African Journal of Advanced Pure and Applied Sciences (AJAPAS)
Online ISSN: 2957-644X
Volume 4, Issue 3, 2025
Page No: 539-551
Website: *https://aaasjournals.com/index.php/ajapas/index*
ISI 2025: 1.126 **SJIFactor 2024: 6.752** **معامل التأثير العربي: 1.62**

Knowledge, Attitudes, and Practices Toward Hepatitis B Virus Among Medical Students and Residents in Northwest Libya

Ali Madour [1*], Rahmah Aboulqasim [2], Rahma Alkurdi [3], Hana Alaswad [4], Amani Jafaari [5], Ehab Naji [6], Eanas Elmaihub [7]
[1,2,3,4,5,6,7] Department of Molecular Biology and Biochemistry, Faculty of Science, Sabratha University, Libya

المعرفة والمواقف والممارسات تجاه فيروس التهاب الكبد الوبائي ب بين طلاب الطب والمقيمين في شمال غرب ليبيا

علي مدور[1*]، رحمة أبوالقاسم[2] ، رحمة الكردي [3]، هناء الأسود [4]،أماني الجعفري [5]، إيهاب ناجي [6]، إيناس الميهوب [7]
[1،2،3،4،5،6،7] قسم الأحياء الجزيئية والكيمياء الحيوية، كلية العلوم صبراتة، جامعة صبراتة، ليبيا

[*]Corresponding author: ali.madour@sabu.edu.ly

Received: July 24, 2025	Accepted: September 07, 2025	Published: September 20, 2025

Abstract

Background: Hepatitis B remains a major global public health concern and poses a significant threat to human health. In Libya, particularly in the northwest region, there is limited evidence on the knowledge, attitudes, and practices (KAP) of the general population and medical students toward hepatitis B virus (HBV) infection. Understanding baseline knowledge is essential for both the public and healthcare trainees to guide prevention strategies. Furthermore, the attitudes of future physicians play a pivotal role in controlling disease transmission and shaping patient care. **Objective**: This study aimed to evaluate the KAP regarding HBV among residents and medical students in northwest Libya. **Methods**: A cross-sectional descriptive survey was conducted among 1,000 residents and 70 dental students in northwest Libya. Data were collected through a questionnaire administered both electronically and face-to-face. The survey assessed knowledge of HBV infection, transmission routes, vaccination, and participants' attitudes and practices toward HBV patients. Data were analyzed using SPSS version 23, with statistical significance set at $p < 0.05$. **Results**: The majority of residents demonstrated poor knowledge regarding HBV infection, while medical students showed only basic awareness of the disease. Despite this, participants exhibited generally positive attitudes toward prevention, and reported practices reflected an effort to protect themselves from infection. **Conclusion**: Knowledge of HBV was insufficient among residents and limited among medical students, although preventive attitudes and practices were reported. Public health campaigns are urgently needed to raise awareness about HBV and its prevention. Additionally, targeted educational interventions for medical students are essential to foster supportive attitudes, reduce stigma, and improve the quality of care for individuals living with HBV.

Keywords: HBV, KAP, Libya, Residents, Students, Health care workers.

الملخص

الخلفية: يُعد التهاب الكبد الفيروسي "ب" مشكلة صحية عامة رئيسية على مستوى العالم ويمثل تهديدًا كبيرًا لصحة الإنسان في ليبيا، وخصوصًا في المنطقة الشمالية الغربية. لا توجد بيانات حول مستوى المعرفة والمواقف والممارسات لدى السكان عامةً وطلبة الطب خاصة تجاه عدوى فيروس التهاب الكبد "ب". يعد فهم المعرفة الأساسية أمرا ضروريا سواء لعامة الناس أو للمتدربين في المجال الصحي لتوجيه استراتيجيات الوقاية. علاوة على ذلك، تلعب مواقف أطباء المستقبل دورًا محوريًا في السيطرة على انتقال المرض وتشكيل نمط الرعاية الصحية للمرضى. **الهدف**: هدفت الدراسة لتقييم مستوى المعرفة والمواقف والممارسات المتعلقة بفيروس التهاب الكبد "ب" بين السكان وطلبة الطب في شمال غرب ليبيا. **المنهجية:**

تم إجراء دراسة مقطعية وصفية شملت 1000 من السكان و70 من طلاب طب الأسنان في شمال غرب ليبيا. جُمعت البيانات من خلال استبيان وُزع إلكترونيًا وبالمقابلة المباشرة. شمل الاستبيان تقييم المعرفة حول عدوى فيروس التهاب الكبد "ب", طرق انتقاله، التطعيم ضده, إضافة لمواقف وممارسات المشاركين تجاه مرضي فيروس التهاب الكبد. جرى تحليل البيانات باستخدام برنامج SPSS الإصدار 23, باعتبار دلالة إحصائية عند مستوى ($P < 0.05$) . **النتائج:** أظهر غالبية السكان ضعفا في المعرفة حول عدوي مرض التهاب الكبد "ب", بينما أظهر طلاب الطب مستوى معرفيا أساسيا فقط. وعلى الرغم من ذلك أبدى المشاركون مواقف إيجابية عموما تجاه الوقاية وعكست ممارساتهم جهودا لحماية أنفسهم من العدوى. **الخلاصة:** كانت المعرفة بفيروس التهاب الكبد "ب" غير كافية بين السكان ومحدودة بين طلاب الطب، وعلى الرغم من الإبلاغ عن وجود مواقف وممارسات وقائية. فمن الواضح وجود حاجة ماسة إلى حملات توعية صحية عامة لرفع مستوى الوعي بفيروس التهاب الكبد "ب" وطرق الوقاية منه. كما أن التدخلات التعليمية الموجهة لطلاب الطب ضرورية لتعزيز المواقف الداعمة، والحد من الوصمة، وتحسين جودة الرعاية للأشخاص المصابين بفيروس التهاب الكبد "ب".

الكلمات المفتاحية: التهاب الكبد ب، المعرفة والسلوك والممارسات، ليبيا، السكان، الطلاب، العاملون في مجال الرعاية الصحية.

Introduction

Hepatitis B virus (HBV) is a globally widespread pathogen and a major public health concern, responsible for an estimated 820,000 deaths annually [1]. Approximately 250–300 million individuals worldwide are chronically infected, with over one million new cases occurring each year [2]. Chronic hepatitis B (CHB) is associated with severe complications, including cirrhosis, hepatocellular carcinoma, and liver failure. Sub-Saharan Africa (SSA) and the Western Pacific region together account for nearly 80% of all chronic cases, while the Eastern Mediterranean region alone harbors about 60 million infections [1,3]. The burden is particularly high in Asia and Africa, where most chronic carriers reside.

