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NAPATA COLLEGE

بسم الله الرحمن الرحيم

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Faculty of Medicine

Knowledge, Attitude and Practice about hepatitis B viral infection and its vaccine among Medical Students in NAPATA College 2021

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قال تعالى:

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ﴾

صدق الله العظيم

سورة المجادلة

الآية (11)

Dedication

.....I dedicate our dissertation work to

*Our family and our mothers & fathers whose words of encouragement and push
for tenacity ring in our ear.*

To our friends for your understanding and encouragement us in all moment

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List of Abbreviations

BMC	Buganda Medical Centre
CHB	chronic hepatitis B
HBV	Hepatitis B virus
HCC	Hepatocellular Carcinoma
HCV	Hepatitis C virus
HCWs	health care workers
HIV	human immunodeficiency virus
KAP	knowledge, attitude and practice
OAU	Obafemi Awolowo University
PEP	Post-exposure prophylaxis
WHO	World Health Organization

Abstract

Background: Hepatitis B virus (HBV) is a blood-borne infectious disease. Patients with hepatitis B may feel like influenza and might, in other cases, be asymptomatic, but blood analysis can detect the disease. Hepatitis B usually starts to cure on its own after a few months, but the disease can turn into chronic hepatitis if the virus is not cured and usually lasts a lifetime. **Objective:** this study aimed to estimate the knowledge, attitude and practice about hepatitis B virus and its vaccine among medical students of NAPATA colleges, Kartoum-Sudan. **Methodology:** this cross sectional type of observational institutional-based study conducted targeting medical students of NAPATA colleges in 2020-2021. Data were collected using self-administered questionnaire which has been distributed among two hundred and eleven students using simple random sampling technique, the self-administration questioner aimed to estimate knowledge practice and attitude towards HBV and its vaccination and whether the students were vaccinated or not. Analysis has been done by using computer program (SPSS) for displaying frequency, mean and percentage. Descriptive statistics analysis also have been used. **Results:** this study found that overall knowledge about HBV hazards and prevention among students was good and satisfactory (92.8%). The majority of the respondents (86%) had positive attitude toward HBV and its vaccine, 69% have poor practice, 44% received vaccination and only 14% were fully vaccinated. **Conclusion:** Medical students were at high risk of exposure to the HBV by direct contact with patients and their body fluids or accidental injury by needles, that's why students should be vaccinated upon entry to colleges or before starting clinical training and well-educated about postexposure prophylaxis when exposed to these injuries.

Keywords: Knowledge, Attitude, Practice, hepatitis B virus, vaccine, medical students

الخلاصة

خلفية: فيروس التهاب الكبد الوبائي B هو مرض معد ينتقل عن طريق الدم. مرض التهاب الكبد قد يكون مثل الأنفلونزا وقد يكون ، في حالات أخرى ، بدون أعراض ، ولكن تحليل الدم يمكن أن يكشف المرض. يبدأ التهاب الكبد الوبائي عادةً في الشفاء من تلقاء نفسه بعد بضعة أشهر ، ولكن يمكن للمرض يتحول إلى التهاب الكبد المزمن إذا لم يتم الشفاء من الفيروس وعادة ما يستمر مدى الحياة.

الهدف: هذه الدراسة تهدف إلى تقدير المعرفة والمواقف والممارسات حول فيروس التهاب الكبد الوبائي ولقاحه بين طلاب الطب في كلية ننتبه الخرطوم - السودان.

المنهجية: نوع هذه الدراسة هي دراسته مقطعية عرضيه قائمة على الملاحظة التي أجريت على المعاهد والتي تستهدف طلاب الطب في كلية ننتبه في الفترة 2020-2021. تم جمع البيانات باستخدام الاستبيان الذي تم إجراؤه ذاتياً وزعت على مائتين وأحد عشر طالباً باستخدام تقنية أخذ العينات العشوائية البسيطة. يهدف الاستبيان إلى تقدير الممارسة المعرفية والموقف تجاه فايروس الكبد الوبائي وتطعيمه وهل تم تطعيم الطلاب أم لا. تم التحليل بواسطة استخدام برنامج الكمبيوتر (SPSS) لعرض التردد والمتوسط والنسبة المئوية. كما تم استخدام التحليل الإحصائي.

النتائج: وجدت هذه الدراسة أن المعرفة الشاملة حول مخاطر فايروس الكبد الوبائي والوقاية بين الطلاب كانت جيدة ومرضية (92.8%). الأغلبية من الطلاب (86%) لديهم موقف إيجابي تجاه فيروس التهاب الكبد B ولقاحه ، 69% لديهم ممارسات سيئة ، 44% تلقوا التطعيم و 14% فقط تلقوا التطعيمات مع الجرعات الكاملة

الخلاصة: طلاب الطب معرضين لخطر كبير للتعرض لفيروس التهاب الكبد B عن طريق الاتصال المباشر مع المرضى وسوائل أجسامهم أو الإصابة العرضية بالإبر ، لذلك يجب تطعيم الطلاب عند دخولهم إلى الكليات أو قبل البدء في التدريب السريري و تثقيفهم جيداً حول الوقاية بعد التعرض و عند التعرض

