

KNOWLEDGE, ATTITUDES AND PREVENTIVE BEHAVIOR OF PREGNANT WOMEN REGARDING HEPATITIS B AND C: A CROSS SECTIONAL STUDY FROM PESHAWAR

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Abstract

Objectives: To assess the knowledge and attitudes of pregnant women regarding Hepatitis B and C in tertiary care hospitals in Peshawar.

Methods: A cross-sectional study was conducted from January to April 2025 at Khyber Teaching Hospital and Hayatabad Medical Complex. A structured questionnaire divided into three sections: knowledge, attitudes, and preventive behaviors related to HBV and HCV. It was administered to 399 pregnant women, and the data were analyzed using SPSS version 20. Chi-square test was applied to check significant association between knowledge and attitude with the demographic of participants. P-value >0.05 was considered statistically significant.

Results: This study showed, 20% of the participants had good knowledge, 53% had moderate knowledge, and 27% had poor knowledge. Most had a positive attitude on HBV/HCV screening and prevention (78%). More specifically, during study visits participation behavioral assessment indicated that 45.1% were vaccinated against HBV, and 27.6% reported having ever been tested for HBV or HCV. Of the participants 72.7% made sure that sterile instruments would be used in the procedures but only 30.1% practiced safe sex. Positive attitude also had statistically significant associations with age group ($p=0.0013$), education ($p<0.0001$), and income ($p=0.0019$). Knowledge was also higher among individuals with higher education and income levels ($p<0.0001$). The proportion of those with poor knowledge among rural participants was much higher than that among urban residents, 63.6% vs. 13% ($p<0.0001$). Likewise, those with no formal education had the poorest knowledge (66%).

Conclusion: Although most pregnant women had adequate knowledge of HBV, awareness about HCV and its prevention was low. Education programs focusing on HBV and HCV transmission, prevention, and treatment should be prioritized in antenatal care.

INTRODUCTION

Hepatitis B and C are both viral diseases that cause inflammation of the liver and can result in chronic liver disease, cirrhosis, and liver cancer [1]. These infections are transmitted through blood and bodily fluids, with HBV being highly contagious and spread via percutaneous exposure, sexual contact, and vertical transmission (from mother to child during childbirth). HCV, conversely, is mostly transmitted via infected needles and direct blood exposure, blood transfusions, and less commonly, from mother to child at the time of labor and delivery [2]. Pregnant women are especially vulnerable to Hepatitis B and C because both viruses have a high risk of vertical transmission from mother to child. Vertical transmission is defined as the passage of a virus from an affected mother to her offspring during gestation or the time of delivery [3]. This is especially important for Hepatitis B and C since in both cases the newborn may have serious outcomes. As an example for Hepatitis B, it can be transmitted from mother to baby during the delivery process, and in the absence of adequate medical treatment including vaccination and immunoglobulin injection, neonates have a high probability to develop chronic HBV and remain infected in adulthood, developing life-threatening liver complications [4].

Pregnant women have a greater susceptibility to Hepatitis B and C infections for multiple reasons [5]. This can be explained, firstly, by the fact that pregnancy hormones influence the immune system, providing a less efficient response to control viral infections. Which may, in turn, increase the chance of both infection acquisition and transmission to the fetus? Second, exposure to higher levels of medical care, such as blood tests, injections, and even childbirth itself, increases the chances of being exposed to a contaminated procedure or equipment that can transmit blood-borne viruses such as HBV and HCV [6]. Also, most pregnant women would not know their status as these infections can also be asymptomatic in early stages, implying that women may not show evident signs of infection until a damaging amount of liver injury is already present [7]. This is of particular concern specifically to Hepatitis C because there is currently no vaccine to prevent the transmission of this virus. Similarly, for