In Libya, HBV prevalence has been consistently reported at 1–2.2%, corresponding to approximately 120,000–150,000 hepatitis B surface antigen (HBsAg) carriers, classifying the country as having low-to-intermediate endemicity (1–5%) [4,5,6]. Major risk factors include scarification, household contact with HBV patients, blood transfusion, multiple sexual partners, and a family history of infection [4]. To address the burden, Libya introduced a neonatal vaccination program in 1993 and later extended coverage through national campaigns in 2005–2006 [7]. These efforts significantly reduced HBV prevalence and lowered the incidence of childhood hepatocellular carcinoma, mirroring outcomes seen globally. However, vaccine-induced immunity may wane in individuals vaccinated during infancy, increasing susceptibility during adolescence and adulthood, particularly through sexual transmission and close contact, thereby raising the need to consider booster doses [7,8].

Despite these preventive measures, HBV remains a persistent problem in Libya [9]. Saeed and Ongerth [10] highlighted a high prevalence (23.4%) among Sub-Saharan migrants in southern Libya, reflecting the influence of migration dynamics [11]. More recently, Al-Haddad et al [9] documented an even higher prevalence (50.5%) in migrants, underscoring the ongoing public health challenge. These findings indicate that while vaccination has reduced childhood infection, significant gaps in control remain among adults and high-risk groups. International studies assessing knowledge, attitudes, and practices (KAP) toward viral hepatitis consistently reveal inadequate public awareness and preventive behavior [12,13,14,15,16]. In Libya, however, data on KAP related to HBV are scarce. This is concerning, given the rising risk of transmission among young people, the presence of diverse migrant communities with varying cultural practices, and the limited awareness reported even among healthcare workers who face occupational exposure risks. Improving KAP is crucial for designing effective educational campaigns, reducing stigma, and enhancing prevention strategies.

The present study, therefore, aimed to assess the knowledge, attitudes, and practices related to HBV among residents, medical students, and dental students in Northwest Libya, with further analysis of differences across gender, occupation, and age groups.

Material and methods

Study Design and Setting

A descriptive cross-sectional study was conducted between December 2024 and June 2025 to assess knowledge, attitudes, and practices (KAP) regarding hepatitis B virus (HBV) among residents of in Northwest Libya. The study was based on both paper-based and electronic questionnaires. Ethical approval was obtained from the Department of Molecular Biology and Biochemistry, Faculty of Sciences, Sabratha. No biological samples or personally identifiable data were collected, and participation was entirely voluntary.

Participants completed the questionnaire either in person, under the supervision of the researcher, or electronically via a survey link. For online participation, an information page preceded the questionnaire, clarifying the study purpose, the voluntary nature of participation, and the option to withdraw at any stage. In addition to residents, the survey was distributed to the general population, medical doctors, and laboratory technicians.

Pilot testing and validation
To ensure clarity, the questionnaire was piloted among 30 participants, and feedback was used for refinement. Content validity was assessed by three subject matter experts, who evaluated item relevance and importance to the study objectives.

Measurement and Data Collection Tool
The structured questionnaire consisted of four sections.
Section 1*:* Socio-demographic characteristics (gender, age, nationality, residence, marital status, and educational level).
Section 2*:* Knowledge of hepatitis viruses, including transmission routes, vaccination, and complications.
Section 3*:* Attitudes toward hepatitis viruses and patients living with HBV.
Section 4*:* Preventive practices adopted by participants against HBV infection.

Study Population and Sample Size
A total of 1,000 residents of in Northwest Libya, both citizens and foreign nationals aged ≥18 years, were recruited through random sampling. Only individuals who consented to participate were included. In addition, 70 self-administered questionnaires were distributed to final-year dental students.

Statistical Analysis
Completed questionnaires were collected either in hard copy or electronically through Google Forms. Data were coded, entered into Microsoft Excel, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0 (IBM Corp., Armonk, NY). Descriptive statistics were presented as frequencies and percentages. Inferential analyses were performed using the Chi-square test or Fisher's exact test, with statistical significance set at $p < 0.05$.

Results
Demographic Characteristics
For the first questionnaire, a total of 1,000 participants completed the questionnaire. Female respondents constituted (n = 576; 57.6%), while males accounted for 42.4% (n = 424). The participants' ages ranged from 18 to 71 years, with most respondents (92%) younger than 40 years. The majority held a university degree (n = 806; 80.6%). In terms of occupation, 661 (66.1%) were medical students, 303 (30.3%) were members of the general public, and 36 (3.6%) were healthcare workers.

Table 1: Baseline demographic characteristics of the respondents.

Gender	**Gender**	**Number**
	Female	576
	Male	424
Total		**1000**
Age	**Age group**	**Number**
	Age 15-25	577
	Age 26-40	341
	Age 40+	82
Total		**1000**
Occupation	**Number**	**Frequency**
Healthcare workers	36	3.6
Medical students	661	66.1
Public	303	30.3
Total	1000	100

Knowledge of Hepatitis B Virus
Overall, participants demonstrated moderate knowledge regarding HBV. A large proportion (90.9%) correctly identified viruses as the causative agent of hepatitis, while 85% recognized the role of personal hygiene in preventing HBV transmission. Similarly, 91.1% of respondents were aware that HBV infection is preventable. Awareness of vaccination was relatively high, with 81% correctly responding to questions regarding the HBV immunization schedule. Knowledge of safe practices was also encouraging: 95% acknowledged the importance of screening blood donors for HBV, and 97% emphasized the need for sterile needles in injections.
Vertical transmission was less well understood, with only 72% recognizing that HBV can be transmitted from mother to child. Knowledge of sexual transmission was higher (81%), and 87% of respondents believed HBV could be transmitted through saliva. Despite these strengths, several gaps and misconceptions were evident. Only 34.3% of participants correctly answered questions regarding HBV transmission through breastfeeding. Misunderstandings also surrounded the general curability of HBV and the precise modes of transmission. The overall knowledge scores for HBV curability and transmission were approximately 52% and 55%, respectively.

Associations with Socio-Demographic Factors

Inferential analysis revealed significant associations between knowledge and demographic variables ($p < 0.05$). Awareness regarding HBV curability was higher among males and healthcare workers. Conversely, knowledge of transmission routes was more accurate among healthcare workers and female participants. These findings suggest that professional background and gender influence the depth of HBV-related knowledge. The present study highlights a moderate level of awareness about HBV among residents in Northwest Libya. While general knowledge of prevention, vaccination, and safe practices was satisfactory, notable misconceptions persist regarding vertical transmission, breastfeeding, and curability.

Table 2: Assessment of the knowledge about hepatitis viruses on knowledge, transmission, and prevention.

