Prevalence and Factors Associated with HCV (Hepatitis C Virus) Seropositivity in Islamabad, Pakistan

Hammad Ali Qazi[1*], Khalid Saleem[2], Iqbal Mujtaba[1], Anjum Hashmi[3], and Jamil Ahmed Soomro[1]

[1] College of Physicians and Surgeons Pakistan, Karachi, Pakistan
[2] PINSTECH Complex Hospital, Pakistan
[3] Private Public Health Consultant, Pakistan

Abstract- An estimated 150-200 million people worldwide are infected with hepatitis C. Prevalence is higher in some countries in Asia and Africa. Only limited information about the epidemiology of Hepatitis C Virus (HCV) infection especially in females is available. The aim of this study is to determine the prevalence of anti-HCV antibodies and the possible factors for transmission in the female population of a largely urban city Islamabad. A cross sectional study was conducted from May 2006 to August 2006 in Islamabad. We select 252 female households (n=252) following the selection criteria. The primary outcome variables were HCV seropositivity and factors like history of major surgical procedure, blood transfusion, Intravenous drug use etc. The results showed mean age of the sample was 33.21 (±9.95) years and HCV seropositivity was present in 62 (24.6%) females. Final Forward Stepwise multiple logistic regression showed blood transfusion [OR, 10.094 95% CI 1.950-52.257], dental procedure [OR, 5.381 95% CI 2.315-12.507] and dilation and curettage [OR, 3.869 95% 1.867-8.015] were significantly associated with HCV seropositivity in females. The study highlights poor quality of care provided and a massive need to educate general population including patients as well as health professionals and allied health workers.

Introduction

Hepatitis C is a blood-borne infectious disease that is caused by the hepatitis C virus (HCV), affecting the liver. An estimated 150-200 million people worldwide are infected with hepatitis C. Prevalence is higher in some countries in Asia and Africa. Egypt has the highest seroprevalence for HCV, up to 20% in some areas (1). Hepatitis C infects nearly 200 million people worldwide and 4 million in the United States. The factors associated with HCV are intravenous drug use ($P < 0.001$), blood transfusion ($P < 0.01$), tattoos ($P < 0.001$), previous hospitalization ($P < 0.05$), history of sexually transmitted disease (STD) ($P < 0.001$) and lack of travels outside of Europe ($P < 0.05$) (2).

Only limited information about the epidemiology of HCV infection especially in females is available in high prevalence areas like Pakistan. Previous study has suggested a- prevalence of 9% HCV seropositivity among a sample of patients in Mardan, Pakistan (3).

Although HCV infection has been identified as one of the major causes of chronic hepatitis, CLD and hepatocellular carcinoma its prevalence in the female population and associated factors like minor surgical procedures, biopsy, endoscopy and dilation and curettage (D&C) are largely unknown. The aim of this study was to determine the prevalence of anti-HCV antibodies and the possible risk factors for transmission in the female population of a largely urban based city Islamabad.

Patients and Methods

The study was conducted in Islamabad, capital of Pakistan having a population of around 0.9 million (1997) with population growth rate of 2.6% (1997). Female to male ratio is 94 females per 100 males, meaning our study population was 0.85 million (1997). Currently the approximate population is well above 1.5 million.

***Corresponding author:** Hammad Ali Qazi
RTMC, CPSP, Karachi, Pakistan.
Tel: +92 216952447, E-mail: hammadali400@hotmail.com

The study was carried out from May 2006-August 2006 in Islamabad, Pakistan. All female inhabitants of age range between15-50 years living in the study site were eligible to participate in the study. A cross-sectional study design was used to achieve the primary objective. To determine the prevalence of HCV seropositivity and evaluate potential risk factors by comparing HCV seropositive and seronegative female individuals. Our sample size of the study was (n=252).

