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Original Article

Prevalence of Hepatitis B and C Infection and its Associated Risk factors in Pregnant Women Visiting Hospitals of Southern Punjab

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ABSTRACT

Background: Hepatitis B and C infections remain formidable challenges to global health, with significant morbidity and mortality rates, especially among pregnant women. These infections pose substantial risks not only to the infected individuals but also to their unborn children, due to the potential for vertical transmission. In Pakistan, particularly in the Southern Punjab region, the prevalence and impact of these infections demand rigorous investigation to inform public health strategies.

Objective: This study aimed to assess the prevalence of Hepatitis B and C infections among pregnant women visiting selected hospitals in Southern Punjab, Pakistan, and to identify associated risk factors, thereby contributing to the formulation of targeted intervention strategies.

Methods: Employing an analytical cross-sectional design, this study involved 422 pregnant women from the outpatient departments of Gynecology at Nishtar Hospital, Shahbaz Sharif Hospital in Multan, and Bismillah Medical Complex in Kahror Pacca, between December 1, 2023, and March 5, 2024. Participants were selected using a convenience sampling technique. Data on demographic characteristics and potential risk factors were collected through a structured questionnaire. Hepatitis B and C seropositivity was determined through specific serological tests. The analysis was performed using SPSS version 25, focusing on the prevalence rates and the identification of major and minor risk factors for the transmission of Hepatitis B and C.

Results: The study found an 8.3% prevalence rate for Anti-HCV and a 5.2% prevalence rate for HBsAg among the participants. Notable risk factors included ear or nose piercings, history of blood transfusions, and previous cesarean sections. Socio-demographic analysis revealed higher rates of infection among participants with lower educational levels, those residing in rural areas, and among certain age groups and parity statuses.

Conclusion: The observed prevalence rates of Hepatitis B and C infections among pregnant women in Southern Punjab highlight the critical need for enhanced screening programs, targeted vaccination initiatives, and comprehensive education campaigns to mitigate the risk of vertical transmission and reduce the burden of these infections.

Keywords: Hepatitis B, Hepatitis C, Pregnant Women, Prevalence, Risk Factors, Vertical Transmission, Southern Punjab, Public Health.

INTRODUCTION

Hepatitis B and C infections are among the most significant global health challenges, leading to both acute and chronic liver diseases in affected individuals. The World Health Organization (WHO) estimates that each year, approximately 354 million people are affected by viral hepatitis B and C, resulting in about 1.4 million deaths annually. These infections are considered the second most lethal infectious diseases after tuberculosis, with the population at a ninefold higher risk of contracting hepatitis compared to HIV (1). In Pakistan, the prevalence and impact of hepatitis B and C mirror the global scenario, necessitating further and comprehensive investigations into these infections. Studies, such as the one by Khokhar et al., have reported the prevalence of HBsAg at 2.56% and anti-HCV at 5.31% (2), highlighting the need for targeted research in this area.

Transmission of hepatitis generally occurs through blood transfusions, the use of contaminated needles, sharing of used syringes, sexual contact, and vertical transmission from mother to child. Specifically, in Pakistan, hepatitis C is often transmitted via

Journal of Health and Rehabilitation Research 2791-156X JHRR

contaminated and unsterilized medical instruments, unsafe blood transfusions, intravenous drug use, unsterilized equipment used by barbers, and poor personal hygiene practices (3). The majority of hepatitis B cases stem from sharing personal items, unscreened blood donations, tooth extractions, surgeries, sexual contact with infected individuals, contaminated injections, and skin tattooing (4). A study by Rashid Latif Medical College in Lahore assessed healthcare workers' knowledge of hepatitis transmission, prevention, and nosocomial acquisition risks, revealing adequate knowledge but poor vaccination and preventive practices against HBV infection (5).

Despite significant advances in understanding hepatitis C, including immunological insights and genetic polymorphism tests to predict drug treatment responses, the translation of this knowledge to the pregnant population remains insufficient. The risk of mother-to-child transmission of hepatitis C is known to be between 2-8% in monoinfected pregnant women (6). Hepatitis infections can lead to severe maternal and neonatal complications, such as miscarriages, preterm births, stillbirths, preeclampsia, gestational diabetes, placental abruption, low birth weight, macrosomia, and small for gestational age infants (7).