Questions	Respond		M (n=424)	F (n=576)	HC (n=383)	S (n=479)	P (n=138)	Age 15-25 (n=577)	Age 26-40 (n=341)	Age 40+ (n=82)
Is hepatitis B caused by a virus?	**Yes**	90.9	90.8	91	92.4	91	86.2	91	91.2	89
	No	9.1	9.2	9	7.6	9	13.8	9	8.8	11
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Is personal hygiene effective in preventing Hepatitis B?	**Yes**	85	85.6	84.4	85.6	82.3	92	83.2	86.5	90.2
	No	15	14.4	15.6	14.4	17.7	8	16.8	13.5	9.8
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Can infection with viral Hepatitis B be prevented?	**Yes**	91.1	89.2	93.1	92.2	91.2	89.9	91	91.8	92.7
	No	8.9	10.8	6.9	7.8	8.8	10.1	9	8.2	7.3
			(P > 0.05		(P > 0.05)			(P > 0.05)		
Is there a vaccine for viral hepatitis B?	**Yes**	81.1	83	79.2	84.1	80.6	72.5	80.6	82.1	76.8
	No	18.9	17	20.8	15.9	19.4	27.5	19.4	17.9	23.2
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Is HBV curable?	**Yes**	55.4	58.7	52.1	53.8	52.4	66.7	53.2	54	70.7
	No	44.6	41.3	47.9	46.2	47.6	33.3	46.8	46	29.3
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
Does Hepatitis B spread like AIDS?	**Yes**	52.2	46.7	57.6	60.1	53	33.3	52.7	56.3	41.5
	No	47.8	53.3	42.4	39.9	47	66.7	47.3	43.7	58.5
			(P < 0.05)		(P > 0.05)			(P < 0.05)		
Blood should be screened for hepatitis virus before donation.	**Yes**	95.1	93.4	96.9	94.8	96.7	92.8	95.1	95	98.8
	No	4.9	6.6	3.1	5.2	3.3	7.2	4.9	5	1.2
			(P < 0.05)		(P > 0.05)			(P > 0.05)		
Sterile needles should be used to prevent infection with viral hepatitis.	**Yes**	97.7	97.4	97.9	98.4	97.5	96.4	98.1	96.8	98.8
	No	2.3	2.6	2.1	1.6	2.5	3.6	1.9	3.2	1.2
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Is the virus transmitted through the blood?	**Yes**	94.4	94.8	93.9	93	94.8	96.4	95.5	93.8	87.8
	No	5.6	5.2	6.1	7	5.2	3.6	4.5	6.2	12.2
			(P > 0.05)		(P > 0.05)			(P < 0.05)		
Is the virus transmitted from mothers to infants?	**Yes**	72.2	71.9	72.4	70.8	73.9	70.3	74.9	70.1	62.2
	No	27.8	28.1	27.6	29.2	26.1	29.7	25.1	29.9	37.8
			(P > 0.05)		(P > 0.05)			(P < 0.05)		
Is the virus transmitted through a sexual route?	**Yes**	81.2	83.5	78.8	80.4	80	84.8	79.5	83.9	76.8
	No	18.8	16.5	21.2	19.6	20	15.2	20.5	16.1	348.8
			(P < 0.05)		(P > 0.05)			(P > 0.05)		
Is the virus transmitted by sharing toilets?	**Yes**	65.2	67.7	62.7	75.7	58.2	57.2	59.8	72.4	68.3
	No	34.8	32.3	37.3	24.3	41.8	42.8	40.2	27.6	31.7
			(P > 0.05)		(P < 0.05)			(P < 0.05)		
Is the virus transmitted by hugging?	**Yes**	32.9	38.4	27.3	31.6	29.2	57.2	30.5	33.1	37.8
	No	67.1	61.6	72.7	68.4	70.8	42.8	69.5	66.9	62.2
			(P < 0.05)		(P < 0.05)			(P > 0.05)		
Is the virus transmitted by sneezing and coughing?	**Yes**	67.3	72.6	62	68.4	65.1	65.9	64.5	70.1	65.9
	No	32.7	27.4	38	31.6	34.9	34.1	35.5	29.9	34.1
			(P < 0.05)		(P < 0.05)			(P > 0.05)		
Is the virus transmitted through the Saliva?	**Yes**	87	89.2	84.9	87.7	85.6	87.7	85.6	89.7	81.7
	No	13	10.8	15.1	12.3	14.4	12.3	14.4	10.3	18.3
			(P < 0.05)		(P > 0.05)			(P > 0.05)		
Is the virus transmitted through breast milk?	**Yes**	65.7	71	60.4	62.9	64.5	71.7	64.5	68.3	53.7
	No	34.3	29	39.6	37.1	35.5	28.3	35.5	31.7	46.3
			(P < 0.05)		(P > 0.05)			(P < 0.05)		
Is the virus transmitted by drinking from the same cup?	**Yes**	69.3	73.3	65.3	78.6	38	64.5	63.3	76	76.8
	No	30.7	26.7	34.7	21.4	62	35.5	36.7	24	23.2
			(P < 0.05)		(P < 0.05)			(P < 0.05)		

Assessment of Attitudes Toward Hepatitis Viruses

Overall, participants demonstrated mixed attitudes toward individuals with hepatitis infections. While only 30% reported unwillingness to interact with someone living with a liver virus, a much larger proportion (68%) expressed discomfort with their children sharing a classroom with children infected with HBV. These findings were not significantly associated with gender, age, or occupation ($p > 0.05$). Stigma related to personal contact was also evident. More than two-thirds of respondents (70.7%) strongly disagreed or disagreed with sharing personal items, and this response was significantly influenced by gender, occupation, and age ($p < 0.05$). Females, healthcare workers, and individuals aged 26–40 years were most likely to disagree with item-sharing.

Attitudes toward vaccination were generally positive. Approximately 64.2% of respondents strongly disagreed or disagreed with the statement that HBV vaccination should not be mandatory. This response was significantly associated with age and occupation ($p < 0.05$), with younger participants (15–25 years) and healthcare workers more strongly supporting compulsory vaccination. These results suggest broad acceptance of integrating HBV vaccination into public health policy in Libya.

Regarding occupational safety, 62.3% of participants had no objection to individuals with hepatitis infections working in restaurants and cafeterias. However, this view was significantly associated with gender, age, and occupation ($p < 0.05$), with females, younger respondents (<25 years), and students expressing higher levels of disagreement. Most respondents (83.5%) strongly supported restrictions on blood donation from individuals with hepatitis.

Concerns about personal risk were notable. Approximately 60% reported fear of acquiring infection, with this response significantly associated with gender, occupation, and age ($p < 0.05$). Higher proportions of females, students, and respondents aged 40 years or older agreed with this statement. Social attitudes also revealed misconceptions: only 21.7% believed it was safe to share meals with a person infected with hepatitis. This perception was significantly associated with age and occupation ($p < 0.05$), with disagreement more prevalent among students and those aged 25–40 years.

On a positive note, most participants (81%) expressed willingness to undergo screening for hepatitis viruses, reflecting proactive health-seeking behavior. Additionally, only 21.8% viewed hepatitis infection as a source of shame, suggesting that social stigma toward infected individuals may be less widespread than anticipated. These responses were significantly associated with gender and occupation Table 3.