Hepatitis B there is a highly effective vaccine yet many pregnant women are unaware of the virus and its risks and the need for timely intervention. As a result, pregnant women with these infections are not screened, diagnosed, or treated and may therefore unknowingly spread the virus to their child at the time of delivery [8]. Through early diagnosis and management, the risk of vertical transmission can be minimized. In the particular case of Hepatitis B, the newborns may be protected by prompt vaccination with the HBV vaccine and administration of hepatitis B immunoglobulin (HBIG) within 12 hours from birth, before the virus has the chance to establish a chronic infection in the baby [9]. Hepatitis C, but, does not have a vaccine and antiviral therapies for pregnant women are available, yet not recommended because of the possible dangers for the fetus. Thus it is important to perform screening of Hepatitis B as well as Hepatitis C in pregnancy, in order to have the possibility of applying the appropriate measures to prevent transmission [3]. This is especially true in high endemic countries like Pakistan for Hepatitis B and C, where even women at risk are not largely aware of their status. Lack of access to healthcare, low education levels, and poor public health campaigns all lead to these infections not being diagnosed or treated during pregnancy. Accordingly, several women are not aware of their hepatitis diagnosis, and if they are, still they may not be provided the necessary prophylactic treatment to their infants. Considering these, it is important to evaluate knowledge and attitudes among pregnant women themselves about Hepatitis B and C, that is, how aware they are about the vertical transmission risks, about preventative strategies, and about the importance of early screening and intervention. This type of research is necessary so that public health programs can be implemented with the aim of decreasing these infections and improving the health of both, pregnant women and newborns [13]. This study aims to assess the knowledge and attitudes regarding Hepatitis B and C among pregnant women in two tertiary care hospitals in Peshawar, Pakistan, with a focus on their understanding of the risks of transmission, available vaccines, and treatment options.

OBJECTIVE:

To assess the knowledge and attitudes of pregnant women regarding hepatitis B and C.

MATERIALS AND METHODS:

Study design, duration and setting:

This cross-sectional study was conducted from 1 January to 25 April 2025 in the Gynecology and Obstetrics department of two tertiary care hospitals of Peshawar (Khyber Teaching Hospital and Hayatabad Medical Complex).

Sampling technique:

A convenience sampling technique was used to select the hospitals, while the participants were chosen randomly.

Sample size:

The sample size was calculated using the formula $S = \frac{4pq}{l^2}$, where p (0.47) represents the prevalence of knowledge from a previous study [14], q is $1-p$, and l is the margin of error (0.05). Substituting these values into the formula gave a sample size of 399.

Inclusion criteria:

Pregnant women of all ages who visit the hospital for routine antenatal check-ups during the study period will be included.

Exclusion criteria:

Women with known psychiatric illness, cognitive impairment, or those who decline to give informed consent will be excluded from the study.

Data collection methods:

The data collection tool was a structured questionnaire. It was designed following an extensive literature review. It was reviewed and approved by the Departments of Community Medicine and Medical Education at Khyber Medical College. A pilot study involving 30 participants was conducted, which yielded meaningful insights, leading to minor revisions for clarity and relevance. Knowledge was assessed using 13 questions covering key aspects of hepatitis B and C, including their viral nature, modes of transmission (such as unprotected sex and contaminated needles), and risk of mother-to-child transmission. Questions also addressed awareness of

the asymptomatic early stages, long-term complications like liver cancer, the availability of a vaccine for HBV, and the absence of one for HCV. Additional items evaluated knowledge of neonatal vaccination for HBV-exposed infants and precautions needed during delivery by HCV-positive mothers.

Attitudes were assessed using 8 statements exploring participants' willingness to undergo HBV and HCV testing during pregnancy, accept vaccination for their newborns, and support education on viral hepatitis during antenatal care. The questions also evaluated perceptions about the importance of knowing one's infection status, trust in healthcare providers, concerns about stigma, and the need for follow-up care for HCV-positive mothers after delivery. Each question was asked directly by the data collectors during face-to-face interviews to ensure understanding and accurate responses. The fourth part of the questionnaire included items on Hepatitis B and C prevention activities. This included a section of 10 items asking about behaviors including vaccination history, testing history, use of sterilized instruments in medical or cosmetic procedures, avoiding personal items not owned by them, safe sex practices, antenatal screening, and healthcare seeking behavior. Responses were collected using "Yes," "No," or "Not sure/Sometimes" responses.

