



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**

<http://doi.org/10.5281/zenodo.3275642>

Available online at: <http://www.iajps.com>

Research Article

## ASSOCIATION OF DENTAL PROCEDURES WITH HEPATITIS C

Dr. Amjad Irfan<sup>1</sup>, Dr Sareena Pathan<sup>2</sup>, Dr Bilal Ahmed<sup>3</sup>

<sup>1</sup>Ayub Medical College, Abbottabad, <sup>2</sup>Women Medical College, Abbottabad,

<sup>3</sup>Liaoning Medical University, China.

Article Received: May 2019

Accepted: June 2019

Published: July 2019

**Abstract:**

*Study Objectives:* To find the association of dental procedures with Hepatitis C.

*Methods and Materials:* To determine the association of dental procedures with hepatitis C, we have done Case-control study among patients in different wards of Holy family Hospital, Rawalpindi. The study was done over a period of 4 months i.e. from 1<sup>st</sup> September 2018 to 31<sup>st</sup> December 2018. A total of 120 patients were taken in which 60 were cases and 60 were taken as controls through non-probability convenient sampling technique. Patients admitted in Holy family Hospital with positive hepatitis C disease were taken as cases and patients of same gender and age  $\pm 5$  years of case with no hepatitis C disease were taken as control. The Data was collected using a structured questionnaire. Data was analyzed using SPSS 16.

**Sample Collection:**

**Cases:**

*Inclusion criteria:* Hepatitis C patients with positive finding of rapid agglutination test for HCV antibodies. The patients treated for teeth/tooth such as tooth extraction, RCT, tooth fillings.

*Exclusion criteria:* Patients having history of blood transfusion, any surgical procedure, uncooperative and comatose hepatitis c patients.

**Control:**

*Inclusion criteria:* Patients of either gender will be included in the study.

*Exclusion criteria:* Uncooperative and comatose patients.

**Data Analysis:**

1. The completed questionnaires were entered into the computer using SPSS version 16.0.
2. Data was described in terms of frequencies and percentages for categorical variables.
3. Continuous variables were described in terms of Mean  $\pm$  SD.
4. For finding association we use odd ratio.

*Results:* Minimum age was 16 years maximum age was 110 years. Mean age was  $50.18 \pm 18.28$  years. Regarding gender distribution 52(43.3%) were male and 68(56.1%) were females. Minimum duration was 1 day, and maximum duration of infection is 5110 days. The odd ratio is 1.070 and 95% confidence interval is (0.520-2.200) so null value fall in the range of 95% confidence interval so association of dental procedure with hepatitis C is statistically not significant.

*Conclusion:* The dental procedure is not a significant risk factor for Hepatitis C infection.

**Key Words:** Dental procedure, Hepatitis C, Risk factors.

**Corresponding author:**

**Dr. Amjad Irfan,**

Ayub Medical College, Abbottabad.

QR code



Please cite this article in press Amjad Irfan et al., Association Of Dental Procedures With Hepatitis C., Indo Am. J. P. Sci, 2019; 07[07].

## INTRODUCTION:

Patients suffering from hepatitis C are at increased risk of developing end stage liver disease and hepatocellular carcinoma. Hepatitis C is infectious disease caused by blood borne hepatitis C virus (HCV) which affect the liver.<sup>1</sup> HCV is a small enveloped virus and classified as a separate genus within the flaviviridae family. HCV is a RNA virus so it lacks full proof reading mechanism so mutation occur more upon exposure to the mutagens. As a result of mutation it may escape from the immunologic response of the host.<sup>2</sup> Genotypes of HCV is different in different regions of the world.<sup>3</sup> Genotypes of HCV are classified into six major genotypes and subdivided into many subtypes (1a,1b and 1c etc).<sup>4</sup> This classification is based on difference in the genes that encode the envelope glycoprotein.<sup>2</sup> Genotypes 1, 2 and 3 are distributed worldwide. Genotype 1 is distributed throughout world and most prevalent while genotype type 3 are second most prevalent and genotype 2 have less than 5% of the total HCV cases.<sup>5</sup>