Table 3: Assessment of the attitude of the study participants regarding hepatitis virus infections**.**

Questions	Respond		M (n=424)	F (n=576)	HC (n=383)	S (n=479)	P (n=138)	Age 15-25 (n=577)	Age 26-40 (n=341)	Age 40+ (n=82)
I have no objection to dealing with someone who has a liver virus	Strongly agree	6.9	9.9	4	10.4	2.3	10.1	3.3	11.7	7.3
	Agree	33.8	34	33.7	34.2	33.4	34.1	32.4	35.2	37.8
	Neutral	29.4	26.9	31.9	29.5	32.6	21	32.2	27.3	23.2
	Disagree	20.5	21.2	19.8	17.5	21.3	25.4	21.1	19.4	19.5
	Strongly disagree	9.3	8	10.6	8.4	10.4	9.4	10.9	6.5	12.2
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
I don't mind having my child in the same class as children with any hepatitis B viruses	Strongly agree	3.4	3.8	3.1	4.2	3.1	2.2	3.1	3.8	3.7
	Agree	8	13.2	2.8	11.5	12.3	10.1	12.3	10.6	12.2
	Neutral	16.6	14.6	18.6	16.2	17.5	16.7	18.5	15.5	11
	Disagree	36.4	35.1	37.7	37.1	33.4	46.4	33.4	38.4	51.2
	Strongly disagree	31.6	33.3	30	31.1	33.6	24.6	32.6	31.7	22
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
I don't mind sharing my gadgets with anyone else	Strongly agree	7.1	9.9	4.3	7.6	6.3	5.8	6.8	5.9	9.8
	Agree	5.7	5	6.4	2.3	9.4	2.9	8.1	2.3	3.7
	Neutral	16.5	17.9	15.1	13.1	17.3	21.7	19.2	12.6	11
	Disagree	46.3	44.1	48.4	51.7	41.8	49.3	41.6	53.7	52.4
	Strongly disagree	24.4	23.1	25.7	25.3	25.3	20.3	24.3	25.5	23.2
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
Hepatitis viral vaccines should not be mandatory	Strongly agree	8.3	8	8.7	12.5	4.6	10.1	4.9	12	18.3
	Agree	15.2	17.7	12.7	13.1	14.8	19.6	15.1	15.2	11
	Neutral	12.3	12	12.5	11.7	11.9	15.2	12.1	12.6	12.2
	Disagree	33.8	34.4	33.2	33.9	32.8	36.2	33.4	34	34.1
	Strongly disagree	30.4	27.8	33	28.7	35.9	18.8	34.5	26.1	24.4
			(P > 0.05)		(P < 0.05)			(P < 0.05)		

People with a hepatitis virus should not be allowed to work in restaurants and cafeteria	**Strongly agree**	24.2	26.2	22.2	21.7	21.3	39.1	22.5	25.8	25.6
	Agree	17.8	22.9	12.7	20.4	13.2	21	14	19.4	28
	Neutral	10.5	13.4	7.5	10.2	11.1	5.8	11.1	9.7	3.7
	Disagree	25.3	33.5	17.2	24	24.6	22.5	25.1	22	25.6
	Strongly disagree	27	39.9	14.1	23.8	29.9	11.6	27.2	23.2	17.1
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
A person with hepatitis should be not allowed to donate blood	**Strongly agree**	53.7	53.8	53.6	55.6	54.5	45.7	53.7	56	43.9
	Agree	29.8	30	29.7	26.9	29.9	37.7	29.1	27.6	43.9
	Neutral	5.8	4.2	7.3	4.2	6.9	8	6.4	4.4	9.8
	Disagree	5.5	7.1	4	7.6	2.9	7.2	5.2	6.5	1.2
	Strongly disagree	5.2	5	5.4	5.7	5.8	1.4	5.5	5.6	1.2
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
I have concerns about a liver virus	**Strongly agree**	19	19.1	18.9	19.1	19.6	16.7	19.1	19.9	14.6
	Agree	40.8	37.3	44.3	39.7	42.8	40.6	43.8	34.3	52.4
	Neutral	30.3	30.2	30.4	31.9	29.4	29	29.3	34.6	19.5
	Disagree	6.8	9.2	4.3	5.2	6.7	8.7	6.2	6.2	8.5
	Strongly disagree	3.2	4.2	2.1	4.2	1.5	5.1	1.6	5	4.9
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
Infection with a liver virus is shameful	**Strongly agree**	6.8	9.7	4	5	6.3	10.9	6.2	6.7	6.1
	Agree	15.1	16	14.1	11	14.4	27.5	14	12.9	29.3
	Neutral	14.9	16	13.7	14.4	15	14.5	14.6	14.7	15.9
	Disagree	41	37.7	44.3	53	38	21.7	39	47.2	35.4
	Strongly disagree	22.2	20.5	24	16.7	26.3	25.4	26.2	18.5	13.4
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
It is safe to have a meal with a hepatitis patient	**Strongly agree**	4.4	3.8	5	3.7	3.8	9.4	3.5	2.9	18.3
	Agree	17.3	15.8	18.8	16.2	19.6	13.8	20.3	15	8.5
	Neutral	26.1	26.4	25.7	24.3	26.1	30.4	26.3	25.8	24.4
	Disagree	37.8	38.4	37.2	42.8	35.5	31.2	35.5	40.8	36.6
	Strongly disagree	14.5	15.6	13.4	13.1	15	15.2	14.4	15.5	12.2
			(P > 0.05)		(P < 0.05)			(P < 0.05)		
I am willing to detect the liver virus	**Strongly agree**	32.9	33.3	32.6	32.9	33.4	31.2	33.3	32	34.1
	Agree	48	42.5	53.5	48.6	50.5	43.5	49.2	47.2	52.4
	Neutral	13.9	17.2	10.6	14.9	11.1	17.4	12.3	16.1	9.8
	Disagree	4	5.7	2.4	2.9	3.5	7.2	4.2	3.8	1.2
	Strongly disagree	1.1	1.4	0.9	0.8	1.5	0.7	1	0.9	2.4
			(P < 0.05)		(P < 0.05)			(P > 0.05)		

Assessment of the practice toward hepatitis viruses

Table 4 summarizes the practices of study participants regarding the prevention of hepatitis virus transmission. Overall, mixed responses were observed. When asked about avoiding injections in hospitals as a preventive measure, the majority answered "sometimes," with no significant associations between gender, occupation, or age group ($p > 0.05$). A similar pattern was observed in relation to avoiding blood transfusions and dental procedures, where 33.1% also answered "sometimes." However, this response was significantly associated with gender, occupation, and age ($p < 0.05$), as 24.1% of females, 22.3% of students, and 23.2% of participants aged ≥40 years selected "rarely."

