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Beyond transmission: exploring the knowledge of risk factors and myths about hepatitis B and C among undergraduate medical students

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Abstract

Hepatitis B virus (HBV) and hepatitis C virus (HCV) have significant impacts on global public health, necessitating a deep understanding of their transmission dynamics and risk factors. Given the high prevalence in Pakistan and the critical role of healthcare education, this study aimed to assess medical students' knowledge of transmission risk factors and common myths and misconceptions about HBV and HCV. An exploratory study was conducted in May 2022 at Rai Medical College, Sargodha, Pakistan. A total of 376 undergraduate medical students were recruited using a convenient sampling technique. Participants completed self-administered questionnaires to assess their knowledge of HBV and HCV transmission risk factors and associated myths and misconceptions. The data were analyzed for frequencies and percentages with SPSS version 25.00. The majority of students accurately identified traditional transmission pathways for HBV, with 78.72% recognizing transmission during pregnancy and 73.14% during delivery. However, knowledge about nontraditional transmission routes and household practices was less robust, with only 60.64% acknowledging the risks of sharing nail cutters. For HCV, knowledge was generally lower, with 62.77% recognizing the risk associated with tattooing. Misconceptions were also prevalent; for instance, 53.99% of students mistakenly believed that HBV could be transmitted through the home care of patients. This study highlights significant knowledge gaps and pervasive misconceptions among medical students regarding HBV and HCV transmission. Despite a good grasp of traditional risk factors, the widespread misunderstanding of nonbloodborne transmission routes underscores the urgent need for enhanced educational interventions. The findings suggest that targeted improvements in curriculum design could better equip future healthcare providers to combat hepatitis effectively.

Keywords

Knowledge; Risk factors; Hepatitis B; Hepatitis C; Students, medical

1. Introduction

Hepatitis B virus (HBV) and hepatitis C virus (HCV), which are known for their subtle progression and severe impact on liver health, pose substantial public health challenges globally [1,2]. These viruses can cause a range of conditions, from acute illnesses to chronic diseases such as cirrhosis and hepatocellular carcinoma, highlighting the importance of understanding their transmission modes and risk factors [3,4]. Worldwide efforts to combat these infections with treatments such as nucleotide analogs and direct-acting antivirals are ongoing, yet the quest to achieve the intended outcome remains significantly unmet [5]. According to the World Health Organization (WHO), in 2019, nearly

296 million individuals were living with chronic hepatitis B, while 58 million were dealing with hepatitis C [6,7].

The situation in Pakistan, with an estimated 7–9 million carriers of HBV with a carrier rate of 3%–5% and projections indicating that by 2030, 3.25% of the population will likely test positive for HBV and 6.36% for HCV, not only exemplifies but also intensifies the global challenge of hepatitis by adding considerable complexities [8]. This substantial prevalence of HBV and HCV infections, evidenced by millions of affected individuals and significant mortality rates, aligns with the global context yet adds a distinct layer of complexity, underlining the urgent need for targeted interventions [9,10]. Such a scenario underscores the global endeavor to mitigate hepatitis, highlighting the critical need for a thorough understanding of both disease awareness and prevalent misconceptions, particularly among emerging healthcare professionals [11].

Medical students represent a unique cohort within the healthcare landscape [12]. As future professionals, their knowledge, attitudes, and practices concerning hepatitis B and C—not only in terms of transmission but also in terms of a broader understanding of risk factors and prevailing myths—can significantly influence public health outcomes [13]. In Pakistan, where the prevalence of HBV and HCV is notably high, the education and training of medical students in these areas are of paramount importance [14].

This study mainly focused on undergraduate medical students to explore their understanding of HBV and HCV. With their forthcoming entrance into the healthcare profession and ongoing academic preparations, these students' comprehensive grasp of hepatitis has the potential to significantly influence healthcare policies and educational practices. This investigation also aligns with global and local efforts to enhance hepatitis awareness and control, especially in heavily impacted regions such as Pakistan. Therefore, this study aimed to assess medical students' knowledge of transmission risk factors and common myths and misconceptions about HBV and HCV. The anticipated outcomes are expected to refine pedagogical strategies, better equip future healthcare professionals to combat hepatitis effectively, and significantly contribute to public health measures geared toward prevention and comprehensive disease management.

2. Methods

2.1. Study design and duration

This exploratory study was conducted over one month in May 2022.

