T.C
REPUBLIC OF TURKEY
HACETTEPE UNIVERSITY
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KNOWLEDGE REGARDING INFECTION AND PREVENTION MODES OF HEPATITIS B DISEASE AND ASSOCIATED FACTORS AMONG FIRST CLASS STUDENTS OF NYALA UNIVERSITY IN SUDAN

Sanaa Ishag Ahmed Elrasheed

Program of Public Health

MASTER OF PUBLIC HEALTH THESIS

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Knowledge Regarding Infection and Prevention Modes of Hepatitis B Disease and Associated Factors Among First Class Students of Nyala University in Sudan.

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Supervisor: Prof. Dr. Sarp Uner

This thesis study has been approved and accepted as a Master dissertation in "Public Health program" by the assessment committee, whose members are listed below in (12.09.2018):

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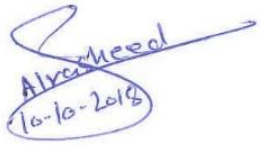
In this thesis study, I declare that all the information and documents have been obtained in the base of the academic rules and all audio-visual and written information and results have been presented according to the rules of scientific ethics. I did not do any distortion in data set. In case of using other works, related studies have been fully cited in accordance with the scientific standards. I also declare that my thesis study is original except cited references. It was produced by myself in consultation with **Prof. Dr. Sarp Uner** and written according to the rules of thesis writing of Hacettepe University Institute of Health Sciences .

Sanaa Ishag Ahmed Elrasheed



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My great parents, who never stop giving of themselves in countless ways.

My great teacher Prof. Dr. Sarp UNER.

The administration of Nyala University.

And to every person who encouraged and supported me to complete this thesis.

ÖZET

ALRASHEED, S.I.A., Sudan'da Nyala Üniversitesi Birinci Sınıf Öğrencileri Arasında Hepatit B Hastalığının Enfeksiyon ve Korunma Yolları ile İlgili Bilgi Düzeyi ve İlişkili Faktörler, Hacettepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Halk Sağlığı Yüksek Lisans Tezi, Ankara 2018. Bu çalışmada, üniversitenin birinci sınıf öğrencilerinin Hepatit B (HB) hastalığın bilgi düzeylerinin değerlendirilimesi ve HB hastalığına bilgi düzeyini etkileyen faktörleri belirlemeyi amaçlanmıştır. Kesitsel olarak planlanann çalışmada, çalışma grubu üniversitenin birinci sınıf öğrencilerinin tamamını kapsamaktadır (n = 1204). Veriler SPSS 20.0 (Chicago IL, ABD) versiyonu kullanılarak analiz edilmiştir. Hepatit B hastalığı bilgi soruları benzer çalışmalardan oluşturulmuş ve her bir doğru cevap için 1 puan verilerek toplam puan hesaplanmıştır (puan yüksekliği HB hastalığı bilgisinin fazlalığını göstermektedir). Verilerin değerlendirilmesinde tanımlayıcı istatistikler, ikili analizler (ki-kare testi, Kruskal-Wallis testi, Mann-Whitney testi) ve lojistik regresyon analizi kulllanılmıştır. Sonuçlar %95 güven aralığında (GA) değerlendirilmiş ve anlamlılık düzeyi $p<0.05$ olarak belirlenmiştir. Bu çalışma, öğrencilerde HB hastalığına karşı bilgi konusunda genel bir zayıflık olduğunu ortaya koymaktadır; bilgi puanı ortalama (± SD) 41 puan üzerinden 19,3(±5,1) puan olarak hesaplanmıştır. Katılımcıların yarısından fazlası (%59,6) daha önce HB hastalığını hiç duymamıştır. Tüm katılımcılardan sadece %6,5'i HB hastalığına karşı aşılanmıştır. Kadın olmak (OR = 1,4; % 95 GA= 1,1-1,9), ücretli bir işte çalışmamak (OR=1.9; % 95 GA=1,2-3,2) gelir durumunu iyi (OR=3.0; %95 GA=2,2-4,6) ve ortalama (OR=1,5; %95 GA=1,2-2,1) olarak algılama ile akademik başarıyı kötü ve ortalama olarak algılama (OR=1,5; %95 GA=1,2-2,0) HB hastalığı hakkında yüksek düzeyde bilgi ile ilişkilidir. Bu çalışmada, katılımcılar arasında HB ile ilgili bir bilgi düzeyinin yetersiz olduğu sonucuna varılabilir. Üniversite öğrencileri arasında HB ile enfekte olma riskini en aza indirmek için sağlık eğitimi programları uygulanmalı ve üniversite öğrencilerine HB'ye karşı aşı alma konusunda teşvik edilmelidir.

