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Assessment of knowledge, awareness and vaccination compliance of hepatitis B among students of health colleges of Al-Baha University

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ABSTRACT

Background: Viral hepatitis is a blood-borne liver infection that is caused by the Hepatitis B virus (HBV). It is preventable disease through immunization. Medical students are at higher risk of HBV contraction due to occupational exposure. *Objective:* The aim of the study is to assess the knowledge and awareness of Hepatitis B (Hep B) vaccination and vaccination compliance among the students of health colleges of Al-Baha University. *Methods*: A cross-sectional quantitative study was carried out using a close-ended survey of 394 medical students at Al-Baha University and the collected data was statistically analyzed using the SPSS tool. *Results:* The descriptive analysis revealed that more of the participants were males (73%) than females (26.9%). Most of the participants (92%) were not infected with HBV. About 50% reported not receiving HBV vaccination. In terms of awareness among respondents, 43.60% were not aware of the length of dosses that they need to achieve full immunity while 57.11% were aware of the protection of vaccine against HBV infection. About, 71.07% of the respondents think of Hep B as liver disease and are aware of its immunization as a preventive measure. However, some participants (44%) were not aware of symptomless HBV. *Conclusion:* HBV is a complicated viral infection. The knowledge of vaccination was not enough among students of Al-Baha University and therefore, it is recommended to increase the awareness and knowledge of medical students as they are at higher risk of contracting HBV infection.

Keywords: HBV, awareness, knowledge, hepatitis, vaccination, Al-Baha.

1. INTRODUCTION

Background

Hepatitis B is a liver infection caused by the Hepatitis B virus (HBV) and spread through semen, blood or other fluids of the body. It can lead to acute

as well as chronic illnesses (CDC, 2021). Furthermore, it is a major health issue and about one-third of the global population is infected with HBV (Rathi et al., 2018). People who are at greater risk of getting HBV infections worldwide are the medical students at health colleges who are working with HBV, they are susceptible and at risk to get HBV infection. Therefore, knowledge and awareness about Hepatitis B (Hep B) are pertinent to them (Sannathimmappa et al., 2019). Moreover, Hep B can be prevented by vaccination which is available commercially for the prevention of Hep B (CDC, 2021). Hence, healthcare students should know and be aware of method of transmission, infectious symptoms and prevention of Hep B and therefore, complete their Hep B vaccinations to protect themselves.

Aims and Objectives

Our research aims to assess the knowledge, awareness and vaccination compliance of Hep B: Especially among the medical students of Al-Baha University. On that basis, the following objectives of the contemporary study are outlined:

To examine the level of knowledge about Hep B infections among the healthcare students of Al-Baha University

To assess the awareness of healthcare students of Al-Baha University regarding the spread and prevention of Hepatitis B infection

To evaluate the vaccination compliance of Hepatitis B among the healthcare students of Al-Baha University

To measure the impact of knowledge, awareness and vaccination compliance of Hepatitis B among Al-Baha University's healthcare students

Research conducted by Altamimi et al., (2021) highlighted the importance of assessment of the knowledge, Awareness level and Vaccination compliance of Hep B among health college students. In line with the research by Altamimi et al., (2021), the research question for the present research study is: How does an assessment of knowledge, awareness and vaccination compliance of hepatitis B among students at health colleges of Al-Baha University alleviate the spread of HBV in them? Based on the following research question, the current research hypothesis (H) is as follows:

H1: Adopting the knowledge and awareness assessment criteria transforms the incidence of HBV infections among medical students.

H2: Adopting the vaccination compliance strategy changes the frequency of HBV cases in healthcare students working with HBV.

Research Significance

Contemporary research has a significant place in providing a thorough assessment of the knowledge, awareness level and Vaccination compliance of Hep B among students at health colleges of Al-Baha University. It gives important insights to managerial and medical staff working at the health colleges of Al-Baha University to control HBV cases among the medical students who are at high-risk environment for transmission of HBV. Our study will provide a thorough study of the level of knowledge and awareness as well as vaccination compliance.

