

The Overlooked Risk Behaviors of Hepatitis B Virus among Medical and Nonmedical Undergraduate Students

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Abstract. Hepatitis B is the liver tissue inflammation that caused by a viral infection. It causes chronic disease and can be fatal due to cirrhosis and liver cancer. Overlooking the risk behaviors can significantly contribute to the spread of HBV. A cross-sectional study was conducted to investigate the risk-behaviors prevalence of HBV among undergraduate students and to examine its association among medical and nonmedical undergraduates. A questionnaire was randomly distributed to 200 students at Tishk International University, Erbil, Iraq. Demographic and HBV risk-behavior data were collected and analyzed by Chi-square. Linear regression examined the relationship between medical, nonmedical, and HBV risk behaviors. The results revealed that the most common risk-behaviors for HBV among students were sharing nail cutters (79%), sharing razors (55.5%), body piercing (51%), and sharing toothbrushes (23%). However, those risk behaviors varied by gender. Unexpectedly, there was a significant association between some risk-behaviors for hepatitis B and medical students, particularly in pharmacy and nursing departments. Nonmedical students showed fewer risk behaviors than those in pharmacy and nursing departments. The behavioral risk incidence of pharmacy and nursing students was significant in sharing razors ($p \leq 0.005$) ($p \leq 0.033$) and sharing nail cutters ($p \leq 0.000$) ($p \leq 0.000$) respectively. This study concludes that the transmission of hepatitis B is most likely among undergraduate students due to the overlooked risk behaviors of HBV, and lack of knowledge or awareness. An awareness program is crucial particularly for those in the medical field who may have an impact on other people's lives. Additionally, vaccination against HBV infection is needed to control its transmission and reduce its spread.

Keywords: Hepatitis, virus, cirrhosis, risk-behaviour, awareness, vaccination, students.

Introduction

Hepatitis is the inflammation of the liver tissue caused by viral infections of hepatitis B virus (HBV). When this occurs, the function of the liver is negatively altered and causes cirrhosis that leads to chronic hepatitis B, cirrhosis and hepatic carcinoma (1) and eventually ends in death (2; 3). Annually, HBV infects 1.5 million people, with a total infection of over two billion people worldwide (4). The yearly number of death cases related to HBV was estimated to be 780,000 (5 ; 6). Hepatitis B can be transmitted via blood and body fluids (7). Thus, several risk factors were associated with HBV, such as dental procedures, healthcare staff, HBV infected family members, sexual partners, tattoos, piercings, sharing toothbrushes, razor blades, blood transfusions, hemodialysis, homosexuality, and drug and alcohol consumers (8, 9, 10, 11, 12). However, people tend to behave and risk themselves by sharing personal tools, particularly among friends or family members, due to a lack of financial resources or the lack of knowledge of the risk of diseases transmitted through these shared tools. Many studies have identified several HBV risk behaviors, such as sharing nail cutters, sharing razors, piercing,

barber, sex, drug use, acupuncture, tattooing, sharing of unsafe and contaminated needles and other personal tools (8, 13, 14, 15, 16). An overlooked risk factor plays a key role in the spread of HBV worldwide (4). Recently, the World Health Organization (WHO) collaborated with international organizations to set plans to eliminate hepatitis B by 2030. However, only a few countries are able to achieve viral hepatitis elimination target due to the lack of proper vaccination strategies and awareness program (17, 18, 19). More than 90% of HBV infected people were unaware of the symptoms and transmission method (20). Awareness is a significant factor in the prevention of HBV. Unfortunately, people worldwide have low awareness of the HBV various aspect especially its risk behaviors (21). A lack of knowledge and understanding of the risk factors and behaviors can contribute to the spread of this HBV. However, in Iraq, up to date, no study has been done regarding the risk behaviors of HBV, and particularly among undergraduate students. This vulnerable category in society is being ignored and not considered to investigate their understanding and awareness of the risk behaviors of

HBV. Thus, this study was conducted to assess the overlooked risk behaviors of HBV among medical and nonmedical undergraduate students in Erbil, Iraq.

