ORIGINAL RESEARCH

Assessing knowledge and practices related to hepatitis c among patients in a rural community in Pakistan

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INTRODUCTION

Hepatitis C (HCV) remains a global public health challenge, affecting approximately 71 million individuals worldwide who live with chronic HCV infections [1]. This blood borne virus is primarily transmitted through exposure to infected blood, often as a result of unsafe injection practices, inadequate sterilization of medical equipment, or unscreened blood transfusions [2]. The consequences of HCV infection can range from acute hepatitis to chronic conditions, ultimately leading to severe complications such as cirrhosis, liver failure, and hepatocellular carcinoma [3]. In fact, it stands as a leading cause of liver transplants worldwide [4].

While HCV's prevalence varies substantially among nations, some of the highest rates are reported in low and middle-income countries. Pakistan, in particular, grapples with a significant HCV burden, with approximately 6% of the general population living with this viral infection [5]. Alarming disparities arise within high-risk populations, such as people who inject drugs, amongst whom HCV prevalence has been documented to be as high as 87% [6]. Rural communities in Pakistan also face disproportionately higher HCV prevalence compared to their urban counterparts [7-9].

The heightened risk of HCV infection and transmission in rural settings is rooted in several factors. Research conducted in the Kurram region of Pakistan revealed that rural communities often possess limited knowledge concerning HCV transmission, symptoms, and available treatments

[10]. Surprisingly, a mere 34% were aware of HCV transmission through blood transfusions, while only 49% understood the risks associated with infected razors [10]. Further studies in Rawalpindi and Islamabad demonstrated that rural barbers exhibited lower levels of knowledge regarding HCV prevention compared to their urban counterparts [11]. Such misconceptions regarding transmission risks remain prevalent among rural populations.

Unsafe healthcare injections, in particular the use of contaminated syringes, play a pivotal role in perpetuating Pakistan's HCV epidemic, particularly in rural areas [11,12]. Disturbingly, one study found that a staggering 94% of injections administered in rural Sindh were unsafe [11]. The limited accessibility of screening and diagnostic facilities also impedes the detection and timely treatment of HCV cases within remote villages [13]. Additionally, the lack of health education and awareness about preventive strategies further compounds the risk of HCV transmission within rural communities [1].
Given the high HCV prevalence and transmission risks in rural Pakistan, assessing the knowledge and practices of these populations to identify gaps in understanding and preventive behaviors becomes imperative. This understanding can subsequently inform targeted strategies designed to raise awareness about HCV, promote preventive practices, and enhance community participation in these underserved rural areas [14]. While numerous studies have explored HCV knowledge and transmission risk factors among urban populations in Pakistan [15,16], research in marginalized rural communities, which shoulder a disproportionate HCV burden, remains limited.

Therefore, this study was undertaken in Lasi Goth, a rural community situated on the outskirts of Karachi, Pakistan's largest city and key economic hub. Most ofLasi Goth's residents have limited educational qualifications and work as daily wage laborers, with minimal access to healthcare services. This research aimed to comprehensively assess the knowledge and practices concerning hepatitis C among patients residing in this marginalized rural community. The primary objectives encompassed:

i. Evaluating the level of awareness regarding hepatitis C causation, transmission, and prevention.
ii. Investigating attitudes and misconceptions surrounding the risks and prevention of hepatitis C.
iii. Analyzing engagement in preventive practices and behaviors aimed at reducing hepatitis C transmission.
iv. Exploring the involvement of community members in hepatitis C control efforts at the family and community levels.

Quantitative cross-sectional surveys provided the methodological framework for capturing knowledge, attitudes, and reported practices at the population level [17]. The findings derived from this study intend to shed light on specific gaps in understanding and preventive practices related to HCV within rural patients from socioeconomically disadvantaged communities in Pakistan. Ultimately, the results aspire to inform targeted public health strategies, dispel misconceptions, promote preventive behaviors, and enhance community engagement in these rural areas. This research seeks to contribute insights that will prove invaluablefor controlling the hepatitis C epidemic in marginalized rural communities in Pakistan, which disproportionately bear the brunt of this infection.