Anahtar Kelimeler: Hepatit B, Bilgi, Öğrenciler

ABSTRACT

ALRASHEED, S.I.A., Knowledge Regarding Infection and Prevention Modes of Hepatitis B Disease and Associated Factors Among First Class Students of Nyala University in Sudan. Hacettepe University, Graduate School of Health Sciences, Public Health Program, Master of Science Thesis, Ankara, 2018. In the present study, we aimed to assess the level of information regarding Hepatitis B (HB) disease among the first year students of the university, and to determine the factors affecting the level of information regarding HB disease. A cross-sectional study was conducted and the study group covered the first year students of the university (n = 1204). The data were analysed by using the SPSS 20.0 (Chicago IL, USA) version. Hepatitis B disease knowledge were collected by questions, which were used in similar studies and the total score was calculated by giving 1 point for each correct answer (higher scores indicating greater HB disease knowledge).. Descriptive statistics, binary analysis (chi-square test, Kruskal-Wallis test, Mann-Whitney test) and logistic regression analysis were used. The results was evaluated for a 95% confidence interval and the level of significance was determined as $p < 0.05$. This study revealed that there was a general weakness in knowledge towards HB disease among students; the mean (±SD) knowledge score was 19.3 (±5.1) over a total of 41 points More than half (59.6%) of the respondents have never heard about the HB disease before. Out of all respondents, only 6.5% were vaccinated against HB disease. Being female (OR=1.4; 95% C.I. =1.1-1.9), not working in a paid job (OR=1.9; 95% C.I. =1.2 - 3.2) perceiving income status as good (OR=3.0; 95% C.I. =2.2-4.6) and as average (OR=1.5; 95% C.I. =1.2-2.1) and perceiving academic success as bad and average (OR=1.5; 95% C.I. =1.2-2.0) were associated with high level of knowledge about HB disease. From this study, it can be concluded that there was an inadequate knowledge level regarding HB among the participants. In order to minimise the risk of the infectious with HB among the university students, health education programmes should be conducted, and encourage the university students to receive vaccination against HB.

Keywords: Hepatitis B, Knowledge, Students.

CONTENTS

ABBREVIATIONS

CHB	Chronic Hepatitis B
DNA	Deoxyribo Nucleic Acid
EPI	Expanded Program on Immunization
GAVI	Global Alliance for Vaccines and Immunization
HB	Hepatitis B
HBc	Hepatitis B core Antibody
HBcAg	Hepatitis B core Antigen
HBeAg	Hepatitis B e Antigen
HBIG	Hepatitis B Immuno Globulin
HBs	Hepatitis B surface Antibody
HBsAg	Hepatitis B surface Antigen
HBV	Hepatitis B Virus
HCC	Hepatocellular Carcinoma
HCWs	Health Care Workers
Hep B3	Hepatitis B 3rd dose
Hep B-BD	Hepatitis B - Birth Dose
HIV	Human Immunodeficiency Virus
ICC	Intrahepatic Cholangio Carcinoma
IgM	Immunoglobulin M
U.S	United States of America
WHO	World Health Organization

FIGURES

TABLES

1. INTRODUCTION

Hepatitis term in general, means inflammation of the liver, and it is caused by five different types of viruses, Hepatitis A, B, C, D and E [1]. The risk of developing chronic infection with hepatitis B virus (HBV) is highest among children. Someone may be infected with HBV for 30 years or more before developing clinical symptoms of the disease [2]. Untreated chronic viral hepatitis can progress to very hazardous or life-threatening complications [3].

Hepatitis B globally has a great importance, because it is a serious and common infectious disease of liver, which affects millions of people worldwide [1]. Poeple are therefore at risk of HBV infection that is endemic in developing countries [3, 4]. In the early 21st century, it is estimated that one out of every twelve people in the world is chronically infected with either hepatitis B or C. This results in about 1 million yearly deaths from chronic hepatitis, cirrhosis or liver cancer [1,5,6]. It is also estimated that the global prevalence of hepatitis B infection is 5%, but ranges between 0.1 to 20% among the low and high endemic areas [5,6]. But today viral hepatitis B and C are major health challenges, affecting 325 million people globally. They are root causes of liver cancer, leading to 1.34 million deaths every year [7]. Implementation of effective vaccination program s in many countries has resulted in a significant decrease in the incidence of acute hepatitis B. Nevertheless, hepatitis B remains an important cause of morbidity and mortality [8].