Hepatitis C is a worldwide disease.<sup>3</sup> The World Health Organization (WHO) estimates that about 170 Million people worldwide have chronic Hepatitis C infection. Hepatitis C leads to 33600 deaths per annum.<sup>6</sup> The prevalence of hepatitis C is highest in Egypt (15 to 20%) while lowest in United Kingdom (0.01 to 0.1%).<sup>7</sup> In European countries the prevalence is 1 to 2.3 %.<sup>8</sup> In Pakistan, first case was observed in 1992. About 6% (8-10million) people are infected with it in Pakistan. In Punjab 6-7%, in Sindh 5%, in Khyber PukhtoonKhawa (KPK) 1.1% and in Balochistan 1.5% people are infected with hepatitis C.<sup>8</sup> About 20% HCV cases which causes acute hepatitis C cleared within 6 month and about 80% lead to chronic hepatitis C infection.<sup>6</sup>

Risk factors associated with hepatitis C 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(P<0.001%).<sup>1</sup> Other risk factors for HCV transmission are sharing razors needles stick injuries ,ear piercing, acupuncture and body piercing .dental procedures performed by dentists by using unsterilized instruments.<sup>9</sup> HCV RNA has been detected in saliva and salivary glands of patients with sialadenitis. Gingival sulcus of patients with hepatitis C may have large amount of HCV than in saliva so during dental procedures there may have highest risk of HCV transmission.<sup>10</sup> HCV can be transmitted from mother to baby during pregnancy but it is less

common.<sup>3,11</sup> people having sexual contact with infected person, surgical procedures and dialysis are also at risk of developing hepatitis C.<sup>12</sup>

The incubation period of hepatitis C is 2 weeks to 6 months following initial infection approximately 80% people may not exhibit symptoms, those who have acquired acute infections may suffer from fever, fatigue, decrease appetite, nausea, vomiting, abdominal pain, dark urine, grey- colour faeces, joint pain and jaundice.<sup>3</sup> In acute infection 20-30% patients present with jaundice or with de-arranged ALT (alanine amino-transferase), 20- 30% have nonspecific symptoms like lethargy, anorexia, abdominal cramps, in 6-7% patients the symptoms appear later, from the exposure and 8 to 9 weeks to seroconversions. 15-25% patients may clear virus spontaneously or lead to chronic infection. The patients with chronic infection are 75% and have de-arranged liver enzymes and cirrhosis develop in 20-30% patients after 20 years. Its risk factors are obesity, alcohol intake, diabetes, male, older age and co infection with HBV or HIV.<sup>9</sup> Screening and diagnosis.

The patient remains asymptomatic, so few people are diagnosed during acute infection. Those patients, who develop chronic infection also remain asymptomatic until decade after infection when symptoms develop secondary serious liver damage occurs in persistent infection.<sup>3</sup> HCV-RNA is detectable, and aminotransferase show episodic elevation or continuous elevation with fluctuating level<sup>13</sup>. Infection is diagnosed in two steps; in first step, Anti HCV antibodies are produced in patient infected with HCV, these are diagnosed with a serological test. Second step, if the test is positive for anti HCV antibodies then an HCV RNA is needed to confirm chronic HCV infection.<sup>3</sup>

**Management:** Patient with acute HCV infection have a chance to respond to 6 month of standard therapy of interferon . The benefits of sustained virologin response has been increased by initial treatment for the patients with fibrosis. Treatment of HCV infection has two goals; First to achieve a sustained chronic HCV eradication for about six months. The second goal is to prevent progression of disease. When the patient has raised ALT which meet with the criteria like old age, positive HCV antibodies, serum and HCV RNA test result positive, compensated liver disease (e.g., no hepatic encephalopathy or ascites) low neutrophils

count. The treatment of hepatitis c is interferon alpha mono therapy or interferon alpha with ribavirin.<sup>11, 14</sup>

Recently new antiviral drugs have been developed called as direct anti-viral drugs which are more effective, better tolerated and it make the treatment duration shorter and safer.<sup>3</sup> These directly acting drugs are telaprevir, boceprevir, sieprevi, rvaniprevir and faldapreviretc the patients who are previous failure to Interferon alpha and ribavirin therapy as they are intolerated to side effect of interferon alpha, then we use directly acting drug like sofobovir with ribavirin.<sup>14</sup> Patients having infection with HCV genotypes two and three previously was treat with interferon alpha and ribavirin but after 2013 they are treating with sofosbuvir. Sofobovir is directly acting drug NS5b polymerase inhibitor. The duration of sofobovir with ribavirin is 12 weeks. Genotypes four five and six of HCV are tested with directly acting drugs and they have good results<sup>15</sup>.

