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Prevalence of Hepatitis C and associated risk factors among pregnant women of district Nowshera, Khyber Pakhtunkhwa

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Abstract

Background: The epidemiological study of Hepatitis caused by Hepatitis C viruses during pregnancy is absolutely necessary for program managers and health planners. Currently, enough data exist regarding viral hepatitis among pregnant women in various districts of KP, Pakistan, however, proper published data from district Nowshera is not available. The study was aimed at determining the prevalence of hepatitis C infection along with its associated risk factors among pregnant women who attended the antenatal clinics at district Nowshera, KP.

Methods: One hundred and fifty (150) blood samples were obtained from pregnant women attending antenatal centers at district headquarter hospital Nowshera. Rapid immune-chromatographic technique (ICT) was used for detection of antibodies against HCV. Further confirmation of antibodies was done using Enzyme Linked Immunosorbent Assay (ELISA) followed by Reverse-transcription polymerase chain reaction (RT-PCR) for detection of HCV-RNA.

Results: Among 150 pregnant women, 7(4.66%) were positive for HCV of which 5(3.33%) were found positive for Anti-HCV antibodies while 2(1.33%) showed positivity for HCV-RNA. A significant association of age (x^2 = 9.345, df = 3, P = 0.025), Gravidity (x^2 = 9.15, df = 2, P = 0.010), education (x^2 = 48.00, df = 5, P = 0.000), and Blood Transfusion (x^2 = 4.629, df = 1, P = 0.031) was found with prevalence of HCV.

Conclusion: The study revealed 4.66% HCV prevalence among pregnant women of district Nowshera. The age, gravidity, and blood transfusion were the risk factors found significantly associated with HCV positivity in pregnant women. Additionally, the educational level of these women was also linked with the viral infection.

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Introduction

Hepatitis C viral infection is a worldwide health problem. According to an estimate by World Health Organization (WHO), 3% of the world's populations have chronic HCV infections, of which the highest HCV prevalence rate is reported from Africa [1, 2]. The most efficient mode of HCV transmission is direct percutaneous inoculation. Many studies have demonstrated that household, occupational, sexual and vertical transmissions of HCV are also important as contributing factors [3]. It has been estimated that more than 170 million chronic HCV carriers across the world having risks of developing hepatic(liver) cancer, liver cirrhosis or both [4]. It is thought of as an important cause of jaundice and acute hepatitis in pregnancy and other complications [5].

Primarily, HCV spreads by direct contact with human blood [6]. However, during pregnancy, HCV was found to be associated with a high rate of vertical transmission, high risks of maternal complications, neonatal and fetal hepatitis. It has also been reported as major cause of maternal mortality [7-10].

Screening of blood products for hepatitis C viral antibodies has reduced such mode of HCV acquisition and leave the vertical transmission as a predominant mode of infection in infants. It is worthy to note that women who have caesarean section, vaginal birth or any other gynecological procedure which require blood transfusion are always have risk of hepatitis C. Vertical transmission of hepatitis C virus might occur during lactation, at conception, perinatally or in utero but its actual mechanism of transmission, including timing is still undiscovered [11]. In developed countries, the most common cause of HCV infection in children is maternal-child transmission (MCT) with an estimated rate of 5% transmission [12].

Currently, no vaccine is available to prevent hepatitis viral infection. Treatment for chronic hepatitis C is too costly for a person in developing countries. From the global perspective, efforts should be made to reduce risk of HCV transmission from nosocomial (hospital acquired) exposure, blood transfusion and unsafe injections practices [1]. Given that childbearing women have high risk of transmitting HCV infection, there is dire need to identify HCV carriers among women in the district under study. This study therefore is aimed at the detection of pregnant women with HCV infection, increasing awareness about viral hepatitis and aiding health care providers for the management of infected individuals. It is also aimed at preventing emanating complications of HCV and to diminish its attendant socio-economic load in the study area assuming its presence is established.

Methods

Study area: The study was hospital based and the sampling was carried out at district headquarter hospital Nowshera. Due ethical clearance was taken for the study.

Study population: One hundred and fifty (150) blood samples were obtained from women attending antenatal clinics at district headquarter hospital Nowshera. Informed consent was taken from every participant. A structured questionnaire was designed to obtain their socio-demographic predispositions and risk factors (Table1) that exposed individuals to HCV infection.

Collection of blood sample and processing: 10ml of blood was obtained from the arm by venepuncture after disinfection with 70% alcohol. Five ml of the sample was placed in sterile labelled test tubes and allowed to clot. The sera were separated out into pre-labelled vials and were stored at -20^{o}C until tested for detection of antibodies while rest of 5ml of samples were used for the detection of HCV-RNA.

Screening for HCV antibodies: Rapid immuno-chromatographic technique (ICT) was used for the detection of HCV-antibodies. Further confirmation of antibodies was done using ELISA. Manufacturer's instructions were strictly adhered to IVD-REF E0320 micro-plate ELISA.