Additionally, this research also gives insights to medical students as well as to how carefully to work with HBV and how to prevent themselves from HBV acute and chronic infections. This research critically analyses the knowledge level of healthcare students, especially those who are new to HBV research labs. In this way, the incidence of HBV infections can be reduced. The critical assessment of the awareness level among the old medical students about Hep B infections assists the newcomers in knowing about the spread, symptoms and prevention of Hep B infections. This research study is an excellent way to assist the health care students with the vaccination compliance and motivate them to complete their Hep B vaccination.

2. METHODS

Study setting and population

The major public health issue through which people suffer for many years is a liver infection caused by the Hepatitis B virus. It spread through semen, blood or other fluids of the body (Revill et al., 2019). Medical student working with patients who have Hep B virus are at great risk of getting hepatitis B. Therefore, their knowledge, awareness and vaccination compliance are necessary to reduce the incidence of hepatitis B in them (Shrestha et al., 2020).

Study design, period and setting

This prospective, cross-sectional, community-based study was conducted from June 2022 to November 2022 to evaluate the level of awareness and compliance toward HBV and Hep B vaccination in Al-Baha, the capital city of the Al-Baha area located in southwest Saudi Arabia.

Analytical methods

The present study deals with quantitative data analyzed through SPSS to conclude quantitative results and discussion. In the present study, the quantitative research strategy is employed to critically bridge the gap between variables of research and conclude common outcomes.

Data collection

To assess the level of knowledge, awareness and vaccination compliance regarding Hepatitis B infection, the data was collected from 394 medical students of Al-Baha University through primary data collection which provided the researcher to acquire impersonal views of the medical students. This method was used to gain unbiased and immediate data from the targeted population i.e., medical students while creating the relationship between the dependent and independent variables of the research study. It also assisted the researcher to maintain a focus on the problem of the research, which was why the primary data collection was ideal to comprehend the impact of knowledge, awareness and vaccination compliance of Hepatitis B among Al-Baha University's healthcare students. Paradis et al., (2016) claimed that the analysis of data is a focal point in a research study where different researchers employ strategies to evaluate data and draw conclusions. Data was collected by primary data collection method i.e., survey and results were produced using SPSS software to analyze the data findings.

3. RESULTS

Demographic Characteristics

The demographic characteristics of the participants are attached in Table 1. It was found that most of the participants were males (73.10%), aged between 18 and 20 years old (44.42%), were single (91.12%), and were enrolled in faculty of medicine (67.01%).

Table 1 Demographics information

Variable	N	Percentage
Gender		
Female	106	26.90
Male	288	73.10
Age		
18-20	175	44.42
>20 – 23	143	36.29
> 23 – 26	71	18.02
> 26	5	1.27
Nationality		
Saudi	394	100.00
Marital Status		
Married	28	7.11
Other	7	1.78
Single	359	91.12
Housing Condition		
Live Alone	42	10.66
Live with his Family	298	75.63
live with his Friends	54	13.71
The College		
College of Applied Medical Sciences	81	20.56
College of Clinical Pharmacy	23	5.84

Faculty of Dentistry	26	6.60
Faculty of Medicine	264	67.01

Table 2 Academic year and residence

Variable	N	Percentage
Residence		
Alaqiq	36	9.14
Albaha	215	54.57
Aldamam	1	0.25
Algara	9	2.28
Almakwah	23	5.84
Almandaq	22	5.58
Baljurashi	70	17.77
Bani-Hasan	2	0.51
Eastern	1	0.25
Kara-Alhait	1	0.25
Qelwah	11	2.79
Algonfodah	1	0.25
Khairah	1	0.25
Ghamd-Alznad	1	0.25
Academic year		
First-year	83	21.07
Second year	49	12.44
Third Year	58	14.72
Fourth year	55	13.96
Fifth year	42	10.66
Sixth year	58	14.72
Internship	49	12.44

Additionally, a larger portion of respondents (54.57%) were from Al-Baha and were enrolled in their first year of academic (21.07%). The risk and knowledge factors of these participants are explained in the next section.

Risk and Knowledge

Risk Factors

The study's findings depict most of the participants (92.13%) were not infected with hepatitis B before, nor their family members were (76.68%). When asked about having needle stick injuries while they were in the hospital, most of them (75.89%) denied the fact. Similarly, the statistics also suggest that around 49.75% had not received the Hepatitis B vaccine. 10.15% of them fear of the side effects of the vaccine, 11.17% they don't have time to take the vaccine, 18.53% they don't know how to get it, 28.17% they don't know the importance of the vaccine.