The adverse effects of treatment require management. Interferon cause side effects like bone marrow depression, flu like symptoms and neuropsychiatric problems. Ribavirin cause majorly hemolytic anaemia. Sofosbuvir and sofobovir cause additional side effects like rash or dysgeusia.<sup>15</sup>

Patients who develop cirrhosis are at the increased risk of hepatocellular carcinoma. Between 1- 5% of those infected with HCV will develop primary liver cancer. Hepatocellular carcinoma, as suggested by weight loss and raised alpha feta protein level.<sup>14</sup> People infected with hepatitis C are prone to decay loss of self-esteem due to poor oral health and that lead to compromised quality of life.<sup>16</sup>

**Prevention:** HCV is prevented by primary secondary and tertiary prevention. Primary prevention which is recommended by WHO is hand hygiene, safe handling and safe disposal of waste, provide safe service to people who inject drugs, testing donated blood for HCV, promotion of correct use of condoms. Secondary prevention is education and counselling option for care and early treatment, appropriate medical management including anti viral therapy, immunization against HBV & HIV to prevent co-infection, regular management for the early diagnosis of chronic liver disease. Most people with acute hepatitis are not treated because they don't manifest symptoms of disease.<sup>3</sup> Prevention of alcohol consumption during chronic Hepatitis C infection may reduce the chances of hepatocellular carcinoma.<sup>2</sup>

### RESULTS:

We take a sample of 120 persons from different wards of Holy family Hospital. Quantitative variables were described in terms of descriptive statistics like age, income, duration of infection and time since dental procedures. Minimum age was 16 years. Maximum age was 110 years. Mean age was  $50.18 \pm 18.28$  years. Minimum monthly family income was 5000 PKR and maximum were 100000 PKR. Mean income was  $2.04 \pm 14418.23$  PKR. Minimum duration of infection was 1 day, and maximum was 5110 days. Mean duration of infection was  $750.03 \pm 1245.088$  days. Minimum time since dental procedure was 180 days and maximum were 10950 days. Mean time since dental procedure was  $2572.51 \pm 2519.552$  days as shown in the table below:

VARIABLES	N	Minimum	Maximum	Mean	Std. Deviation
age(in years)	120	16	110	50.18	18.281
monthly family income in PKR	120	5000	100000	20400	14418.233
duration of infection(in days)	60	1	5110	750.03	1245.088
time since dental procedure (in days)	53	180	10950	2572.51	2519.552
Valid N (list -wise)	27				

There were 52(43.3%) males and 68(56.7%) females in our study and female cases (68) are more than male cases (52).

GENDER	Frequency	Percent
Male	52	43.3
Female	68	56.7
Total	120	100

33(27.5%) were educated and 87(72.5%) were uneducated in our sample as shown in the table below:

**TABLE NO.3: EDUCATION STATUS OF STUDY SUBJECTS**

EDUCATION	Frequency	Percent
educated	33	27.5
uneducated	87	72.5
<b>Total</b>	<b>120</b>	<b>100.0</b>

If socioeconomic status is compared, 7(5.8%) were from middle class and 113(94.2%) were from lower class as shown in the table below:

**TABLE NO.4: SOCIOECONOMIC STATUS OF STUDY SUBJECTS**

SOCIOECONOMIC STATUS	Frequency	Percent
middle class	7	5.8
lower class	113	94.2
<b>Total</b>	<b>120</b>	<b>100.0</b>

As our study shows that most of cases from rural areas, 88(73.3%) were from rural areas and 32(26.7%) were from urban areas as given in the table below:

**TABLE NO.5: Area of Residency**

Area of Residency	Frequency	Percent
Rural	88	73.3
Urban	32	26.7
<b>Total</b>	<b>120</b>	<b>100.0</b>

Those 53(44.2%) people who had undergone dental procedures, 1(0.8%) had undergone dental cleansing, 2(1.7%) had undergone RCT, 49(40.8%) had undergone tooth extraction and 1(0.8%) had undergone tooth replacement as given in the table below:

**TABLE NO.6: Type of Dental Procedures**

Dental procedure type	Frequency	Percent
	67	55.8
dental cleansing	1	.8
RCT	2	1.7
tooth extraction	49	40.8
tooth replacement	1	.8
<b>Total</b>	<b>120</b>	<b>100.0</b>

In our study those who did their dental procedure are 27(50.9%) cases and 26(49.1%) controls while 33(49.3%) cases and 34(50.7%) controls had no history of dental procedures. Chi-square test was performed to determine the association of dental procedures with hepatitis C and it was found to be significant value (p value=0.034) as shown in the table below:

**TABLE NO.7: Relationship Between Dental Procedure and Hepatitis C**

			Category		Total
			Case	Control	
dental procedure	Yes	Count	27	26	53
		% within dental procedure	50.9%	49.1%	100.0%

	No	Count	33	34	67
		% within dental procedure	49.3%	50.7%	100.0%
Total		Count	60	60	120
		% within dental procedure	50.0%	50.0%	100.0%

P value: 0.034

The aim of our study to find the association of dental procedure with hepatitis C, theist give us by odd ratio which was calculated through 95% confidence interval and it was found to be 1.070 which is statistically significant. Hence there is association of dental procedures with hepatitis C as given in the table below:

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for dental procedure (yes / no)	1.070	.520	2.200
For cohort category = case	1.034	.722	1.481
For cohort category = control	.967	.673	1.388
N of Valid Cases	120		

Among 53 subjects who had undergone dental procedures, 18(11 cases and 7 controls) dental procedures were performed in public sector hospitals. In private sector hospitals, 26(11 cases and 15 controls) were performed while 9(5 cases and 4 controls) were performed by local dispensers /technicians as shown in the table below:

Chi-square test value=8.189

df= 2

Asymp.sig =0.017

0 cell (.0%) had expected frequency less than 5. The maximum expected cell frequency is 17.7.

**TABLE NO.8: Association of Sources of Dental Procedures with Cases and Controls**

Source		Category		Total
		Case	control	
Source	public sector hospitals	11	7	18
	private sector hospitals	11	15	26
	local dispenser/ technician	5	4	9
Total		27	26	53

In our study, total 7 subjects (2 cases and 5 controls) were from middle class while 113 subjects (58 cases and 55 controls) were from lower class, it gives us clear information that most of the cases are from lower socioeconomic class as show in the table below:

Odd ratio was 0.379 calculated by SPSS, which is not statistically significant.

**TABLE NO.9: Association of Socioeconomic Status with Cases and Controls**

socioeconomic status		Category		Total
		Case	control	
socioeconomic status	middle class	2	5	7
	lower class	58	55	113
Total		60	60	120

Included in our study, total 33(15 cases and 18 controls) were educated while 87(45 cases and 42 controls) were uneducated as shown in the following table;

Odd ratio was .778 with (lower limit .348 and upper limit 1.738) not statistically significant.

Education		Category		Total
		case	Control	
Education	Educated	15	18	33
	Uneducated	45	42	87
<b>Total</b>		<b>60</b>	<b>60</b>	<b>120</b>

Sex	Category		Total
	Case	Control	
Male	26	26	52
Female	34	34	68
Total	60	60	120

Odd ratio=1.00 (.486-2.59)

### DISCUSSION:

Hepatitis c have many risk factors The issue of hepatitis C in dental procedure is important. the risk of acquisition of hepatitis C through dental procedure is evaluated in our study that it is associated with hepatitis C or not. We did our study in Holy family Hospital, Rawalpindi .We took sample of 120 people 60 cases and 60 controls and our study reveal that the dental procedure is statistically significant associated with hepatitis C (odd ratio 1.070, 95% CI 0.0520 to 2.200.)In other study which perform in 2014 that tooth extraction have significant risk for hepatitis c infection .Ali et al indicated dental procedure have a risk in transmission of hepatitis c infection is (39.7%).<sup>17</sup>