2.2. Ethics approval

This study was conducted in compliance with international ethical standards for research involving human subjects [15] and received ethical clearance from the Ethical Review Committee of Rai Medical College, Sargodha, Pakistan (No. RMCS/ERC/14/22).

2.3. Sampling technique and sample size

The data were collected using a convenience sampling technique. The initial sample size of 221 was calculated using the Raosoft calculator, accounting for a 5% margin of error, a 95% confidence interval, and a 50% response distribution, given the targeted college population of 516 undergraduate medical students [16]. However, the number of respondents increased to 376, enhancing the strength of the study outcomes by exceeding the initial sample size estimate, thereby providing a broader data set for analysis.

2.4. Study setting and participants

The study was conducted at Rai Medical College in Sargodha, Pakistan, which is affiliated with the University of Health Sciences, Lahore, and recognized by the Pakistan Medical & Dental Council. The college, situated in the Sargodha district, operates two attached hospitals and has 516 enrolled MBBS students who composed the sample for this study [16].

2.5. Selection criteria

Data were collected from male and female MBBS students ranging from their second year to their final year, and those who did not provide written informed consent were excluded.

2.6. Data collection tool and procedure

The survey questionnaire was developed after an extensive review of the literature on previously conducted studies [17,18,19,20,21,22]. To ensure its clarity and applicability, it underwent a critical review by two senior faculty members specializing in the relevant discipline. The survey instrument consisted of two main sections. The first section assessed participants' knowledge of risk factors associated with HBV and HCV transmission and included 24 items. The second section assessed common myths and misconceptions associated with HBV and HCV and consisted of 11 items. Responses were recorded as 'true,' 'false,' or 'I do not know,' enabling the evaluation of respondents' ability to correctly identify false information concerning the viruses.

Data collection was self-administered; questionnaires were distributed to study participants who returned them duly filled out, along with their written informed consent.

2.7. Statistical analysis

The collected data were entered into the Statistical Package for Social Sciences (SPSS) (version 25.00) and analyzed using frequencies and percentages.

3. Results

Table 1 shows undergraduate medical students' knowledge of hepatitis B and C transmission risk factors. For hepatitis B, a majority of the participants identified maternal and perinatal transmission risks, with 78.72% acknowledging transmission during pregnancy and 73.14% during delivery. Knowledge of common household practices varied; for instance, while 82.71% recognized nail scratching as a risk, only 60.64% viewed sharing nail cutters similarly. In body modification practices, 66.22% of the students recognized the risk associated with ear and body piercing, 65.16% with tattooing, and 73.67% with acupuncture for hepatitis B, whereas awareness of these risks for hepatitis C was 60.9%, 62.77%, and 65.69%, respectively. Additionally, for hepatitis B, 73.94% of the students were aware of the risks associated with minor surgery, 76.33% with major surgery, and 79.52% with laparoscopic surgery. The corresponding awareness of hepatitis C was lower, with 65.16% recognizing risks for minor surgery, 72.07% for major surgery, and 66.76% for laparoscopic surgery.

Table 1. Knowledge regarding risk factors for hepatitis B and C transmission among undergraduate medical students (n = 376).