لهذه الإصابات

CHAPTER ONE

INTRODUCTION, RATIONALE & OBJECTIVES

1. Introduction

1.1 Background

Hepatitis B virus (HBV) is a causative agent of hepatitis infection, which is asymptomatic in most individuals, but it can show features of fulminant, acute, or chronic hepatitis [1]. Transmission of HBV is through the parenteral route, blood transfusion products and sexual intercourse and vertically from infected mothers to neonates. The virus is found in body fluids such as urine, saliva, nasopharyngeal fluids, semen and menstrual fluids, and can be transmitted through contact with these fluids [2]. Hepatitis B virus is the most commonly transmitted bloodborne virus among the health-care workers and medical students. Transmission generally occurs from student to other or from patients to student or from health-care personnel to student via contaminated instruments or accidental needle-stick or sharps injuries. The virus can be transmitted directly through body fluids to mucous membranes, cutaneous scratches, abrasions, burns or other lesions. Indirect transmission can occur from surfaces contaminated with blood or body fluids to mucous membranes. HBV has been shown to survive in dried blood on surfaces at room temperature for at least a week [3]. Hepatitis B virus infection is common in Sudan in all age groups. Sudan is considered highly endemic for HBsAg, with prevalence about 16%–20% in the general population [12]. The risk of HBV infection among health-care workers and medical students is 3–5 times higher than in the general population [4]. Medical students being part of the health care delivery system are exposed to the same, if not greater, magnitude of risk as other health care workers when they come in contact with patients and contaminated instruments. They are the first level of contact between patients and medical care. They are expected to undertake activities related to patient care with the beginning of their clinical years [8]. The only methods for prevention of infection spread across health care workers and medical students are vaccination and standard precautions against hepatitis B virus (8). So this study was carried out to estimate the knowledge, attitude and practice about hepatitis B virus and its vaccine among medical students.

1.2 Problem statement

Hepatitis B virus infection has become a serious problem of public health and a major cause of morbidity and mortality, particularly in developing countries. Globally, two billion people (about one-third of the world's population) have been infected by Hepatitis B virus (HBV), and 300 to 420 million people are chronic carriers, affecting 57% of the world's population. Hepatitis B virus infection is common in Sudan in all age groups. Sudan is considered highly endemic for HBsAg, with prevalence about 16%–20% in the general population

Vaccination is a safe and economical way to deal with this dangerous infection .Hepatitis B vaccine is the first anticancer vaccine which has outstanding record of safety and effectiveness and 95% effective in preventing children and adults from developing chronic infection. Health workers, especially physicians and medical students are always in direct contact with patients and are vulnerable to the acquisition of these infectious diseases. They are involved in blood transfusion, injections and surgical operations in their practices. They should be aware of the risk involved in the treatment procedures and should take appropriate precautions in dealing with patients. Few studies have been conducted in Sudan regarding vaccination status for hepatitis B and the knowledge, attitude and practice (KAP) about hepatitis B among medical students.

1.3 Justification

Medical students being part of the health care delivery system are exposed to the same, if not greater, magnitude of risk as other health care workers when they come in contact with patients and contaminated instruments. They are the first level of contact between patients and medical care. They are expected to undertake activities related to patient care with the beginning of their clinical years. Hepatitis B virus is the most commonly transmitted bloodborne virus among the health-care workers and medical students. Transmission generally occurs from student to other or from patients to student or from health-care personnel to student via contaminated instruments or accidental needle-stick or sharps injuries. The virus can be transmitted directly through body fluids to mucous membranes, cutaneous scratches, abrasions, burns or other lesions. Indirect transmission can occur from surfaces contaminated with blood or body fluids to mucous membranes. HBV can remain stable on environmental surfaces for up to 7 days. It is thus the greatest threat of infection for health care workers and Medical students. This risk may be higher during the professional training period. No medication can cure HBV but the infection can be prevented by following a simple and available vaccination schedule. The hepatitis B vaccine is safe and effective if appropriate doses are given during a period of 6 months, it has more than 90% effective protection after all doses.

1.4 Objectives

1.4.1 General Objective

- To estimate the knowledge, attitude and practice about hepatitis B virus and its vaccine among Medical Students in NAPATA College 2021

1.4.2 Specific Objectives

- To determine level of knowledge regarding HBV and its vaccination among medical students.
- To determine attitude of students toward HBV and its vaccination among medical students.
- To determine practice regarding HBV and its vaccination among medical students.

CHAPTER TWO
LITERATURE REVIEW

2. Literature Review

2.1 Hepatitis B Virus (HBV)

Hepatitis B Virus (HBV) is a member of the Hepadnaviridae family with a small DNA virus and unusual features of replication similar to retroviruses, in which HBV can replicate through an RNA intermediate and forming a stable minichromosome (cccDNA) in the nucleus. These features of the HBV replication cycle give it the ability to persist in infected cells [8]. HBV can cause acute hepatitis and can also lead to other more serious complications like Chronic Hepatitis, Liver Cirrhosis, and Hepatocellular Carcinoma (HCC) [9]. HBV can survive outside the body for up to seven days; the virus incubation period is around two and a half months. The virus can be transmitted perinatally from a mother to her baby, horizontally by exposure to infected blood or blood products, or through direct spread percutaneously or to mucosal membranes [10]. HBV is contagious and easy to be transmitted from one infected individual to another by blood contact, mother to child, unprotected sexual intercourse, sharing of eating utensils, and other barbershop and beauty salon equipment [11]. Hepatitis B is mainly transmitted through prenatal infection, skin, and mucous membrane infections caused by contaminated blood or body, sexual contacts, and injection drug abusers. Also, tattooing, acupuncture, and dialysis are procedures that increase the risk of infection. HBV is the leading risk factor for Hepatocellular Carcinoma HCC globally and accounts for at least 50% of cases of Hepatocellular Carcinoma HCC. Chronic liver disease due to hepatitis B virus (HBV) accounts for the majority of HCC cases and thus highly amenable to preventive measures [12, 13] Hepatitis B infection is a worldwide public health problem. Hepatitis B virus infection remains a severe problem worldwide but more prevalent in Sub-Saharan Africa with 240–400 million persons reported to have chronic HBV infection[14] HBV infects more than 300 million people worldwide; Sudan is classified among the countries with high HBV seroprevalence. Exposure to the virus varied from 47 to 78%, with a hepatitis B surface antigen prevalence ranging from 6.8% in central Sudan to 26% in southern Sudan [15].