In contrast different studies reveals that HCV infection is not associated with dental procedure performed in Australia, Romania, Nigeria, France and Pakistan. Murphey et al.in a study on 2316 seronegative and 2316 seropositive blood donor in the USA conclude that hepatitis C infection is not associated with dental procedure.<sup>18</sup>

Transcos et al in descriptive study in 2011 Australia reveal that 85.2% Of 54 HCV infected indivial have history of dental procedure such as tooth extraction and 35% had a history of complex dental procedures such as dental extraction.<sup>19</sup>

Another study reveals that prevalence of hepatitis c is more in people who have did dental procedure .infection are acquired from other patients or staff or

doctors who did dental procedures . Paizaet al that dental treatment had a risk of 9% for hepatitis c infection.<sup>20</sup>

Some reports give information that in places like middle east, Africa and eastern Europe where dental procedure is to associated with hepatitis c .It is of because where people and doctors do not follow the guide lines for infection control or may be due to use of non-sterilized syringes or instruments during dental surgery or no likely apply sufficient sterilization technology while in western Europe and Australia there are not any report that dental procedure associated with hepatitis C.<sup>21</sup>

As our study explain that number of male cases are 26 and number of cases of female are 34 .so it clearly indicate that females are more infected .As another study Hussain A et al , in 2011 indicate that there is high prevalence of hepatitis C in females than in males.<sup>24</sup>

As our study indicate that there are equal cases who did their dental procedure from public sector and private sector which are 17 and cases who did their dental procedure from technician or in local dispensary there numbers are 4 less than the other group who did their dental surgery in private and public sector hospitals.as this may be due to our samples numbers are less. As another study Mehboobi et al in the year of 2013 show that hepatitis C infection is a serious problem in developing countries that there

dental treatment is performed by unqualified dentists or they perform by their assistant in clinic which increases a risk of hepatitis C infection.<sup>22</sup>

Our study explain that most cases from lower class which are 58 in numbers less from middle class which are 2.As in developing countries the socioeconomic study of the most people are low .We consider people in lower class whose monthly income is less than 50000 PKR. The other study of Mukhtar et al in 2015 show that cases of hepatitis mostly belong to lower socio economic status. The another study of Ghias et al show the same result.<sup>23</sup>

Our study show that most patients of hepatitis c are uneducated (45) and the less are educated (15).As another study of Mukhtar et al in year 2015 show the same result that 71% of the patients of hepatitis C are uneducated .this show that of lack of education about disease transmission and infection may increase for acquiring hepatitis C infection .<sup>23</sup>

### CONCLUSION:

From our research we conclude that the dental procedure is not significantly associated with Hepatitis C disease.

### RECOMMENDATIONS:

The limitation of our study is that our sample size is less and we collect the data through non probability covenant sampling technique. We take one control for one case with 1:1. We did our study in one center so our study was not generalizable. For ideal study there should be random sampling, multicentre study, two or three control for one case.

### REFERENCES:

1. Qazi HA, Saleem K, Mujtaba I, Hashmi A, Soomro JA. Prevalence and factors associated with HCV (hepatitis C virus) seropositivity in Islamabad, Pakistan. *Acta Medica Iranica* 2010 ;48(6):394-8
2. Clinical virology. Warren L. Review of Medical Microbiology and immunology.13<sup>th</sup> ed. New York:lange, 2014 .p.337
3. World health organization. Hepatitis C. [On line]. [cited 21 march 2016] Available from: <http://www.who.int/mediacentre/factsheets/fs164/en/>
4. Hussain AR, Nasir MI, Siddiqui AA, Ahmed A. Prevalence of HCV genotypes in patients reporting in tertiary health care hospital of Karachi. *Pak J Pharma* 2011;28:23-9.
5. Galdino AS, Santos JC, Souza MQ, Nóbrega YK, Xavier MA, Felipe MS et al A Novel Structurally