Data analysis tools:

Data was analyzed by SPSS version 20. Frequency and percentages were calculated for demographic variables. Knowledge was assessed using 13 questions, with each correct answer scored as 1 and incorrect as 0, yielding a maximum score of 13. Scores were categorized as good (≥ 10), moderate (7–9), and poor (< 7). Attitude was evaluated through 8 statements on a 3-point Likert scale (Agree = 2, Neutral = 1, Disagree = 0), with a maximum score of 16. Attitude levels were classified as positive (≥ 12), neutral (8–11), and negative (< 8). Chi-square test was applied to check significant association between knowledge and attitude with the demographic of participants. P-value > 0.05 was considered statistically significant.

ETHICAL APPROVAL:

Approval was obtained from the Institutional Review Board (IRB) of Khyber Medical College, Peshawar, on 1st January 2025. Ref no=401/DME/KMC. Informed written consent was obtained from all participants before the distribution of questionnaires.

Results:

Table 1: Distribution of participants based on knowledge and attitude level (n=400).

Table 1 illustrates participant distribution with respect to their level of knowledge and attitude towards hepatitis B and C; of the total sample size of 400, only 20% (n = 80) were found to have a good level of knowledge while most of them demonstrated moderate level of knowledge (53%) and 27% (n = 108) possessed poor level of knowledge about HBV and HCV. Regarding attitude, most participants (78%, n=312) had a positive attitude about having prenatal screening and education on hepatitis. Of the remaining respondents, 14% (n=56) were neutral and another 8% (n=32) considered it bad. The above described overall positive opinion, despite the knowledge gaps, certainly suggests an opening for public health interventions to increase awareness and easily change behavior through community education and involvement.

Table 1: Distribution of participants based on knowledge and attitude level (n=400).

Category	Percentage (%)	Number of Participants	
Knowledge			
1. Good Knowledge	20%	80	
2. Moderate Knowledge	53%	212	
3. Poor Knowledge	27%	108	
Total (Knowledge)	100%	400	
Attitude			
1. Positive Attitude	78%	312	
2. Neutral Attitude	14%	56	
3. Negative Attitude	8%	32	
Total (Attitude)	100%	400	

Table 2: Demographics and their relation with Knowledge and attitude regarding HBV and HCV

The table show the association between demographic characteristics and attitude as well as knowledge among participants. Significant relationship was found between age and positive attitude, with a higher percentage of positive responses in the older age groups; 63.7% of 18-25 compared to 84.1% of >35 years old ($P=0.0013$). Lack of knowledge, but, did not significantly differ among age groups ($P=0.07$). More urban residents had a positive attitude (83.1%) than rural residents (64.5%); but, this did not reach statistical significance ($P=0.091$). On the contrary, there was a higher proportion of poor knowledge among rural participants, 63.6%, compared to urban, 13% ($P<0.0001$). Education level was highly correlated with attitude and knowledge. Attitudes were also more positive with

higher levels of education: only 32.5% of respondents with no education had positive attitudes compared to 91.6% of those with some education beyond secondary school ($P<0.0001$). In the same way, poor knowledge was more prevalent in non-educated population (66%) to gradually decline among higher levels of education reaching 13% in the > secondary education group ($P<0.0001$). Positive attitude was also significantly associated to monthly income, with positive attitude percentage increasing from 55.7% in lowest income group (5,000-10,000) to 91.2% in highest income group (More than 20,000) ($P=0.0019$). The association between income and poor knowledge, but, was not significant ($P=0.12$). These results indicate that older age, higher education and income are related to positive attitudes while education as well as area of residence are important predictors of levels of knowledge.

