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Prevalence of Hepatitis C, its Risk Factors, and Role of Preventive Measures among Healthcare Providers working at Primary Healthcare Centers (RHCs and BHUs) in District Gujrat Pakistan

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ABSTRACT

Introduction: Healthcare providers (HCPs) have an elevated risk of hepatitis C virus (HCV) infection. HCV infection is an important threat to public health. According to WHO, it is anticipated that more than 3 % population in the world has an HCV infection. **Methodology:** This descriptive cross-sectional study was conducted at a primary healthcare facility. A total of 168 HCPs from RHCs and BHUs from District Gujarat were included in the study. A random sampling technique was used to collect data. The information was collected using a structured questionnaire. **Results:** Among 168 HCPs, 86.3% knew about the prevention of HCV, 29.2% had a history of needle prick, and 8.3% had a history of blood transfusion. Most of the healthcare providers (92.3%) used gloves, 82.7% took preventive measures while handling HCV-positive patients, and 1.8% of HCPs were found positive for HCV. Insignificant results (P>0.5) were found regarding designation (p=0.494), duration of employment (P-value = 1.000), and preventive measures (P-value = 0.457). **Conclusion:** The study concluded that the prevalence of HCV infection was 1.8% among healthcare providers. HCV infection was prevalent among LHVs/midwives or lab technicians/sanitary inspectors.

INTRODUCTION

Hepatitis C is a liver disease caused by HCV single-stranded RNA [1]. The virus belongs to the family Flaviviridae and is a member of the species *Hepaciviral* [2]. HCV infection is an important threat to public health [3]. According to WHO, it is anticipated that more than 3 % population in the world has HCV infection [4], and over 58 million patients have chronic hepatitis C infection with almost 1.5 million incidents annually globally [5].

The Global Health Sector Policy of the WHO, 2016, aimed to eradicate viral hepatitis, which is considered a public health hazard by the year 2030, through a 90 % decrease in novel infections and a 65 percent decrease in mortality [6]. Pakistan is one of the alarming countries with high HCV prevalence [7] because according to WHO estimates, Pakistan has 2nd highest prevalence of HCV infection worldwide after Egypt [8, 9].

Hepatitis C virus is a blood-borne virus [10]. Infectivity can generally occur via percutaneous

routes, such as blades and needles, or through mucosal routes [11]. Healthcare providers have the most hazardous biohazards compared with several other professionals [12].

Chronic HCV infectivity after the acute phase is defined as HCV RNA persistence in the patient's blood for a minimum of 6 months. Persistent fatigue was the most common complaint [13].

According to WHO estimation, 71 million individuals were infected with HCV in 2015, accounting for one percent of the world population [14]. Among the liver-associated disorders, HCV is one of the common causes, and the Hepatitis C virus causes hepatocellular cancer, which is an important cause of (disease) morbidity and death worldwide [15,16]. Researchers have highlighted that HCV-positive patients during the last ten years possibly received more than five injections (16). HCV belongs to the Flaviridae family [17].

The results of a study conducted 2020 highlighted that barber are a major cause of Hepatitis C Virus transmission. In Sheikhupura City, Punjab, the incidence of Hepatitis C virus transmission due to barbers was 17.9 percent while among the barbers was 58.6% [18]

HCV transmission in Pakistan is mostly observed among paramedics because of the lack of adequate information and standard procedures, such as training in medical procedures [19].

HCPs are at a higher risk of exposure to bodily fluids, blood, and infectious substances. Approximately 75 % of occupational/job-related exposures occur through puncture wounds, and the remaining 25 % occur through contact with non-intact skin and mucous membranes. The risk of hepatitis C infection is higher in puncture wounds than in mucous membrane exposure [20]. Compliance with standard safety measures plays an important role in preventing job-related exposures [21].

In one of the study it was identified that infection and risk factors for HCV seropositivity in 206 HCVs in Egypt. Approximately 6.8% tested positive for hepatitis C virus antibodies, with higher rates among sanitary workers [22].

The objectives of this study were to decrease the morbidity and mortality among healthcare providers, to determine the prevalence of Hepatitis C Virus among healthcare providers, to determine the risk factors correlated with hepatitis C virus, to observe the preventive measures followed by the healthcare provider, and to formulate suggestions to prevent HCV infection among healthcare providers.

MATERIALS AND METHODS

Study design and study population

A descriptive cross-sectional study was conducted at primary healthcare facilities in Gujrat District. The healthcare providers (HCPs) of District Gujrat comprised the study population.