The management and treatment of hepatitis B and C during pregnancy is a critical area of research. Information on the safety of antivirals, particularly concerning potential teratogenicity, is vital for counseling pregnant women with chronic hepatitis B about the benefits and risks of treatment for their offspring (8). For hepatitis C, antiviral drugs may reduce perinatal transmission, although most direct-acting antivirals (DAAs) are considered safe in pregnancy based on animal studies, none are yet approved for human use during pregnancy (9). Factors such as gender, education level, income, and marital status influence the prevalence and awareness of hepatitis infections, with studies showing significant disparities in infection rates among different demographic groups and healthcare settings (10, 11). Vertical transmission risks are elevated for HBV-positive mothers, especially if infection occurs in the third trimester, and for HCV, the risk increases with co-infection with HIV (12).

The social and psychological burden of hepatitis C in pregnant women, including stigma, discrimination, and stress, further complicates disease management and family dynamics (13). Given the varying prevalence rates and the complex web of risk factors associated with hepatitis B and C, this study aims to assess the current prevalence and identify major and minor risk factors for these infections among pregnant women in Southern Punjab. Additionally, it will explore the impact of a spouse's hepatitis infection history on the pregnant woman's risk, contributing to a more nuanced understanding of transmission dynamics within this population.

MATERIAL AND METHODS

This study employed an analytical cross-sectional design to assess the prevalence of Hepatitis B and C infections among pregnant women visiting the outpatient departments of the Gynecology units at Nishtar Hospital and Shahbaz Sharif Hospital in Multan, as well as the Bismillah Medical Complex in Kahror Pacca, Tehsil of District Lodhran, Southern Punjab, Pakistan. Conducted between December 1, 2023, and March 5, 2024, the research aimed to identify associated risk factors. Utilizing a convenience sampling technique, a non-probability approach was adopted, whereby participants were selected haphazardly. The study included a total of 422 participants, determined based on a 4.6% prevalence rate of Hepatitis infection, with a 95% confidence interval and a 5% margin of error, as suggested by previous studies.

Prior to the commencement of the data collection, informed consent was obtained from all participants. Inclusion criteria were limited to pregnant women confirmed by the Gynecology outpatient departments of the selected hospitals who had given their consent. Exclusion criteria encompassed those unwilling to participate and those previously diagnosed with and treated for Hepatitis B or C infection. Data collection was facilitated through a questionnaire developed by the research team, focusing on socio-demographic characteristics and potential risk factors for Hepatitis B and C infections. In an effort to ensure clarity and accuracy of responses, questions were posed in the respondents' first language. The questionnaire covered aspects such as age, residence (urban or rural), occupation, education level, household monthly income, and a history of potential risk factors including previous Hepatitis B or C infections, drug injections, blood transfusions, ear or nose piercings, history of Cesarean sections, and spouse history concerning Hepatitis infection, blood transfusions, and IV drug abuse.

Data analysis was conducted using SPSS version 25 to ascertain the prevalence of Hepatitis B and C infections and to identify the frequency and significance of various risk factors, thereby distinguishing between major and minor ones in relation to the transmission of these viral infections. Ethical considerations were meticulously adhered to throughout the study, in compliance with the Declaration of Helsinki. This included obtaining prior permission for data collection from relevant authorities, ensuring informed consent with the provision for withdrawal at any time, maintaining participant anonymity, and upholding the confidentiality of collected data. The study was independently conducted without external financial support, affirming the absence of any potential conflict of interest.

Journal of Health and Rehabilitation Research 2791-156X JHRR

RESULTS

In this study, an analysis of Hepatitis B and C prevalence among pregnant women visiting selected hospitals in Southern Punjab, Pakistan, revealed significant findings. Out of the 422 participants surveyed, 35 were found positive for Anti-HCV, representing an 8.3% positivity rate (Table-1). This contrasts with the frequency of HBsAg positivity, where 22 individuals tested positive, indicating a lower prevalence rate of 5.2% among the study population (Table-2). Such data underscore the relatively higher prevalence of Hepatitis C compared to Hepatitis B in this demographic.

Age distribution played a crucial role in the occurrence of these infections. The majority of the study participants fell within the 16-25 years age group, which comprised 216 individuals. Among these, 12 tested positive for HBsAg (5.6%), and 18 for Anti-HCV (8.3%). The 26-35 years age bracket included 186 participants, with 8 (4.3%) and 16 (8.6%) testing positive for HBsAg and Anti-HCV, respectively. Notably, the >36 years age group, despite its small size of 20 participants, showed a higher HBsAg positivity rate of 10.0%, though it had a lower Anti-HCV positivity rate of 5.0% (Table-3). This age-related distribution suggests that while Hepatitis B infection rates may increase with age, Hepatitis C shows a more evenly distributed pattern across the younger age groups.