In sub-Saharan Africa, chronic infection with the HBV is a profoundly important public health issue characterised by high prevalence, frequent co-infection with HIV, and suboptimally applied ascertainment and management strategies [9]. Proportion of deaths due to cirrhosis increased by 31% between 1990 and 2010 [10]. If hepatocellular carcinoma (HCC) and cirrhosis were grouped together, chronic viral hepatitis would rank within the top 10 causes of global mortality, above malaria and TB [11].

Sudan is the second largest African country with about 38.4 million (in 2015) inhabitants who have a high prevalence rate of blood borne infectious diseases.

Exposure to the HBV varied from 47%-78%, with a hepatitis B surface antigen and prevalence ranging from 6.8% - 26% [11, 12, 14]. Sudan is classified among african countries with high HBV sero-prevalence. HBV infection is common in Sudan in all age groups. Studies pointed to infection in early childhood in southern parts of Sudan while there was a trend of increasing infection rate with increasing age in northern Sudan [14, 15]. Viral hepatitis during pregnancy is associated with high risk of maternal and fatal complications and it has been reported as a leading cause of maternal mortality in Sudan [16]. In a study among soldiers in five urban localities, 78% had evidence of past infection [17]. In a study conducted in eastern Sudan with people in high-risk groups (sex workers, long distance truck drivers and soldiers), positivity for hepatitis B surface antigen test (HBsAg) was 14% [17]. In the study was conducted to determine the seropositivity of hepatitis B infection, associated risk factors and history of vaccination among staff in 3 teaching hospitals in Khartoum, 4.9% reacted positively for HBsAg and Only 11 (4.5%) of the participants had received the full vaccination dose for hepatitis B [18]. The epidemiology of hepatitis B was also studied in central Sudan, Gezira area, where HBsAg positivity was 14% [19]. Also in study was conducted to determine the prevalence and risk factors for transmission of hepatitis B virus (HBV) infection in the Gezira state of central Sudan, HBsAg and HBcAb were reactive in 6.9% and 47.5% of the studied population, respectively [20]. In a study conducted in Omdurman among adults with acute hepatitis, HBV infection was 12.6% [21]. Similarly, 12.4% of patients attending a surgical unit were positive for HBsAg [22]. Sudan is considered highly endemic for HBsAg, with prevalence about 16%–20% in the general population [23].

There is hope that with concerted action, prevention of transmission and reversal of the rising tide of liver-related morbidity is an achievable goal in sub-Saharan Africa and in Sudan [24]. Collaborative action among epidemiologists, patient advocacy groups, research funders, public health professionals, policy-makers, physicians and patients will be essential to make this aspiration a reality for millions affected with viral hepatitis [9].

However, few data exist concerning knowledge among people in Sudan, thus the current study was directed at assessing knowledge, regarding Hepatitis B

among the undergraduate-first year students in Nyala University in Sudan. The study population were usually young and some middle aged males and females, representing the most reproductive age group. Infection of this age group with HBV has a major impact on the population as a whole. Knowledge and awareness about the mode of transmission is important for the planning of preventive health education program mes [25]. So disease control by a preventive strategy is more effective than a curative one [8].

1.1. Justification of the Study

Study was for locally to determine the knowledge of first class students attending Nyala University on Hepatitis B infection. The information obtained would be added knowledge necessary in prevention of hepatitis B, in planning for education of the first year students [25]. Because of the education level of the target group, their knowledge was considered at the highest level of knowledge in the community [8].

1.2. Purpose and Assumption

1.2.1. Short-term Objectives

1. To assess the level of information regarding hepatitis B disease transmission and prevention among the first year students of the university.

2. Determining the factors affecting the level of information regarding transmission and prevention modes of hepatitis B disease among the first class students of the university.

1.2.2. Long-term Objectives

1. To contribute to intervention studies to raise the level of knowledge of hepatitis B among the first class students of the university..

2. Building resources for future work in this regard.

2. LITERATURE REVIEW

Hepatitis B is the inflammation of the liver [26]. It is one of most common liver infections in the world [27]. It is an infectious liver disease that caused by infection with the Hepatitis B virus. In the first infection, a person can develop it as an “acute” infection, which vary in riskiness from a very few symptoms or no symptoms to a serious case requiring a hospital care. Acute Hepatitis B refers to the first 6 months after person is infected with Hepatitis B virus (HBV). Some people can resist the infection and clear the virus. For other people, the infection remains and turn into a “chronic” illness. Chroni**c** Hepatitis B refers to the illness that occurs when the Hepatitis B virus remains in the body. With in a long time, the infection can cause serious health risks and complications [26, 27, 28].