Table 2: Demographics and their relation with knowledge and attitude regarding HBV and HCV (n=400)

Demographic	Total n%	Positive attitude (n=312).	P value	Poor knowledge (n=108)	P value
Age group (year)					
18-25	80(20%)	51(63.7%)	0.0013*	24(30%)	0.07
26-35	150(37.5%)	118(78.6%)		39(26%)	
>35	170(42.5%)	143(84.1%)		45(26.4%)	
Area					
Rural	110(27.5%)	71 (64.5%)	0.091	70(63.6%)	<0.0001*
Urban	290(72.5%)	241 (83.1%)		38(13 %)	
Education level					
No education	77(19.2%)	25 (32.5%)	<0.0001*	51 (66%)	<0.0001*
Primary	178(44.5%)	156 (87.6%)		35 (19%)	
Secondary	85(21.2%)	76 (89%)		14 (16%)	
>Secondary	60(15%)	55 (91.6%)		8 (13%)	
Income per month					
5000-10,000	140 (35%)	78 (55.7%)	0.0019*	46 (32%)	0.12
10,000-20,000	180 (45%)	161 (89.5%)		51 (28.3%)	
>20,000	80 (20%)	73 (91.2%)		11 (13.7%)	

Table 3: Knowledge of Participants Regarding Hepatitis B and C (n = 400).

Correct answers to a total of 13 knowledge-based statements regarding Hepatitis B virus (HBV) and Hepatitis C virus (HCV) among a total of 400 participants are shown in table X. 87.5% of participants reported to know that a vaccine can

prevent HBV infection, while only 28% knew there is/are no vaccine/s for HCV. Knowledge regarding MTCT of HBV was relatively high at 72.5% but only 23.7% believed that vaccination can protect babies born to HBV positive mothers. A reasonable percentage of the participants answered correctly to the possibility of transmission of HCV from mother

to child (57.5%) and to the need for caution on the part of the HCV-positive mother during labor (62.5%). Less than a third of respondents knew that HBV can be sexually transmitted (31%) and that both HBV and HCV can have asymptomatic early phases of infection (28.7%). Knowledge of transmission via contaminated needles or sharp objects was 47.5% for HCV. Less than half knew

that HBV can cause liver cancer (50.7%) and that HCV can cause chronic liver disease (51%). In general, this reflects the overall HBV and HCV knowledge among participants with important gaps in understanding the cause of the virus, its mode of transmission, the fact that the virus can be asymptomatic, preventive measures, and potential complications.

Table 3: Knowledge of Participants Regarding Hepatitis B and C (n = 399)

No.	Knowledge Statement	Correct answer (n %)
1	A virus causes hepatitis B.	88(22%)
2	A virus causes hepatitis C.	91 (22.7%)
3	HBV can be transmitted from mother to child.	290 (72.5%)
4	HCV can be transmitted from mother to child.	230 (57.5%)
5	HBV spreads through unprotected sex.	124 (31%)
6	HCV can be transmitted through the use of infected needles or sharp objects.	190 (47.5%)
7	HBV and HCV may be asymptomatic in early stages.	115 (28.7%)
8	HBV can lead to liver cancer.	203 (50.7%)
9	HCV can cause chronic liver disease.	205 (51%)
10	There is a vaccine to prevent HBV.	350 (87.5%)
11	There is currently no vaccine for HCV.	112 (28%)
12	Babies born to HBV-positive mothers can be protected with vaccination.	95 (23.7%)
13	HCV-positive mothers should also take precautions during delivery.	250 (62.5%)

Table 4: Attitude of Participants Regarding Hepatitis B and C (n = 400).

