. The other related emotional impact can just be easily surmised.

The most common oral health complaints of these patients are toothache, chronic pain in the mouth especially with the gums and difficulty relaxing due to the pain.

Hepatitis C patients always have higher risks for poor oral health. They are more likely to develop tooth decay, periodontal diseases, and sensitive teeth, soreness of the mouth and the gums and bleeding. They also will likely suffer from having what is referred to as salivary gland dysfunction which is a reduction in the volume of the saliva. With less saliva, patients can suffer from halitosis or bad breath and frequent dryness of the mouth. An estimated 80% of hepatitis C patients are expected to incur this salivary gland dysfunction.

Interestingly, it has been demonstrated that both HBV and HCV can be transmitted via saliva and gingival cervical fluid. According to this research, there is a major risk of HBV and HCV infection during dental treatment. This correlation has been appreciated in other studies as well; however it is more important in developing countries like Pakistan where incidence of HBV and HCV is higher. This risk can be eliminated by the enforcement of correct precautionary measures [11].

Blood transfusions are one of the major risk factors for HBV and HCV, especially for HCV [17] since it requires a high viral load. According to this study it was the second most common risk factor, right behind dental treatments. This is another risk factor which can be controlled by enforcing the correct precautionary measures.

Reuse of syringes, as mentioned earlier, is major risk factor. In Pakistan a large proportion of the population prefers injections over oral medication [16]. There is a general misconception amongst the uneducated that leads them to believe that getting injected with medication makes them better. This makes it easy for the 'quacks' practicing to administer simple saline. The

injections they use are mostly reused. According to a study conducted previously, most of the syringes used in the healthcare system are simply dumped into general waste, which places a great threat on the people sifting through it [14].

Shaving at the barber's shop happens to be an important risk factor as demonstrated by this study. Unfortunately there is a portion of the barber population not aware about hepatitis being a disease that can be transmitted through reusing unclean razors [16, 13 & 14]. Many of them are not careful about the hygiene practices such as changing their aprons and towels or washing their hands [18].

Vaccinating only high risk individuals in order to protect the entire community has not worked in the past [19]. Therefore greater measures have been taken in order to head towards eradication. The HBV vaccine has been included in the EPI schedule since 2002 and healthcare providers in the public sector are eligible for free vaccination [20]. Even after this incorporation, the burden is extremely high in Pakistan due to a lack of adequate health facilities and awareness about the transmission of HBV and HCV.

Certain measures can be taken in order to improve the situation. Preventive measures should include routine blood screening before transfusions [21], screening of patients before surgery [22], proper sterilization of dental and surgical equipment [23], creating awareness and discouraging people from tattoos and delivering babies in unsterile conditions at home, creating awareness amongst barbers about the prevalence, spread and consequences of HBV and HCV, vaccination against HBV, educating and creating awareness about safe sex, and ensuring the proper disposal of used syringes [24].

In preparing this paper, we noted that available reports are mostly from developing countries, as this risk has been reduced remarkably in developed countries with adequate precautionary measures. The quality of the studies reviewed was not good generally and in a large number of them, statistical data was not available, especially among those which did not find a significant between dental treatment and infection with HBV and HCV. The results in the tables mostly suggest dental treatment as a risk factor. There is therefore a need for more studies on this subject, properly planned, controlled and analyzed. If possible, prospective cohort studies evaluating dental treatment as a risk factor for viral hepatitis transmission are also recommended. Prevention is better than cure. Therefore it is important to dig deeper and conduct more research to get the HBV and HCV prevalence rate along with the emerging risk factors within Pakistan then only one can be eradicated and reduce the burden of these diseases.

CONCLUSION:

Finally with this study it has been concluded that certain measures can be taken in order to improve the situation. Preventive measures should include routine blood screening before transfusions [21], screening of patients before surgery [22], proper sterilization of dental and surgical equipment [23], creating awareness and discouraging people from tattoos and delivering babies in unsterile conditions at home, creating awareness amongst barbers about the prevalence, spread and consequences of HBV and HCV, vaccination against HBV, educating and creating awareness about safe sex, and ensuring the proper disposal of used syringes [24].

LIST OF ABBREVIATION

Hepatitis B virus (HBV)

Hepatitis C virus (HCV)

Hepatocellular carcinoma (HCC)

Dental health-care personnel (DHCP)

DISCLOSURE: No financial assistance was received to support this study.

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