Original Article

Frequency of Hepatitis B and C in rural and periurban Sindh

Sina Aziz, Rafiq Khanani, Wajeeha Noorulain, Jamila Rajper
Medical Unit 4, Civil Hospital Karachi, Dow University of Health Sciences, Karachi, Pakistan.

Abstract

Objectives: To determine the frequency of HBV and HCV and identify risk factors for transmission of these viruses in rural and periurban Sindh.

Method: This is a descriptive/cross sectional study done between June 2007 to May 2008, in which screening and evaluation of risk factors for Hepatitis B virus surface antigen (HBsAg) and HCV Antibody (Anti-HCV) in two remote villages namely Taluka Tharo Shah and Jalbani, District Nausheroferoz (where investigators had to walk in the area to reach the population) and a subsection of Gharo District Thatta (peri-urban area) was done. Included were children of more than one year of age and all previously unscreened adults who were counseled and a written consent was obtained. All drug addicts by history were excluded. A structured information sheet regarding risk factors was filled and screening done by immunochromatography (ICT) kits.

Results: Of the 573 subjects enrolled who met the inclusion criteria, females were 52.5%. Mean age (years) of participants was 24.74±14.41. In two remote villages 7.0% were HBsAg positive and 28.6% were Anti HCV reactive, whereas in periurban area 3.1% were HBsAg reactive and 3.9% were Anti HCV positive. In the analysis of risk factors for transmission of infection, blood related factors especially for HCV like surgical, dental procedures and body piercing were main factors noted more in rural as compared to the periurban area.

Conclusion: The frequency of HCV in our study is alarming and that of HBV also quite high which underline the need of mass HBV vaccination. Overall (in both urban and rural areas) immediate steps must be taken to reduce transmission of these viruses by limiting use of unsafe (unsterilized/reused) injections for therapeutic purposes), razor blades, body piercing equipment and proper sterilization of surgical, dental and circumcision equipment (JPMA 60:853; 2010).

Introduction

Hepatitis B and C virus infections are major public health problems and are leading causes of Chronic Liver Disease (CLD).[1] Based on a current global estimation of 2006, as many as 175 million persons are infected with HCV alone[2] whereas HBV is responsible for 500,000 to 1,000,000 deaths annually worldwide from cirrhosis and Hepatocellular carcinoma (HCC).[3] In United States the Centre for Disease Control and Prevention estimates that there are more than 2.7 million people with ongoing HCV infection and accounts for 40% of all CLD cases,[2] and is the most frequent indication for liver transplantation.[4] HBV is frequent in Asia in both adults and children.[5,6] Pakistan is in the intermediate HBV prevalence zone with a carrier rate of 3-4% where both HBV and HCV are emerging as a major health problem.[7] Studies conducted in cases of Chronic hepatitis, cirrhosis and Hepatocellular carcinoma have shown a paradigm shift in HCC from hepatitis B to HCV infection and studies from different regions of Pakistan showed 50-80% anti HCV and 20-30% HbsAg positivity in HCC patients.[8] Horizontal transmission, particularly in early childhood accounts for most cases of chronic HBV infection in intermediate prevalence countries like Pakistan. Such viral diseases may also increase the burden on government expenditures related to health as a substantial amount is required to curtail morbidity and mortality related to it. In our Out patient department where the cohort of patients comprises of all ethnic and age groups coming from various parts of Pakistan we have noticed that since the last two years number of patients with HBV and HCV infections are increasing , also we observed an upsurge of Hepatitis D Virus not previously documented.[9] We also observed that certain districts were contributing maximum number of cases. To confirm our observation we identified two remote villages of District Nausheroferoz in Deh Palara, Taluka Tharo Shah, namely Mewa Khan and Jalbani village and a peri-urban area of Gharo District Thatta. We also wanted to confirm our observations regarding practices being followed in these areas which may cause an increase in transmission of these viral hepatitis. Karachi/ Hyderabad were excluded as the population here is more aware of the risk factors and have better access to medical facilities plus Karachi is a metropolitan city whereas we wanted to have Sindhi population as our cohort of patients to minimize bias regarding certain practices generally observed depending on ethnic variation. Our team visited the areas for counseling, testing, and referral for treatment with the objective to determine the frequency of HBV and HCV and identify risk factors for transmission of these viruses in rural and periurban Sindh.