Methodology

Design and Sample of the Study

This study was carried out in Erbil, the capital of Kurdistan Region of Iraq, to assess the risk behavior of hepatitis B among undergraduate students at Tishk International University (TIU). The research reported in this paper adhered to the Declaration of Helsinki's ethical guidelines. This study was also approved by the Board of Scientific Committee and Research (BSCR), Biology department at the University of TIU, with approval letter number 401E 08122021. This study design was a cross-sectional survey, as it is easier to collect data on a large number of variables and it is more suitable for exploratory studies (22). The sample for this study was undergraduate students at Tishk International University. The university students are chosen, as observations demonstrate that, most students are sharing many tools with their friends and families. In addition, the majority of females do cosmetic nail procedures, such as gel nail extensions, piercings, and tattoos, as this increases their risk of getting infected with blood-borne illnesses (23). The questionnaires were distributed to undergraduate students randomly in four different medical departments and 8 nonmedical departments. An online sample size calculator Raosoft (24) was used to calculate the sample size. The required sample size was calculated with a confidence level of 95 and 5 margin of error. Thus, the required sample size range was approximately 200 students.

Research Instruments and Variables

The variables of this study were the risk behaviors for hepatitis B infection among undergraduate students at TIU. Thus, a questionnaire was adopted (14), developed in relation to the participant' lifestyles. The developed questionnaire was validated, reviewed, and proofread before being distributed to the participant. The study questionnaire consisted of 2 sections; the first section includes the participants demographic information, such as age, gender, race, college, educational level, marital status, occupation, and place of residence. The second section includes 10 risk behavior variables that were chosen to be the tested variable for this study. The related risk factors were sharing a toothbrush, sharing razor

blades, sharing a nail cutter, acupuncture, sharing needles, tattoos, body piercing, unprotected sex, sex with more than 1 partner, alcohol use, and prison experience.

Data Collection and Analysis

Students were chosen randomly from each department and were handed out the questionnaire to share their understanding and knowledge about the risk behaviors of HBV. Students who willingly agreed to participate in this study were offered a survey package. Each package contained a consent form, a demographic information sheet, and the study questionnaire. A brief overview of the study along with the consent was provided to the participants. The students were requested to give their honest answers while answering the handed-out questionnaire. A translation was offered into their preferred languages, or the explanation of any difficult term was given accordingly. The questionnaires along with the signed consent forms were collected immediately. The statistics software IBM SPSS version 22.0 was used for all analyses. Data were analyzed using SPSS (version 21) by frequency analysis, chi-square analysis, and linear regression analysis. The collected data were analyzed by linear regression to identify the relationship between departmental factors and risk behaviors for HBV infection. Then, the 10 risk behaviors were considered for the statistical analysis by regression analysis to determine the P value.

Result

Participant Demographic Characteristics

Data were collected from 200 participants at TIU. The characteristics of the participants are shown in Table 1. More than half (52.5%) of participants were female, and most respondents were Kurdish, followed by Arab and Turkish nationality. Most of them were single (99%), and the majority of the participants were living with their families (84%). The majority of participants (32.5%) were in their fourth and third years, most respondents are unemployed (93%). Figure 1 depicts the participants' departments, with nursing students accounting for 22%, pharmacy students at 20%, ELT students 5%, and physics and mathematics students 6%. Other departments, such as law, had only 11%. Subsequently, the departments were divided into two groups: medical departments (60%) and non-medical departments (40%).

Table 1. Demographic characteristics of participants

	Frequency	Percentage%
Sex		
Male	95	47.5%

Female	105	52.5%
Ethnic		
Kurdish	17	88%
Arab	19	9.5%
Turkish	5	4.5%
Material status		
Married	2	1%
Single	19	99%
Accommodation		
Family	168	84%
Dormitory	32	16%
Grade level		
First grade	26	13%
Second grade	30	15%
Third grade	65	32.5%
Fourth grade	65	32.5%
Fifth grade	14	7%
Work		
No work	186	93%
Total	200	100%

