

Epidemiology of hepatitis C virus infection in Pakistan

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Since the discovery of hepatitis C virus (HCV) in 1989 as the causative agent of post-transfusion non-A non-B hepatitis, the epidemiology, pattern of transmission, different genotypes and clinical consequences of the disease have been studied worldwide, but little is known about the epidemiology of HCV infection in Pakistan. This paper reviews the available evidence on the epidemiology of HCV infection in Pakistan obtained via MEDLINE search (1970-2005) of published articles with key words hepatitis C and Pakistan, and other sources including ongoing discussions within the medical community. Approximately 10 million people have been infected with HCV in Pakistan. The majority of patients have acquired their infection through unsafe injections, reuse of syringes and needles and community barber shops used for face and armpit shaving. More than two-thirds of HCV patients were 40 to 50 years old. Although at present a small proportion of those with chronic HCV infection develop liver failure or hepatocellular carcinoma, it is estimated that the incidence of these advanced disease complications will increase over the coming years.

Key words: Epidemiology; Hepacivirus; Hepatitis C; Pakistan; Public health

Introduction

Hepatitis C virus (HCV) is an important causative agent of parenteral non-A non-B hepatitis. Choo and coworkers of Chiron Co-operation Group discovered HCV as a new viral agent of non-A non-B hepatitis virus in 1989 [1]. HCV is an RNA virus belonging to the family *Flaviviridae*, with an approximate diameter of 40-50 nm. The HCV genome is a single-stranded RNA molecule of 9500 kilodaltons [2,3].

HCV is a tremendous health problem not only in Pakistan but also worldwide. The global epidemiology of viral hepatitis A and hepatitis B is well established, although HCV data remain limited, particularly in Pakistan. Despite the employment of modern laboratory apparatus for the screening of blood, blood transfusion remains the main mode of transmission of HCV infection, since unscreened blood and blood products are still used in many developing countries. As a result, HCV is one of the most common blood-borne infections [4].

In the majority of cases, HCV remains undetected, due to its asymptomatic nature. HCV is a major cause of chronic liver disease and hepatocellular carcinoma (HCC) [5]. The World Health Organisation estimates that approximately 3% of the world population have been infected with HCV thus far. There are about 170 million patients with HCV in the world, and three to four million individuals are diagnosed as new cases every year [4,6]. Approximately 2 million cases are in Japan, 2.7 million are in the United States, 5 million are in Europe and approximately 10 million are in Pakistan [7,8]. Approximately a quarter of a million deaths per annum occur due to chronic liver disease associated with HCV [4]. The highest prevalence has been reported from Egypt [9].

Initially, it was believed that blood transfusion and intravenous drug abuse were the most common routes of transmission of HCV. Further epidemiological studies revealed the existence of other possible modes of transmission of the disease. Early attempts to screen the blood supply for hepatitis viruses have markedly reduced the transfusion-related infection rate [10]. The other modes of transmission of HCV include unsafe injections (reuse of glass syringes or needles

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by medically unqualified personnel, vertical transmission, non-sexual contact in households, face or armpit shaving at community barber shops, ear piercing, tattooing and inadequately sterilized surgical or dental instruments [8,11-13].

This article briefly reviews the epidemiology, patterns of transmission and genotype distribution of HCV, community groups with high HCV prevalence, and chronic liver disease associated with HCV infection in Pakistan.

Methods

A variety of sources was used to access data for this review. A *MEDLINE* search (1970-2005) of published articles was performed with key words hepatitis C and Pakistan. Additional searches were undertaken, using key authors involved in HCV-related research in Pakistan and other information from colleagues.

Initial reports of hepatitis C in Pakistan

The first description of HCV in Pakistan was in 1992. In this study, 45 histologically confirmed cases of chronic liver disease were tested for the presence of anti-HCV antibodies. Anti-HCV antibodies were detected in six patients. Of the six, two had chronic hepatitis, three had cirrhosis and one developed HCC [14]. In 1994, a study revealed a low HCV prevalence rate (0.44%) in 236 healthy Pakistani children [15], while another study described a slightly higher prevalence rate (1.18%) in healthy blood donors in Pakistan [16]. Tong et al highlighted the potential long-term consequences of this increasing prevalence of HCV after detecting anti-HCV antibodies in 23 of 105 patients with biopsy-proven chronic liver disease [17].

Patterns of HCV transmission in Pakistan

Unfortunately, HCV infection is not a notifiable disease in Pakistan and there is no national data collection system for evaluation of routine risk factors.

Excessive use of injections and use of unsafe needles

Several published studies suggested that excessive use of unnecessary injections and reuse of unsterilized needles are the leading risk factors for HCV transmission in Pakistan [2,8,18-22]. Health care workers usually practice unsafe injections or reuse of inadequately sterilized syringes and needles. The majority of health care workers are not medically qualified or scientifically trained and are unaware of standard

sterilisation procedures or the importance of safe injection practice. Apart from this, the general population of Pakistan typically prefer to be treated by injection rather than oral medication. Thus, patient demand and financial incentives favour the use of injectable treatment in patient care [18,20,23,24].

Blood transfusion

In Pakistan, blood transfusion is still a major source of HCV transmission. Possible reasons for this include lack of resources, weak infrastructure, ill-equipped resources, poorly trained staff, inadequate policy implementation, frequent power breakdown and ineffective screening of blood donors for anti-HCV antibody [25,26].