Keeping in view the awareness level of participants, the study found that most of the research respondents (43.60%) were not aware of the length of dosses that they take to achieve full immunity. However, a larger portion of respondents (57.11%) were aware of the protection of vaccine against Hepatitis B infection. Finally, 34.52% of the participants believed that the best time to get a vaccine is before clinical careers. Figure 1 shows the percentage of correct answers for each of the vaccine awareness questions.

Knowledge

In last, the results indicate that 71.07% of the participants think that Hepatitis B is a liver disease caused by the hepatitis B virus, and the virus interferes with liver function and causes other pathological damage. Interestingly, 59.39% of them believe that Hepatitis B tends to have a complication such as cirrhosis. In addition, a larger chunk of them (44.67%) know about the treatment of Hepatitis B. Figure 2 shows the percentage of correct answers for each of the knowledge of hepatitis B virus questions.

Table 3 Hepatitis B and vaccination acceptability

	n	Percentage
Have you been infected with hepatitis B before?		
I don't know	16	4.06
No	363	92.13
Yes	15	3.81
Have any of your family members had a hepatitis B infection?		
I don't know	43	10.91
No	310	78.68
Yes	41	10.41
Have you had a needle stick injury while you were in the hospital?		
I don't know	29	7.36
No	299	75.89
Yes	66	16.75
Have you received the hepatitis B vaccine?		
I don't know	61	15.48
No	196	49.75
Yes	137	34.77
If your answer to the previous question was (no or I don't know), why did not you receive the vaccine?		
Fear of the side effects of the vaccine	40	10.15
I don't have time to take the vaccine	44	11.17
I don't know how to get it	73	18.53
I don't know what the importance of the vaccine is	111	28.17

Table 4 Vaccine awareness

	N	Percentage
How many doses of the vaccine to reach complete immunity from hepatitis B?		
2 doses	42	10.66
I don't know	171	43.40
No need for a vaccine	29	7.36
Single dose	38	9.64
Three doses	114	28.93
How long does it take to reach full immunity?		
I don't know	228	57.87
One month	20	5.08
Six months	93	23.60
Three months	53	13.45
Does the vaccine protect against hepatitis B infection?		
I don't know	132	33.50
No	37	9.39
Yes	225	57.11
What is the best time to get the vaccine?		
After graduation	80	20.30
Before entering the university	84	21.32
Before the clinical career	136	34.52
I don't know	94	23.86