Preventive behaviors were more consistent in certain contexts. For example, 44.7% of respondents reported "always" avoiding sharing dinnerware with strangers due to fear of infection, while 60.8% reported "always" requesting barbers or hairdressers to use sterile tools. Both practices were significantly associated with age ($p < 0.05$), with participants aged 26–40 years showing the highest adherence.

Hygiene-related behaviors also showed significant trends. When asked about eating with permanent catering utensils versus requesting disposable utensils, higher proportions of males, public employees, and participants aged >40 years selected "always" ($p < 0.05$). In contrast, more than half of participants (52.5%) reported "never" sharing personal items such as clothes, towels, toothbrushes, or earphones. This practice was significantly associated with gender, occupation, and age ($p < 0.05$), with males, students, and individuals aged 26–40 years most likely to report never sharing.

Protective sexual practices were relatively high, as 78% of participants reported "always" using protective tools during intercourse, with no significant differences across demographic groups.

However, social interactions still reflected some stigma: 23.7% of participants reported they would "never" shake hands with or sit next to someone known to be infected with hepatitis.

Finally, two-thirds of participants reported "always" practicing safe hygiene measures, including washing sterilizers after use and disposing of razors properly in the trash Table 4.

Table 4: Assessment of the practices of the study participants associated with liver viruses.

Questions	Respond		M (n=424)	F (n=576)	HC (n=383)	S (n=479)	P (n=138)	Age 15-25 (n=577)	Age 26-40 (n=341)	Age 40+ (n=82)
I avoid injections in hospitals to protect myself from transmission of hepatitis B	Always	13.9	14.9	12.8	13.1	14.2	13.8	13.7	14.7	9.8
	Usually	17.1	19.8	14.4	13.3	18.4	20.3	17.9	15.5	13.4
	Sometimes	38.1	35.8	40.3	43.1	36.1	33.3	35.9	40.2	48.8
	Rarely	19.2	20.3	18.1	21.1	17.3	18.8	18.2	19.4	23.2
	Never	11.8	9.2	14.4	9.4	14	13.8	14.4	10.3	4.9
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
I avoid blood transfusions and dental procedures because I am afraid, he will get the liver virus	Always	15	16	13.9	16.2	13.4	15.9	14	17.6	8.5
	Usually	15.6	17.2	13.9	16.7	17.1	5.1	17.3	11.1	18.3
	Sometimes	33.1	37.5	28.6	36.6	25.5	44.9	26.3	41.1	39
	Rarely	19.6	15.1	24.1	19.1	22.3	16.7	20.3	19.6	23.2
	Never	16.8	14.2	19.4	11.5	21.7	17.4	22	10.6	11
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
I don't share dinnerware with strangers for fear of infection	Always	44.7	45.5	43.9	47.5	42.2	44.9	42.5	48.7	42.7
	Usually	18.3	19.1	17.5	18.8	18.2	16.7	18.9	15.8	23.2
	Sometimes	25	23.8	26.2	22.7	26.3	28.3	26.9	23.8	19.5
	Rarely	10.8	10.4	11.3	10.2	12.5	7.2	11.3	10.9	8.5
	Never	1.1	1.2	1	0.8	0.8	2.9	0.5	0.9	6.1
			(P > 0.05)		(P > 0.05)			(P < 0.05)		
I do not eat with permanent catering utensils and order the same use (plastic)	Always	31.5	36.1	26.9	30.8	28	40.6	27.7	32.6	45.1
	Usually	15.5	17.9	13	20.1	11.7	13	12.8	20.2	9.8
	Sometimes	21.6	25.7	17.5	22.2	21.3	16.7	20.3	22.9	18.3
	Rarely	15.3	9.9	20.7	14.9	16.9	16.7	18	13.2	14.6
	Never	16.1	10.4	21.9	12	22.1	13	21.1	11.1	12.2
			(P < 0.05)		(P < 0.05)			(P < 0.05)		
Ask barbers/hairdressers to use new or sterile tools for shaving and cutting hair, for fear of transmission of diseases	Always	60.8	62.3	59.4	64	60.5	51.4	58.4	64.5	59.8
	Usually	17.8	16	19.6	19.6	17.1	17.4	17.7	17.9	22
	Sometimes	10.1	10.6	9.5	8.4	8.6	19.6	9.5	9.7	14.6
	Rarely	4.2	4	4.3	2.9	5.8	2.2	5.	2.9	2.4
	Never	7.1	7.1	7.1	5.2	7.9	9.4	9.2	5	1.2
			(P > 0.05)		(P > 0.05)			(P < 0.05)		
I share my personal items (my clothes, my towel, my toothbrush, and earphones) with others	Always	8.9	11.1	6.8	8.6	8.1	10.1	6.8	10.6	13.4
	Usually	9.2	11.3	7.1	11	5.4	15.2	7.5	11.4	8.5
	Sometimes	15.1	14.4	15.8	12	16.3	20.3	18.2	10.9	12.2
	Rarely	14.3	8	20.7	19.6	16.3	18.9	23.6	19.6	30.5
	Never	52.5	55.2	49.6	48.8	53.9	35.5	44	47.5	35.4
			(P < 0.05)		(P < 0.05)			(P > 0.05)		
If I know this person is infected with the hepatitis virus, I avoid shaking hands and sitting next to him	Always	21.9	23.6	20.3	25.3	18	24.6	18.4	25.2	30.5
	Usually	11.6	18	17.4	15.9	21.1	18.1	21	13.2	24.4
	Sometimes	20	22.6	17.4	18.3	18.4	27.5	18.4	22.6	15.9
	Rarely	15.6	13.75	18.4	17	17.7	7.2	17.2	15.2	11
	Never	23.7	22	26.4	23.5	25.1	22.5	25.1	23.8	18.3
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Wash personal sterilizers after use	Always	65.2	65.6	64.8	65.8	67.4	55.1	66.6	61.9	68.3
	Usually	16.2	15.1	17.4	19.3	14	16.7	13.9	20.5	17.1
	Sometimes	13.2	13.9	12.5	11	12.5	21	12.8	13.8	12.2
	Rarely	1.6	0.9	2.3	1	2.3	1.4	2.6	0.6	0
	Never	3.8	4.5	3.1	2.9	3.8	5.8	4.2	3.2	2.4
			(P > 0.05)		(P < 0.05)			(P < 0.05)		
Dispose of razors after use in the trash	Always	78	77.8	78.1	77.3	80.2	72.5	79.9	76.2	72
	Usually	14.2	16	12.3	17.5	10.9	14.5	11.1	17.3	19.5
	Sometimes	4.5	4.2	4.7	3.4	4	9.4	4.3	4.4	6.1
	Rarely	1	0	2.1	1	1.7	0	1.4	0.9	1.2
	Never	2.3	1.9	2.8	0.8	3.3	3.6	3.3	1.2	1.2
			(P > 0.05)		(P > 0.05)			(P > 0.05)		
Use protection during intercourse	Always	52.9	52.8	53	54.8	53.4	.7	53.2	51.9	54.9
	Usually	10.8	11.3	10.2	12.3	8.6	13.8	9.4	12.6	12.2
	Sometimes	10.7	10.6	10.8	7.3	9.8	23.2	10.4	8.8	20.7
	Rarely	4	5	3	4.4	3.5	2.9	3.8	4.4	1.2
	Never	21.7	20.3	23.1	21.1	24.6	14.5	23.2	22.3	11
			(P > 0.05)		(P > 0.05)			(P > 0.05)		

Knowledge of medical and dental students on hepatitis B

The overall attitude of participants toward patients with HBV was unsatisfactory, reflecting both negative perceptions and inconsistent preventive practices. While most students reported "always" wearing gloves, only 50% consistently used face masks, 27.1% wore protective eyewear, and 24.3% wore a cap when treating patients, whereas 55.7% reported "never" wearing a cap.