Risk Factors	Hepatitis B			Hepatitis C		
	True	False	I Don't Know	True	False	I Don't Know
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Maternal and perinatal transmission						
Transmission during pregnancy	296 (78.72)	65 (17.29)	15 (3.99)	-	-	-
Transmission during delivery	275 (73.14)	78 (20.74)	23 (6.12)	-	-	-
Breastfeeding	243 (64.63)	101 (26.86)	32 (8.51)	-	-	-
Common household practices						
Sharing nail cutter	228 (60.64)	103 (27.39)	45 (11.97)	-	-	-
Sharing hair comb and brush	294 (78.19)	72 (19.15)	10 (2.66)	-	-	-
Nail scratching	311 (82.71)	39 (10.37)	26 (6.91)	-	-	-
Tooth biting	296 (78.72)	46 (12.23)	34 (9.04)	-	-	-
Body modification practices						
Ear and body piercing	249 (66.22)	101 (26.86)	26 (6.91)	229 (60.9)	102 (27.13)	45 (11.97)
Tattooing	245 (65.16)	112 (29.79)	19 (5.05)	236 (62.77)	106 (28.19)	34 (9.04)
Acupuncture	277 (73.67)	67 (17.82)	32 (8.51)	247 (65.69)	73 (19.41)	56 (14.89)
Unsafe sexual practices						
Extramarital affairs	313 (83.24)	54 (14.36)	9 (2.39)	311 (82.71)	52 (13.83)	13 (3.46)
Unprotected sexual practices	307 (81.65)	61 (16.22)	8 (2.13)	327 (86.97)	41 (10.9)	8 (2.13)
Operative procedures						
Minor surgery	278 (73.94)	52 (13.83)	46 (12.23)	245 (65.16)	103 (27.39)	28 (7.45)
Major surgery	287 (76.33)	65 (17.29)	24 (6.38)	271 (72.07)	64 (17.02)	41 (10.9)
Laparoscopic surgery	299 (79.52)	39 (10.37)	38 (10.11)	251 (66.76)	77 (20.48)	48 (12.77)
Other medical procedures						
Endoscopic diagnostic procedures	266 (70.74)	78 (20.74)	32 (8.51)	249 (66.22)	80 (21.28)	47 (12.5)
Dental procedure	262 (69.68)	87 (23.14)	27 (7.18)	247 (65.69)	81 (21.54)	48 (12.77)
Platelets transfusion	244 (64.89)	89 (23.67)	43 (11.44)	235 (62.5)	79 (21.01)	62 (16.49)
Blood donation	245 (65.16)	70 (18.62)	61 (16.22)	249 (66.22)	77 (20.48)	50 (13.3)
Injections and drips	293 (77.93)	74 (19.68)	9 (2.39)	276 (73.4)	49 (13.03)	51 (13.56)
Vaccination injections	231 (61.44)	102 (27.13)	43 (11.44)	284 (75.53)	44 (11.7)	48 (12.77)
Hemo-peritoneal dialysis	233 (61.97)	99 (26.33)	44 (11.7)	212 (56.38)	100 (26.6)	64 (17.02)
Substance abuse						
IV drug abuse	277 (73.67)	74 (19.68)	25 (6.65)	252 (67.02)	53 (14.10)	71 (18.88)
Inhalation drug abuse	301 (80.05)	46 (12.23)	29 (7.71)	-	-	-

* Items with no responses under the 'Hepatitis C' column indicate that these risk factors are predominantly or exclusively relevant to 'Hepatitis B' transmission. ** Responses marked as 'true' are considered correct and indicate that respondents have correctly identified the listed item as a risk factor for hepatitis B and hepatitis C.

Table 2 shows common myths and misconceptions about hepatitis B and C transmission among students. For instance, 53.99% mistakenly believed that HBV could be transmitted through the home care of patients, while 62.50% held similar misconceptions for HCV. Moreover, sharing food and utensils was incorrectly identified as a transmission risk by 39.63% for HBV and 39.10% for HCV. Additionally, the majority of students inaccurately thought that nebulizers could transmit HBV (73.94%) and HCV (80.59%). Misconceptions were also observed in nontraditional medical practices such as cupping/Hajama and the application of leeches, with 48.40% and 37.50% of students, respectively, inaccurately considering them as transmission routes for HBV.

Table 2. Knowledge regarding common myths and misconceptions regarding hepatitis B and C transmission among undergraduate medical students (n = 376).

Common Myths and Misconceptions	Hepatitis B			Hepatitis C		
	True	False	I Don't Know	True	False	I Don't Know
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Home care of hepatitis patients	203 (53.99)	131 (34.84)	42 (11.17)	235 (62.50)	97 (25.80)	44 (11.70)
Home-made nappies	41 (10.90)	269 (71.54)	66 (17.55)	96 (25.53)	257 (68.35)	23 (6.12)
Sharing chopstick	177 (47.07)	174 (46.28)	25 (6.65)	158 (42.02)	185 (49.20)	33 (8.78)
Sharing food and food utensils	149 (39.63)	190 (50.53)	37 (9.84)	147 (39.10)	201 (53.46)	28 (7.45)
Common toilet and bathroom	163 (43.35)	171 (45.48)	42 (11.17)	123 (32.71)	196 (52.13)	57 (15.16)
Common washing machine	35 (9.31)	286 (76.06)	55 (14.63)	42 (11.17)	316 (84.04)	18 (4.79)
Sharing undergarments	224 (59.57)	106 (28.19)	46 (12.23)	219 (58.24)	104 (27.66)	53 (14.10)
Sharing Nebulizers	278 (73.94)	75 (19.95)	23 (6.12)	303 (80.59)	51 (13.56)	22 (5.85)
Tooth polishing	115 (30.59)	212 (56.38)	49 (13.03)	129 (34.31)	207 (55.05)	40 (10.64)
Cupping/Hajama	182 (48.40)	152 (40.43)	42 (11.17)	160 (42.55)	153 (40.69)	63 (16.76)
Leeches' application	141 (37.50)	196 (52.13)	39 (10.37)	151 (40.16)	165 (43.88)	60 (15.96)