2.2 Hepatitis B Epidemiology

The prevalence of HBV infection varies geographically and can be categorized into areas of high (.8%), intermediate (2–8%) and low (.2%) endemicity. The principal mode of HBV transmission also varies geographically. In low prevalence areas such as Northern Europe and North America, HBV infection is primarily acquired in adulthood through sexual contact or injecting drug use, whereas in high prevalence areas, HBV infection is most commonly acquired perinatally or in early childhood [15]. In a recent review conducted by the European Centre for Disease Prevention and Control, population prevalence of CHB was found to vary widely between European countries ranging from 0.1% in Ireland and the Netherlands to .7% in the eastern part of Turkey. The review also found that in all the countries for which data were available, the estimated prevalence of chronic hepatitis B (CHB) CHB infection was higher among migrant groups than in the general population. Similarly, immigration of individuals with CHB from countries of intermediate and high HBV prevalence has been estimated to account for .95% of the estimated annual incidence of CHB infections in England [16]. HBV virus can be subdivided into different genotypes. To date, eight HBV genotypes (A–H) have been identified and these have distinct geographical distributions. For example, Genotype A is prevalent in northwestern Europe and the USA, Genotypes B and C in Asia and Genotype D in the Mediterranean Basin, Middle East and India. Epidemiological studies suggest that HBV genotype may influence disease progression, with Genotypes A and B associated with more favourable outcomes than Genotypes C and D [17].

2.3 Complications of HBV infection

Patients with CHB are at increased risk of cirrhosis, hepatic decompensation and HCC. Longitudinal studies of patients with CHB indicate that after diagnosis, the 5years cumulative incidence of cirrhosis is from 8 to 20%, and once cirrhosis has developed, the annual risk of HCC is 2–5%. It has been estimated that HBV infection is responsible for 50–80% of HCC cases worldwide [18]. The risk of cirrhosis is highest in those with chronic active hepatitis (HBeAg-positive CHB or HBeAg-negative CHB), whereas the risk in those who remain in the low replicative or HBsAg-negative phase approaches that of the background uninfected population. The majority of cases of HCC occur in individuals who have already developed cirrhosis, although recent studies have shown that HCC can still occur in the low replicative and the HBsAg-negative phases in patients with seemingly normal liver architecture. The risk of cirrhosis and HCC is

increased in males, older age, family history of HCC, high viral load, persistently raised ALT, co-infection with HCV or HIV and HBV Genotypes C and F [19].

2.4 Prevention of HBV infection

2.4.1 Vaccination

Safe and effective hepatitis B vaccines containing inactivated HBsAg have been available since the early 1980s. The first vaccines were plasma derived; however, these have been replaced over the years by vaccines manufactured in yeast or mammalian cells using recombinant DNA technology [20]. In general, the vaccine is administered using a three-dose schedule. Vaccine efficacy (defined as anti HBs concentration of ≥ 10 mIU/ml) is greatest in infants, children and young adults—with protective antibody levels achieved in 95% of those vaccinated. After the age of 40 years, the proportion of persons who have a protective antibody response following vaccination declines to, 90% and to 75% in those vaccinated over the age of 60 years. Other factors associated with a reduced response to vaccination include immunosuppression, liver disease, renal failure, smoking and obesity. Protection conferred by hepatitis B vaccination has been shown to be long lasting, with the risk of HBV infection significantly reduced even when anti-HBs concentrations decline to ≥ 10 mIU/ml over time [21].

2.4.2 HBV vaccination programmes

In 1992, the WHO recommended that all countries should introduce universal HBV vaccination into their routine immunization programmes. The impact of universal infant HBV vaccination has been reported in a variety of countries and settings. In general, studies in high endemicity areas have shown a decline in the prevalence of CHB infections in children to, 2% and a reduction in the incidence of HCC in children and young adults has also been reported in some South East Asian countries where universal infant vaccination programmes have been in operation for up to 20 years [22]. In the USA, the number of newly acquired HBV infections has declined substantially since the introduction of a national immunization strategy which includes the universal vaccination of infants beginning at birth and the identification and vaccination of adults at increased risk of

infection. Between 1990 and 2007, the annual incidence of HBV infection in the USA declined by .80% overall, and by 98% in children ,15 years old. In Europe, studies in Italy and Bulgaria have demonstrated a dramatic decline in the incidence of acute HBV infections and the prevalence of CHB following the introduction of universal HBV vaccination programmes. As of 2008, 177 of 193 WHO member states (92%) had integrated HBV vaccination into their national infant vaccination schedules. In Europe, 22 of 29 EU/EEA countries have implemented a universal infant or adolescent HBV vaccination programme. The remaining seven countries, including the UK, have adopted a selective vaccination programme targeting at-risk groups based on the local epidemiology of HBV infection [23].

2.4.3 Occupational HBV vaccination

Vaccination and post-vaccination testing of response is recommended for individuals at occupational risk of exposure to HBV. In the UK, vaccination is recommended for the following occupational groups: • health care workers (HCWs) • laboratory workers • staff of residential and other accommodation for those with learning difficulties: • other occupational groups at increased risk, e.g. morticians, embalmers and prison service staff. Similar recommendations for occupational HBV vaccination have been made elsewhere [24].

2.5 Prevention of mother to child transmission

PEP, initiated at birth, is recommended for all infants of HBV infected mothers .PEP using a combination of HBIG and an accelerated course of HBV vaccine has been shown to be effective in preventing perinatal HBV transmission in 90% of cases [25]. Many countries, including the USA and the UK, have introduced routine antenatal screening of all pregnant women to identify HBsAg-positive mothers and maximize opportunities to prevent mother to child transmission of HBV infection [26].

2.6 Other prevention measures

In addition to vaccination, the risk of HBV transmission can be reduced through other prevention measures including: routine testing of blood, organ and tissue donors screening of blood and blood products, harm reduction advice and provision of needle exchange programmes for injecting drug users and condom use to reduce the risk of sexual transmission [25].