Regarding vaccination, 77.2% of participants expressed doubts about the effectiveness of the HBV vaccine. Nevertheless, nearly 80% reported having been vaccinated, although only 58.6% had completed all three recommended doses (or more).

Despite negative perceptions, a majority demonstrated empathy: 81.4% expressed sympathy for individuals suffering from HBV, and 99% felt morally responsible for providing care to infected patients. Furthermore, 60% of participants believed they could treat HBV patients safely, and 37.1% indicated they had no difficulty hugging patients with HBV.

Perceptions toward testing and infection control measures varied. While 36.7% felt that testing outpatients for HBV was unnecessary, 75.7% supported routine HBV screening for all patients before receiving healthcare. Similarly, 58.6% stated they would allow an HBV-infected dentist to treat their teeth. However, only 29.2% agreed that HBV-positive patients should be scheduled as the last appointment of the day. A large proportion (81.4%) believed that an alert note should be placed in the medical records of HBV patients to ensure proper infection control precautions.

Concerning stigma, 47.4% of respondents believed that HBV-positive healthcare workers should not be allowed to provide patient care. Nevertheless, explicit discrimination was relatively low: only 2.9% admitted harboring feelings of hatred toward HBV patients, and 8.6% believed stigma should be attached to them.

Finally, preventive training was strongly endorsed, with 95.7% of participants agreeing that more occupational health and infection prevention programs are needed to reduce HBV transmission among healthcare workers Table 5.

Table 5: Knowledge, Attitude, and Practice of Hepatitis B Virus among medical students.

Question	**(n =70)**
Do you wear gloves while examining the patient?	**%**
Always	75.7
Mostly	10
Sometimes	10
Rarely	0
Never	4.3
Do you wear a face mask while examining the patient?	
Always	50
Mostly	5.8
Sometimes	27.2
Rarely	5.7
Never	11.4
Do you wear protective eyewear while examining the patient?	
Always	27.1
Mostly	2.9
Sometimes	8.6
Rarely	20
Never	41.5
Do you wear a disposable cap while examining the patient?	
Always	24.3
Mostly	2.9
Sometimes	4.3
Rarely	12.9
Never	55.7
Patients with HBV infection should always be given the last appointment for the day	
Agree	38.6
Neutral	5.7
Disagree	55.7
Healthcare workers who are HBV-positive should not be allowed to give healthcare services to patients	
Agree	47.4
Neutral	9.4
Disagree	43.2
I am always worried that I might contract the disease from HBV patients anytime I am around them	
Agree	72.9
Neutral	18.6
Disagree	8.7

More occupational disease prevention programs should be organized to reduce HBV infection among healthcare workers	
Agree	95.7
Neutral	4.3
Disagree	0
An alert note should be placed in the case file of an HBV patient so that I will quickly know how to be extra careful when treating such a patient	
Agree	81.4
Neutral	14.3
Disagree	4.3
Dentists have the right to know their patient's HBV infection status	
Agree	84.3
Neutral	8.6
Disagree	7.2
I often have some hatred towards HBV patients	
Agree	2.9
Neutral	2.9
Disagree	94.3
I think stigma should be attached to HBV patients	
Agree	8.6
Neutral	7.2
Disagree	84.3
I would like to get my patients tested before giving any serious attention to them	
Agree	75.7
Neutral	8.6
Disagree	15.7
I always feel that HBV vaccines are not potent enough to prevent me from contracting the infection	
Agree	77.2
Neutral	12.9
Disagree	10
Vaccination status	
Yes	80
No	20
Number administration dose	
No one	20
Less than 3 doses	21.4
3 doses	58.6
I have more sympathy for people suffering from HBV infection	
Agree	87.2
Neutral	8.6
Disagree	4.3
I will be willing to manage HBV patients anytime they seek treatment	
Agree	81.4
Neutral	17.1
Disagree	1.4
Testing outpatients for HBV is not necessary	
Agree	35.7
Neutral	10
Disagree	54.3
I do not find it difficult to hug HBV patients	
Agree	37.1
Neutral	38.6
Disagree	24.3
I have a moral responsibility to treat patients with HBV infection	
Agree	90
Neutral	8.6
Disagree	1.4
I can safely treat patients with HBV infection	
Agree	60
Neutral	27.2
Disagree	12.9
I will let dentists treating patients with HBV treat my teeth	
Agree	58.6
Neutral	27.1
Disagree	14.3

Discussion

Knowledge, Attitudes, and Practices (KAP) among residents in Northwest Libya

This study assessed the knowledge, attitudes, and practices (KAP) of residents regarding hepatitis B virus (HBV) between December 2024 and June 2025. While most previous studies have focused on medical students and healthcare professionals in Africa and Asia, there is limited evidence on the general population's awareness and behavior toward HBV [17,18]. Our findings provide valuable insights into public understanding and perceptions in Libya.

Knowledge

The majority of respondents (90.9%) correctly identified HBV as a viral disease, which reflects a higher level of knowledge compared to earlier studies conducted in Taif, KSA (70%), among Saudi residents (56%) [19], and in the general population in Malaysia (36.1%) [20].

Awareness of preventive measures was also relatively high, with 85% recognizing the role of personal hygiene in reducing HBV transmission. Similarly, awareness of HBV vaccination was notable (81.1%), surpassing levels reported in Malaysia (49.2%) [20]. Hong Kong (62.4%) [21], and among the Saudi public (52.6%) [22].

However, misconceptions regarding curability persist, with 55.4% of respondents believing that HBV is curable. This figure aligns with results from Pakistan (53.9%) [23] but remains higher than findings from the Saudi population (49.4%) [22].

Such misconceptions highlight the need for targeted health education to correct misunderstandings and promote accurate information.