Methods

A descriptive/cross sectional study in which the population of two villages of Taluka Tharu Shah Deh Palara District Nausheroferoz namely Mewa Khan and Jalbani village (remote rural areas) with an estimated population of 1500 in each village (including children and newborns, the villages were located deep in the district and the investigators had to walk a certain distance to reach within the population) and a sub-section of Gharo District Thatta was screened for viral hepatitis B and C. Screening camps were arranged with the help of local social workers and general public was informed about the venue and timings of the camp. It was tried that every person from each household was encouraged to attend the camp. All apparently healthy, asymptomatic individual adults and children above one year of age not previously screened or vaccinated were included. Individuals previously tested and confirmed of disease, on treatment patients for HBV/HCV, previously vaccinated persons, children less than one year of age and all drug addicts by history were excluded. About 500 were less than 1 year of age and 500 were unable to attend either due to old age, were not interested or already had immunization. A total number of 573 subjects were included in this study. A team of doctors, laboratory technicians and volunteers visited the area. All subjects were counseled and informed consent was obtained. A structured information sheet was used to collect demographic and personal details and possible risk factors for transmission of these viral hepatitis. Screening was done with The Advanced Quality™ Rapid Immunochromatographic Anti-HCV and HBsAg Tests Kits (Intec® production. Inc (Xiamen) China)[10] with sensitivity and specificity of 99.8% with 95% CI, done according to the manufacturer's instructions.) Briefly, for Anti-HCV 10μL of whole blood was added to the S well of the test card followed by addition of 2 drops of sample diluent into D well. After 15 minutes results were interpreted. For HBsAg 100μL of whole blood was added into the S well and results were read after 15 minutes. Test was considered positive if two coloured bands appeared in reading window opposite the place marked as C (control) and T (test) on the test card, negative if one colored band appeared against C mark and invalid if no coloured band appeared. Invalid tests were repeated.Random samples of those found positive were collected and reconfirmed with fourth generation ELISA Those found HBV or HCV positive were referred for management to a tertiary care hospital.

Statistical Analysis: Variables were defined qualitatively and quantitatively and frequency, percentage, proportion and ratios applied. SPSS version 15 was used for this analysis.

Ethical Considerations: The Project was approved by the ethical review board of the University. A written consent for screening and immunization from each adult individual and in case of children from their guardian was obtained.

Results

This study was conducted in two remote villages namely Jalbani and Chandio, Taluka Tharo Shah Deh Palara of District Nausheroferoz and a periurban area Gharo, District

Table-1: HBsAg and HCV prevalence in Gharo and Nausheroferoz districts.

	†Peri-Urban (Gharo) n=129		Rural (Nausheroferoz) n=444		p-value
	Reactive n (%)	Non-Reactive n (%)	Reactive n (%)	Non-Reactive n (%)	
HBs Ag	4 (3.1)	125(96.9)	31 (7.0)	413 (93.0)	0.001
	Urban n=129		Rural n=388††		
Anti HCV	5 (3.9)	124 (94.6)	111 (28.6)	277 (71.4)	<0.001

p value is significant when < 0.05
† population of peri urban Gharo was less so the discrepancy in sample size.
†† 388 out of 444 total subjects, remaining patients lost to follow up for anti HCV testing.

Table-2: Overall comparison of HBsAg and Anti HCV among pediatric and adult age group (rural and peri-urban).

Age Group (N)	HBsAg Positive n (%)	HBsAg Negative n (%)	p value	Anti HCV Positive n (%)	Anti HCV Negative n (%)	p value
< 5 (23)	0	23 (100)	---	0	23 (100)	---
5-10 (43)	1 (2.3)	42 (97.7)	0.999	6 (13.9)	37 (86.0)	0.084
10-15 (98)	6 (6.1)	92 (93.9)	0.594	9 (9.1)	89 (90.8)	0.205
>15 (303)	22 (7.3)	281 (92.7)	0.384	76 (25.0)	227 (74.9)	0.003

N= Total number of subject in each group
p-values are calculated by applying Fisher's Exact test.
Comparison is between different age groups (<5, 5-10, 10-15, >15) and p value obtained. p value < 0.05 indicate frequency of HBV and HCV is higher than <5 years.

Table-3: Comparison of risk factors between HBV and HCV (reactive and nonreactive) individuals among rural and peri-urban population of Sindh.