2.7 High risk of Hepatitis B among Medical students

Hepatitis B virus is highly contagious. Individuals with chronic infection are usually the main reservoir for continued HBV transmission [27]. Health-care workers (HCWs) and Medical Students particularly have greater chances of hepatitis B infection due to the risk of occupational contact with blood and other body fluids of infected individuals [28]. This risk is significantly higher than that for hepatitis C virus (0.5%) and for human immunodeficiency virus (HIV) (<0.3%) [29]. This may occur following percutaneous injury (when a needle or other sharp object penetrates the skin), blood and body fluids coming in contact with the mucous membrane (eyes, nose and mouth) or non-intact skin exposure to blood and other body fluids [30]. Percutaneous injuries carry the greatest risk of HCW and Medical Students HBV infection and account for about 66,000 HBV infections annually [31]. Every year, about a third of HCWs working and Medical Students in Africa are occupationally exposed to body fluids through percutaneous injuries,[30] which in the context of high prevalence of Hepatitis B in Africa puts HCWs and Medical Students at a high risk of HBV infection. The risk of non-percutaneous exposure may account for a significant proportion of HBV transmission in the healthcare setting. Hepatitis B virus can survive in dried blood for up to a week and thus may be transmitted via discarded needles or fomites, even days after initial contamination. Indeed, many healthcare workers infected with HBV cannot recall an overt needle stick injury, but can remember caring for a patient with hepatitis B. Medical students may be at a higher risk of acquiring hepatitis B infection in the hospitals as they are learning to do procedures and may be less cautious than other health workers. They are also less likely to practice universal precautions and are more likely to sustain needle stick injuries due to inexperience [32].

2.8 Prevention of hepatitis B virus among Medical students

It is estimated that 240 million people worldwide are chronically infected with hepatitis B virus (HBV). HBV infection is endemic in Africa [32, 33]. Prevention is key to minimizing HBV transmission and the long-term disease burden. A strategy addressed in the World Health Assembly, as a framework for global action against viral hepatitis, is Awareness raising, Partnerships and Resource Mobilization. The common barriers to control the problem of high prevalence include negligence, vaccine unavailability, fear of side effects, lack of knowledge and cost.16 Control of viral hepatitis needs education and right attitude [34] The World Health Organization (WHO) has also recommended increasing awareness [35]. Level of knowledge and

awareness impact on the five core interventions of a cascade of care for HBV to minimize the burden of viral hepatitis: testing, linkage to care, treatment, long-term care and prevention. Testing for HBV infection and vaccination against it depend on the level of knowledge in a population and the awareness of healthcare personnel [36-38]. Having enough knowledge and proper attitudes toward this infection is cornerstones of preventing transmission. Medical students have a very important role in preventing the disease by improving the disease knowledge among themselves and the patients they treat.

No medication can cure HBV but the infection can be prevented by following a simple and available vaccination schedule. Vaccination against HBV remains the most important strategy in the prevention and elimination of the infection [39, 41]. A safe and effective vaccine has been available since 1982. The World Health Organization (WHO) and the Centre for Disease Control Advisory Committee on Immunization Practices recommend hepatitis B vaccination for HCWs who are at risk of occupational exposure to blood and other body fluids [40] Primary vaccination in immune-competent adults consists of a 3-dose series of Hepatitis B vaccine which when completed confers a protective antibody response in more than 90% of healthy recipients aged \leq 40 years [42]. Major barriers to HBV infection control include the low numbers of infected individuals and the proportion of the general population who are aware of the disease and its implications. A number of studies have indicated that lack of knowledge about HBV transmission and the consequences of infection result in low levels of vaccination and screening [43-44]. In addition, awareness of the problem, but inadequate knowledge and information in a community, could result in stigmatization and discrimination [45]. Current data are lacking on the level of awareness of HBV infection among the general population and healthcare personnel in Southeast Asia. A recent study in Laos demonstrated that 86% of students in the healthcare professions scored poorly on an assessment of knowledge about HBV infection [46].

2.9 Previous studies

Medical students at high risk of infection when they become in contact with the patients inside the hospital, so they should be aware of how to be more careful and eager to protect themselves from infectious disease during interaction with patients in the future [47]. Lots of cross-sectional studies [48-49] have been conducted in the recent years about HBV prevalence and in spite of the variable results and they generally indicated high prevalence specially among health care workers.

Mueller et al [48] studied 600 health care workers in a tertiary hospital in Tanzania at the Buganda Medical Centre (BMC) and the authors found that one third of HCWs were susceptible to HBV infection, although 63.5 % stated in their questionnaires that they had been vaccinated against HBV which indicated high prevalence of chronic HBV infection among Tanzanian HCWs. In Najran region a study found that, the overall seroprevalence of HBV of 1.7% and 8.7% was found among HS and HCWs, respectively. Two-thirds of HS (66.7%, 200) and 23.3% (70) of HCWs lack anti-HBs and are susceptible to HBV infection. An overall seroprevalence of HCV of 0% and 0.3% was found among Medical Students and HCWs, respectively [49]. In 2013 at Haramaya University of Ethiopia a study revealed that 95.3% of medical and health science students had poor knowledge about hepatitis B disease, its modes of transmission and prevention and even hadn't been fully vaccinated against it [50]. In February 2014 at the Syrian Private University, Ibrahim and Idris found that 40.62% of students were unaware that contaminated blood, contaminated needles, unprotected sex with an infected person and birth to an infected mother are all modes of HBV transmission [51]. A study on students of health colleges in Saudi Arabia between 2000-2007 showed that HBV prevalence for males and females was 0.17% and 0.78% respectively in the 18–21-year-olds and 0.39% and 0.90% in the 22–30-year-olds [47]. A descriptive study conducted in Nigeria during 2014 concluded that most of clinical students of OAU (Obafemi Awolowo University) had poor knowledge about HBV transmission and exposure and had poor vaccine uptake [52] and eventually on March 2015 in Saudi Arabia study showed that hepatitis B vaccination status among medical students at KFU (King Faisal University) was low [53]

CHAPTER THREE
MATERIALS & METHODES

3. Materials & Methods

3.1 Study design

This study was cross sectional type of observational institutional-based study

3.2 study duration

This study carried out during period from March to December 2021.