Table 2. Department clusters of participants
Frequency Percentage%

Medical Department		
Nursing	44	22%
Pharmacy	40	20%
Medical analysis	23	11.5%
Density	13	6.5%
Total	120	60%
Non-Medical Departments		
ELT	11	5.5%
Physics	12	6%
Mathematic	12	6%
Law	22	11%
Architecture	10	5%
Accounting	6	3%
Business	4	2%
Engineering	3	1.5%
Total	80	40%

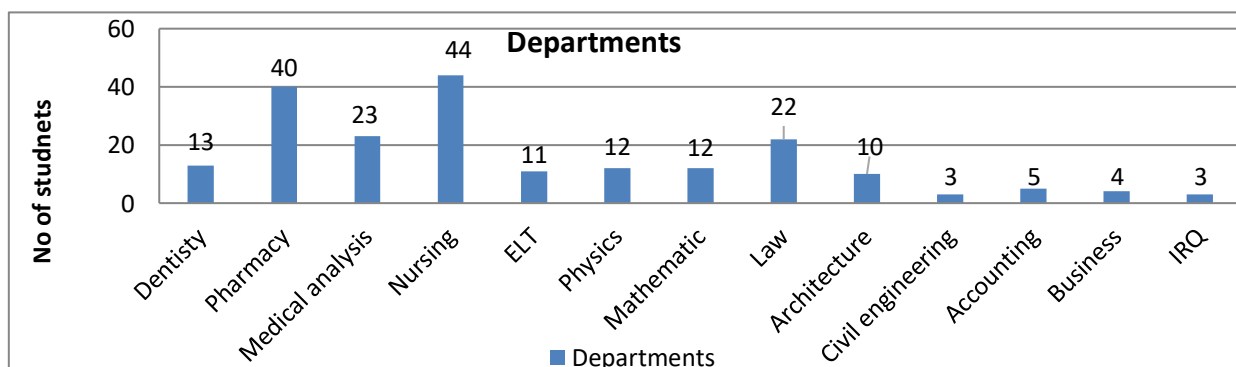


Figure 1. Number of Participants According to Each Department.

Evaluation of Hepatitis B Risk Behavior

The frequencies and percentages of risk behaviors of HBV among undergraduate students are presented in Table 3 and Table 4. The result showed that the students tend to perform many risk behaviors through the sharing of tools among them. The most common high-risk behaviors were the sharing of nail cutter (79%), sharing razors (55.5%),

body Piercing (51%), sharing toothbrushes (23%), tattooed (20%), undergoing acupuncture and alcohol consumption (16%), and sharing needles (15%). The prevalence of risk behaviors (% of those engaging in a behavior rarely or more often) varied by gender Figure 2 &3. Among males, the two most common risk behaviors for males were sharing nail cutters and sharing razors, whereas the two most common risk behaviors were sharing nail cutters and body piercing for females.

Table 3. Descriptive statistics of hepatitis B risk behaviors.

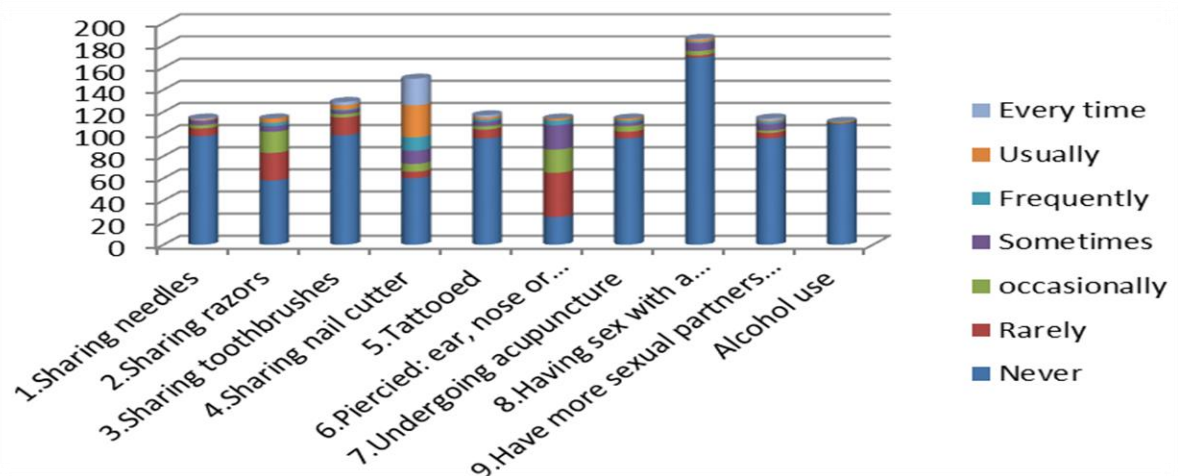
Risk behaviours of HBV	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Every time
	N	N	N	N	N	N	N
1. Sharing needles	169	13	5	7	2	2	2
2. Sharing razors	92	53	23	21	7	6	1
3. Sharing toothbrushes	155	22	7	7	2	4	4
4. Sharing nail cutter	42	12	11	19	18	53	45
5. Tattooed	160	15	6	8	4	2	5
6. Pierced: ear, nose or anywhere in the body	98	46	23	22	6	5	----
7. Undergoing acupuncture	168	11	8	8	5	----	----
8. Having sex with a prostitute or a stranger	174	4	5	9	4	2	2
9. Have more sexual partners	170	8	4	8	3	3	4
10. Prison	170	7	10	7	5	1	----
11. Alcohol consumption	167	3	3	9	2	8	8