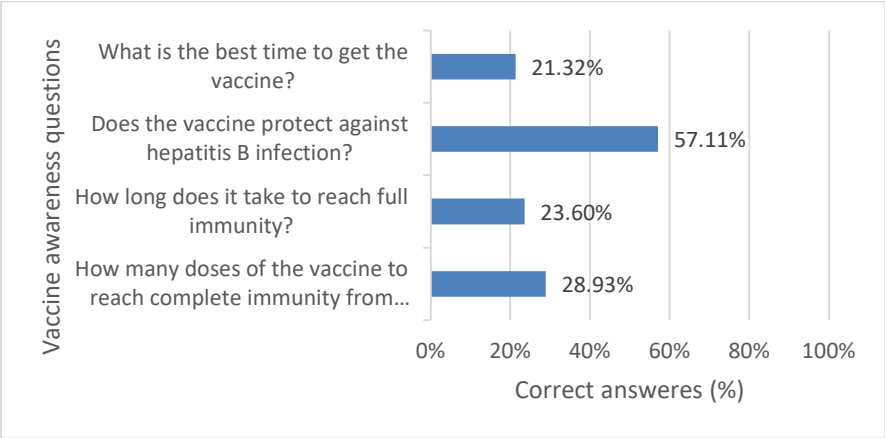

Figure 1 Percentage of correct answers to vaccine awareness questions

Table 5 Knowledge

	n	Percentage
Hepatitis B is a liver disease caused by the hepatitis B virus. The virus interferes with liver function and causes other pathological damage.		
I don't know	87	22.08
No	27	6.85
Yes	280	71.07
Is it possible for a person to be infected and not show the above symptoms?		
I don't know	174	44.16
No	39	9.90
Yes	181	45.94
What are the complications of hepatitis B (liver cancer)?		
I don't know	176	44.67
No	37	9.39
Yes	181	45.94
Complications of hepatitis B (cirrhosis)?		
I don't know	131	33.25
No	29	7.36
Yes	234	59.39
Can the hepatitis B vaccine cause disease?		
I don't know	147	37.31
No	157	39.85
Yes	90	22.84
In case of infection, can hepatitis B be treated?		
I don't know	162	41.12
No	56	14.21
Yes	176	44.67
After exposure to any form of infection, what is the next step to be taken?		
Contact the infection control department	231	58.63
Do nothing	27	6.85
I don't know	99	25.13
Watch for symptoms of hepatitis B	37	9.39

Can pregnant or breastfeeding women get the vaccine?		
I don't know	219	55.58
No	74	18.78
Yes	101	25.63
Can the transmission of hepatitis be prevented when taking the vaccine?		
I don't know	152	38.58
No	41	10.41
Yes	201	51.02