3.3 Study area

This study conducted at NAPATA College located at kaforie –North Khartoum is meant to contribute more substantially to the promotion, modernization and advancement of higher education values. Has six faculties which are (Medicine, Dentist, Pharmacy, Laboratory, Nursing and IT).

3.4 Study population

The study population were medical students from first to fifth year. As the students of this faculty had contact with patients more than others, they were at higher risk. Groups were chosen from 3 faculties

3.5 Inclusion criteria

All Student at faculty of medicine of Napta college with age is 18 and above and both gender were included in this study.

3.6 Exclusion criteria

Students who refuse to participate were excluded from this study.

3.7 Sampling techniques

It was conducted by probability sampling methods

3.8 Sample size

It was calculated by using this equation:

$$n = \frac{N}{1 + N(d)^2}$$

Where:

- n = Sample Size
- N = Total Population
- d = Degree of Accuracy (0.05)

First Year = 301

Second Year = 290

Third Year = 310

Fourth Year = 272

Total Population= 903

n = 211

3.9 Study variables

- Dependent variables: level of Knowledge, attitude and practice regarding HBV and its vaccination among participants
- Independent variables: sociodemographic data such as: age, gender, academic level (number of year in college), Residence and Family history of Hepatitis B Virus (HBV).

3.10 Data collection

Data were collected from respondents using a standardized self-administered questionnaire developed from questionnaire used in a previous study. Hard copies of the questionnaires, provided in English language, were distributed to study participants by research assistants. The purpose of the study was explained, and written consent obtained from the study participants. The participants

had an opportunity to contact the research team for clarity on the questions in the questionnaire if the need arose. The questionnaires were completed and returned within an hour or by the end of the working day. Questionnaires were coded with numbers and did not have any personal identification to maintain privacy and confidentiality.

There were multiple sections in the questionnaire that covered: demographic information part, and 'Yes' or 'No' or 'I Do Not Know' questions and multiple-choice questions aimed to estimate basic knowledge and attitudes and practice toward HBV and its vaccination and if the students took the vaccine or not.

3.11 Tools and measurements of Knowledge, Attitude and Practice about hepatitis B virus and its vaccine among Medical Students

- Knowledge was assessed by giving 2 to correct answer and 1 to the wrong answer. The scale measured knowledge from maximum 24 to minimum 0. Scores <13 were taken as poor, ≥ 13 as adequate knowledge of Hepatitis B and its vaccination.
- Attitude was assessed by giving 1 to positive and 0 to negative attitude. The scale classified attitude as positive with score >6 and negative ≤ 6 .
- Practice was assessed by giving 1 to positive and 0 to negative. The scale classified practice as good with score ≥ 3 and poor < 3 .

3.12 Ethical Considerations

An approval from Institutional Ethics Committee, NAPATA College. The objective of the study was explained to all participants, and their consent was taken. Students who fulfilled the above criteria were included in the study after taking consent.

3.13 Data analysis

The collected data were analyzed by using the Statistical Package for Social Sciences (SPSS) for displaying frequency, mean and percentage. Descriptive statistics and correlation analysis were used to detect the association

CHAPTER FOUR

RESULTS

4. Results

4.1 Socio-demographic characteristics of medical student at NAPATA College 2021 (n=211)

A total of two hundred and eleven medical students at NAPATA College enrolled in this study 58% (122 out 211) of them were female and 42% (89 out 211) were male **Figure 4.1**. Age were divided in two group 18-22 years and 22-26 years, majority of students (68%) in age group 18-22 years with mean age 21.88 +- 1.367 **Figure 4.2**.

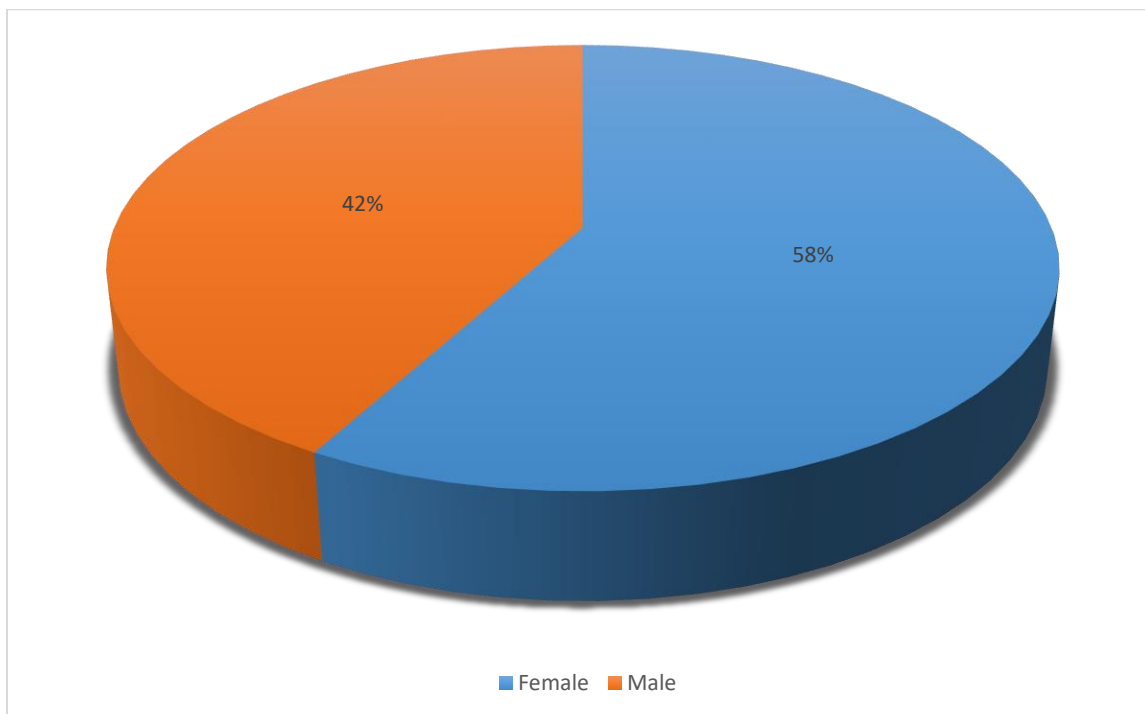


Figure 4.1. Illustrates the gender of the studied students at NAPATA College 2021(n=211)