Table 4. The percentage statistic of hepatitis B risk behaviors.

Risk behaviours of HBV	Never (%)	Rarely (%)	Occasionally (%)	Sometimes (%)	Frequently (%)	Usually (%)	Every time (%)
1. Sharing needles	85%	6.5%	2.5%	3.5%	1%	1%	1%
2. Sharing razors	45.5%	26.5%	11.5%	10.5%	3.5%	3%	0.5%
3. Sharing toothbrushes	78%	11%	3.5%	3.5%	1%	2%	2%
4. Sharing nail cutter	21%	26%	5.5%	9.5%	9%	26.5%	22.5%

5. Tattooed	80%	7.5 %	3%	4%	2%	1%	2.5%
6. Pierced ear, nose or anywhere in the body	49%	23%	11.5%	11%	3%	2.5 %	----
7. Undergoing acupuncture	84%	5.5 %	4%	4%	2.5 %	----	----
8. Having sex with a prostitute or a stranger	87%	2%	2.5%	4.5%	2%	1%	1%
9. Have more sexual partners	85%	4%	2%	4%	1.5 %	1.5 %	2%
10. Prisoner	85%	3.5 %	5%	3.5%	2.5 %	0.5 %	----
11. Alcohol consumption	84%	1.5 %	1.5%	4.5%	1%	4%	4%

Figure 2. Shows the HBV risk factors among male students.



Association Factors and Hepatitis B risk Behaviors

A linear regression model was used to examine the relationship between educational-demographic factors and hepatitis B risk behaviors Table 5. Twelve departments participated in this study, which were divided into 2 groups, medical departments group, and nonmedical departments group. Surprisingly, nonmedical departments didn't have a significant association with risk behaviors exposures compared to medical departments. The medical group consisted of 4 departments: pharmacy, dentistry, nursing, and medical analysis. The result showed that pharmacy department students were significantly associated with several risk behaviors exposures, above all, sharing razors ($p = 0.005$) and sharing nail cutters ($p = 0.000$). The result also showed that nursing department students were significantly associated with several exposures of risk behaviors particularly sharing razors

($p=0.03$) and sharing nail cutters ($p=0.000$).

Discussion

In recent years, the prevalence rate of HBV infection increased significantly and became one of the most dangerous infectious diseases that leads to significant mortality (25, 26). This situation has become more threatening worldwide (27). Lack of knowledge and understanding of the risk factors and behaviors can increase the transmission of HBV. Thus, the significance of this study is to shed light on understanding of the risk behaviors of hepatitis B among undergraduate students. The ways of prevention, treatment, and most importantly students' understanding of the method of transmission of HBV are of high importance for public health and the whole community. This is the first study that highlighted some important HBV risk behaviors among undergraduate