Two co-researchers also medical reactionaries registered with Pakistan Medical and Dental Council (PMDC) went to the selected houses and approached the female head in the family. They explained the purpose and objectives of the study and asked for written informed consent from participants before administering the questionnaire and collecting a blood sample. The self administered questionnaires were available in both Urdu and English versions. The questions gathered demographic characteristics including age, socio-economic status (classified into high class, upper middle class, lower middle class and poor) based on monthly incomes, marital status and also the following information: number of years in education (classified into primary educated, secondary educated, and graduate), history of surgical procedure, transfusion with blood or blood products, history or current use of IVDU (Intravenous drug use), history of tattooing or scarification, history of dental treatment, ear piercing, minor surgical procedures like biopsy and D& C(Dilation and Curettage), C-section (Cesarean section), abroad visits and working as a health worker (It includes doctors, and all laboratory, paramedical staffs, nurses etc).

Five ml of blood was collected from each case and was sent to the designed laboratory. Sera were separated by centrifugation and were tested for anti HCV antibodies within one hour. The anti HCV antibodies were tested by the Dot immuno chromatographic method. Results were analyzed for finding the prevalence of Hepatitis C in the target population.

The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 13. Descriptive statistics of socio-demographic and other variables of the sampled population were computed. Means and standard deviations (SD) were calculated for quantitative variables and proportions for categorical variables. Logistic regression analysis was performed to measure the association between dependent and independent variables. Odds ratios (OR) and 95% confidence intervals (CI) were calculated from β coefficients and their standard errors. Associations between independent variables were assessed using chi square and only those with significant association were entered to perform multivariate analysis. A multivariate logistic regression model was employed with HCV antibody status as the dependent variable. P values < 0.05 were considered to be statistically significant.

Results

The Descriptive analysis showed that the mean age of the sample was 33.21 (±9.95) years with minimum and maximum values of 15 years and 50 years respectively. HCV seropositivity was 62 (24.6%). About 148 (58.73%) were poor, 80 (31.7%) middle class and 24 (9.52%) upper class (Table 1). The frequency of factors associated with HCV seropositivity were blood transfusion 12 (4.8%), sexual 2 (0.8%), surgery 88(34.9%), IVDU 208 (82.5%), health worker 4 (1.6%), tattooing 6 (2.4%), dental procedures 154 (61.1%), endoscopy 14 (5.6%), biopsy 4 (1.6%), dilation and curettage 134 (53.2%) and cesarean section 36 (14.3%).

Table 1. Demographic and Descriptive Analysis of sample

Demographic characters	N (%)
Age groups (15-20 years)	18 (7.1%)
(21-25 years)	40 (15.9%)
(26-30 years)	58 (23%)
(31-35 years)	42 (16.7%)
(36-40 years)	36 (14.3%)
(41-45 years)	24 (9.5%)
(46-50 years)	34 (13.5%)
Socio economic (Poor)	148 (58.73%)
(Middle Class)	80 (31.7%)
(Upper Class)	24 (9.52%)

Table 2. Factors associated with seropositivity of Hepatitis C in females

Risk Factors	Anti Hepatitis Positive n (%)	C Antibody Negative n (%)	*P* value
Blood Transfusion	12 (4.8%)	240 (95.2%)	<0.001
Sexual	2 (0.8%)	250 (99.2%)	0.013
Surgery	88 (34.9%)	164 (65.1%)	<0.001
Dental Proceedure	154 (61.1%)	98 (38.9%)	<0.001
Health Worker	4 (1.6%)	248 (98.4%)	<0.001
Endoscopy	14 (5.6%)	238 (94.4%)	<0.001
Biopsy	4 (1.6%)	248 (98.4%)	<0.001
Dilation and Curettage	134 (53.2%)	118 (46.8%)	<0.001
C- section	36 (14.3%)	216 (85.7%)	0.003

The univariate analysis showed that blood transfusion, sexual contact, surgery, health worker, dental procedure, endoscopy, biopsy, dilation and curettage, cesarean section, were significantly associated with HCV seropositivity (Table 2). Final Forward Stepwise (Wald) multiple logistic regression showed blood transfusion [OR, 10.094 95% CI 1.950-52.257], dental procedure [OR, 5.381 95% CI 2.315-12.507] and dilation and curettage [OR, 3.869 95% 1.867-8.015] were significantly associated with HCV seropositivity in females (Table 3).