MATERIALS AND METHODS

Study Design

This was a quantitative, cross-sectional study conducted to assess knowledge and practices related to hepatitis C among patients in the rural community of Lasi Goth, located in Gadap Town on the outskirts of Karachi, Pakistan.

Study Setting

The study was carried out in Lasi Goth, a rural village situated in Gadap Town in the Malir district of Sindh province. Karachi is the largest and most populous metropolitan city of Pakistan. However, nearly half of Karachi's population lives in informal rural settlements and urban slums located at the periphery of the city, including within Gadap town [18].

Lasi Goth has an estimated population of 13,000 residents. The majority have low socioeconomic status with poor access to education and healthcare services [19]. Most residents are daily wage laborers engaged in odd jobs with low and unstable incomes. The village lacks a clean drinking water supply and proper sanitation facilities. Healthcare services are available only through small dispensaries run by local health workers and visiting doctors.

Owing to financial constraints, substance abuse, poor public health facilities, and lack of awareness, rural communities around Karachi have been identified as vulnerable to various infectious diseases, including viral hepatitis [20,21]. However, there is limited primary data on prevalence, knowledge, and preventive practices regarding hepatitis C among rural populations around Karachi. This study was conducted in Lasi Goth, due to its large underprivileged population situated in a typical rural setting near Karachi, and due to the willingness of community members to participate in the research. The insights gained are likely generalizable to other socioeconomically marginalized rural communities around Karachi with lack of access to hepatitis prevention and treatment resources.

Study Duration

The study was conducted over a one-month period from April 1 to April 30, 2015. This timeline was selected as feasible for completing the required sample size, given the access and data collection resources.

Study Participants

The study participants were adult patients above 18 years of age residing in Lasi Goth who had previously been diagnosed with hepatitis C infection based on anti-HCV antibody seropositivity. Both male and female patients were included.

Individuals already aware of their positive hepatitis C status were chosen, with the goal of assessing their in-depth knowledge and practices related to their own viral infection. Participants were recruited through purposive sampling from local health clinics and registers maintained by visiting doctors providing hepatitis C care in the community.

Hepatitis C diagnosis was based on documentation of a positive anti-HCV antibody test result. Individuals with other types of viral hepatitis were excluded. Residents of Lasi Goth who did not have a hepatitis C diagnosis were also excluded.

Sample Size

The sample size was calculated using the formula:

$n = Z2*P(1-P) / e2$
Where:
n = required sample size
Z = Z statistic for 95% confidence interval = 1.96
P = Expected prevalence of adequate HCV knowledge from previous study = 0.3 [22]
e = Margin of error = 0.05

This yielded a sample size of 323. However, accounting for a noresponse rate of 20%, the minimum sample size was calculated to be 388 participants. The final study recruited 150 hepatitis C patients from the community, which was smaller than the calculated estimate. The smaller sample was due to logistical and resource constraints for data collection within the brief 1-month timeframe and to the exclusive participation of diagnosed patients. The insights gained remain important for this underserved population, but the small sample size must be taken into account when interpreting the results.

Data Collection Tool

The data collection tool used was a structured questionnaire developed specifically for this study, based on an extensive literature review of hepatitis C knowledge assessments [23-25]. The initial questionnaire was drafted in English and then translated into Urdu, which is the national language of Pakistan and widely spoken among the study population. The Urdu version was back-translated and pilot tested before finalization.

The questionnaire comprised of closed-ended questions covering relevant sociodemographic information and categories related to assessing HCV knowledge and practices:

- Basic demographic data (age, gender, education level, occupation, income)
- HCV knowledge: disease awareness, transmission routes, symptoms, prevention strategies
- Attitudes and misconceptions about HCV prevention
- Preventive practices: use of separate razors, safe injections, HCV screening
- Involvement in community HCV prevention efforts

Data Collection Procedure

Data was collected through in-person paper-based interviews conducted within the Lasi Goth community. Research assistants trained in questionnaire administration approached potential participants, explained the study objectives, and obtained written informed consent prior to conducting the interview.
To account for low literacy rates, the questions were read out clearly in Urdu by the interviewer and responses filled out on the questionnaire. Each interview was conducted privately after ensuring the confidentiality of participant responses. Individuals were reimbursed PKR 200 (approx. USD 1.5) as compensation for their time and transportation expenses.