Sample Size

The sample size was calculated using the WHO sample size calculator with a 05% prevalence rate, 95% confidence interval, and 80% power, which came to 168. Considering an attrition of 10%, the sample size was 168.

Sampling Technique

A simple random sampling technique was used to collect a sample of healthcare providers in the Gujrat district. To do this, we first created a list of all healthcare providers working at RHCs and BHUs in Gujrat.

Data Collection Techniques

Quantitative data were collected by administering a structured questionnaire and finalized after pretesting. The researcher assessed the healthcare providers working in rural health centers and basic health units of district Gujrat, and the results were noted on the proforma. Blood samples from healthcare providers were collected by laboratory technicians through phlebotomy and tested for Hepatitis C using rapid chromatography strip technology. Primary data were collected through structured questionnaires and screening laboratory tests (rapid chromatography strip technology) from healthcare providers working in rural health centers and basic health units of district Gujrat.

Biosafety and Disposal and Transportation

Laboratory technicians collected the blood samples of health care providers by using all protective measures. Medical waste was segregated and collected in yellow (infectious waste), red (glass, vials, bottles), and white (paper, wrappers) bins. Syringes and needles were collected in separate safety boxes. Infectious waste, including facemasks, aprons, and gloves, was always collected by wearing protective clothing. Non-

infectious waste was burnt deep in the burial pit. The infectious waste was transported to the yellow room of a nearby THQ hospital and sent to an incinerator for incineration.

Study Duration
The duration of the study was three months.

Inclusion Criteria
Physicians/dentists, dispensers/health technicians, nurses, LHVs/midwives, vaccinators, and laboratory technicians were included in this study.

Exclusion Criteria
No exclusion criteria were present except for unwillingness or refusal.

Statistical Analysis
IBM SPSS statistics 25.0 was used to analyze data. The chi-square test was applied to find the association between designations, employment, and preventive measures taken while handling HCV patients with hepatitis C status.

Ethical Approval
The study was approved by the Institutional Review Board of HSA Islamabad, CEO DHA Gujrat, and hospital ethical committees to collect the data. Informed written consent was taken from participants. Privacy and confidentiality were maintained at all costs following principles issued by Health Services Academy, Islamabad.

Reliability and validity
For reliability and validity, the prevalence of HCV was assessed using rapid chromatography strip technology.

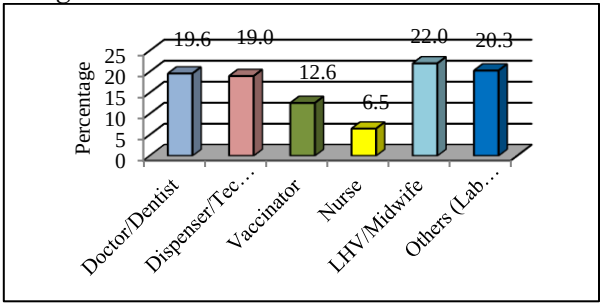
RESULTS
168 healthcare providers participated in this study, 56 (33.5%) were up to 30 years old 73 (43.3%) were 31-40 years old and 39 (23.3%) were above 40 years old. The mean age of healthcare providers was 35.27±8.575 years. Out Of 168 HCPs, 76.2% were married, 20.8% were unmarried, and 3.0% were widows/divorced. (Table 1)

Table 1
Frequency Distribution of Healthcare Providers According to Demographic Characteristics

Demographic Characteristics	Frequency	Percentage (%)
Age		
≤30 years	56	33.5%
31-40 years	73	43.3%
Above 40 years	39	23.2%
Total	168	100.0 %
Mean ±SD	35.27±8.575	
Gender		
Female	67	39.9%
Male	101	60.1%
Total	168	100.0%
Marital status		
Married	128	76.2%
Unmarried	35	20.8%
Widow/divorced	5	3.0%
Total	168	100.0%

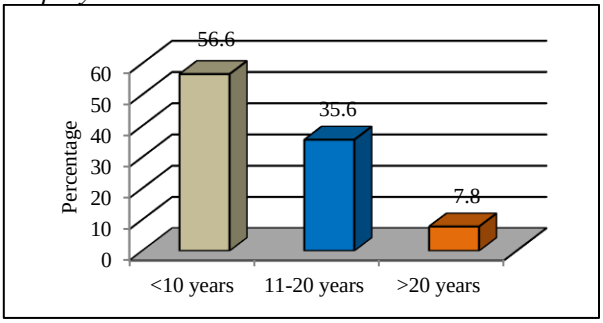
SD: Standard Deviation; Age: Ages were categorized into three groups: less than 30 years, 31-40 years, and above 40 years 168 HCPs surveyed: doctors/dentists accounted for 19.6%, dispensers or technicians were 19.0%, vaccinators 12.6%, and nurses 6.5%. LHVs and midwives were 22.0%. (Figure 1)