Screening for HCV-RNA: Reverse-transcription polymerase chain reaction (RT-PCR) was used to test the blood samples for the presence of HCV-RNA using Sacace Kit HCV Real-TM Qual.

Statistical analysis: The data obtained were entered in computer and checked twice before analysis using SPSS 20.0 version. The means and percentages were calculated. To compare the means and percentages between the sero-positive and sero-negative (HCV), Chi-square test was used. The age, gravidity, education and some other possible risk factors were taken as independent variable. The *p-v*alues less than 0.05 were considered as significant.

Results

Among 150 pregnant women, 7 (4.66%) were positive for HCV of which 5 (3.33%) were found positive for Anti-HCV while 2 (1.33%) were positive for HCV-RNA.

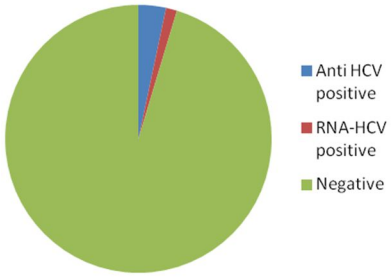

Figure 1: Frequency of HCV among pregnant women of District Nowshera, KP

To test the association between different risk factors and prevalence of HCV, Chi-square test of association was utilized. Several different factors were tested for their association with HCV. A total of 19 different factors namely: age, education, gravidity, dilation and curettage (D&C), history of abortion, cesarean section, blood transfusion, history of general surgery, tooth surgery, jaundice, accidents, cuts, use of injections, tattooing, family history of liver disease/jaundice, traveling abroad, residential status and awareness were tested for association with prevalence of HCV. The results obtained were of mixed type, 15 factors namely Dilation and curettage(D&C), history of abortion, cesarean section, history of general surgery, tooth surgery, jaundice, accidents, cuts, use of injections, tattooing, family history of liver disease/jaundice, traveling abroad, residential status and awareness were found to have no significant relationship with prevalence of HCV. However, the results reveal a significant association of age (x^2 = 9.345, DF = 3, P = 0.025), Gravidity (x^2 = 9.15, DF = 2, P = 0.010), education (x^2 = 48.00, DF = 5, P = 0.000), and blood transfusion (x^2 = 4.629, DF = 1, P = 0.031) with prevalence of HCV (Table1).

HCV positivity was confined to women of age group 26-35 years. Statistically, there exist a significant difference in association between seroprevalence of HCV and age (p=0.025).

The seroprevalence of HCV with respect to demographics indicated that except for age, gravidity, education and blood transfusion rest of the factors did not play a main role in disease contraction.

Factor	Chi-Value	Df*	P-value
Age	9.345	3	0.025
Education	48.002	5	0.000
Gravidity	9.155	2	0.010
D&C	0.826	1	0.363
H/o Abortion	1.045	1	0.307
Cesarean section	2.231	3	0.526
Blood transfusion	4.629	1	0.031
H/o General surgery	0.402	1	0.526
H/o Dental surgery	0.015	1	0.904
Family H/o jaundice	2.418	1	0.120
Awareness	0.723	1	0.395
History of jaundice	1.61	1	0.204
H/o hospitalization	0.015	1	0.904
H/o cuts	0.347	1	0.556
H/o accidents	2.071	1	0.150
Use of Injections	1.861	1	0.172
Tattooing	0.201	1	0.654
Travel abroad	1.037	1	0.309
Residential status	0.414	3	0.937

Table 1: Chi square analysis of possible risk factors for HCV in pregnant women of district Nowshera

Factor	HCV		Total*
Age	**Negative**	**Positive**	
16-25	75(52.4%)	0(0.00%)	75(50%)
26-35	59(41.3%)	7(100%)	66(44%)
36-45	8(5.6%)	0(0%)	8(5.3%)
46-55	1(0.7%)	0(0%)	1(0.7%)
Education			
Middle	1(0.7%)	0(0%)	1(0.7%)
Secondary	12(8.4%)	1(14.3%)	13(8.7%)
Higher secondary	10(7.0%)	1(14.3%)	11(7.3%)
Bachelors	3(2.1%)	4(57.1%)	7(4.7%)
Masters	3(2.1%)	0(0%)	3(2.0%)
Gravidity			
Primigravid	62(50.0%)	0(0.00%)	62(47.3%)
Multigravida	48(38.7%)	4(57.1%)	52(39.7%)
Grand multigravida	14(11.3%)	3(42.9%)	17(13.0%)
Ear and nose piercing			
Yes	90(63.4%)	6(85.7%)	96(64.4%)
No	52(36.6%)	1(14.3%)	53(35.5%)
Awareness			
Yes	40(28.0%)	3(42.9%)	43(28.7%)
No	103(72.0%)	4(37.1%)	107(71.3%)
Tattooing			
Yes	4(2.8%)	0(0.00%)	4(2.7%)
No	139(97.2%)	7(100%)	146(97.3%)
Travel abroad			
Yes	7(5.2%)	1(14.3%)	8(5.6%)
No	128(94.8%)	6(85.7%)	134(94.4%)
Occupation			
House wife	128(89.5%)	7(100%)	135(90.0%)
Working lady	11(7.7%)	0(0.00%)	11(7.3%)
Residential Status			