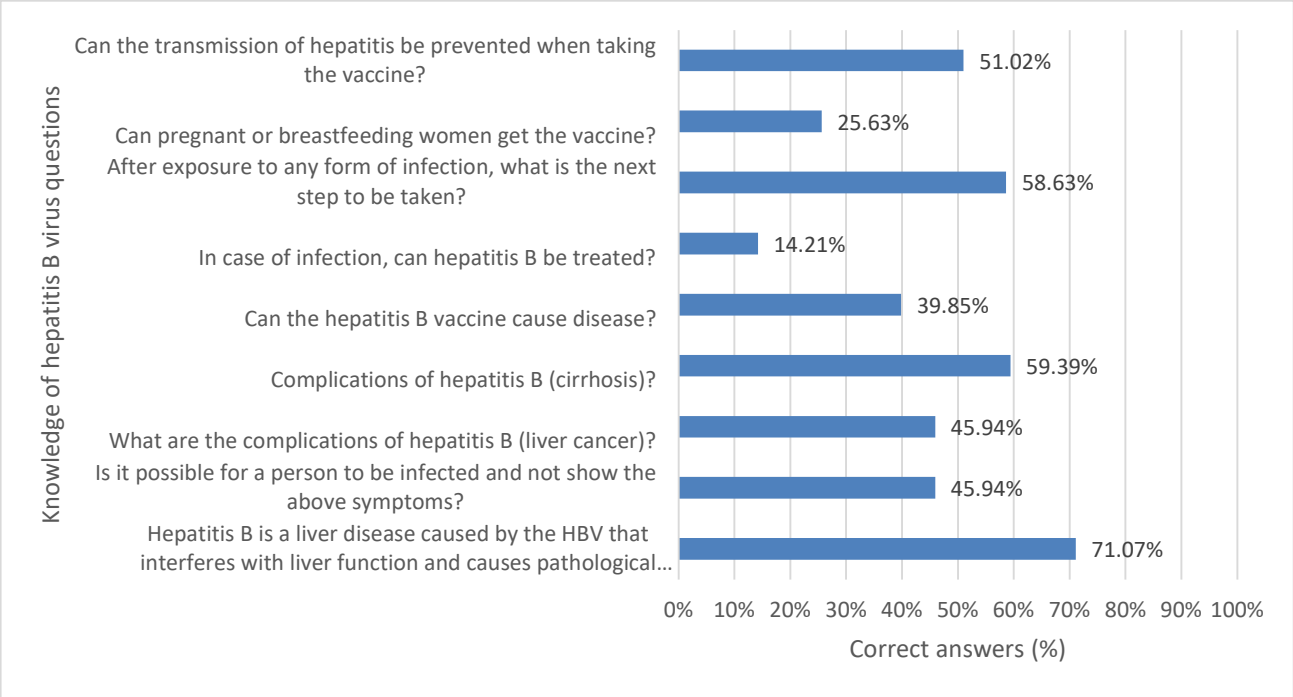

Figure 2 Percentage of correct answers to hepatitis B virus knowledge questions

4. DISCUSSION

The reason for studying awareness and practices across Hepatitis B is substantial. The chronicity, disparities of infection and mortalities across Hepatitis B are being widely studied in the literature since its wider prevalence from 1990 till date (Sheena et al., 2022). The blood-borne pathogen transmits through contaminated needles and syringes thereby imposing a higher burden of disease seroprevalence among medical professionals. Likewise, medical students are frequently exposed to contaminated instruments and accidental inoculation, making them sensitive to acquiring HBV infection (Singh and Jain, 2011). In this regard, the knowledge of awareness and practices among students was necessarily required for the development of outcomes. The study has therefore assessed the different dimensions of HBV knowledge, vaccination awareness and vaccination compliances among healthcare students from different regions of Albaha city. The study was carried out among 394 students from different academic levels in the field of medicine. Most of them were in the first year, while others were in the second, third, fourth and fifth years and some were placed on their internships. The assessment of their knowledge has resulted in mixed outcomes. This can be the result of their difference in academic years which can affect their knowledge of HBV (Alhowaish et al., 2017; Sannathimmappa et al., 2019). Most of the students out of the population of 394 were aware of the definition and symptoms of HBV. The participants have also significantly shared that HBV can be latent without showing any symptoms. It was also discussed in the literature that latent HBV facilitates the evolution of occult viral infection and may become the cause of harboring infection transmission and chronic exacerbation of the liver (Van-Hemert et al., 2008).

However, another significant proportion of participants (44%) were not aware of symptomless HBV. In addition, some participants were unsure about the complications of HBV which are usually liver cancer and cirrhosis. However, 59% of students responded to cirrhosis as a major complication and 45% responded to liver cancer, however other 55% were not aware and

conflicted about the risk of complications. This is in parallel with the findings of supportive evidence. Sannathimmappa et al., (2019) carried out a study in the UAE and found that the majority of medical students at CMHS University lack in their knowledge of hepatitis B risk and complications. This finding is however contradictory to the one from Jazan university, KSA where the student participants have shown good and satisfactory knowledge of HBV hazards and positive attitudes toward HBV vaccination (Zaeri et al., 2018). In addition, the findings have also shown students' knowledge of the immediate responses against the suspected infection and hazards of HBV. About 58% of students said to immediately contact the infection control department if suspected of any kind of infection. It guides proper clinical assessment of the HBV infection and control measures such as contact precautions to prevent the spread of infection (WHO, 2015). This shows their understanding of the necessary measures that must be taken in the earlier period of HBV infection. However, there was still a proportion that was unaware of the effective measures against infection which poses a challenge of still spreading infection of HBV.

In parallel with the understanding of infection control practices, students had satisfactory and positive attitudes toward HBV vaccination and perceived that it can be effective prevention mitigation against the viral infection. It was consequently observed from the literature that knowledge of the occupational risk and complications such as cirrhosis and hepatocellular carcinoma among clinical students is associated with the development of positive beliefs and anticipation for the vaccine as the safest preventive treatment for HBV (Zaeri et al., 2018). Even though participants have positive attitudes toward vaccination, there were a considerable proportion of respondents unaware of whether the HBV vaccine can cause any disease complication, whereas some respondents agreed upon it. Since the present study also entails an exploratory research design, these beliefs can be investigated to find justifications. Earlier literature has studied the HBV-related disturbances of immune mechanisms and the subsequent development of skin reactions and dermatomyositis (Altman et al., 2008). Another study reported neurological adverse events such as multiple sclerosis as associated with the HBV vaccine (Sestili et al., 2021).