Community barber shops

Another significant risk factor of HCV transmission which has previously been reported from different regions of Pakistan is daily face and armpit shaving at community barber shops. The delicate skin of the face and armpit are susceptible to microtrauma, leading to possible exposure to HCV through a contaminated traditional long-handled razor [21,27].

Person-to-person spread

HCV transmission through non-sexual household contact has been described in a study conducted in Karachi; nonetheless it remains controversial [12]. In one study, dried blood spot samples were collected from mothers and their offspring in obstetric and paediatric departments of two hospitals in Lahore, to test for antibodies to HCV. This study reported that the seroprevalence rate of HCV in women of child-bearing age was 6.7%, and was 1.3% in children from anti-HCV positive mothers [28].

Intravenous drug abuse and sexual preference

Homosexuality and intravenous drug abuse are on the rise in Pakistan, although at present these make only a nominal contribution to HCV prevalence infection in this country [29]. However, data are lacking regarding these possible routes of entry, and intravenous drug abuse is the leading risk factor for HCV transmission worldwide.

Other routes of transmission

There are several other established risk factors contributing to the transmission of HCV infection, such as dental and surgical procedures, circumcision, tattooing, ear piercing and dialysis [2,11,30].

Community groups with high HCV prevalence

It is estimated that 10 million people in Pakistan are living with HCV infection [8]. In Pakistan, several population groups have been described as being at increased risk of HCV infection. In several published studies, the proportion of patients with HCV infection who received injections is in the range of 16% to 100% [10,13,18-20]. A recent study revealed high prevalence among people who had been vaccinated against smallpox versus non-vaccinated individuals. The vaccination program ran from the mid-1960s to the early 1980s, and this high seroprevalence generally represents a historical rather than a current risk factor [31]. High prevalence of HCV has been recorded among middle-aged (40-50 years) people [2]. Haemodialysis patients were also noted to be at high risk of HCV infection. High HCV prevalence (23.7% to 68.0%) has been noted in this group of patients, and particularly those on long-term haemodialysis. Haemodialysis patients are exposed to multiple risk factors of HCV transmission, such as multiple transfusions, history of surgeries and multiple injections [32-34]. As already stated, high HCV prevalence has been reported among people who use community barber shops for face or armpit shaving [2].

Blood transfusion prior to HCV screening

Few studies have reported non-A non-B prevalence rate among people with a history of blood transfusion before the advent of blood screening procedures for HCV. A study revealed that 10 out of 48 patients (33 males, 15 females) with chronic liver disease and confirmed anti-HCV antibodies had definitive blood transfusion risk factors. The age of the patients ranged between 40 and 50 years [35]. The risk of HCV transmission through blood transfusion in Pakistan is still unknown but is considered to be high due to a lack of appropriate screening of blood [27]. The government of Pakistan has taken a positive step in this area, by

announcing a national blood policy in 2003 [26]. Proper screening of blood will definitely reduce the risk of HCV transmission. Nevertheless, private blood banks should be brought into the program as well.

HCV genotype distribution

Determination of genotypes provides relevant clinical information and particularly response in interferon treatment. In published reports of distribution of different HCV genotypes within the Pakistani population [8,17,25,36,37]. The most predominant HCV genotype is genotype 3 (75-90%), followed by genotypes 1, 2, and 5 (Table 1).

Hepatocellular carcinoma

The chronic liver disease and HCC associated with HCV clearly seems to be on the rise. It has been established that HCV infections play an etiologic role in HCC. Several researchers have found that HCC in Pakistan occurs preferentially in middle-aged males, there being a long interval between HCV infection and the development of HCC [37-39]. Out of 118 patients with HCC, alpha-fetoprotein values were raised in 63 patients (53.38%), 106 patients (89.83%) were found to have or have had HBV infection, and 92 patients (77.96%) were anti-HCV positive; eighty three patients (70.33%) were cirrhotic. [38]. Data are lacking regarding causation, clinical course and mortality of HCC in Pakistan.

Conclusions

It is estimated that approximately ten million people in Pakistan (6% of the population) have been living with HCV infection. The prevalence rate is high among middle-aged persons and patients receiving haemodialysis or who received blood transfusion before the advent of HCV diagnostic tools. The HCV epidemic in Pakistan continues due to lack of education and awareness of the disease, shortage of medically qualified and

Table 1. Studies of the distribution of hepatitis C virus (HCV) genotypes in Pakistan

Reference	Year of publication	Province	No. of patients	Population groups	HCV genotype (%)				
					1	2	3	5	Others
Tong et al [17]	1996	Punjab	105	Patients with CLD, HCC	-	-	3	-	-
Shah et al [35]	1997	Sindh/Karachi	74	Chronic hepatitis	9	2	87	2	-
Moatter et al [36]	2002	Different areas of Pakistan	245	Patients with HCV	14		68		18
Akhtar and Moatter [25]	2004	Sindh/Karachi	341	Households of thalassaemic children	-	-	100	-	-

Abbreviations: CLD = chronic liver disease; HCC = hepatocellular carcinoma

scientifically trained health care workers and lack of health infrastructure. This spread of HCV is fuelled by the high numbers of therapeutic injections used and the practice of daily face and armpit shaving in community barber shops. The increasing HCV epidemic is likely to progress to a considerable increase in disease burden over the coming years. A multidisciplinary approach will be needed to adopt suitable technical methods, increase awareness in both lay and medical communities, and produce more effective identification and treatment of HCV patients. The medical community needs to continue research aimed at improving understanding of predisposing factors, the clinical course of the disease, and the best strategies for management, so that in future outbreaks, novel therapy can be targeted to high-risk populations.

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