RISK FACTORS FOR HEPATITIS C AMONG WOMEN OF REPRODUCTIVE AGE: A CASE CONTROL STUDY IN QUETTA, PAKISTAN

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ABSTRACT: A case control study was conducted to investigate risk factors for hepatitis C infection among females of reproductive age in Quetta, Pakistan. A total of 316 cases and controls were recruited with equal numbers of cases and controls (108). Cases were enzyme-linked immunosorbent assay-positive (ELISA-positive) for antibodies to HCV, and controls were anti-HCV ELISA negative women. There was no age difference among cases and controls. Among cases the History of injection last month (OR 1.44, 95%CI 1.02 to 2.04, p=0.039), History of injection last year (OR 2.71, 95%CI 1.95 to 3.76, p<0.001), History of injection last five year (OR 1.92, 95%CI 1.51 to 2.44, p<0.001), Lived with Jaundice patient in household (OR 3.34, 95%CI 2.03 to 5.47, p<0.001) were positively associated with HCV and history of previous surgeries (OR 0.70, 95%CI 0.43 to 1.16, p=0.167) was associated negatively associated and its negative association is unusual among female in reproductive age.

Keyword: risk factors, hepatitis C virus, reproductive age women

INTRODUCTION: Hepatitis C virus (HCV) is one of the major etiological agents of parenterally acquired hepatitis. The worldwide literature on HCV prevalence has increased considerably over the past decade[1]. It is estimated that approximately 130-170 million people worldwide are infected with hepatitis C virus (HCV). According to data from WHO community and blood donor surveys, the African and Eastern Mediterranean countries report the highest prevalence rates (> 10%). The rates of infection in the general population and the incidence of newly-acquired cases indicate an appreciable change in the epidemiology of the infection in recent years[2].

Regarding community Prevalence in Pakistan only few population based studies are available, the most comprehensive sample size from a population of 150,000 in Hafizabad and found an overall sero-prevalence of 6%. This increased to 30% with increasing age. The same group also found a 16% sero-prevalence rate in household members of HCV infected cases. Other smaller studies have reported a population prevalence of 16% from Lahore and 23.8% from Gujranwala. Based on an average prevalence rate of 6%, it could be estimated that approximately 10 million people are infected with HCV in Pakistan. The sero-prevalence of HCV in children appears to be low in Pakistan, with 0.2% and 0.4% children infected under the age of 12 and between 12-19 years respectively[3].

Women use more health care than men due to antenatal care and child birth, which may result in surgical procedures, hospitalization, blood transfusion or unsafe medical injections that expose women to iatrogenic exposure to HCV[4].

Women are expected to be the major victims of infection HCV because of greater exposure to syringes, blood and blood products, especially during pregnancy, delivery, ear and nose piercing and especially in the province of Balochistan where females have low literacy rate and less awareness as compare to other provinces of Pakistan. Investigation of risk factors for HCV among women in a high prevalence country will help in promoting their health by identifying and hopefully preventing these risks.

The aim of the study was to investigate the risk factors associated with HCV infection among females in reproductive age in Quetta, to help in promoting their health by good planning after identifying the risks.

MATERIALS AND METHODS : The study was conducted among females 18 to 40 years of age in Quetta, the capital of Balochistan province Pakistan. Subjects were enrolled from

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Bolan medical complex hospital (BMCH) and Sandeman provincial hospital (SPH), both of these are only leading government hospitals of the province and they serve both urban and rural population of the province. A total of 316 Subjects were selected from the laboratories referred by the different departments for the screening of HCV. Cases were HCV positive and controls were HCV negative by ELISA. A case or control was excluded from the study that was positive hepatitis B surface antigen because risk factors are overlapping for hepatitis B and C.

Using a pre-tested questionnaire data were collected from 1st December to 28th February 2009.

Data was entered and analyzed. Descriptive statistics were for categorical variables for cases and controls by computing their frequencies for the two groups and to asses bivariate associations between HCV seropositivity and potential risk factors, odds ratios (ORs) and their 95% confidence intervals (CIs) were computed by logistic regression. The study protocol was approved by the ethical review committee, Chulalongkorn University Bangkok, Thailand.

RESULTS : Results are summarized in table 1. Three hundred and sixteen cases and controls participated in the study. Majority of the study subjects 60.0% were from BMCH and about 40.0% of the subjects were from SPH. About 45.6% cases were from rural areas and 37.9% of the controls were from rural areas (OR=1.37, CI=0.87 to 2.14). Age not differ significantly among cases and controls. A total of 51.5% of cases and 48.5% of controls never went to school. Approximately half of the study subjects had family income between PKR 5000 to 10000 (63 to 126 US$).