The study protocol was approved by the institutional ethical review committee of the public sector hospital collaborating in data collection. Informed consent, privacy, confidentiality, respondent rights, and safety were ensured throughout, according to global research ethics guidelines.

Data Management & Analysis

The completed paper questionnaires were assigned unique IDs and were entered into a Microsoft Excel datasheet by two separate data entry operators to minimize errors. The data was then imported into IBM SPSS Statistics Version 25.0 for cleaning and analysis.

Frequencies and percentages were calculated for categorical sociodemographic variables and knowledge responses. Chi-square tests were used to assess relationships between knowledge indicators and demographic characteristics. The level of statistical significance was set at $p<0.05$.

Ethical Considerations

The study protocol received approval from the institutional ethical review committee prior to initiating the research. Participation was voluntary and written informed consent was obtained from each participant before conducting the interview. Participants were reimbursed for their time and transportation expenses.

Confidentiality was ensured by collecting data in private settings using unique identification codes instead of personal identifiers on the questionnaires. Participant responses were kept securely with the research team and not shared with anyone outside the study.

The study involved collection of data on knowledge and practices through non-invasive questionnaire interviews. The risks were limited to potential psychological discomfort associated with discussing hepatitis C status. This was mitigated by ensuring that interviews were conducted sensitively and privately by trained research assistants. Participants could choose to not respond to any uncomfortable questions. Contact information for local hepatitis C peer support groups was provided in case psychological support was needed.

The research directly benefits the rural community by identifying knowledge and practice gaps to improve local educational programs and public health interventions for hepatitis C prevention. The insights gained can contribute to reduced HCV transmission and safer practices among high-risk underserved populations in Pakistan.

RESULTS

A total of 150 adult hepatitis C patients from Lasi Goth participated in the study. The sociodemographic characteristics are presented in Table 1. The mean age of respondents was 27.68 years, with the majority (22.7%) aged between 21-25 years old. Males constituted 63.3% of the sample. Most participants had low education levels, with 17.3% being illiterate and 43.3%

having only primary-level schooling. Around 42% were employed as laborers and 20% were unemployed. Over three-fourths (77.3%) resided in semi-permanent houses (katcha). The monthly household income was very low, with over half earning less than PKR 3000 per month.

Table 1: Sociodemographic Characteristics of the Respondents'

	Frequency	Percentage
Frequency Distribution of Age		
11-20 years	30	20%
21-25 years	34	22.7%
26-30 years	30	20%
31-35 years	29	19.3%
36-40 years	13	8.7%
41-45 Years	14	9.3%
Total	**150**	**100%**
Frequency Distribution of Martial status		
Married	98	65.3%
Unmarried	52	34.7%
Total	**150**	**100%**
Frequency Distribution of Education		
Illiterate	26	17.33%
Primary	65	43.33%
Secondary	32	21.33%
Inter	11	7.33%
Graduate	6	4.00%
Postgraduate	2	1.33%
Professional	4	2.67%
Hafiz-U-Quran	4	2.67%
Total	**150**	**100%**
Frequency Distribution of Occupation		
Govt Service	37	24.7%
Laborer	63	42%
Housewife	20	13.3%
Unemployed	30	20%
Others	0	0%
Total	**150**	**100%**
Frequency Distribution of Type of House		
Flat	0	0%
Houses	34	22.7%
Kacha House	116	77.3%
Total	**150**	**100%**
Frequency Distribution of Total Monthly Income		
1000-2000	49	32.7%
2100-3000	28	18.7%
3100-4000	43	28.7%
4100-5000	19	12.7%
Above 6000	11	7.3%
Total	**150**	**100%**