students in the Kurdistan region and Iraq. In this study, the results were a set of behaviors that pose greater risk for hepatitis B that were related to the undergraduate student's lifestyles. Our study shows that 79% of the students reported that they share a nail cutter. This was the highest rate of risk behaviors of HBV among undergraduate students. This indicates a huge concern for these behaviors, and it shows the lack of knowledge and awareness about HBV risk behaviors among undergraduate students. It is well known that sharing a nail cutter without sterilizing can lead to the transmission of HBV since the virus can live on surfaces for seven days (23, 28). Thus, the sharing of the nail cutter among students might endanger them getting infected with HBV. In fact, the high prevalence of chronic HBV was attributed partially to the lack of preventive and awareness programs (29). Likewise, sharing nail cutters has the highest rate among HBV risk behaviors in Saudi Arabia, Malaysia, and Nigeria (30, 31, 14). Some other studies reported nail cutters as the highest HBV risk factor such as China and the United Kingdom (32). Another study conducted in Duhok, Iraq, the surgical operation was found to have the same rate of risk factor as nail cutter since the transmission rate of HBV increases in surgical rooms with poor sterilization of the place and tools (33).

In this study, the results show sharing razors was the second highest risk behavior with 55.5% of the students, after sharing nail cutters. Students in this study were reported to share their tools, such as razors, quite often, especially among male students, which was out of carelessness or trust that no harm could be gained by these used razors. This shows that undergraduate students, including the medical department students, are overlooking these HBV risk behaviors, due to their lack of knowledge and awareness. In fact, sharing personal objects with family members, such as safety razors, dishes, cutlery, glasses, face towels, and toothbrush was a significant risk factor in spreading the infection among family members (34). Similarly, body piercing was the third highest risk behavior among students of our study with 51% of the participating students. This is because most students nowadays are influenced by celebrities or media influencers, as they try to imitate them by having a tattoo or piercing the nose, ears, or other parts of the body. Students are unaware of the risk behind these practices and thus, they need some educational programs about HBV risk factors to increase awareness.

On the other hand, our study showed that students who reported that they are sharing toothbrushes were 23% while tattooing (20%). However, in Duhok city, another district of the Kurdistan region of Iraq, tattooing and accidental injuries was the second after surgical operations as risk factors of HBV (33). In Vietnam, sharing a toothbrush was the second highest risk after sexual

intercourse with an infected partner, but in Malaysia piercing and acupuncture were second after sharing nail cutters (35, 36). Despite the low rate of toothbrush sharing in our study, however, this should be taken into consideration, as sharing toothbrushes can cause other diseases, not only HBV.

Globally, sexual transmission, both heterosexually and homosexually was found as one of the main behaviors of getting HBV infection (37). However, our result showed that the lowest rates of risk behaviors were having sex with a prostitute, or a stranger with a rate of 13% of students. Having many sexual partners, sharing needles and prison formed the second lowest rate of risk behaviors in our study with only 14 % of the participating students. On the contrary, in China, Vietnam, and South Korea, sexual intercourse was the highest risk factor, as having sex with someone that has the virus can increase the transmission rate for getting the hepatitis B virus, this was followed by nail cutting, surgical operation, and tattooing (37, 38, 39). This variation between results could be related to the different cultures or how the students were raised, as it is well known that intercourse before marriage is prohibited in the middle east. Moreover, it was also related to socioeconomic and awareness levels too, where in poor countries with poor hygiene and low level of awareness the transmission is higher, while in developed countries most infections occur among young adults through injecting drug use or sexual behavior (28).

On the other hand, those who reported prison, were due to traffic offenses such as driving without a license or using an invalid license, so their prison time was short, and they were not in a public prison. Thus, the use of sterile needles and other items for ear or body piercing and tattooing is recommended for reducing the transmission of HBV (40, 41, 42). However, other techniques including immunizations can help prevent the transmission of hepatitis B (43). Acupuncture and alcohol consumption formed the third lowest risk behaviors with 16%. The use of acupuncture is more common among old people compared to the young. It has been reported that the risk behaviors of HBV varied from one country to another, due to the different cultures, traditions, lifestyles, and other socioeconomic factors (44). Acupuncture and alcohol consumption has a strong correlation with religious beliefs, as their effectiveness is strongly related to religious beliefs, while alcohol consumption is prohibited for Muslim beliefs. Acupuncture has been documented to be a risk factor for HBV since the use of unsterilized cups can offer a good means for the transmission of the virus. The hepatitis B virus can survive for at least 7 days outside the body. During this time, if the virus enters the body of a person who is still not protected by the vaccine, it can lead to infection.