Risk factors	Urban n=129						Rural n=444					
History of	HBsAg +ve n	HBsAg -ve n	p value	Anti HCV +ve n	Anti HCV -ve n	pvalue	HBsAg +ve n	HBsAg –ve n	p value	Anti HCV +ve n	Anti HCV -ve n	pvalue
Immunization	3(0)	112(3)	0.92	3(0)	112(3)	0.92	24(0)	208(6)	0.51	47(0) 0	185(6)	0.25
Jaundice*	3(0)	112(16)	0.63	3(0)	112((16)	0.63	24(12)	206(53)	0.01	46(21)	184(44)	0.00
Unsafe injection	3(3)	116(114)	0.95	3(3)	116(114)	0.95	24(24)	210(208)	0.80	48(48)	186(184)	0.63
Surgery*	3(1)	112(13) 112(13)	0.32	3(0)	112(14)	0.67	24(2)	207(12) 207(4)	0.43	47(6)	184(8)	0.04
Blood Transfusion*	3(0)		0.69	3(0)	112(13)	0.69	24(3)		0.02	47(2)	184(5)	0.43
Circumcision	2	62		2	62		16	110		43	83	
◆ Barbers	1	33		0	34		16	106		41	81	
◆ Doctors	1	21	0.81	2	20	0.13	0	4	0.57	2	2	0.92
Tattooing	3(0)	112(4)	0.89	3(1)	112(3)	0.10	24(0)	207(1)	0.89	47(0)	184(1)	0.79
Ear piercing*	3(1)	112(43)	0.67	3(1)	112(43)	0.67	24(8)	206(95)	0.16	47(4)	183(99)	0.00
Dental surgery*	3(0)	112(10)	0.75	3(0)	112(10)	0.75	24(5)	207(57)	0.33	47(22)	184(40)	0.001

N= Total number of individuals; n= Subjects with a positive history.
P values were obtained by applying chi square test and are significant where <0.05.
*Significant Risk Factors have been highlighted with p<0.05 between rural and peri-urban population for HBV and rural and periurban population for.

Thatta. Out of 580 participants who attended the camp 573 met the inclusion criteria including 129 from Gharo and 444 from two villages of Nausheroferoz. Majority of these subjects were screened for Anti-HCV and HBsAg by ICT (Table-1). Some of the individuals who visited the camp were already screened for HCV previously and had the reports with them; hence these were only tested for HBV. Females were 301 (52.5%) and 273 (47.0%) were less than fifteen years of age among which majority of the individuals were greater than 10 years of age (Table-2). When overall data (rural and peri-urban) was looked at previous immunization was done in only 9 individuals (1.57%) ,history of jaundice was present in 82 (14.3%) [where urban:rural comparison showed p<0.00], risk factors such as dental procedures was reported by 74 (12.9%) [urban:rural comparison p<0.00] ear piercing, tattooing or any other form of body pricking in 153 (26.7%), surgical procedures in 29 (5.0%), blood transfusion in 20 (3.4% . Only in 28 (14.8%) individuals was circumcision done by doctors remaining was done by barbers with unsterilized instruments. History of unsafe injections (unsterilized/ reused) for therapeutic purposes was obtained in which 355/359 (98.9%) had a positive history of injection for minor ailments.

Table-3 shows a comparative analysis between urban and rural population among different risk factors for HBV and

HCV. History of dental surgery ($p<0.001$); ear piercing ($p<0.000$) and previous jaundice ($p<0.000$) were statistically significant risk factors seen in HCV subjects, whereas no risk factors were statistically significant between urban and rural population in HBV individuals. When risk factors among paediatric and adult age group in our data was compared it was noted that surgical and dental procedures and blood transfusion were minimal under fifteen years of age whereas the number increased with increasing age and was statistically significant for surgical, dental procedures and blood transfusion, supporting further the route of transmission to be horizontal rather than vertical in our population.

Discussion

As the hospital is located in the provincial capital of Sindh, the patients here come from various geographical locations within Pakistan, especially from Khyber Pakhtoonkhwa followed by Sindh and Punjab. Since the last four years we have noted an increasing influx of HBV and HCV patients from certain parts of rural (Northern) Sindh and lower Punjab. To determine the causes of viral hepatitis among these patients we decided to conduct this study One was District Nausheroferoz, approximately 500 km from Karachi and a population of 1087571, two villages of which with a population of approximately 3000 each (1998 census government of Pakistan) and the other, a sub-urban area of district Thatta Gharo, located 150 km from provincial capital Karachi.