2.1. Hepatitis B Virus

Hepatitis B disease is caused by the hepatitis B virus (it is a DNA-virus and similar to the retroviruses) [28]. HBV is one of the smallest viruses known to infect humans, and it is classified within family of Hepadnavirus [29]. It is a hepatotropic virus, and liver injury occurs through immune-mediated killing of infected liver cells. HBV is also a recognized oncogenic virus that confers a higher risk of developing HCC. The HBV has a membrane called HBsAg, there are marks under the membrane such as HBeAg and HBcAg. So the virus circulates in serum as a 42-nm, double-shelled particle, with an outer envelope component of HBsAg and an inner nucleocapsid component of hepatitis B core antigen (HBcAg) [30, 31]. HBV DNA can be detected in serum and is used to monitor viral replication. HBeAg, unlike HBsAg and HBcAg, is not particulate, but rather is detectable as a soluble protein in serum. Worldwide, at least nine genotypes of HBV (A through I) have been identified on the basis of more than 8% difference in their genome sequences [31, 32]. Higher rates of HCC have been found in persons infected with genotypes C and F (compared with genotypes B or D), and in those infected with certain subtypes of genotype A found in southern Africa, although aflatoxin exposure may play a role in sub-Saharan Africa. Antiviral therapy is equally effective, and the HBV vaccine protective against all HBV genotypes. A number of naturally occurring mutations in

the pre-core region (pre-core mutants), which prevent HBeAg synthesis, have been identified in HBeAg-negative persons with chronic hepatitis B (CHB) [33]. The HBV genotype influences the prevalence of pre-core mutations, but the functional role of this mutation in liver disease is unclear [34].

2.2. Types of Hepatitis B Disease

2.2.1. Acute Hepatitis B

Approximately two-thirds of the people who are infected with acute HBV have a mild illness and a few symptoms that usually goes undetected [35]. About one-third of adult patients who are infected with acute HBV develop clinical symptoms and signs of hepatitis, which vary from mild symptoms of fatigue and nausea, to more marked symptoms and jaundice, and in rare conditions develop into acute liver failure. Acute hepatitis B has a clinical incubation period which arranges between 2-3 months in average, and can range from 1-6 months after exposure, the length of the incubation period relating, to some exposure, with the level of virus extend [36]. The incubation period usually follows by the short prodromal period of constitutional symptoms such as fever, fatigue, anorexia, nausea, and body aches.

In this stage, serum alanine aminotransferase (ALT) levels rise and high levels of HBsAg and HBV DNA are detectable [37]. The icteric phase of hepatitis B continue for a variable period ranging 1-2 weeks, during which viral levels lower. During convalescence, jaundice resolves, but constitutional symptoms may continue for many weeks or even months. In this period, HBsAg is cleared and also fllowed by disappearance of detectable HBV DNA from serum. Acute liver failure occurs in about 1% of patients are infected with acute hepatitis B and jaundice [38]. The onset of fulminant hepatitis usually occurs with sudden occurrence of fever, abdominal pain, vomiting, and jaundice, followed by disorientation, confusion, and coma. The levels of HBsAg and HBV DNA fall rapidly at general conditions as develop of liver failure, and some patients may be HBsAg-negative at the same time of onset of hepatic coma. Patients who have acute liver failure due to hepatitis B need careful

management and monitoring and should be transferred rapidly to a tertiary medical care center with the availability of liver transplantation [39].