Figure 1
Frequency Distribution of HCPs According to Designation



LHV: Lady Health worker; Lab Tech: Laboratory technician; SI; Sanitary Inspector Among 168 healthcare providers, 56.6% had employment duration of up to 10 years, 35.6% had 11-20 years, and 7.8% of HCPs had over 20 years of employment time. The mean duration of employment was 9.61+8.131 years. (Figure 2)

Figure 2
Frequency Distribution of HCPs According to Employment



HCPs: Healthcare Providers 86.3% knew about HCV prevention, while 13.7% did not know about HCV. 29.2% had a history of needle pricks. In total, 119 participants did not have needle pricks. 8.3% of participants had a history of blood transfusion, while 91.7% did not have a history of blood transfusion. 34.5% shaved at home, 25.6% shaved at a barber shop. 82.7% took preventive measures while handling the HCV-positive patients but 29 (17.3%) HCPs did not take preventive measures. 1.8% were found positive for Hepatitis C virus while the majority 98.2% were found negative for hepatitis C virus. (Table 2)

Table 2

Knowledge, Risk Factors, and Preventive Measures Related to Hepatitis C: Survey Results

Variables		Frequency (n)	Percentage (%)
Knowledge about Hepatitis Prevention	Yes	145	86.3%
	No	23	13.7%
History of Jaundice	Yes	7	4.2%
	No	161	95.8%
Spouse Suffering from HCV	Yes	4	2.4%
	No	164	97.6%
Any Family Member Suffering from HCV	Yes	10	6.0%
	No	158	94.0%
Injury from Hepatitis C Patient	Yes	6	3.6%
	No	162	96.4%
History of Needle Prick	Yes	49	29.2%
	No	119	70.8%
History of Blood Transfusion	Yes	14	8.3%
	No	154	91.7%
History of Dental Procedure	Yes	57	33.9%
	No	111	66.1%
Body Tattoos	Yes	3	1.8%
	No	165	98.2%
Nose or Ear Piercing Done	Yes	63	37.5%
	No	105	62.5%
Shaving at Home or Barber Shop	Yes	58	34.5%
	No	43	25.6%
Routine Use of Gloves at Health Facility	N/A	67	39.9%
	Yes	155	92.3%
Use of Needle Cutter	No	13	7.7%
	Yes	138	82.1%
Workshop Attended About Hepatitis C Prevention	No	30	17.9%
	Yes	83	49.4%
Preventive Measures	No	85	50.6%
	Yes	139	82.7%
Anti-HCV Antigen	No	29	1.3%
	Positive	3	1.8%
	Negative	165	98.2%
Total		168	100%

HCV: Hepatitis C virus; Anti-HCV antigen: Antibodies against Hepatitis C Virus The results showed that all HCPs tested negative for HCV. Among LHVs or Midwives, 0.6% tested positive and 21.4% tested negative. Among lab technicians, 1.2% tested positive, and 19.0% tested negative. The results were not statistically significant (p=0.494) (Table 3).

Table 3

Association between Designation and Hepatitis C Status

Designation	Hepatitis C Status		Total	p-value
	Positive	Negative		
Doctor/Dentist	0 (0.0%)	33 (19.7%)	33 (19.7%)	0.494
Dispenser/ Technician	0 (0.0%)	32 (19.1%)	32 (19.1%)	
Vaccinator	0 (0.0%)	21 (12.5%)	21 (12.5%)	
Nurse	0 (0.0%)	11 (6.5%)	11 (6.5%)	
LHV/Midwife	1 (0.6%)	36 (21.4%)	37 (22.0%)	
Others (Lab Tech, SI)	2 (1.2%)	32 (19.0%)	34 (20.2%)	
Total	3 (1.8%)	165 (98.2%))	168(100.0%)	

Lab Tech: Laboratory Technician; SI: Sanitary Inspector; Vaccinator: HCP who administer vaccine to individuals Out of 155 HCPs with less than 20 years of employment, 1.8% tested positive and 90.5% tested negative for HCV. Among 13 HCPs with over 20 years of employment, all tested negative. The results were insignificant (P=1.00). (Table 4)

Table 4

Association between Duration of Employment and Hepatitis C Status

Duration of Employment	Hepatitis C Status		Total	p-value
	Positive	Negative		
≤20 years	3 (1.8%)	152 (90.5%)	155 (92.3%)	1.00
>20 years	0 (0.0%)	13 (7.7%)	13 (7.7%)	
Total	3 (1.8%)	165 (98.2%)	168(100.0%)	

Here p-value is (P-value = 1.000); Duration of employment: Duration of employment was categorized into two groups; ≤20 years and > 20 years; Hepatitis C Status: The findings of HCV with two possible outcomes: Positive shows the presence of HCV and negative result indicates absence of HCV.