The result showed that pharmacy department and

nursing department students were significantly associated with several risk behaviors exposures compared to the other non-medical departments. A similar result was obtained from (30), where a statistically significant correlation was found between HBV risk behaviors of medical students. This result indicated the low awareness levels and the overlooked risk factors of HBV among medical students represented by pharmacy and nursing. The medical departments had less awareness and knowledge about the risk behaviors of HBV, despite of their education level. This rings an alarm since those students form one of the core pillars of the health sector, where their health status is essential since eventually, they

will work in hospitals or health centers. However, there was no correlation between hepatitis B risk behaviors and socio-demographic variables including age, gender, marital status, and occupation status of the students. In addition, the number of females and males was almost equivalent in their practices of HBV risk behaviors. This result was in line with a previous study from (30) and on contrary to a study by 45, where a significant correlation between HBV intention and socio-demographic variables was found. Another study was in line with our study from Hwang, where the Vietnam students were found to have a low level of knowledge about possible risk factors of Hepatitis B (46).

Department	Sharing needles	Sharing razors	Sharing toothbrushes	Sharing nail cutters	Tattooed	Pierced body	Undergoing acupuncture	Having sex with a stranger	Having more sexual partners	Alcohol maker
Pharmacy	0.970	0.005*	0.799	0.000*	0.233	0.443	1.000	1.000	1.000	1.000
Dentistry	1.000	0.873	1.000	0.622	1.000	0.873	1.000	1.000	1.000	1.000
Nursing	1.000	0.033*	0.931	0.000*	0.998	0.293	1.000	1.000	1.000	1.000
Medical analysis	1.000	0.443	0.998	0.141	0.991	0.364	0.998	1.000	1.000	1.000
Physic	1.000	1.000	1.000	0.931	1.000	1.000	1.000	1.000	1.000	1.000
Mathematic	1.000	0.998	1.000	0.799	1.000	0.991	1.000	1.000	1.000	1.000
ELT	1.000	0.622	1.000	0.713	0.931	0.799	1.000	1.000	1.000	1.000
Law	0.530	0.233	0.443	0.233	0.530	0.443	0.530	0.931	0.931	0.364
Accounting	0.991	0.991	0.873	0.931	1.000	1.000	0.998	0.970	1.000	0.998
Business	0.970	0.991	0.998	0.998	0.991	0.970	1.000	1.000	1.000	1.000
Architecture	0.931	0.799	0.799	0.931	0.970	0.970	0.873	0.970	0.970	0.970
Civil	0.998	0.970	1.000	0.998	0.931	0.998	0.931	1.000	1.000	0.998

Table 5. Association of medical, nonmedical department and hepatitis B risk behaviors

Conclusion

The result of this study highlights the risk behavior of HBV among undergraduate students. Our study revealed that the risk behaviors of hepatitis B were very high among undergraduate students due to a lack of knowledge and awareness. The most common risk behaviors for hepatitis B among undergraduate students were sharing nail cutters, sharing razors, body piercings, and sharing toothbrushes. HBV prevention programs need to be promoted in university courses, especially in medical departments, to increase awareness and understanding of the risk behaviors of HBV. More awareness programs about the risk behaviors of HBV should also be implemented in community projects and social media. Moreover, the Ministry of Health should control and supervise barber shops, salons, and acupuncture centers to avoid the use of unsterilized tools. Full screening for HBV for the population in the city should be implemented. Therefore, virus tests should be free and mandatory, and

individuals should register at the nearest healthcare center to receive a test code provided by the government. Additionally, the hepatitis B vaccine dose given at birth should be not ignored, and people should be encouraged to get vaccinated against the Hepatitis B virus to eliminate the spread and mortality rate of HBV.

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