

Possible Routes of Transmission/Risk Factors of Hepatitis-C Virus in Urban and Rural Areas

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ABSTRACT

Objective: The objective of this study was to determine the possible routes of transmission of hepatitis C virus and to compare routes of transmission of hepatitis C between urban and rural areas.

Study Design: Descriptive / cross sectional study

Place and Duration of Study: This was conducted at the Jinnah Teaching Hospital attached to Jinnah Medical College, Peshawar from October, 2017 to December 2018

Materials and Methods: This study was conducted on 100 consecutive patients. Participants were diagnosed for hepatitis C by suggesting Anti-HCV antibody through immune chromatographic technique (ICT) followed by ELISA and PCR (qualitative) to confirm and abdominal ultrasound to detect ascites or any hepatic parenchymal change or focal hepatic mass. Patient's names, age, sex, marital status, address (rural and urban) and possible routes of transmission/risk factors were recorded. Descriptive statistics were calculated in SPSS 20.0. Comparison was made for possible routes of transmission/risk factors of Hepatitis C between rural and urban using chi-square test. P-value ≤ 0.05 was considered significant.

Results: Males were 40(40%) and female were 60(60%). The mean age was 41.78 ± 14.19 years. The most common routes of transmission of Hepatitis C were surgical procedures and skin piercing $n=32(32\%)$ followed by surgical procedures $n=31(31\%)$. Only skin piercing, surgical procedures for orodental and gynecological reasons, surgical procedures and blood transfusions were found in 11%, 7% and 8% cases respectively. Skin piercing as a possible route of transmission of Hepatitis C was more in rural areas (30%) than urban (13%). Similarly orodental/gynecological procedures were more in rural (4%) than urban (3%). On other hand surgical procedures as a risk factor for Hepatitis C was more in urban (18%) than rural (13%). Invasive medical procedures were also common in urban (3%) than rural (1%). All these results were statistically significant ($P=0.008$).

Conclusion: The major risk factors/possible routes of transmission of hepatitis C were surgical procedures followed by skin piercing by injection needles and least risk factors were invasive medical procedures. Skin piercing and orodental/gynecological procedures to be a possible routes of transmission of Hepatitis C were more in rural areas than urban areas. On other hand surgical procedures and invasive medical procedures were more in urban than rural areas.

Key Words: Hepatitis C, route of transmission, risk factor, rural, urban

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INTRODUCTION

Hepatitis C virus (HCV) is a pathogenic organism that transmit mainly through blood and remains a significant global health concern.¹ After the acquirement of the virus, acute hepatitis C virus infection can lead to chronic stage.²

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The chronic HCV infection is associated with numerous complications like liver cirrhosis and hepato cellular carcinoma(HCC).³ Morbidity related to HCV tensed healthcare systems throughout world, with around 71 million individuals chronically infected worldwide.⁴ Direct-acting antiviral drugs, an extremely efficient HCV therapy, can clear HCV infection and may significantly decrease HCV disease burden and its further transmission.⁵ Now the global targets have been set by the World Health Organization (WHO) is to eliminate HCV by 2030.⁶ In developed countries like USA, the fast improvement in health-care systems and the anti-HCV screening introduction especially for blood donors results in sharp decrease in the incidence of iatrogenic transmission of hepatitis C in developed countries, on the other hand the epidemic of HCV is spreading in developing countries. In developing countries the unscreened blood transfusions and non-

sterile injections are still the main sources of transmission.⁷

Numerous routes of transmission of HCV have been documented and generally accepted while some are less well defined and need further investigations. The most common route of transmission of Hepatitis-C virus is through direct percutaneous exposure to infected blood. Socioeconomic differences may be responsible for geographic variability of HCV.⁸ Illegal injection drug use and iatrogenic exposures have been the main risk factors for HCV transmission throughout the world. Incidence of HCV remains high among injection users, injectable drug users, and tattoo users. Continuing monitoring of the epidemiology of HCV infection is vital for prevention of future infections.⁹

Conry-Cantilena et al.¹⁰ reported that strongly associated risk factors for HCV infection in the HCV affected individuals were blood transfusion in 66 (27%), intra-nasal cocaine use in 169 (68%), intravenous drug use 103 (42%), sexual contact 132 (53%), and ear piercing. Another study reported that overall perinatal HCV transmission rate was 2.4%.¹¹ Terrault et al.¹² reported that overall HCV prevalence among sexual partners was 4%.

MATERIALS AND METHODS

This cross sectional descriptive study was conducted at Jinnah Teaching Hospital attached to Jinnah Medical College, Peshawar from October, 2017 to December 2018 on 100 consecutive patients. Sampling was done using convenient sampling technique. Approval was taken from ethical review committee of the hospital. After detailed explanation to the participants regarding the purpose of the study a verbal informed consent was taken.