Among 139 healthcare providers who took preventive measures while handling HCV-positive patients, 1.2% were found positive, and 81.5% were found negative for hepatitis C virus. Among 29 HCPs who did not take preventive measures while handling HCV-positive patients, 0.6% were found positive, and 16.7% were found negative for hepatitis C virus. The results were not statistically significant (P=0.457). (Table 5)

Table 5

Association between Preventive Measures Taken While Handling HCV Patients and Hepatitis Status

Preventive Measures	Hepatitis C Status		Total	P-value
	Positive	Negative		
Yes	2 (1.2%)	137 (81.5%)	139 (82.7%)	
No	1 (0.6%)	28 (16.7%)	29 (17.3%)	0.457
Total	3 (1.8%)	165 (98.2%)	168(100.0%)	

Preventive measure: Strategies to reduce HCV

DISCUSSION

HCV infection is a major epidemiological problem in developed and developing countries. HCPs are at a high risk of infection due to common and frequent contact with injection, which contaminates and infects patients. This study was conducted to evaluate the prevalence of HCV and its risk factors between HCPs at RHCs and BHUs units, which revealed that 66.5% of the HCPs were over age 30, however, 33.5% were aged 30 and above. Our study findings are comparable to the study in which most of the healthcare providers (75.4%) were above age 30 and 24.6% were up to age 30 [12).

The findings of our study confirmed that mainstream (60.1%) of the healthcare providers were male, while 39.9% were female healthcare providers. However, the findings of a research study carried out in 2018 indicated that the majority of the healthcare providers (HCPs), about 78.0%, were o gender female, and only 22.0% were male gender [23].

In our study, 19.6% of healthcare providers were doctors/dentists while the remaining significant proportion (80.4%) comprised dispensers/technicians, vaccinators, LHVs/midwives, nurses, lab technicians, and sanitary inspectors. The findings of a study are comparable with our study results and also confirm that 21.6% of healthcare providers were doctors and the remaining proportion (78.4%) included nurses, technicians, housekeepers, and administrative and pharmacy staff [12].

It is important to mention here that more than half (56.6%) of healthcare providers had work experience of up to 10 years while 43.4% had more than 10 years. It was reported that most of the healthcare providers (63.8%) had work experience of up to 10 years, whereas 36.2% of HCPs had more than 10 years [12].

In Pakistan, HCV transmission is more common among healthcare providers, owing to a lack of knowledge, training, and standard procedures. It is worth mentioning here that the mainstream (86.3%) of health care providers knew about hepatitis C prevention. The results of our study exhibited a better scenario than the study carried out by Zafar et al. [24] who asserted that only 19.0% of healthcare providers knew about the prevention of hepatitis C infection.

The study discovered that most of the HCPs took preventive measures when handling patients, and about 92.3% used gloves. This showed a much better scenario than a previous study in which 67.2% of healthcare providers used gloves to prevent hepatitis C infection and confirmed that only 19.8% of healthcare providers attended workshops regarding the prevention of infectious diseases [24].

The outcomes of our study further indicated that six healthcare providers had an injury from hepatitis C patients and 29.2% had a history of needle prick. The results of our study are much better than the study done in 2015, who reported that 48.3% of healthcare providers had a history of needle prick. In another study, Kacem et al. [12] reported a high incidence of needle prick injury (42.3%) [25].

This study also assessed the association between hepatitis C status and other variables. Insignificant results (P>0.5) were found for designation, duration of employment, and preventive measures. In one of the study it was found that an insignificant association (P-value > 0.5) of hepatitis C status with duration of employment, while a significant association (P-value ≤ 0.5) was found [26].

CONCLUSION

The research study found that 1.8% of HCPs had HCV. The prevalence of HCV was highest among LHVs, midwives, laboratory technicians, and sanitary inspectors. This study identified risk factors such as needle-stick prick injuries, poor infection prevention control (IPC) practices, and lack of awareness. The need for targeted interventions to address these risk factors has been emphasized. The study also found that education and training (workshops) programs can significantly decrease HCV transmission among HCPs. Further large-scale research is required to determine the prevalence and risk factors of HCV infection in this group.

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