The study was conducted from June 2007 to May 2008. A total of 580 individuals were interviewed and 573, who met the inclusion criteria, were screened for HBV and HCV. Forty percent (n=230) were above fifteen years of age. Several studies document the importance of screening, especially high- risk population firstly to minimize financial burden[9,11] and secondly to recommend guidelines for treatment and prevention of transmission especially in HBV infected persons.[9] The American Gastroenterological Association advocates strongly that member of high-risk groups, even, who are asymptomatic, should be screened for evidence of HCV infection.[2,12] With the high costs associated with the disease it is absolutely necessary to prevent Hepatitis B by promoting HBV vaccination programmes. Any effective treatment that stops disease progression or even better reverses the disease will be economically beneficial.[12,13] Earlier studies, have reported increasing rates of hepatitis infection in Pakistan, particularly in rural areas.[14] According to a recently published Pakistan Medical and Research Council (PMRC) countrywide survey from July 2007 to June 2008 to get the actual prevalence of HBV and HCV, it states that presently the reported prevalence is based mostly on hospital or clinic based studies, which has shown varying prevalence from province to province with highest figures presumed to be from Balochistan and Sindh. According to this PMRC survey HBsAg was positive in 2.5% and anti HCV in 4.9% nationwide. Hence, overall positivity for both HBsAg and HCV is 7.4%. This data indicate that almost 12 million people are positive for these viruses[15] This PMRC survey done was based on household surveys according to randomization and showed the prevalence rate for HBsAg in District Nausheroferoz as 4.0% and 3.1% for Anti HCV. Our study was done in two small villages of that district and showed an alarming 7.0% HBsAg positivity and 28.6% Anti HCV positive cases. This was also our observation at our out patient department that certain areas have a large number of patients positive for HBV, HCV or both. There is a possibility of missing such areas in large nation wide household surveys, which is a drawback of such surveys, but the population is there practicing the same methods and continue transferring infection to others due to lack of awareness and medical facilities. Though a major drawback or limitation of our study is a smaller sample size and walk in camps, as the persons visiting these camps are mostly those who are already diagnosed or at high risk, we tried to minimize this by coordinating with the local social workers who in turn tried to bring persons from every household. An overall positivity of 26.6% Anti HCV reactive in our cohort of individuals studied is alarming and is indicative of rapid increase in frequency as earlier studies in Faisalabad and certain parts of Punjab reported 16% and 14.63% respectively.[16]

The overall analysis of risk factors of our data among rural and peri-urban population showed unsafe injections usage for therapeutic purposes in 98.9%. Various local studies have also reported unsafe injection use as route of HCV transmission in 20-100%.[17,18] The unsafe injection (unsterilized/ reused) usage in our subjects were mainly for therapeutic reasons such as fever, diarrhoea, and generalized body pain. Hence Injection use is becoming a taboo in our society with the rise in number of people using unsafe injections (unsterilized/ reused) increasingly over the past two decades. These patients actually do not require injections for treatment of vague symptoms as mentioned. History of major and minor surgical procedures is 8.2%, previous immunization was present in only 1.5% (n=9). History of Jaundice was found in 23.4% (n=82), blood transfusion history was found in 5.7% (n=20). A similar study done on blood donors samples showed the overall sero-prevalence of HBV infection among donors to be 6.2%.[13] Body piercing (including ear and nose piercing) and tattooing was present in 43.58% (n= 153), circumcision done was mainly by barbers using improperly sterilized instruments. Barbers Shaving, ear and nose piercing, tattooing and non-sterile surgical and dental practices are important risk factors for transmission of infection. A study by Janjua et al showed incidence of 46% of used razors in infected persons.[19] An interesting observation was that very few patients under 10 years of age were positive for HBV or HCV (Table-2) which in this cohort of patients rule out the possibility of vertical transmission as a possible risk factor for viral hepatitis, which is also in support of some previous data which

document the route of transmission in children to be horizontal rather than vertical.[5] When we compared the risk factors among HBsAg positive and negative and Anti HCV positive and negative individuals history of jaundice, unsafe injection[18] use and circumcision were seen to be significant among others. However, comparison between urban and rural areas for HBV and HCV has not been previously done. This comparison showed risk factors to be more in rural as compared to peri urban and more than one risk factor was present in every individual as also documented by other studies.[20]

Limitations of this study are the small sample size. Though, we could not confirm that there is an upsurge, as baseline data was not available from these areas. However, frequency of HBV and HCV was higher when compared to already published data, from other rural areas of Pakistan. . Efforts to limit unnecessary use of injections and reuse of needles by patients, doctors and paramedics, body piercing equipment, proper sterilization of surgical, dental and circumcision equipment and screening of blood before transfusion are required immediately to prevent further spread. Up scaling of mass vaccination for Hepatitis B prevention is recommended especially in rural and sub urban districts of Pakistan.

Conclusion

This limited study done in three areas (rural and peri-urban) of Sindh province, shows significant prevalence of HCV and HBV more in rural areas with multifactorial etiology such as unsafe injections, (especially for therapeutic purposes), surgical and dental procedures.

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