Rural	96(67.1%)	5(71.4%)	101(67.3%)
Urban	43(30.1%)	2(28.6%)	45(30.0%)

Table 2: HCV prevalence correlated with socio-demographics

Factor	HCV		Total*
	Negative	Positive	
Dilation and curettage			
Yes	57(39.9%)	4(57.1%)	61(40.7%)
No	86(60.1%)	3(42.9%)	89(59.3%)
History of Abortion			
Yes	43(30.3%)	3(50.0%)	46(31.1%)
No	99(69.7%)	3(50.0%)	102(68.9%)
History of liver jaundice			
Yes	27(18.9%)	0(0.00%)	27(18.0%)
No	116(81.1%)	7(100%)	123(82%)
History of blood transfusion			
Yes	31(21.8%)	4(57.1%)	35(23.4%)
No	111(78.2%)	3(42.9%)	114(76.5%)
History of general surgery			
Yes	27(18.9%)	2(28.6%)	29(19.3%)
No	116(81.1%)	5(71.4%)	121(80.7%)
History of dental surgery			
Yes	58(40.6%)	3(42.9%)	61(40.7%)
No	85(59.4%)	4(57.1%)	89(59.3%)
Family history of liver disease			
Yes	63(44.1%)	1(14.3%)	64(42.7%)
No	80(55.9%)	6(85.7%)	86(57.3%)
History of hospitalization			
Yes	58(40.6%)	3(42.9%)	61(40.7%)
No	85(59.4%)	4(57.1%)	89(59.3%)
History of cuts			
Yes	46(32.2%)	3(42.9%)	49(32.7%)
No	97(67.8%)	4(57.1%)	101(67.3%)
History of accidents			
Yes	33(23.1%)	0(0.00%)	33(22.0%)
No	110(76.9%)	7(100%)	117(78.0%)
Use of therapeutic injections			
Yes	30(21.0%)	3(42.9%)	33(22.0%)
No	113(79.0%)	4(57.1%)	117(78.0%)

Table 3: HCV associated with risk factors

Discussion

This study is the first document being published on prevalence of HCV among pregnant women of district Nowshera, KP. Different epidemiologic studies have shown HCV seroprevalence in Pakistan with a range of 0.7% to 20% [13]. In our study, 4.66% of the pregnant women were found positive for HCV which is comparable with the findings of other such epidemiologic study [14].

Our finding of 4.66% prevalence has vital health implications for the large number of pregnant women and their families who dwell in our location of study. This is because the majority of the infected women were ignorant of HCV infection and were not aware of their infection status as they were asymptomatic. This imply that there is substantial potential for transmission of HCV infection to other people in their surrounding especially to fetuses. Our finding is parallel to a report from Mardan, which showed 4.34% prevalence of HCV [15] and that of 5.31% in a study at Islamabad [16].

The seroprevalence of HCV in our study was low when compared with that described previously in a study conducted in 2002 in Sindh, Pakistan which showed high HCV prevalence rate of 9% [17]. These pragmatic differences may be attributed to the degree of exposure to risk factors in our study populations as we found out that demographic variables considered in study had no statistical significance with HCV seropositivity.

Studies by Khan in 2004 and Muhammad 2004 has showed history of reused syringes, dental procedure, surgical operation, blood transfusion and tattooing as significant risk [18,19]. Similarly, study by Batash also showed that intramuscular injections and blood transfusions were significantly associated with HCV seropositivity [20]. Our results again reiterate their findings as blood transfusion (x^2 = 4.629, DF = 1, P = .031) and Gravidity (x^2 = 9.15, DF = 2, P = .010) to be significantly associated with HCV.

Similarly, studies by Cacoub found transfusion of blood products (P < 0.0001), and dental treatment (P < 0.0001) and Nafeh showed previous blood transfusions and sexual contacts with intravenous drug user [21, 22] as factors associated with HCV. Delage also showed intravenous drug use (P value 0.001) and blood transfusion (P value 0.01) to be statistically significant factors similar to our study [23].

As far the age groups screened, the highest prevalence of 100% was recorded among pregnant women of age group 26-35 years. This result agrees with the result in other studies which showed increase in HCV seroprevalence with increase in age [24]. Interestingly, statistical analysis showed a significant association between the age and HCV positivity (P = 0.025).

This was also interesting to note that in our study many factors like dilation and curettage (D&C), history of abortion, cesarean section, history of general surgery, tooth surgery, jaundice, accidents, cuts, use of injections, tattooing, family history of liver disease/jaundice,

traveling abroad, residential status and awareness were found to have no significant relationship with prevalence of HCV. The possible justification was female sample population selected. As tattooing and traveling to abroad is not common in females of our society.

The study revealed a high rate of 4.66% HCV prevalence among pregnant women of district Nowshera. The age, gravidity, and blood transfusion were the risk factors found significantly associated with HCV positivity in pregnant women. Additionally, the educational level of these women was also linked with the infection.

Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

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