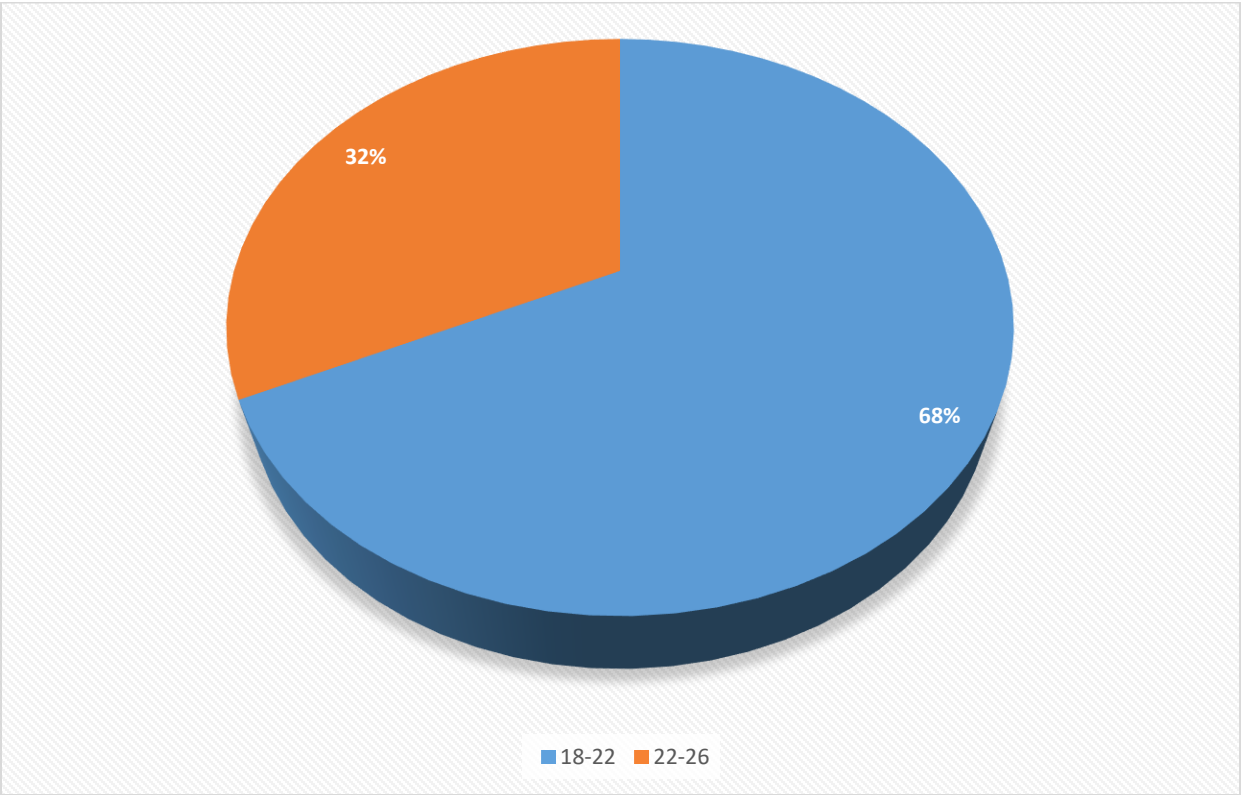


Figure 4.2. Illustrates the age of the studied students at NAPATA College 2021 (n=211)

The highest percent 37.4% (79/211) of students was in the third year, 21.3% (45/211) the fourth year, 19% (40/211) from the final year, 13.7% (29/211) from second year and 8.3% (18/211) first from year. Most students live in Bahri 37.5% (79/211) and other students live in Khartoum 33.5% (71/211) and 29% (61/211) in Omdurman. 8.5% (18/211) of students had family history of HBV presented in **Table 4.1**.

Table 4.1 Distribution of Socio-demographic characteristics of medical student at NAPATA College 2021 (n=211)

Categories		Frequency (percentage)
Study year	1 st	18 (8.3%)
	2 nd	29 (13.7%)
	3 rd	79 (37.4%)
	4 th	45 (21.3%)
	Final	40 (19.6%)
Residence	Khartoum	71 (33.5%)
	Bahri	79 (37.5%)
	Omdurman	61 (29%)
Family history of HBV	Have	18 (8.5%)
	Not have	193 (91.5%)

4.2 Assessment of Knowledge about hepatitis B virus and its vaccine among Medical Students at NAPATA College 2021 (n=211)

Knowledge was assessed by questions focusing on HBV aetiology, sign and symptoms, transmission, and vaccination. Each response was scored as 'yes' or 'no'. The scoring range of the questionnaire was 24 (maximum) to 1 (minimum). A cut off level of < 13 was considered as poor whereas ≥ 13 was considered as good knowledge about HBV. Knowledge scores for individuals were calculated and summed up to give the total knowledge score. Out of the 211 participants, 196 (92.8%) were within the good knowledge range whereas 15 (7.2%) of poor knowledge. Good knowledge was apparent in responses to questions relating to basic knowledge (except question showed poor knowledge of students about which microbes can cause HBV). Good knowledge was apparent in responses to questions relating to symptoms, transmission of HBV (except question Shaw poor knowledge of students about that a superficial wound touching the saliva of a HBV patient and Intact skin touching the blood of HBV patients) and good knowledge of vaccination (except question showed pregnant women can't take the vaccinations which is very low knowledge of students 33.9%).