Table 3 illustrates general acceptability among participants for Hepatitis B and C screening, education, and prevention. 92% agreed to be tested if pregnant and 80% would agree that knowing their HBV/HCV status helps in protecting their baby. But, only the 42.5% would allow their baby to receive the HBV vaccine, while a significant portion of the population (37.5%) also maintained a neutral opinion on the subject, suggesting some uncertainty or hesitancy. Most participants were in favor of education about viral hepatitis during the antenatal period (79.75%) and post-natal follow-up of HCV-

positive mothers (86%). Trust in health workers was similarly high 82.75%. Concerns over stigma, but, was still present, with 54.75% agreeing that “a positive test result could lead to social stigma”. Only 45% of the participants indicated that screening and treatment “can reduce the risk of transmission”, while 42.5% remained neutral or did not believe so, which emphasizes the necessity of conveying a clear message about the importance of early intervention. These results suggest general confidence in testing and counseling while also identifying specific areas in need of public health messaging and trust-building, particularly around infant vaccination and treatment efficacy.

Table 4: Attitude of Participants Regarding Hepatitis B and C (n = 400)

Statement	Agree (n, %)	Neutral (n, %)	Disagree (n, %)
1. I am willing to be tested for HBV and HCV during pregnancy.	368 (92.00%)	22 (5.50%)	10 (2.50%)

2. I would allow my baby to receive the HBV vaccine.	170 (42.50%)	150 (37.50%)	80 (20.00%)
3. Pregnant women should be educated about viral hepatitis during ANC.	319 (79.75%)	30 (7.50%)	51 (12.75%)
4. Knowing my HBV/HCV status helps me protect my baby.	320 (80.00%)	38 (9.50%)	42 (10.50%)
5. I believe screening and treatment can reduce transmission risk.	180 (45.00%)	170 (42.50%)	50 (12.50%)
6. I fear stigma if I test positive for HBV or HCV.	219 (54.75%)	31 (7.75%)	150 (37.50%)
7. I trust healthcare workers to provide HBV/HCV advice.	331 (82.75%)	20 (5.00%)	49 (12.25%)
8. HCV-Mothers should also receive follow-up after birth.	344 (86.00%)	13 (3.25%)	43 (10.75%)

Table 5: Preventive Behaviors of Participants Regarding Hepatitis B and C (n = 400).

Table 5 Self-reported practices aimed at prevention of Hepatitis B virus (HBV) and Hepatitis C virus (HCV). Although 45.1% have received all recommended doses of HBV vaccine, an alarming 36.3% were not vaccinated and 18.6% are unsure. Up to 27.6% of them had ever been tested for HBV or HCV, suggesting low coverage of screening services.

Behavioral infection prevention practices were both mixed. Three quarter of the facilities, 72.7% (n = 16), made provision to use sterile instruments for medical or dental procedures, and 60.2% avoided sharing personal items like razors and toothbrushes. However, just 37.6% asked whether transfused blood had been screened for hepatitis viruses. Regarding sexual health, only 30.1% practiced safe

sex measures to reduce transmission risk, while over half (52.6%) did not. Although 77.7% of participants stated they would inform their partner if they tested positive, discussions about HBV/HCV with healthcare providers were limited (25.1%). Among those who were pregnant, 42.6% had asked for HBV/HCV testing in their antenatal care visits. Encouraging fact was that 76.4% stated they would not go to an unlicensed person for piercings or tattoos, indicating some level of understanding of risks from unsterile procedures. In general, there is moderate participation in preventive behaviors, with two important exceptions related to testing/vaccination and risk-reduction practices. These results show the importance of health education programs dealing behavior more than just awareness campaigns.

Table 5: Preventive Behaviors of Participants Regarding Hepatitis B and C (n = 400).