Discussion

We observed a significantly high prevalence 24.6% of HCV in Islamabad as compared o previous studies. Egypt has a high prevalence up to 20% in some areas. A survey conducted in California showed prevalence of up to 34% among prison inmates (4). A case control study by Irfan in Mardan, Pakistan in 2004, showed much lower prevalence of 4.34% (5). A study conducted in 2002 in Sindh, Pakistan also showed low HCV prevalence 9% (6). Even a hospital based study conducted in community clinic of Islamabad in 2004 only 5.31% individuals were positive for anti-HCV (7).

Studies by Khan in 2004 and Muhammad 2004 conducted in Pakistan has showed history of reused syringes, blood transfusion, dental procedure and surgical operation and tattooing were significant risk (3,8). Similarly study by Batash also showed intramuscular injections (odds ratio 9.1, 95% CI 2.0-42.4) and blood transfusions (odds ratio 3.2, 95% CI 1.2-9.0) were significantly associated with HCV seropositivity (9). Our results again reiterate their findings as blood transfusion [OR, 10.094 95% CI 1.950-52.257] and dental procedure [OR, 5.381 95% CI 2.315-12.507] to be significantly associated with HCV.

Table 3. Factors associated with seropositivity of Hepatitis C in females identified in multiple logistic regression

Risk Factors	AOR	95% CI	*P* value
Blood Transfusion	10.094	1.950-52.257	0.006
Dental Proceedure	5.381	2.315-12.507	<0.001
Dilation and Curettage	3.869	1.867-8.015	<0.001

Studies by Cacoub found, transfusion of blood products (21.7 vs. 5.5%; P < 0.0001), and dental treatment (55% vs 8.3%; *P* < 0.0001) and Nafeh showed previous blood transfusion (10.5; 4.7-23.2) and sexual contact with an intravenous drug user (6.9; 3.1-15.2) (10,11) as factors associated with HCV. Delage in 1999 also showed intravenous drug use (IVDU) (*P* < 0.001) and blood transfusion (*P* < 0.01), to be statistically significant factors, similar to our study (12).

However, this was interesting to note that in our study many factors like history of used syringes, intra venous drug used, major surgery, sexual contact, tattooing, cesarean section and travel abroad, were not significant in final multiple logistic regression. While factors like travel abroad and tattooing were even not significant at univariate analysis. The possible justification was female sample population selected. As tattooing and traveling to abroad is not common in females of our society.

It was also interesting to find significant associations of factors such as female health worker, biopsy and endoscopy with HCV seropositivity. This highlights poor quality of care provided to the patients with use of unsterilized instruments in tertiary care government facilities. Even our female health workers and other health care providers are not using safe practices. The most important finding of our study was to find dilation and curettage to be statistically significant even in multiple regression models along with blood transfusion and dental procedures. Although, again it was due to our female sample population. But these three factors highlight inadequate and inefficient quality of care in our region.

There are few limitations of the study. First participants who refused to participate in the study may limit the genera liability of the sample. Second it may be difficult to self-report the inherent behaviours like injecting drug use etc. Proper counseling including explaining the purpose and objectives of the study especially by trained medical reactionaries was used to minimize the above limitations. Our findings are limited by the lack of information regarding active HCV infection, as the presence of HCV antibodies only indicates prior exposure. However, since most patients exposed to hepatitis C develop chronic infection (13,14). HCV antibody testing provides a reasonable estimate of the amount of HCV infection in a population. Finally the selection of cross sectional study was unable to determine the biologic plausibility between HCV and identified factors.

Acknowledgement

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