Attitudes

Attitudes toward HBV showed both encouraging and concerning trends. Approximately 40.7% of participants expressed willingness to interact with HBV-infected individuals, a figure comparable to findings from Saudi Arabia [22]. While this suggests some stigma reduction, a notable proportion of respondents still favored discriminatory views, 42% believed HBV-infected individuals should not work in food establishments, reflecting trends also reported among medical students in Pakistan and Saudi dentists (78%) [23,24]

Vaccine acceptance was relatively high; most participants supported mandatory vaccination and expressed concerns about HBV infection, consistent with earlier findings from KSA [22,24]. Importantly, 81.5% of respondents were willing to undergo HBV testing, though this figure was lower than that reported among barbers in Pakistan (92.8%), [25] possibly due to the higher occupational risk perceived in that profession.

Interestingly, stigma persisted in other forms: over 83% disagreed with allowing HBV-infected individuals to donate blood, a higher rate than that found among the Saudi public (66%) [22]. Such results highlight ongoing public health challenges in balancing stigma reduction with essential infection-control measures.

Practices

The study also revealed encouraging preventive practices. Nearly half of the participants reported consistent use of disposable or separate eating utensils, reflecting heightened awareness of infection control. This practice was significantly associated with demographic variables such as gender, age, and occupation ($P < 0.05$). Similarly, the majority reported demanding sterile equipment at barbershops or hairdressers and ensuring proper disposal of razors, aligning with findings from studies in Pakistan and India [25,26,27]. Risky practices, however, were still evident. A small proportion (12.9%) reported consistently sharing personal items such as clothes, towels, or toothbrushes, which may facilitate HBV transmission.

Additionally, 39% of participants expressed no hesitation in shaking hands or sitting next to HBV-infected individuals. While this indicates reduced stigma, it also contrasts with avoidance behaviors observed in studies from Iraq and Pakistan [25,26], potentially reflecting differences in education levels and cultural perceptions.

Regarding sexual practices, 53% of respondents reported consistent use of protection during intercourse, higher than the general Saudi population (34.7%) [22] but lower than rates observed among Ethiopian medical students (65.5%) [15]. This suggests that while awareness of sexual transmission exists, further educational interventions are needed to reinforce protective behaviors.

Overall, the study highlights a relatively high level of HBV knowledge among the surveyed population, particularly regarding transmission, vaccination, and preventive measures. Nevertheless, gaps remain in understanding HBV curability and in reducing stigma toward infected individuals. While preventive practices were encouraging in areas such as utensil use and barber hygiene, risky behaviors such as sharing personal items and inconsistent use of protection persist.

These findings underscore the need for comprehensive health education campaigns focusing on correcting misconceptions, reducing stigma, and promoting sustained preventive practices. Tailored interventions targeting specific demographic groups may be particularly effective in strengthening HBV prevention and control strategies.

Knowledge, Attitudes, and Practices (KAP) among dental students

Knowledge

The findings of this study indicate that while medical students demonstrated acceptable basic knowledge regarding hepatitis B virus (HBV), such as causative agent, routes of transmission, at-risk groups, and vaccine availability, their level of understanding was inadequate for future healthcare providers who are expected to deliver patient care and lead infection prevention efforts. Similar studies have also emphasized that early knowledge is often limited and requires reinforcement through formal medical education [27,28].

Attitudes

Overall, the surveyed students displayed mixed attitudes toward HBV patients. On one hand, a considerable proportion (87.2%) reported feeling sympathy toward individuals infected with HBV. However, this percentage was lower than that reported in a Nigerian study (97.8%) [28]. Likewise, 81.4% expressed willingness to provide care for HBV patients, consistent with findings from other studies (82.8%) [28].

However, signs of stigma and discriminatory tendencies were evident. For instance, 81.4% supported identifying HBV patients with an alert note in their case files, a finding comparable to previous studies, where 79% endorsed such identification for safety reasons [28]. Moreover, 38.6% agreed that HBV patients should be scheduled as the last appointments of the day, a result similar to those reported among Nigerian medical students (48.5%) [28]. Concerns about personal risk were also prevalent, as 79.2% of respondents worried about contracting HBV from patients, mirroring earlier findings (77%) [28].

Encouragingly, overt stigma was less pronounced: only a minority admitted to harboring hatred or supporting stigma toward HBV patients. This contrasts with previous reports that highlighted higher levels of discriminatory attitudes among healthcare students and professionals. [28].

Practices

In terms of practices, infection control measures appeared suboptimal. While 82.8% of students reported applying additional precautions when dealing with HBV patients, and 74.4% stated they would double-glove when managing bleeding cases, these figures suggest that not all students adopt consistent universal precautions [28]. This reliance on patient identification before implementing precautions indicates a potential gap in understanding the principle of "standard precautions," which should apply to all patients regardless of diagnosis.

Taken together, the KAP assessment shows that medical students possess a reasonable foundational knowledge of HBV and display generally positive, though inconsistent, attitudes toward infected patients. Nonetheless, gaps remain in both conceptual understanding and actual practices, particularly regarding universal infection control measures and the persistence of subtle discriminatory attitudes. These findings highlight the urgent need for strengthened HBV education within medical curricula, not only to enhance factual knowledge but also to shape professional attitudes and reinforce consistent infection-control practices.

Conclusion

Overall, the study highlights encouraging levels of HBV knowledge among the surveyed population, particularly in relation to transmission, vaccination, and preventive measures. Nevertheless, important gaps remain, including misconceptions regarding curability, inconsistent adoption of universal precautions, and persistent stigma toward infected individuals. While preventive behaviors such as utensil separation and barber hygiene were widely reported, risky practices, including sharing personal items and inconsistent condom use, were also evident.

Among dental and medical students, knowledge was acceptable but not comprehensive, and subtle discriminatory attitudes toward HBV patients were observed, indicating inadequate preparedness for patient management.

These findings underscore the urgent need for integrated interventions: sustained public health campaigns to improve community awareness, and strengthened HBV education within medical curricula to reinforce both factual knowledge and professional attitudes. Such efforts are critical to reducing stigma, enhancing infection-control practices, and ultimately improving the quality of life for individuals living with HB.

Limitations

This study has some limitations. First, it was conducted in one region in the country, which may limit the generalizability of the findings to all Libyan residents. Second, data were collected using a self-administered questionnaire, which is subject to recall bias and social desirability bias, as students may over-report positive practices or under-report stigmatizing attitudes. Third, the study focused on medical students only; therefore, the results may not reflect the perspectives of other healthcare students or practicing professionals. Finally, some responses may have been influenced by the students' stage of training, as knowledge and practices are expected to improve with greater clinical exposure.

Funding: None

Conflict of interest: None

References

[1] World Health Organization. *Global Progress Report on HIV, Viral Hepatitis and Sexually Transmitted Infections, 2023*. Geneva: WHO; 2023.

[2] World Health Organization. *Hepatitis B Fact Sheet*. Geneva: WHO; 2022. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b.

[3] Centers for Disease Control and Prevention (CDC). *Hepatitis B Information for Health Professionals*. Atlanta, GA: CDC; 2020.