Parity also influenced the prevalence of these infections. Among the nullipara participants (n=61), HBsAg and Anti-HCV positivity rates were 6.6% and 3.3%, respectively. In contrast, those with a parity of 1-4 (n=332) had positivity rates of 5.1% for HBsAg and 9.9% for Anti-HCV. The group with a parity greater than five (n=29) showed the lowest HBsAg positivity rate of 3.4% and no cases of Anti-HCV positivity, indicating varying risk levels associated with the number of pregnancies (Table-4).

Table-1: Frequency of Anti-HCV Positivity

Anti-HCV	Frequency	Percent (%)
Positive	35	8.3
Negative	387	91.7
Total	422	100.0

Table-2: Frequency of HBsAg Positivity

HBsAg	Frequency	Percent (%)
Positive	22	5.2
Negative	400	94.8
Total	422	100.0

Table-3: Age Distribution of Study Cases

Age Groups	No. of Study Cases	HBsAg Positive (%)	Anti-HCV Positive (%)
16-25 years	216	12 (5.6)	18 (8.3)
26-35 years	186	8 (4.3)	16 (8.6)
>36 years	20	2 (10.0)	1 (5.0)
Total	422	22 (5.2)	35 (8.3)

Table-4: Parity-wise Distribution of Study Cases

Parity	No. of Study Cases	HBsAg Positive (%)	Anti-HCV Positive (%)
Nullipara	61	4 (6.6)	2 (3.3)
Para (1-4)	332	17 (5.1)	33 (9.9)
Para (>5)	29	1 (3.4)	0 (0.0)
Total	422	22 (5.2)	35 (8.3)

Table-5: Distribution of Positive Cases According to Sociodemographic Profile

Sociodemographic Profile	No. of Study Cases	HBsAg Positive (%)	Anti-HCV Positive (%)
Occupation Groups			
Housewife	379	19 (5.0)	32 (8.4)
Working Ladies	43	3 (7.0)	3 (7.0)
Residence			
Rural	136	9 (6.6)	18 (13.2)

Sociodemographic Profile	No. of Study Cases	HBsAg Positive (%)	Anti-HCV Positive (%)
Urban	286	13 (4.5)	17 (5.9)
Monthly Income of Household			
<25k	316	16 (5.1)	26 (8.2)
25k-50k	94	6 (6.4)	9 (9.6)
>50k	12	0 (0.0)	0 (0.0)
Education Groups			
Educated	299	13 (4.3)	21 (7.0)
Uneducated	123	9 (7.3)	14 (11.4)

Table-6: Distribution of Positive Cases According to Risk Factors

Risk Factors	HBsAg Positive (%)	Anti-HCV Positive (%)
Hepatitis B Infection	6 (27.3)	0 (0.0)
Hepatitis C Infection	0 (0.0)	22 (62.9)
Smoker in Family	4 (18.2)	10 (28.6)
Drug Being Injected	1 (4.5)	10 (28.6)
Previous History of Blood Transfusions	5 (22.7)	24 (68.6)
Ear or Nose Piercings	21 (95.5)	33 (94.3)
Previous History of C-section	11 (50.0)	18 (51.4)
Uses Protection During Sex	4 (18.2)	10 (28.6)
History of Hepatitis B or C Infection	2 (9.1)	2 (5.7)
History of Blood Transfusion in Spouse	5 (22.7)	8 (22.9)
History of IV Drug Abuse or Injected in Spouse	0 (0.0)	0 (0.0)
Previous History of Hepatitis B or C in Any Child	0 (0.0)	1 (2.9)
Vertical Transmission	0 (0.0)	1 (2.9)

The sociodemographic profile further detailed the infection rates among different groups. Housewives, who formed the majority of the study population (89.8%), showed a 5.0% positivity rate for HBsAg and 8.4% for Anti-HCV. Working ladies, however, had slightly higher rates, with 7.0% for HBsAg and 7.0% for Anti-HCV. The distinction between rural (32.2% of participants) and urban (67.8% of participants) residences revealed higher positivity rates for both infections among rural residents, with 6.6% for HBsAg and 13.2% for Anti-HCV, compared to 4.5% and 5.9%, respectively, in urban dwellers. Household income and education level also influenced infection rates, with lower income and uneducated groups showing higher prevalence (Table-5).