Table 4.2 Level of Knowledge regarding HBV and its vaccination among medical students at NAPATA College 2021 (n=211)

Categories		Frequency	Percentage
Students who have knowledge about HBV	Yes	208	98.8%
	No	3	1.2%
Causes HBV	Bacterial	70	33%
	Viral	141	67%
Students who think HBV is communicable disease	Yes	182	86.2%
	No	29	13.8%

Students who think that HBV Carrier is well and has no symptoms of disease	Yes	138	65.5%
	No	73	43.5%
Students who think HBV can lead to death	Yes	178	84.3%
	No	33	15.7%
Students who think patient who has HBV transmit the infection among medical students or health care workers	Yes	196	93%
	No	15	7%
Students who think the HBV can cause these signs and symptoms	Fever	150	71%
	Nausea and/or Vomiting and/or loss of appetite	141	66.8%
	Jaundice	183	86.7%
	pain in upper right quadrant of abdomen	175	82.9%
	half of the patients have no symptoms	161	76.3%
Students who think that HBV can transmitted by these ways	A superficial wound touching the blood of a HBV patient	180	85.3%
	A superficial wound touching the saliva of a HBV patient	94	44.5%
	Intact skin touching the blood of HBV patients	89	42.1%
	The pregnant mother may transmit the virus to the child during childbirth	167	79%
	Transfusion of contaminated blood	202	95.7%
	Organ transplantation of infected person	187	88.6%
	Sexual relations	175	83%
Students who think that the HBV vaccine protect from HBV	Yes	194	92%
	No	17	8%
Students who think that HBV vaccine don't cause HBV	Yes	120	57%
	No	91	43%
Students who think that pregnant women can't take the vaccinations	Yes	70	33.1%
	No	141	66.9%

4.3 Assessment of attitude of Medical Students toward hepatitis B virus and its vaccine at NAPATA College 2021(n=211)

Over all the respondents had positive attitude towards Hepatitis B with mean score of 7.80 ± 2.25 . Attitude towards HB was assessed by asking 10 questions as shown in **table 4.3**. Each question was labelled with positive or negative attitude. A score of 1 was given to positive, while 0 was given to negative attitudes with a score range of maximum of 10 to a minimum of 0. Majority of the respondent 181 (86%) had positive attitudes toward HBV and its vaccination and 30(14%) had negative attitude about HBV and its vaccination. except for last question there were 97(46%) believed that they had a little contact with HBV patients. Overall, the respondents had positive attitude toward HBV and its vaccination

Table 4.3 attitude of students toward HBV and its vaccination(n=211)

Categories	Agree	Disagree
Exposure to HBV because of the nature work	181	30
	86%	14%
Vaccination prevents the spread of infection	192	19
	91%	9%
HBV is a dangerous disease	196	15
	93%	7%
The risk of death of people who received vaccination was reduced compared to those who did not receive vaccination	175	36
	83%	17%
Concerned about the side effects of vaccination	69	142
	33%	67%
Afraid of the injection used for vaccination	50	161
	24%	76%
Vaccination is ineffective in the protection against disease	38	173
	18%	82%

Not Exposure to HBV infection	40	171
	19%	81%
Vaccination is not available	69	142
	33%	67%
Little contact with HBV patients	97	114
	46%	54%

4.4 Assessment of Practice regarding HBV among Medical Students at NAPATA College 2021(n=211)

Over all the respondents reported to have poor practice towards Hepatitis B with mean score of 1.98+-0.76 Practices towards HB were assessed by asking 4 questions as shown in **table 4.4**. Each question was labelled with good or poor practice. Majority of respondents (69%) had poor practice toward HBV and vaccine and 31% of them had positive practice. 2% of students had HBV infection. and 44% received vaccination and only 14% of them complete 3 doses and 36% of them organized on the dates of taking the dose. 88% of the students were personal protective equipment during their practice

Table 4.4 Practice regarding HBV among Medical Students at NAPATA College 2021(n=211)

Categories		Frequency	Percentage
Students who had Past infection with HBV	Yes	5	2%
	No	206	98%
Students who follow preventive measures in the work of wearing masks, glasses and gloves	Yes	186	88%
	No	25	12%
Students who received the HBV vaccination	Yes	94	44%
	No	117	56%
	One dose	42	20%
	Two doses	21	10%
	Three doses	31	14%
Students who organized on the dates of taking the doses	Yes	76	16
	No	36%	8%

CHAPTER FIVE

DISCUSSION, CONCLUSION & RECOMMENDATIONS

5. Discussion, conclusion & Recommendations

5.1 Discussion

Medical students are susceptible to HBV infection during their exposure to clinical cases and different procedures. Hence, medical students were advised to have vaccination against HBV before coming to clinical side, as they acquire good immune response with immune memory. Three doses of vaccination are provided free of charge to all the students during the time of admission [54].

The present descriptive cross-sectional study involved 211 medical students at Napata College, Khartoum state- Sudan. A total of 211 students responded to the questionnaire, among them, 153 participants were females (58%), while the remaining 89 (42%) were males. In terms of age, the participants were young adults aged between 18 and 22 years with a mean age 21.88 ± 1.367 years. Our findings are similar to a study carried out in Sudan which found 66.8% of medical students were female with mean age (20.93 ± 1.62) years, but disagree with previous studies like a study carried out in Uganda done by Wibabara et al, 2019 who found majority of medical students 65% were male, also other study done by Nazir et al, 2014 among Syrian Medical Students who found 62.5% of medical students were males and 37.5% were females but agree with our study in age which he found age of the participants ranged from 17 to 25 years (mean: 21.4) [51, 55].