Apart from this, our findings also illustrated that most of the students (55%) were unsure about pregnant and breastfeeding women receiving the HBV vaccine. Since the HBV vaccine was not based on the live attenuated virus, its risks in pregnant and breastfeeding women are not found to be severe. There is an essential need for women at risk of HBV to receive the vaccine administration (Gabutti et al., 2017). However, literature has a significant debate on this topic such that the administration of the HBV vaccine in pregnant women requires an exclusive assessment of pregnancy status to prevent the risks of antiviral intervention. Since mother-to-child transmission is one of the considerable factors for HIV incidence in infants, the HBV vaccine would surely be a preventive measure. However, the vaccine administration in the third trimester of pregnancy is suggested for the higher loads of viremia (He and Jia, 2016). The debate is still ongoing regarding the appropriate findings. Besides, HBV vaccination for both pregnant and breastfeeding women is suggested as an effective prophylaxis for both mother and infant. One of the major benefits is preventing infection in an infant such that the vaccine administration during pregnancy in the mother can induce active immunity in the infant (Giles et al., 2011). The potential of the hepatitis B vaccine for preventing a virus is associated with building immunogenicity in the recipient. Ho et al., (2020) studied that HBV sub-particles such as surface viral proteins are used for vaccine development. They represent the viral epitopes on the cellular surface of the host to initiate the immune responses. The potential of the vaccine lies in only presenting the chimeric particulates for immune cells to recognize and not secreting particles thereby protecting the host from infection (Ho et al., 2020). However, despite excessive coverage of HBV vaccination globally, the knowledge is still limited about its potential efficacy to prevent the infection (Ximenes et al., 2015; Flores et al., 2022). On the other hand, the study of potential mechanisms of viral vaccines is giving sound hope for the future of vaccine-mediated prevention of the disease (Ho et al., 2020). A considerable number of participants (55%) in the present study positively responded that the HBV vaccine can prevent hepatitis B.

Apart from the HBV and vaccine perceptions among students, the awareness of vaccines must also be assessed to understand the depth of the vaccine's potential and students' level of susceptible HBV risks. This was also achieved in the present findings. The awareness of the vaccine is usually associated with knowledge of its dosage, time, protection potential and appropriateness of getting the HBV vaccine. First, there were more participants who have no idea of the vaccine dose that is required to reach full immunity in the body. Sande et al., (2007) at the time studied that the WHO recommended three doses of HBV vaccine as a way toward optimal protection against infection and carriers. Also, the vaccine efficacy between two and three doses was tested among infants receiving the HBV vaccine which showed the same efficacy of the vaccine in both dosage patterns. However, this also needed a follow-up trial since the studied sample size was low (Sande et al., 2007). This was precise in the later research with advancements in vaccination outcomes. Walayat et al., (2015) also reported that the vaccine is usually administered in three doses as it can achieve 95% efficacy and shows long-term serological immunity in the recipients. At present, WHO recommends the first dose of the HBV vaccine in infants within 24 hours of birth followed by 2 or 3 more recommended doses after a month (WHO, 2022). The WHO does not recommend the fourth vaccine dose among individuals receiving three doses since three-dose

administration is optimal (WHO, 2022). However, studies have investigated the need for boosters and the efficacy of the fourth dose among non-responders which resulted in anticipated outcomes (Walayat et al., 2015). Contrary to the previous discussion, present findings have conflicted outcomes for awareness of vaccines in medical students. Most of them do not have an idea of effective vaccine doses with full efficacy. However, a significant proportion has also said that the three doses are required for reaching full immunity. On the other hand, a few students even mentioned that there is no need for the HBV vaccine. This can be said that knowledge of the required dose is not good enough among medical students in the present study of KSA. Apart from this, different responses may be because of some factors such as the difference in students' academic year and depth of students' knowledge. These should be studied in detail as well.

For the timeliness to achieve full immunity, literature has studied that it takes appropriately six months to produce adequate protection from full immunity after receiving complete HBV vaccination series (Puvačič et al., 2005). In the present study, only 93 students agreed upon six-month time, whereas most of them did not have an idea about the duration of acquiring HBV antibodies. However, participants have positive beliefs about the fact that HBV vaccination can protect against viral infection. This is contradictory to previous findings in the literature. Darwish and Al-Khaldi, (2013) studied the knowledge of medical students at Dammam university, Saudi Arabia whereby students' knowledge of vaccination and its potential to prevent HBV was found poor as was discussed earlier that the WHO recommended vaccine administration in the early years of infancy. This was especially for those at risk of acquiring HBV from the mother-related transmission. Among the medical students, most have agreed on receiving vaccines before starting one's clinical career since students are at high risk of infection during clinical practices. Earlier studies have however shared that students should receive vaccination before coming to the clinical area which would avail them immunity against the infection (Vinodhkumaradithyaa et al., 2008). On the other hand, the current practices also suggested students get an examination for their HBV markers and get vaccinated before starting their clinical practices (Acikgoz et al., 2021). Overall, the students must have pronounced knowledge about when to get the vaccination for HBV.