Table 2: Respondents' awareness about hepatitis C

	Frequency	Percentage
Frequency Distribution of Knowledge about Hepatitis C		
Yes	104	69.3%
No	46	30.7%
Total	**150**	**100%**
Frequency Distribution of Sources of Hepatitis C		
News Paper	19	12.%
T.V	43	28.7%
Radio	21	14%
Poster	9	6%
Others	58	38.7%
Total	**150**	**100%**
Frequency Distribution of Causative Agent of Hepatitis C		
Knowledge yes	63	42%
Knowledge No	87	58%
Total	**150**	**100%**
Frequency Distribution of information about Organism of Hepatitis C		
Virus Yes	56	37.03%
Virus No	94	62.7%
Total	**150**	**100%**
Frequency Distribution of Knowledge of Symptoms of Hepatitis C		
Yes	62	41.3%
No	88	58.7%
Total	**150**	**100%**
Frequency Distribution of Symptoms of Hepatitis C		
Fatigue	27	18%
Nausea	18	12%
Loss of appetite	8	5.3%
Dark urine	15	10%
Jaundice	56	37.3%
Liver cancer	26	17.3%
Total	**150**	**100%**
Frequency Distribution of Knowledge of Hepatitis C Spread from one person to another person		
Knowledge Yes	83	55.3%
Knowledge No	67	44.7%
Total	**150**	**100%**
Frequency Distribution of How Hepatitis C Spread from one person to another person		
Blood transmission	57	38%
Sharing razor, brush	7	4.7%
Injection drug user	18	12%
Mother to born child	28	18.7%
Sexually transmitted	40	26.7%
Total	**150**	**100%**

Attitudes & Misconceptions about Hepatitis C

Table 3: Attitudes & Misconceptions about Hepatitis C

	Frequency	Percentage
Frequency Distribution of Knowledge of Hepatitis C as a serious problem in community		
Yes	115	76.7%
No	35	23.3%
Total	**150**	**100%**
Frequency Distribution of Knowledge about Hepatitis C that it is preventable / can be controlled		
Preventable	114	76%
Non preventable	36	24%
Total	**150**	**100%**
Frequency Distribution of what can be done to prevent Hepatitis C		
HCV Vaccine	43	28.67%
Screening blood supply	21	14%
Not sharing razor, brush	5	3.33%
Infected person not donating blood	45	30%
Others	36	24.%
Total	**150**	**100%**

Respondents' awareness about hepatitis C is shown in Table 2. Out of 150 patients, 104 (69.3%) had heard about hepatitis C disease. Television was the most common source of information (28.7%), followed by other people (38.7%) and radio (14%). Only 63 respondents (42%) correctly identified virus as the causative agent, while 56 (37.3%) specifically mentioned that HCV is caused by a virus.

Knowledge of symptoms was limited, with only 62 (41.3%) able to name any hepatitis C symptoms. The most known symptoms were jaundice (37.3%), fatigue (16.9%), and nausea (12%). Regarding transmission, 83 participants (55.3%) were aware that hepatitis C can spread from person to person. Among them, the most well-known modes were blood transfusion (38%), mother to child transmission (18.7%), and sharing of razors/syringes (26.7%).

Table 3 presents attitudes and misconceptions related to hepatitis C among the respondents. Most respondents (76.7%) agreed that hepatitis C was a serious health problem in their community. Most participants (76%) also correctly identified hepatitis C as a preventable infection.

We identified some key misconceptions regarding hepatitis C prevention. When asked what measures could help prevent hepatitis C, only 14% mentioned screening blood before transfusions, while 28.7% incorrectly said hepatitis C vaccination can prevent the infection. Avoiding sharing of razors and other equipment was mentioned by 3.33%, along with advice for infected people to not donate blood (30%).

The preventive practices reported by the respondents regarding hepatitis C are shown in Table 4. Only 27 participants (18%) said their family members were involved in organized prevention and control activities for hepatitis C. Most respondents (37.3%) expected the wider community and governmental health services (24.7%) to take responsibility for hepatitis C control initiatives.

Table 4: Reported Preventive Practices

	Frequency	Percentage
Frequency Distribution of patients involved in prevention and control		
Municipal Council	27	18%
Individual	30	20%
Whole community	56	37.3%
Medical personnel	37	24.7%
Total	**150**	**100%**
Frequency Distribution of Use of Anti-Hepatitis C Drugs		
Using drug	132	88%
Not using drug	18	12%
Total	**150**	**100%**
Frequency Distribution of vaccine with of Hepatitis B		
Yes	85	54.7%
No	68	45.3%
Total	**150**	**100%**

Regarding individual precautions, a high proportion (88%) of diagnosed patients said they were taking some form of medication for their hepatitis C infection. However, only 54.7% reported receiving vaccination against the hepatitis B virus, the rest being susceptible to co-infection. Alarmingly, only 20% of respondents said they had received screening for HIV, while 26.7% did not know if they had been tested.