* Responses marked as 'false' correctly identify the response as a common myth or misconception.

4. Discussion

Our study revealed a varied extent of knowledge about hepatitis B and C transmission among undergraduate medical students. A significant portion of students accurately identified traditional transmission pathways for hepatitis B, particularly maternal and perinatal transmission, with more than 70% accuracy. However, there were notable gaps in recognizing common household and nontraditional medical practices as potential transmission routes. Awareness of hepatitis C transmission was generally lower across similar categories. Misconceptions about transmission through routine home care, food sharing, and nebulizers were observed, suggesting a substantial misunderstanding of nonbloodborne transmission routes.

Our study indicates that undergraduate medical students in Pakistan possess a relatively strong understanding of hepatitis B transmission, in line with findings from another study at a tertiary care facility, which showed progressive improvement in HBV knowledge from the first to the final professional year of medical students [23]. This finding is also supported by research conducted in a rural medical college, where a significant portion of students were found to understand hepatitis B transmission modes [24]. However, our findings contrast when considering nontraditional medical practices and household risks, where knowledge gaps were apparent, similar to a study among medical and dental students in Karachi, which identified discrepancies in understanding potential transmission routes [25].

In global contexts, a Croatian study presented contrasting perspectives by highlighting a generally poor understanding of both hepatitis B and C among medical students, particularly in the lower academic years, suggesting a correlation between academic progress and knowledge [26]. This observation was reported somewhat differently by a Nepalese medical institution, which indicated significant gaps in HBV knowledge across all years [27]. Furthermore, a Nigerian study revealed suboptimal knowledge regarding HBV infection prevention among healthcare students [28].

Variations in knowledge about risk factors for transmission and common myths and misconceptions among medical students could be attributed to several factors. This may be due to inadequate educational strategies and outdated curricula that fail to keep pace with current medical practices, which are significant concerns [29]. Additionally, limited practical exposure might hinder students from effectively applying theoretical

knowledge in clinical scenarios [30]. Furthermore, insufficient preclinical training on infection prevention and control before clinical rotation is a critical gap that needs to be addressed to better prepare medical students for real-world healthcare challenges [31].

This descriptive study has some limitations due to its inability to be generalized beyond the college setting, as it draws on a sample exclusively from a medical college in Punjab Province. The findings are based on descriptive statistics without inferential analyses, limiting our capacity to draw more comprehensive epidemiological conclusions. Despite these limitations, the study's strengths lie in its thorough assessment of both recognized risk factors and common myths or misconceptions about transmission risks, providing valuable insights into the current knowledge gaps that exist among future healthcare professionals. Future studies may expand the study's sample size and include students from various medical colleges across Punjab and Azad Jammu and Kashmir (AJK) to enhance the generalizability of the results. Furthermore, the absence of stratification by educational year within our study population excludes detailed insights into how knowledge progresses throughout the medical education continuum. Incorporating such stratifications in future research could provide critical insights into the educational dynamics and effectiveness of current hepatitis teaching modules at different stages of medical training.

5. Conclusions

This study highlights critical areas where undergraduate medical students' understanding of hepatitis B and C transmission is robust, as well as areas where common myths and misconceptions persist. Accurate knowledge of maternal and perinatal risks contrasts sharply with misconceptions about nonbloodborne transmission routes. This discrepancy indicates a dire need for targeted educational interventions to correct these myths and misconceptions and enhance overall understanding, ensuring that future healthcare professionals are well prepared to manage and prevent hepatitis transmission effectively.

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Consent to participate: Written informed consent was obtained from all participants included in the study.

Data availability: The data supporting this study's findings are available from the corresponding author, Danish, upon reasonable request.

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Conflicts of interest: The authors declare no conflicts of interest.

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