The study's exploration of risk factors highlighted several significant associations. Ear or nose piercings emerged as a common risk factor for both HBsAg (95.5%) and Anti-HCV (94.3%) positivity. Previous history of blood transfusions was also a prominent risk factor, especially for Anti-HCV positivity (68.6%). Other notable factors included a family history of smoking, drug injections, and previous cesarean sections, each contributing to the infection rates in varying degrees (Table-6). These findings underscore the multifaceted nature of hepatitis transmission risks among pregnant women in Southern Punjab, emphasizing the need for targeted preventive measures and awareness programs.

DISCUSSION

In the context of the escalating prevalence of viral hepatitis in Pakistan, this study's findings illuminate the critical public health challenge posed by Hepatitis B and C infections among pregnant women. With the World Health Organization (WHO) setting ambitious targets for the elimination of viral hepatitis by 2030, the urgency for implementing preventive strategies and enhancing public awareness becomes evident (14). This study's revelation of an 8.3% prevalence rate for Hepatitis C and a 5.2% prevalence rate for Hepatitis B among the target population starkly underscores this necessity. These findings are particularly noteworthy when juxtaposed with previous research, such as a study from Hyderabad, Pakistan, which reported lower prevalence rates of 3.45% for Hepatitis C and 1.82% for Hepatitis B among blood donors (15), and another study within a pregnant female cohort at Combined Military Hospital Hyderabad, Sindh, Pakistan, identifying a 7.299% seropositivity for Hepatitis B and C (16).

The disparity in prevalence rates observed in this study compared to earlier research may be attributed to a multitude of factors, including variability in public awareness, diagnostic methodologies, and geographical distribution. Particularly, the association of viral hepatitis seropositivity with different socioeconomic indicators observed in this study aligns with findings from other regions,

such as Khyber Pakhtunkhwa, Pakistan, and Northern India, where low educational levels, rural residency, and specific age groups have been identified as significant risk factors for hepatitis infection (17, 18). This study further refines these insights by delineating higher rates of HBsAg seropositivity in individuals over 36 years of age, nulliparous females, working women, residents of rural areas, and those with lower educational attainment and household incomes ranging from 25k to 50k. Conversely, Anti-HCV seropositivity was predominantly observed in the 26-35 age group, among multiparous women, housewives, individuals residing in rural areas, and those in the same intermediate household income bracket and with lower educational levels.

The elucidation of major risk factors for Hepatitis B and C transmission in this study, such as unsafe blood transfusions, dental procedures, and the history of cesarean sections, underscores the complex interplay of healthcare practices and personal behaviors in the epidemiology of these infections. Notably, ear or nose piercings emerged as a significant risk factor for both infections, reflecting broader cultural practices that may inadvertently contribute to viral transmission (19, 20). Furthermore, the potential for vertical transmission from spouses and the observed transmission rate to children from HCV-positive mothers in this cohort echo the findings from other studies, emphasizing the familial and perinatal dimensions of hepatitis transmission dynamics (21, 22).

This study's insights are tempered by its limitations, including its cross-sectional design, which constrains causal inferences, and the reliance on convenience sampling, potentially limiting the generalizability of the findings. Despite these constraints, the study significantly contributes to the understanding of hepatitis B and C epidemiology among pregnant women in Southern Punjab, underscoring the imperative for targeted screening, vaccination, and public health interventions to mitigate the burden of these infections. In light of these findings, it is recommended that pregnant women be systematically screened for HBsAg and Anti-HCV antibodies. Additionally, neonates born to HBsAg-positive mothers should receive appropriate immunization, and protective measures against HBV infection should be extended to Anti-HCV-positive mothers. Healthcare providers must play a pivotal role in counseling patients regarding the risks of viral transmission, ensuring that preventive strategies are both understood and implemented effectively. Through such comprehensive approaches, the aspirations of the WHO 2030 elimination targets may be realized, contributing to the global effort to combat the scourge of viral hepatitis.

CONCLUSION

This study highlights a significant prevalence of Hepatitis B and C infections among pregnant women in Southern Punjab, underscoring the urgency for targeted public health interventions, including systematic screening and vaccination programs. The identification of major risk factors such as unsafe medical practices, personal behaviors like piercings, and the potential for vertical transmission emphasizes the need for comprehensive education and counseling efforts aimed at pregnant women and healthcare providers alike. These measures are critical not only for protecting maternal and neonatal health but also for contributing to the global ambition of eliminating viral hepatitis as a public health threat by 2030. The findings underscore the imperative for integrated healthcare strategies that address the complexities of viral hepatitis transmission within at-risk populations, thereby safeguarding human health and advancing towards the achievement of broader public health goals.

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