[4] Elzouki, A.N., 2008. Hepatitis B infection in Libya: The magnitude of the problem. *History*, *10*(7.2), p.9..

[5] Alashek, W.A., McIntyre, C.W. and Taal, M.W., 2012. Hepatitis B and C infection in haemodialysis patients in Libya: prevalence, incidence and risk factors. *BMC infectious diseases*, *12*(1), p.265.

[6] World Health Organization. *Global Health Observatory (GHO) Data: Hepatitis B*. Geneva: WHO; 2022. Available from: https://www.who.int/data/gho/data/themes/hepatitis.

[7] Madour, A., A. Alkout, and Stefano Vanin. "First evaluation of the serum level of anti-hepatitis B surface antigen after vaccination in Libya." East Mediterr Health J 19.12 (2013): 990-4.

[8] Bruce, M.G., Bruden, D., Hurlburt, D., Zanis, C., Thompson, G., Rea, L., Toomey, M., Townshend-Bulson, L., Rudolph, K., Bulkow, L. and Spradling, P.R., 2016. Antibody levels and protection after hepatitis B vaccine: results of a 30-year follow-up study and response to a booster dose. *The Journal of infectious diseases*, *214*(1), pp.16-22.

[9] Al-Haddad, S.A., Elyounsi, N.A., Ashour, A.A. and Khalifa, W., 2023. Estimating the prevalence of Hepatitis B Virus infection among age groups of the Libyan population in Tripoli. *African Journal of Advanced Pure and Applied Sciences (AJAPAS)*, pp.270-277.

[10] Saaed, F.M. and Ongerth, J.E., 2023. Prevalence of hepatitis B and hepatitis C in migrants from sub-Saharan Africa before onward dispersal toward Europe. *Journal of Immigrant and Minority Health*, *25*(4), pp.882-888.

[11] Almlyan, I., Alrouwab, O. and Amara, I., 2025. Seroprevalence of Infectious Diseases Among Migrant and Local Libyans: A Cross-Sectional Study. *AlQalam Journal of Medical and Applied Sciences*, pp.596-602..

[12] ul Haq, N., Hassali, M.A., Shafie, A.A., Saleem, F., Farooqui, M., Haseeb, A. and Aljadhey, H., 2013. A cross-sectional assessment of knowledge, attitude and practice among Hepatitis-B patients in Quetta, Pakistan. *BMC Public Health*, *13*(1), p.448.

[13] Aroke, D., Kadia, B.M., Anutebeh, E.N., Belanquale, C.A., Misori, G.M., Awa, A., Mbanga, C.M. and Ngek, L.T., 2018. Awareness and vaccine coverage of hepatitis B among Cameroonian medical students. *BioMed research international*, *2018*(1), p.3673289.

[14] Abdela, A., Woldu, B., Haile, K., Mathewos, B. and Deressa, T., 2016. Assessment of knowledge, attitudes and practices toward prevention of hepatitis B virus infection among students of medicine and health sciences in Northwest Ethiopia. *BMC research notes*, *9*(1), p.410.

[15] Mesfin, Y.M. and Kibret, K.T., 2013. Assessment of knowledge and practice towards hepatitis B among medical and health science students in Haramaya University, Ethiopia. *PloS one*, *8*(11), p.e79642.[16] Abiola, A. O., O. E. Omoyeni, and B. A. Akodu. "Knowledge, attitude and practice of hepatitis B vaccination among health workers at the Lagos State accident and emergency centre, Toll-Gate, Alausa, Lagos State." West Afr J Med 32.4 (2013): 257-62.

[17] ul Haq, N., Malik, Z., Nasim, A., Riaz, S., Mohammad, G. and Azhar, S., 2016. Knowledge, attitude and practice towards hepatitis B among medical college students of Quetta, Pakistan. *Value in Health*, *19*(7), p.A839.

[18] Nguyen, M.H., Wong, G., Gane, E., Kao, J.H. and Dusheiko, G., 2020. Hepatitis B virus: advances in prevention, diagnosis, and therapy. *Clinical microbiology reviews*, *33*(2), pp.10-1128..

[19] Elbur, A., Almalki, N., Alghamdi, A. and Alqarni Alqarni, H.A., 2017. Knowledge, attitude and practice on Hepatitis B: A survey among the internet users in Taif, Kingdom of Saudi Arabia. *J Infect Dis Epidemiol*, *3*(3), pp.1-7.

[20] Nazri, N.N.M., Rahman, N.A.A., Shafri, M.A.M., Rahman, N.I.A. and Haque, M., 2019. Knowledge, attitude and practice of Malaysian public university students on viral hepatitis. *Advances in Human Biology*, *9*(1), pp.46-53.

[21] Wong, N.S., Lee, S.S., Poon, C.M., Chan, D.P.C. and Chan, C.P., 2020. Awareness of hepatitis B virus infection status in the general population in Hong Kong. *International Journal of Infectious Diseases*, *101*, p.471..

[22] Alotaibi, B.S., Althobaiti, M.A., Hazazi, A.Y., Hazazi, S.Y., Nassir, R.A., Alhaddad, M.S. and Abdelwahab, S.F., 2021. Exploration of knowledge, attitude, and practice among residents of Saudi Arabia toward hepatitis viruses. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *58*, p.00469580211059965.

[23] Khan, N., Ahmed, S.M., Khalid, M.M., Siddiqui, S.H. and Merchant, A.A., 2010. Effect of gender and age on the knowledge, attitude, and practice regarding hepatitis B and C and vaccination status of hepatitis B among medical students of Karachi. *Pakistan. J Pak Med Assoc*, *60*(6), pp.450-5.

[24] Al-Hazmi, A.H., 2015. Knowledge, attitudes and practice of dentists concerning the occupational risks of hepatitis B virus in Al Jouf Province, Saudi Arabia. *Nigerian journal of clinical practice*, *18*(2), pp.276-281.

[25] Jokhio, A.H., Bhatti, T.A. and Memon, M.S., 2010. Knowledge, attitudes and practices of barbers about hepatitis B and C transmission in Hyderabad, Pakistan. *Eastern Mediterranean Health Journal*, *16*(10).
[26] Nawaz, K., Hussain, M., Majeed, I., Afzal, M. and Gilani, S.A., 2018. Knowledge, attitude and practices regarding hepatitis C prevention among people of rural community, Lahore. *International journal of social sciences and Management*, *5*(3), pp.138-145.
[27] SA, V. and HN, H., 2018. Effect of educational intervention on knowledge, attitude and practice of hepatitis B vaccine among medical students. *Int J Basic Clin Pharmacol*, *7*(5), p.992.
[28] Onaolapo, A., Mojisola, A., Oluwatosin, J., Kikelomo, I., Adeola, J. and Margaret, O., 2024. Attitudes of health workers towards management of hepatitis B Infection in general hospitals in Kwara State, Nigeria. *AlQalam Journal of Medical and Applied Sciences*, pp.44-49.