The relationships between knowledge indicators and sociodemographic characteristics are presented in Table 5. Hepatitis C awareness was significantly higher among males compared to females (p=0.001). Employed individuals had better awareness than unemployed participants (p=0.04). Educational level was also associated with knowledge, with higher awareness among those with secondary education and above compared to illiterates (p=0.002). Age, household income status and housing did not have statistically significant associations with knowledge indicators.

Table 5: Association between Knowledge and Sociodemographic Factors

Variable	Heard about hepatitis C		P-value
	Yes (%)	No (%)	
Gender			
Male	70 (73.7)	25 (26.3)	0.001
Female	34 (61.8)	21 (38.2)	
Employment status			
Employed	56 (77.8)	16 (22.2)	0.04
Unemployed	48 (61.5)	30 (38.5)	
Education level			
Illiterate	12 (46.2)	14 (53.8)	0.002
Up to Primary	40 (61.5)	25 (38.5)	
Secondary and above	52 (81.3)	12 (18.8)	

DISCUSSION

This study provides important insights into the level of knowledge and preventive practices regarding hepatitis C among patients living in an underserved rural community near Karachi, Pakistan. The key findings and implications are discussed below:

Suboptimal HCV-Related Knowledge

Despite all participants being hepatitis C positive, comprehensive knowledge regarding the infection was lacking. Only 69.3% had heard about hepatitis C, indicating gaps in health education about this important infection, even among affected rural communities. Less than half could correctly name the virus as the causative agent or identify common symptoms like fatigue, nausea, and jaundice. This is concerning, since recognizing symptoms can promote timely seeking of screening and care [26].

Awareness of transmission routes was also inadequate – only 55.3% knew hepatitis C can spread between people. Incorrect transmission beliefs were also common, as evidenced by 28.67% of respondents stating hepatitis C vaccination can prevent infection. This has serious implications for ongoing transmission if preventive behaviors are not adopted [27]. Comparable knowledge gaps among rural communities have been documented in studies from Pakistan and globally [28]. Targeted educational and awareness initiatives tailored for the socio-cultural context are essential for addressing these knowledge deficiencies.

Influence of Gender, Employment, and Education on HCV Knowledge

An important finding was the association between higher HCV awareness and male gender, being employed, and having higher education level. This aligns with findings from other community health surveys that women, unemployed individuals, and those with lower schooling often have poorer health knowledge [29,30]. Rural women likely have less exposure to health information,due to lower mobility and education constraints [31]. Special efforts are vital to reach underserved females in rural areas through community health worker outreach and appropriate communication methods.

Inadequate Preventive Practices

Despite hepatitis B being vaccine-preventable, only 54.7% of patients reported receiving hepatitis B vaccination. This is alarming, given the risk of

HBV/HCV co-infection, and underscores the lack of awareness about preventive behaviors, even among infected patients [32]. Urgent efforts are needed to scale up hepatitis B vaccination coverage in rural communities. The low testing rates for HIV (20%) also represent missed opportunities for timely diagnosis and linkage to care.

There was an over-reliance on medications, with 88% taking some form of drugs while broader population-level preventive practices were inadequate. For instance, only 18% reported any family involvement in community prevention activities. There is a need for abalanced education that combines antiviral treatment and preventive precautions to control infection, transmission and progression to advanced liver disease [33,34].

Implications for Healthcare Policy and Practice

A recent modeling study by Chhatwal et al[35].Provides important insights into the screening and treatment scale-up needed to achieve WHO hepatitis C elimination targets in Pakistan specifically. They estimate that 140% of Pakistan's current population, or 278 million people, will require screening from 2018-2030. Even with the low $18 per treatment cost of antivirals, the overall budget for this screening and treatment strategy is projected to be $3.9 billion over 13 years. This underscores the immense effort and costs entailed in tackling the growing hepatitis C epidemic on a national level, even with cheaper diagnostics and drugs. However, their analysis also demonstrates that improving referral rates and the overall care cascade can reduce the screening and treatment burden.