History of injection was asked for last month, last year and last 5 years. For last month 25.9% among cases and 23.4% among controls had up to three injections, and 12% of the case and only 5.7% of controls had more than 3 injections. In the last year 40.5% of the cases and 36.7% of the controls had 2 to 5 injections, 33.5% of the cases and 8.9% of the controls had more then 6 injections. In last five years 30.4% cases had 5-10 injections and 19.0% had more than 20 injections, while 51.9% controls had less than five injections only 5.7% of the controls had more than 20 injections.

History of surgery was negatively associated with HCV infection.

Regarding living with jaundice patient in household 46.8% of the cases and 20.09% of the controls were living or ever lived. The mean number of pregnancies was 4.94 (±3.57) in cases and 4.6 (±3.86) in controls. Increased number of children were seen in case than controls, 4 (±3) and 3 (±3.24). As we know there are 2 modes of the deliveries, 81.6% of the cases and 84.2 % of the controls had normal vaginal deliveries, while 12% of the cases and 12.7% of the controls had caesarian section. Almost same number of cases and controls had abortion. Only a small number of subjects 15.8% among cases and 17.1% of the controls had dilation and curettage ever in their life.

Table 1 Characteristics of hepatitis C patients and controls, with odds ratios, 95% confidence intervals, and p-values for patients in relation to controls

Characteristics	Number (percentage)		Odds ratio	95% CI	P value
	Case	Control			
Age (year)			1.01	0.98 to 1.05	0.384
Range	18-40	18 - 40			
Mean ± SD	32.37±6.68	31.71±6.89			
Hospital			1.00	0.64 to 1.57	1.000
Bolan medical complex	96 (50.0)	96 (50.0)			
Sandmen provincial	62 (50.0)	62 (50.0)			

Table 1 Characteristics of hepatitis C patients and controls, with odds ratios, 95% confidence intervals, and p-values for patients in relation to controls (cont.)

Characteristics	Number (percentage)		Odds ratio	95% CI	P value
	Case	Control			
Living place					
Urban*	86(54.4)	98(62.1)	1	---	---
Rural	72(45.6)	60(37.9)	1.37	0.87 to 2.14	0.172
Education			0.86	0.62 to 1.19	0.358
No schooling	118(51.5)	111(48.5)			
Primary to secondary	25(47.2)	28(52.8)			
High school and above	15(44.1)	19(55.9)			
Family Income			0.69	0.50 to 0.94	0.019
<5000	56(52.8)	50(47.2)			
5000-10000	83(56.1)	65(43.9)			
>10000	19(30.6)	43(69.4)			
History of injection					
In last month			1.44	1.02 to 2.04	0.039
Nil	98(62.0)	112(70.9)			
1-3	41(25.9)	37(23.4)			
> 3	19(12.0)	9(5.7)			
In last year			2.71	1.95 to 3.76	<0.001
Nil	41(25.9)	86(54.4)			
2-5	64(40.5)	58(36.7)			
≥ 6	53(33.5)	14(8.9)			
In last 5 years			1.92	1.51 to 2.44	<0.001
< 5	41(25.9)	82(51.9)			
5-10	48(30.4)	47(29.7)			
11-20	39(24.7)	20(12.7)			
> 20	30(19.0)	9(5.7)			
History of previous surgeries					
No*	120(75.9)	109(69.0)	1	---	---
Yes	38(24.1)	49(31.0)	0.70	0.43 to 1.16	0.167
Lived with Jaundice patient in household					
Never*	84(53.2)	125(79.1)	1	---	---
Ever	74(46.8)	33(20.9)	3.34	2.03 to 5.47	<0.001
Number of pregnancies			1.03	0.96 to 1.09	0.458
Range	0-20	0-20			
Mean ± SD	4.94±3.57	4.63±3.86			
Parity			1.02	0.95 to 1.10	0.540
Range	0-19	0-17			
Mean ± SD	4.04±3.01	3.83±3.24			
Types of delivery					
Normal vaginal					
No*	22(13.9)	25(15.8)	1	---	---
Yes	136(86.1)	133(84.2)	1.16	0.63 to 2.16	0.635
Caesarean section					
No*	139(88.0)	138(87.3)	1	---	---
Yes	19(12.0)	20(12.7)	0.94	0.49 to 1.84	0.864
History of abortion					
Never*	119(75.3)	120(75.9)	1	---	---
Ever	39(24.7)	38(24.1)	1.04	0.62 to 1.73	0.896
History of D&C					
Never*	133(84.2)	131(82.9)	1	---	---
Ever	25(15.8)	27(17.1)	0.91	0.50 to 1.66	0.762