2.2.2. Chronic Hepatitis B

The chronic hepatitis B has a very variable and dynamic nature or course. In the early infection, HBeAg, HBsAg, and HBV DNA are usually present high, and there are mild to moderate rises in serum aminotransferase levels. With time, however, the activity of disease can resolve each with constancy of high levels of HBeAg and HBV DNA which called ("immune tolerance phase") or with loss of HBeAg and fall of HBV DNA to low or undetectable levels ("inactive carrier state"). Some patients continue to have chronic hepatitis B, although some lose HBeAg and develop anti-HBe (HBeAg-negative chronic hepatitis B) [29]. The overall prognosis of patients with chronic hepatitis is directly related to the riskiness of disease. For those with severe chronic hepatitis and cirrhosis, the 5-year survival rate is about 50%. About 35-37% of the patients with evidence of chronic hepatitis, many are asymptomatic or have nonspecific symptoms, such as fatigue and mild right upper quadrant discomfort. Patients with more severe disease or cirrhosis may have significant constitutional symptoms, jaundice, and peripheral stigmata of end-stage liver disease including spider angiomata, palmar erythema, and splenomegaly, gynecomastia, and fetor hepaticus. Ascites, peripheral edema, encephalopathy, and gastrointestinal bleeding are seen in patients with more advanced cirrhosis. ALT and AST are often elevated, but may not correlate well with severity of liver disease. Bilirubin level, prothrombin time, and albumin level often become abnormal with progressive disease. Decreasing platelet count is often a poor prognostic sign. Patients with chronic hepatitis may develop acute exacerbations with markedly elevated serum ALT. This scenario is more frequently described in those with HBeAg negative chronic hepatitis B [40, 41]. To distinguish between acute hepatitis B and chronic hepatitis B with a flare, anti-HBc IgM is a useful marker, as described in the previous section. However anti-HBc of the IgM class can be detected occasionally in patients with chronic hepatitis B with exacerbation. Alpha-fetoprotein (AFP), used as a marker for HCC, is often elevated in parallel with ALT during acute exacerbation [42]. However, AFP is unlikely to exceed 400 ng/mL. In

patients with AFP much greater than this level, development of HCC should be suspected [34]. An estimated one-third of persons with chronic HBV infection will ultimately develop a long-term consequence of the disease, such as cirrhosis, end-stage liver disease, or HCC. The determinants of outcome of chronic hepatitis B appear to be both viral (HBV DNA levels, HBV genotype, some HBV mutation patterns) and host-specific (age, gender, genetic background, immune status) [41].

2.3. Diagnosis of HBV

In 1964 it became possible to identify people with HBV using serological testing, searching for hepatitis B surface antigen (HBsAg) [43]. There are specific blood tests for Hepatitis B that are not part of blood work typically done during regular physical exams. The tests help a doctor determine if a person has never been infected, has been infected and recovered, or is currently infected [44]. Laboratory blood tests are used to test for HBV antibodies in the blood, the tests can distinguish if it is an acute or chronic infection [45]. Early identification of infected persons with the help of blood tests can break the on-going transmission and lead to necessary treatment with antiviral medication [46,43]. It is also important to enable the identification and vaccination of those who share household with the infected person and sexual partners that might have become infected. To avoid transmission there are a few measures that HBV positive individuals can take [43, 47].

If a person has never gotten Hepatitis B, then the vaccine will protect them against the disease. For anyone who has chronic Hepatitis B, testing helps identify the disease early so they can benefit from medical care [44].2.4. Transmission of Hepatitis B Virus

There are two major modes of transmission of HBV that occur in the world. Perinatal transmission, occurring at birth from infected mothers to their newborns, accounts for the majority of HBV transmission worldwide. Horizontal transmission can occur through open cuts and scratches, transfusion of blood products, breaks in good practices to prevent blood-borne infections in the health care setting, sexual transmission and risky behaviour, including injecting-drug use or tattooing, body

piercing, and scarification procedures without the use of sterilized equipment and needles.

The risk of developing chronic HBV infection among susceptible persons decreases with age at infection and thus depends on the mode of transmission. Up to 90% of perinatal infections become chronically infected, approximately 20% to 60% of children aged 1 to 5 years become chronically infected, and 5% to 10% of older children and adults [48, 49, 50].

2.4.1. Perinatal Transmission

Hepatitis B “e” antigen (HBeAg) is a serologic marker which refers to high viral levels of HBV DNA. Perinatal transmission occurs almost globally in mothers who are positive for HBV, however also can occur in mothers who have very high levels of HBV DNA in their blood. The risk of an unvaccinated infant acquiring HBV at birth is up to 100% in an infant born to an HBeAg-positive mother. The classic study by Palmer Beasley in Taiwan in the 1970’s, before vaccine was available, demonstrated that among women who were HBeAg-positive, 85% of their infants became chronically infected as compared to 32% among HBeAg negative women [48, 51]. An estimated 90% risk of developing chronic HBV exists among infants infected perinatally [48].