Third, this research has also studied the acceptability of HBV vaccination and the risk factors for getting the infection. Most of the participants were not infected with HBV whereas few had previous infectious exposure and few did not have an idea of their infection status. These concerns have been rooted in earlier literature where the consistent prevalence of HBV infection in students of healthcare in Saudi Arabia was studied. Male students got more frequently infected with the virus than females (Al-Ajlan, 2011). In addition, about 41 students have said that one in their family got infected with HBV. There were a greater number of participants living with their families and may have been at greater risk of infecting with the viral transmission. About 61 students reported that they experienced a needle-stick injury during working in the hospital. This holds potential concerns as one study in Saudi Arabia discussed that the medical students at Al-Jouf University strongly agreed upon the risks of needle injury and blood-mediated transmission of HBV (Al-Hazmi, 2015). However, there were more numbers of participants who did not receive vaccination compared to those who had received the HBV vaccine. On the contrary in Turkey, 86% of healthcare students have a positive vaccination status. On further investigation, the students' protective behaviors and knowledge scores were found higher (Acikgoz et al., 2021). Unlike this, the present study did not have much-anticipated outcomes for vaccination practices and acceptability among students despite their higher risk of getting the infection. However, there is a possibility of risk factors that prevent students to comply with protective behaviors. In light of this, it was found that student does not have sound knowledge of the significance of the HBV vaccine, but fear having adverse effects from the vaccine, lack of time and unawareness of where to get the vaccine. These factors were also reported in the existing literature. Singh and Jain, (2011) reported that reasons for medical students not receiving vaccination were associated with a lack of information and a fear of needles. As far as the vaccine's side effects are concerned, most people do not get side effects and these effects have been reported to be only mild, lasting one to two days. However, candidates are also advised to not get follow-up vaccination if experience an allergic reaction against the previous first, as per guidelines recommended for vaccines (CDC, 2021). Overall, the vaccination practices and acceptability among medical students require more compliance and realization for showing protective behavior.

The present research has a substantial discussion on the knowledge, awareness, attitudes and practices of medical students in KSA regarding HBV infection and vaccination respectively. There were four major findings where the first one is that students' knowledge of HIV infection was fair enough, however, knowledge of risk and complications was insignificant which can make them less motivated toward prevention and treatment care. Second, the students have satisfactory attitudes towards acquiring vaccination, but this has contradictions since later findings depicted that the students were afraid of getting a vaccination and have lesser protective behaviors. Third, in line with the second finding, the practice and acceptability of HBV vaccination among medical students in the present research was not appropriate and requires an inherent effort of strategic mitigation which can educate and inform students to develop realization and concerns about the disease. The fourth and basic finding is overall associated with the risk and prevalence of HBV and its higher incidences among medical students.

Our study has both strengths and limitations in terms of quality and findings. The strengths lie in the fact that the study was conducted among healthcare students from multiple regions of Al-Baha which positively impact the generalizability of the findings. The generalizability of the sample results shows the quality and strength of the methodological design. Second, the generalizability of the findings was included with a quantitative descriptive analysis of the results. The quantitative study has greater generalizability and application in progressive research to present justifications. However, some limitations were also present such that only students' responses were assessed and supportive evidence was used to critique these responses. However, students' demographic factors were less reflected in the discussion. For example, the educational level and experiences of medical students greatly matter when discussing their efficacy of knowledge and practices toward the HBV vaccine (Maudsley and Strivens, 2000; Schei et al., 2018). However, it provides an opportunity for progressive research to assess the relationship of students' demographic factors with their knowledge and practice efficacy. This is very important since the clinical practices of medical students are based on the enrichment of knowledge and experiences. Overall, HBV is a raising concern worldwide and especially for students in the healthcare sector and therefore this aspect of research must be considered with seriousness and delegation among healthcare researchers.

5. CONCLUSION

Acknowledgment

We thank the population of Al-Baha region for their cooperation during the study.

Author Contributions

All authors contributed evenly with regards to development of study design, data collection and analysis, interpretation of data, drafting the manuscript and critical revision.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Ethical approval

This study was approved by the Research Ethics Committee in Faculty of Medicine, Al-Baha University with the ethical approval number (REC/MED/BU-FM/2022/4).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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