The current study demonstrated that vast majority of participants have heard of hepatitis B and had knowledge concerning the various aspects of HBV (Good knowledge was apparent in responses to questions relating to symptoms, transmission of HBV and HBV vaccination). In agreement with these findings, Habiba et al., 2012 reported high participants' knowledge concerning the various aspects of HBV in their similar study (knowledge of HBV infection, the routes of transmission of the infection, the ways of preventing the infection and the fact that the infection can be transmitted as a nosocomial infection) and is consistent with the current study [56]. Also these results are in line with the results of a study conducted in Northwest Ethiopia which found that 86.2% of the participants

had adequate knowledge about ways of transmission [50]. In contrast, lower knowledge particularly regarding infections from health worker to a patient was reported by Abdal M and Al-Mousa K, 2013. Also Opposite results were obtained in Syria. Furthermore, limited knowledge was found among Vietnamese American college students toward their increased risk of HBV and demonstrated the need for general HBV education. As regard student's knowledge of HBV vaccination, it is noted in the current study that majority of participants 92% know that HBV vaccination can prevent hepatitis and more than half 57% believe that HBV vaccination does not increase the risk for complications. A previous study in Taiwan has shown that 75.0% of the dental students had adequate knowledge of hepatitis B. However, they had little information about vaccine dose, transmission via personal objects, and precautions and prevention [57].

In addition, a study conducted by Alavian SM et.al, 2005 revealed that vaccination against HBV was done in 94.9% of dentists which is higher than that reported in our study 44% but higher than 30.5% reported among students studying health-related courses (Al-Hazmi, 2015). This difference could be attributed to different sample size in different studies [58, 59]. Concerning positive attitude towards HBV vaccination, this study showed that the most important reasons for a positive attitude towards HBV vaccination are: Prevention, prevention of infection, and reduced risk of death which suggests satisfactory awareness toward HBV vaccination. Furthermore, they believed that hepatitis B is a serious illness cause the death. This finding is similar to another study by Habiba. et.al, 2012 which showed that factors associated with a positive attitude towards vaccination was the belief in the efficacy of the vaccine and that their job puts them at risk of HBV infection [56]. On the other hand, the most important reasons for a negative attitude towards HBV vaccination was non availability of the vaccine, concern about the negative effects of the vaccine, no need for a vaccine because of limited contact as a students with hepatitis patients, and fear of injection. Other previous studies also mirror evidence to our findings which involving students' vaccination attitude (Al-Hazmi, 2015; Aniaku et al., 2019; Biradar et al., 2015; Wibabara et al., 2019) [59, 60, 61, 51].

In the present study, majority of respondents (69%) had poor practice toward HBV and vaccine. 31% of them had positive practice, in spite of their good knowledge and positive attitude. These results are in line with the results from a study conducted in Northwest Ethiopia [50] and Quetta, Pakistan [62].

5.2 Conclusion

The present study found that:

- Overall knowledge about HBV hazards and prevention among students was good and satisfactory.
- Majority of the respondents had positive attitude toward HBV and its vaccine.
- More than half of medical students had poor practice
- Low percentage of students received vaccination and very little of them were fully vaccinated and major of them were not organized on dates of doses.

5.3 Recommendations

- Students should be vaccinated upon entry to colleges or before starting clinical training.
- Ministry of education in cooperation with ministry of health should have Student Health Departments; take responsibility for testing, vaccination, and observation the response to vaccine.

CHAPTER SIX

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6.2 Appendix

Questionnaire

NAPTA College

Faculty of medicine

Questionnaire

Part 1

Socio-demographic characteristics of medical student

Age: Years

Gender:

Male

Female

Study year:

1st

2nd

3rd

4th

Final

Residence:

Khartoum

Bahri

Omdurman

Family History of HBV infection

Do you have any one in your Family with HBV infection?

Yes

No

Part 2

A) Level of Knowledge regarding HBV and its vaccination

- Do you know about HBV? Yes No
- What the causes HBV? Bacteria viral
- Is HBV communicable disease? Yes No
- Do you think that HBV Carrier is well and has no symptoms of disease? Yes No
- Can HBV lead to death? Yes No
- Can patient who has HBV transmit the infection among medical students or health care workers? Yes No
- Do you think the HBV can cause these signs and symptoms? Fever , loss of appetite Nausea , Jaundice , Vomiting , pain in upper right quadrant of abdomen , half of the patients have no symptoms
- Do you think that HBV can transmitted by these ways?
 - A superficial wound touching the blood of a HBV patient
 - A superficial wound touching the saliva of a HBV patient
 - Intact skin touching the blood of HBV patients
 - The pregnant mother may transmit the virus to the child during childbirth

Transfusion of contaminated blood

Organ transplantation of infected person

Sexual relations

- Do you think that the HBV vaccine protect from HBV? Yes No
- Do you think that HBV vaccine don't cause HBV? Yes No
- Do you think that pregnant women can't take the vaccinations? Yes No

B) Attitude of students toward HBV and its vaccination

- I am exposed to HBV because of the nature of my work: agree disagree
- Vaccination prevents the spread of infection: agree disagree
- HBV is a dangerous disease: agree disagree
- The risk of death of people who received vaccination was reduced compared to those who did not receive vaccination: agree disagree
- I am concerned about the side effects of vaccination: agree disagree
- I am afraid of the injection used for vaccination: agree disagree
- Vaccination is ineffective in the protection against disease: agree disagree
- I am not exposed to HBV infection: agree disagree
- Vaccination is not available? agree disagree
- I have little contact with HBV patients? agree disagree

C) Practice regarding HBV among participant

- Have you ever had HBV? Yes No
- Do preventive measures in the work of wearing masks, glasses and gloves?
Yes No
- Have you received the HBV vaccination?

One dose

two doses

three doses

➤ Have you organized on the dates of taking the doses? Yes

No