A detail history was taken followed by relevant examination. All participants were diagnosed for hepatitis C by history, examination and appropriate laboratory investigations. The participants were diagnosed for hepatitis C by suggesting anti-HCV antibody through immune chromatographic technique (ICT) followed by confirmation with Enzyme-linked immune sorbent assay (ELISA) and qualitative Polymerase chain reaction (PCR). Abdominal ultrasound was also advised for each patient to look for the presence of Ascites and any parenchymal liver disease or focal mass lesion e.g. hepato cellular carcinoma. Patient's name, age, sex, marital status, address (rural and urban) and possible routes of transmission/risk factors were recorded in pre-structured proforma. Pakistani nationals, both genders, age above 15 years and cooperative patients were included in this study.

The collected data were analyzed using SPSS version 20.0. Mean and standard deviation were calculated for quantitative variables like age. Frequency and percentages were computed for qualitative variables

like sex, marital status, address (rural and urban) and possible routes of transmission/risk factors of Hepatitis C. Comparison was made for possible routes of transmission/risk factors of Hepatitis C between rural and urban area using chi-square test. P-value less or equal to 0.05 (≤ 0.05) was considered significant.

RESULTS

The total participants were hundred (100), in which male were n=40(40%) and female were n=60(60%). The mean age was 41.78±14.19years. The age ranged from 17 to 75 years. Most of the participants were married n=95(95%). Half of the sample belong to urban n=50(50%) and half to rural areas n=50(50%). The details of frequency of gender, marital status and rural/urban are given in table 1.

The most common age group was 31-45 years n=31(31%) followed by 46-60 years n=29(29%) and 15-30 years n=28(28%). The least number of participants were in age group 61-75 years n=12(12%). (Fig 1)

The major risk factor/possible route of transmission of hepatitis C was surgical procedure for various purposes like gynecological, finger pathology, laparotomy n=85(85%) followed by skin piercing by injection needle n=11(11%) and least risk factor were invasive medical procedures n=4(4%). (Fig 2)

However most (54%) participants had more than one risk factor which is shown in table 2. The most common routes of transmission/risk factors of Hepatitis C was surgical procedures and skin piercing due to needle injection n=32(32%) followed by only surgical procedure n=31(31%). Skin piercing as a risk factor for Hepatitis C was found in 11(11%) cases. Surgical procedures for orodental and gynecological reasons were found in 7(7%) participants. Surgical procedures and blood transfusion were found in 8% cases. Rests of details are given in table 2.

Table No.1: Frequency of gender, marital status and rural/urban area

Variable		Frequency	Percent
Gender	Male	40	40
	Female	60	60
	Total	100	100
Marital status	Married	95	95.0
	Unmarried	5	5.0
	Total	100	100.0
Urban/ Rural	Urban	50	50.0
	Rural	50	50.0
	Total	100	100.0

Comparison of possible routes of transmission/risk factors of Hepatitis C between rural and urban showed that skin piercing as possible route of transmission of Hepatitis C was more in rural areas n=30(24+6%) than Urban n=13(8+5%). Similarly orodental/gynecological

procedure was more in rural n=4(4%) than urban n=3(3%). On other hand only surgical procedure was more in urban n=18(18%) than rural n=13(13%). Invasive medical procedure was also common in urban n=3(3%) than rural n=1(1%). All these results were statistically significant (P=0.008). (Table 3)