*reference group

Factors associated with HCV sero-positivity are as follow, History of injection last month (OR 1.44, 95%CI 1.02 to 2.04, p=0.039), History of injection last year (OR 2.71, 95%CI 1.95 to 3.76, p<0.001), History of injection last five year (OR 1.92, 95%CI 1.51 to 2.44, p<0.001), Lived with Jaundice patient in household (OR 3.34, 95%CI 2.03 to 5.47, p<0.001) showed significant positive association. Other risk factors like age (OR,101 95%CI0.98 to 1.05, p=0.384), living place (OR1.37, 95%CI 0.87 to 2.14, p=0.172), Number of pregnancies (OR 1.03, 95%CI 0.96 to 1.09, p=0.458), Parity (OR 1.02, 95%CI 0.95 to 1.10, p=0.540), Types of delivery vaginal (OR 1.16, 95%CI 0.63 to 2.16, p =0.635), and history of abortion (OR 0.91, 95%CI 0.50 to 1.66, p=0.762) were also associated with HCV infection. While family income (OR 0.69, 95%CI 0.50 to 0.94, p=0.019), History of previous surgeries (OR 0.70, 95%CI 0.43 to 1.16, p=0.167 were negatively associated with HCV infection.

DISCUSSION: My study identified the positive association of HCV sero-positivity with use of injections last year, injections last 5 years, subjects lived with jaundice patient in house hold, and negative association for family income and history of previous surgeries among women seeking treatment in hospitals of Quetta. The results indicate that iatrogenic transmission is major contributor of HCV infection among women in Quetta. This calls for strengthening patient safety at health care facilities, which requires comprehensive infection control steps, especially use of sterilized instruments and use of a new syringe for every injection.

Several published epidemiological studies of hepatitis C virus infection in Pakistan suggested the use of excessive use of unnecessary injections and reuse of unsterilized needles[5] of HCV and other blood-borne pathogens is efficient if injection equipment is contaminated with blood of infected patients. Studies in Pakistan have reported that injection overuse is very common in Pakistan and most injections are provided with previously used equipment[6] as majority of health care workers are not medically qualified or scientifically trained and are unaware of standard sterilization procedures or the importance of safe injection practice[7] In this study the history of injections showed a significant association for last one and five years[4] their study concluded an odds ratio of 2.4 for one or more injections. Women are especially at higher risk of receiving injections because of their greater health care needs.

The data show that 27% of women had history of surgical interventions with more controls than cases having had surgery and revealed a negative association of surgery with HCV risk. However, in previous studies in Pakistan, Poland, Italy and Turkey surgery was positively and significantly associated with HCV infection[8] In this study results showed that caesarean sections and D&C were not risks for HCV this might be related to many factors such as mandatory screening of blood for infectious diseases prior to surgery and may also be related to the income as in my study most of the cases were belonging from low income category. Moreover, pregnant women are more likely to receive therapeutic injections and interventions such as episiotomy (which is performed routinely in primipara women in these hospitals) during their normal deliveries. Another reason might be influencing the surgeries to be the post surgical consequences that patients use more number of injections.

Household contact with a member who had jaundice was associated with elevated odds of HCV seropositivity among cases compared with controls. Other studies confirm these finding[4] the possible explanation could be by infectious blood or saliva, sharing a needle, razor and toothbrush within the household. Another study in Karachi revealed that sharing of toothbrushes was significantly associated with HCV seropositivity among household contacts of HCV positive patients.

Ideally in a case-control study using hospitalized cases should identify the reference population that is the source of the cases so that this reference population can be sampled to select controls. But our study hospitals do

not have well-defined catchment areas. Since we selected controls from the same hospitals presenting for same reasons as cases, both were subject to the same selection factors

CONCLUSION: This study showed that iatrogenic exposure (excluding previous surgery), number and place of health care injections, hospitalizations for deliveries and household contact with jaundice are the major risk factors for transmission of HCV among women in reproductive age in patients visiting BMCH and SPH Quetta, Pakistan. This calls for strengthening the prevention aspect of the hepatitis control program to focus on behavior change for reducing injection reuse and overuse. Further steps are required to enhance infection control practices at health care facilities. This could start with establishing infection control committees in hospitals, providing training to health care workers and measures to enforce adherence to universal precautions.

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