No.	Behavior Statement	Yes (n, %)	No (n, %)	Not Sure (n, %)
1	I have been vaccinated with all recommended dosages of the HBV vaccine.	180 (45.1%)	145 (36.3%)	75 (18.7%)
2	I've been screened/tested for HBV and/or HCV	110 (27.6%)	250 (62.7%)	40 (10%)

3	I also do not share anything personal such as razors, nail clippers, or toothbrushes.	240 (60.2%)	80 (20.1%)	80 (20%)
4	I make sure needles, for injection or dental work is sterile.	290 (72.7%)	55 (13.8%)	55 (13.8%)
5	I inquire whether transfusion blood was tested for HBV and HCV	150 (37.6%)	190 (47.6%)	60 (15%)
6	I use condoms to prevent HBV/HCV transmission.	120 (30.1%)	210 (52.6%)	70 (17.5%)
7	I have spoken with a healthcare provider about HBV/HCV testing.	100 (25.1%)	260 (65.2%)	40 (10%)
8	I would notify my husband if I were positive for HBV or HCV.	310 (77.7%)	40 (10.0%)	50 (12.5%)

Discussion

There was a clear lack of understanding and awareness of Hepatitis B and C among women interviewed in this study. Generally, the information regarding prevention of Hepatitis B among study participants was consistent, with some exceptions on Hepatitis C awareness and prevention [15][16][17][18]. Less than half of the participants were aware that Hepatitis C currently has no vaccine available, and just over half (57.5%) knew that vertical transmission of Hepatitis C was possible. This also indicates the necessity of improving educational interventions and rising awareness of both infections in general, and Hepatitis C in particular, in most developing countries in general and in particular populations in specific [19]. The results of the positive disposition towards HBV and HCV testing and vaccination suggest an overall openness among pregnant women to engage in prevention efforts [20]. The majority of women,

92%, would be willing to undergo testing for HBV and HCV, while 79.75% would encourage testing in pregnant women during antenatal care education about HBV and HCV. More than half of the women, but, did feel a fear of stigma associated with being positive for either infection. This stigma can act as a deterrent to seeking care, dissuading women from seeking screens and treatments that they require [21-24].

The study's findings correlate with the international data in which knowledge and awareness of Hepatitis B was found to be high comparatively to Hepatitis C. This difference can be attributed in part to the existence of a vaccine for HBV, coupled with the presence of public health awareness campaigns that successfully promote awareness of the prevention of vertical transmission [25]. On the other hand, low levels of knowledge about and understanding of HCV can also be attributed intense virus, no vaccine,

and limited knowledge on use-treatment for pregnant women interested in having children [26]. The concerns over stigma reported by many participants' highlights another important challenge: social stigma with regard to infectious disease, such as Hepatitis B and C. Stigma may result in delayed diagnosis, treatment compliance, and discouragement to seek medical advice. Stigma is also a factor in both Hepatitis B and C, and pregnant women should always be educated on possible risk to her child and the necessity for early intervention [23].

Such lack of knowledge and associated stigma should be closed through education regarding both Hepatitis B and C as a part of standard antenatal care. Healthcare providers should provide clear and correct information on how the disease is transmitted, the existence of vaccines and the relevance of screening during pregnancy. "Improving trust in health care workers" and fostering supportive, non-judgmental spaces within the context of antenatal care is also key to moving beyond stigma and encouraging pregnant women to take measures to protect their own health and that of their babies. Future research will also need to analyze observed pregnant women' practices around HBV and HCV screening, vaccination, and treatment adherence in order to provide a broader view of the challenges and opportunities to improve outcomes should assess the impact and efficacy of education interventions, and public health campaigns aimed at increasing awareness and reducing stigma [27-29]. The findings suggest a general willingness to undergo HBV and HCV testing among women in Peshawar, but with important deficits in knowledge and concern over stigma. In light of these findings, the authors suggest "a strong public health response through education, awareness, and support of women during pregnancy to trend hepatitis B and C transmission and improve maternal and child health.

Conclusion:

Our study shows that expectant mothers in Peshawar, have good level of awareness around Hepatitis B especially modes of transmission and presence of vaccine. But also, there is a lack of knowledge of Hepatitis C and prevention. In turn, public health interventions that address both HBV

and HCV education are needed in order to decrease rates of vertical transmission of these infections and promote maternal and child health.

Limitations

The study was limited to two tertiary care hospitals in Peshawar and may not fully represent the knowledge and attitudes of pregnant women across province.

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