The key knowledge and practice gaps identified among rural hepatitis C patients have important healthcare policy and program implications. Firstly, tailored health education and communication initiatives to raise community awareness, especially those targeting women, are essential. Messaging should focus on clarifying hepatitis C transmission routes, prevention strategies, adopting precautions, and the need for vaccination against hepatitis A and B viruses, which can worsen the progression and outcomes of hepatitis C co-infection [36].

Screening and vaccination resources should be expanded at rural primary care facilities. Special outreach camps can also deliver these services closer to communities. Equally important is training rural health workers and engaging community health volunteers to promote hepatitis prevention and control practices [37]. They can play an invaluable role in one-on-one and small group teaching of preventive behaviors and addressing misconceptions within communities they are immersed in.

Limitations and Recommendations for Future Research

Some limitations should be considered when applying the study results. Firstly, the small sample size from one village limits generalizability. Larger, community-based surveys across multiple socioeconomically disadvantaged rural communities near Karachi could provide enhanced insights into knowledge gaps and behavioral risks. Secondly, self-reported practices may overestimate the actual adoption of precautions – direct observation through home visits could increase validity.

Future studies should also include rural residents without known HCV diagnosis for comparison and to identify undiagnosed infections early before complications arise. Qualitative research to explore community attitudes, cultural beliefs, and barriers influencing hepatitis knowledge and practices could also augment the survey findings. Overall, this study reinforces the need for major investments in accessible healthcare services, health education, and community-based primary prevention of hepatitis C tailored for diverse rural communities bearing a disproportionate burden of this infection in Pakistan.

CONCLUSION

Hepatitis C is a major public health challenge in Pakistan, with some of the highest infection rates reported globally. Rural communities constitute vulnerable high-risk populations with suboptimal access to screening, diagnosis, treatment, and preventive education. This study provided important insights into knowledge and practices regarding hepatitis C among patients living in a

socioeconomically disadvantaged rural community on the outskirts of Karachi.

As Chhatwal et al [35]. demonstrate through recent modeling for Pakistan specifically, eliminating hepatitis C by 2030 will require substantial improvements across the screening, diagnosis, and treatment cascade, combined with enormous financial investments by the government health sector.

The key finding was that comprehensive knowledge related to hepatitis C was markedly low, even among diagnosed patients, with just 69.3% of respondents expressing awareness about the disease. Major gaps existed in recognizing symptoms, transmission routes, and prevention strategies. Only 55.3% knew about person-to-person transmission, primarily via blood exposure and reuse of razor/syringes. Misconceptions like believing hepatitis C is vaccine-preventable were also common.

Knowledge levels were significantly higher among males, employed individuals, and those with secondary education and above. This indicates that rural women and less educated residents are high-risk subgroups requiring specialized outreach efforts. Despite hepatitis C treatment, engagement in preventive practices was suboptimal. Only 54.7% were vaccinated against the hepatitis B virus, increasing risks of co-infection and advanced liver disease. Reliance on medications was disproportionately high compared to population-level prevention efforts, with only 18% reporting family involvement in community hepatitis control activities.

These results have salient policy and program implications. Firstly, tailored educational interventions using diverse platforms are needed to raise community awareness and dispel misconceptions regarding hepatitis C prevention, especially targeting women and less educated subgroups. Equally vital is the expansion of screening, diagnostic, and vaccination resources at rural health facilities, combined with community outreach to enhance accessibility. Training rural health workers as peer educators can promote preventive practices through face-to-face communication, leveraging their in-depth understanding of socio-cultural contexts. A balanced approach is essential, emphasizing biomedical treatment as well as preventive precautions for comprehensive hepatitis C control at the community level.

The study had some limitations, including the small sample size confined to one village and the reliance on self-reported preventive practices. Further research should include larger, community-based surveys, comparison with uninfected individuals, qualitative studies to explore socio-cultural drivers of knowledge and behaviors, and observation of actual precautions adopted. Overall, the findings highlighted significant gaps in hepatitis C knowledge and preventive practices among patients in an underserved rural community near Karachi. Targeted awareness, affordable services, and community health education are vital to stem the hepatitis C epidemic among the poorest and most marginalized populations that bear a disproportionate burden of this infection in Pakistan. The insights can guide context-specific rural health programs and policies aimed at promoting earlier diagnosis, prevention, and control of hepatitis C nationwide.

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