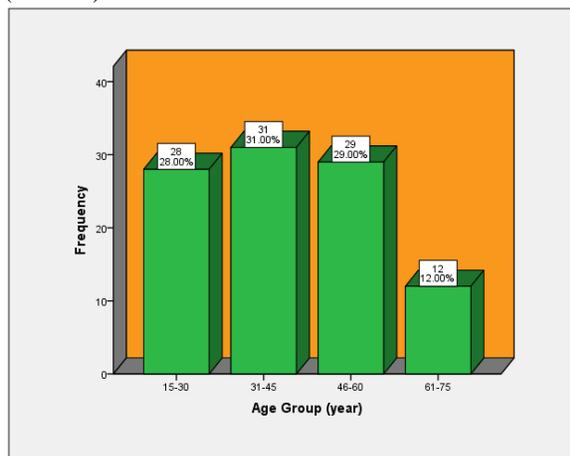


Figure No.1: Age distribution of the study

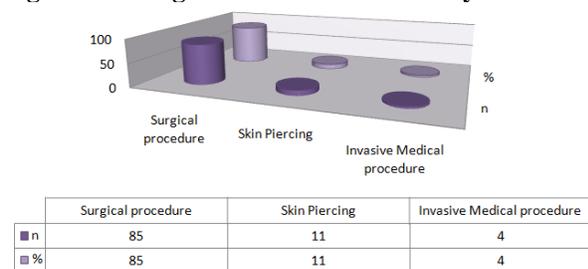


Figure No. 2: Pattern of routes of transmission of Hepatitis C

Table No.2: Frequency of routes of transmission/ risk factors of Hepatitis-C

Routes of transmission/risk factors	Freq- uency	Percent
Surgical procedures, Skin piercing (Inj)	32	32
Skin Piercing	11	11
Surgical procedures	31	31
Surgical procedures(Orodental/Gynae)	7	7
Surgical procedures(Gyn), Blood transfusions, Skin piercing (Inj)	6	6
Surgical procedures , Invasive medical procedures	1	1
Surgical procedures, Blood transfusions	8	8
Invasive medical procedures	4	4
Total	100	100

Table No.3: Comparison of Routes of transmission/ risk factors of Hepatitis C between rural and urban

Routes of transmission/ risk factors	Address				P- value*
	Urban		Rural		
	n	%	n	%	
Surgical procedures, Skin piercing (Inj)	8	8.0	24	24.0	0.008
Skin Piercing	5	5.0	6	6.0	
Surgical procedures	18	18.0	13	13.0	
Surg procedures (Orodental/Gynae)	3	3.0	4	4.0	
Surgical procedures(Gyn), Blood transfusions , Skin piercing (Inj)	6	6.0	0	0.0	
Surgical procedures , Invasive medical procedures	1	1.0	0	0.0	
Surgical procedures, Blood transfusion	6	6.0	2	2.0	
Invasive medical procedures	3	3.0	1	1.0	

*Pearson Chi-Square Test; P≤0.05 significant

DISCUSSION

The most efficient transmission of HCV is by the parenteral route. This transmission is possible even at low levels of viral contamination. From 2008 to 2012 CDC got notice of 15 outbreaks of health-care about HCV transmission in non-dental treatment.¹³ Generally, infectious agents transmission in healthcare systems can occur from patient to patient (e.g. due to inappropriate injection use), patient to clinician (like from needle sticks), or doctor to patient (like during surgery). The factors affecting the risk of transmission are related to the agent, the host, and the environment. Hepatitis C virus can stay alive in the environment for 16 hours on a dry surface,¹⁴ at low temperatures in water for up to 5 months, and in saliva.¹⁵

This study was aimed to determine the possible routes of transmission/risk factors for hepatitis C and to see whether there is a difference between rural and urban areas in its transmission. We selected age above 15 years for our study. This was because most invasive procedures involving blood contact are required in above 15 years age. In our study the least number of participants were in age group 61-75 n=12(12%). This shows lack of prompt diagnosis and treatment of hepatitis in Pakistan which lead to early deaths.¹⁶ In the current study the major risk factor/possible route of transmission of hepatitis C was surgical procedure followed by skin piercing by injection needles and least risk factor was invasive medical procedure. A study conducted by Chlabicz et al.¹⁷ on known and probable risk factors for hepatitis C infection in north-eastern Poland. They reported that potential sources of exposure to HCV among 103 persons without known or probable risk factor was dental n=91(88.3%), hospitalizations more than 5 times n=22(21.4%) and major surgical procedure n=49(47.6%). The differences

in results may due to lack of proper sterilization in our surgical procedures, treatment by non-qualified persons, low quality autoclaves.

Our findings showed that skin piercing and orodental/gynecological procedure as possible route of transmission of Hepatitis-C was more in rural areas than urban areas. On other hand surgical procedure and invasive medical procedure was more in urban than rural ($P=0.008$). This may be due lack of health regulations in Pakistan which results in quackery and non-professional treatment including dental extraction by quacks, delivery by leady health visitors, and re-use of syringes in rural area. Most of the surgeries and invasive medical procedure are performed in cities so this may be responsible for more risk factors for hepatitis C in urban. No study was traced in literature on comparison of risk factors/possible route of transmission of Hepatitis between urban and rural areas. Our study had some limitations. It focused only on treatment seeking population; hence the results may not be a true representation of prevalence and profile in the community.

CONCLUSION

Our findings showed that:

- The major risk factor/possible route of transmission of hepatitis C was surgical procedure followed by skin piercing by needle injection and least risk factor was invasive medical procedure.
- More than one risk factors/possible route of transmission of hepatitis were found in most patients
- Skin piercing and orodental/gynecological procedure as possible route of transmission of Hepatitis C was more in rural areas than urban area. On other hand surgical procedure and invasive medical procedure was more in urban than rural. All these were statistically significant ($P=0.008$).

Author's Contribution:

Concept & Design of Study: Marifat Shah.
 Drafting: Marifat Shah.
 Data Analysis: Marifat Shah.
 Revisiting Critically: Marifat Shah.
 Final Approval of version: Marifat Shah.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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