- Stable Multiepitope Protein for Detection of HCV. *Hepatitis research and treatment* 2016;16(8):1-9
6. Bosan A, Qureshi H, Bile KM, Ahmad I, Hafiz R. A review of hepatitis viral infections in Pakistan. *J Pak Med Assoc.* 2010;60(12):1045-58
  7. Sarwar J, Gul N, Idris M, Farid J, Adeel MY. Seroprevalence of hepatitis B and hepatitis C in health care workers in Abbottabad. *J Ayub Med Coll Abbottabad* 2008;20(3):27-9.
  8. Umar M, Bilal M. Hepatitis C, a mega menace: a Pakistani Perspective. *J PAK MED STUD* 2012;2(2):68-73
  9. Epidimology and risk factor.hepatiis C. [online]. [cited 5 March 2016]. Available from <http://patient.info/doctor/hepatitis-c-pro>
  10. Krasteva A, Panov VE. Hepatitis B and C in Dentistry. *J of IMAB–Annual Proceeding Scientific Papers* 2008;14(2):38-40
  11. Walker BR, Colledge NR. *Davidson's principles and practice of medicine.*23<sup>rd</sup> ed. Elsevier Health Sciences; 2013
  12. Fayyaz M, Ghous SM, Ullah F, Abbas I, Ahmed N, Ahmed A. Frequency of hepatitis B and C in patients seeking treatment at the Dental section of a tertiary care hospital. *J Ayub Med Coll Abbottabad* 2015;27(2):395-7.
  13. Thiese ND. Gall bladder and biliary tract disease. Kumar V, Abbas AK, Aster JC. *Robbin's Basic Pathology.* 9<sup>th</sup> ed. Canada: Saunders; 1987.
  14. Medscape. Treatment for hepatitis C. [Online][cited 9 march 2016]. Available from <http://emedicine.medscape.com/article/177792-treatment#d1>
  15. Mauss S, Berg T, Rockstroh J, Sarrazin C, Wedemeyer H. *Short guide to hepatitis C.*1<sup>st</sup> ed. Germany: Flying Publishers; 2014
  16. Coates EA et al. Hepatitis C infection and associated oral health problems. *Aust Dent J.* 2000;45(2):108-14.
  17. Al-Kubaisy W, Al-Naggar RA, Ibrahim NS, Bobryshev YV, Al-Kubaisy MW. Is dental extraction a risk factor for contracting HCV infection: Abs, RNA and genotype detection. *Oral Biology and Dentistry* 2014;2(1):2-7.
  18. Murphy EL, Bryzman SM, Glynn SA, et al. Risk factors for hepatitis C virus infection in United States blood donors. *NHLBI Retrovirus Epidemiology Donor Study [REDS]. Hepatology* 2000; 31:756-62.
  19. Trasancos CC, Kainer MA, Desmond PV, Kelly H. Investigation of potential iatrogenic transmission of hepatitis C in Victoria, Australia. *Aust N Z J Public Health* 2001; 25:241-4.

20. Coates EA, Walsh L, Logan R. The increasing problem of hepatitis C virus infection. *Aust dental J* 2001;46(1):13-7.
21. Kerzman H, Green MS, Shinar E. Risk factors for hepatitis C virus infection among blood donors in Israel: a case-control study between native Israelis and immigrants from the former Soviet Union. *Transfusion* 2007; 47:1189-96.
22. Mahboobi N, Porter SR, Karayiannis P, Alavian SM. Dental treatment as a risk factor for hepatitis B and C viral infection. A review of the recent literature. *J Gastrointestin Liver Dis* 2013;22(1):79-86
23. Mukhtar O, Zaheer F, Malik MF, Khan JS, Ijaz T. Socio-demographic study of hepatitis C patients visiting tertiary care hospital. *J Ayub Med Coll Abbottabad* 2015;27(3):650-2.
24. Abdel-Aziz F, Habib M, Mohamed MK, Abdel-Hamid M, Gamil F, Madkour S et al. Hepatitis C virus (HCV) infection in a community in the Nile Delta population description and HCV prevalence. *Hepatology*. 2000;32(1):111-5.