In the absence of prophylaxis, a large proportion of infected mothers, especially those who are seropositive for HBeAg, transmit the infection to their infants at the time of, or shortly after birth [52]. The risk of perinatal infection is also increased if the mother has acute hepatitis B in the second or third trimester of pregnancy or within two months of delivery. Although HBV can infect the fetus in utero, this appears to be uncommon and is generally associated with antepartum haemorrhage and placental tears. Horizontal transmission, including household, interfamilial and especially child to-child, is also important. At least 50% of infections in children cannot be accounted for by mother-to-infant transmission and, in many endemic regions, prior to the introduction of neonatal vaccination, the prevalence peaked in children 7–14 years of age [34,53].

HBV infects only humans, and there are 350 million people worldwide infected with chronic hepatitis B virus [28]. So these marks or their identical antibodies will appear in blood samples of the infected person [54].

2.4.2. Horizontal Transmission

Horizontal transmission of HBV, if it occurs in young children, has a high risk of leading to chronic HBV. Three prospective studies conducted before the availability of hepatitis B vaccine have shown this [55, 56]. A study of 1280 persons who were seronegative for HBV markers conducted in Alaskan villages in the 1970s found that, of 189 persons who acquired HBV during a 4-year period, 29% of those less than the age of 5 years developed chronic HBV versus 16% of those between 5 and 10 years and 8% of those more than 30 years of age [55]. In a study which conducted in Taiwan following children born without HBV infection who acquired HBV before 5 years of age, 23% developed chronic HBV [57]. The third study carried out in Senegal found that 50% of children infected horizontally before the age of 2 years became chronically infected. In the Senegal study the rate of chronic HBV decreased from 68% at 1 year to 6.3% after 4 years of age. Furthermore, for those infected at less than 6 months of age, the rate of chronic HBV was 82%, and for those infected between 6 months and 1 year it was 54%. Inclusion of the birth dose and subsequent doses not only prevents perinatal transmission but also reduces acquisition of infection in the first few months of life when there is the greatest risk of developing chronic infection via horizontal transmission [56].

In highly endemic areas, hepatitis B is most commonly spread from mother to child at birth (perinatal transmission), or through horizontal transmission (exposure to infected blood), especially from an infected child to an uninfected child during the first 5 years of life [27].

In young children and some adults, horizontal transmission likely occurs because of the presence of infectious HBV on environmental surfaces. In a study from Alaska 40 years ago, before HBV DNA testing was available, HBsAg was found by environmental sampling on school lunch room table tops, on walls, toys,

and baby bottles in homes where HBsAg-positive persons were living, and filtered from impetigo sores [55, 58]. Furthermore, when HBV was left at room temperature, after at least 7 days viral replication was found to occur [59]. Virus may be shed via open cuts, scratches, and sores from persons with chronic HBV onto environmental surfaces and then can infect other persons with open lesions through their contact with the contaminated surfaces. Horizontal transmission also occurs via unsterile injections from health care encounters or injection-drug use and tattooing as well as scarification practices, sexual transmission, and via high-risk health care environments, including renal dialysis units and emergency rooms [48, 60].

2.5. Prevention and Control

2.5.1 Strategies for Control and Prevention of Hepatitis B Infection

This section discusses the good practice principals that can effectively halt transmission of HBV. It demonstrate how effective infant vaccination strategies can accomplish this goal, starting with the first dose of hepatitis B vaccine administered immediately after birth followed by full vaccination during infancy and the use of catch-up vaccination program s for children. In addition, it highlights how program s targeting adults at the highest risk of HBV infection can prevent acute icteric HBV infection and transmission in this age group [26, 61].

2.5.2. Hepatitis B Virus Vaccine

Since 1982 there is a vaccine against HBV that gives 95 % protection against the infection [27]. The hepatitis B vaccine is counted as one of the safest vaccinations. People cannot get HBV from the vaccine and the most common side effects is soreness and redness in the arm where the injection was given (3 - 29 %) and fever over 37.7°C (1 – 6 %). Fever and pain at the injection site are the most common side effects of the HBV vaccine. Allergic reactions have been reported, but are not common. [62, 63]. The vaccine is the first “anti-cancer vaccine”, because it protects from getting hepatitis B that is the main source for liver cancer. About 80% of all liver cancer cases are developed from HBV [61]. All infants are routinely

vaccinated for Hepatitis B at birth, which has led to dramatic declines of new Hepatitis B cases in many parts of the world. Some people have a greater risk of getting infected than the others, such as medical personnel, persons with sexual risk behaviour, men who have sex with men, and people who inject drugs and partners to a person living with HBV, travellers to certain countries, safety workers exposed to blood people who have certain medical conditions, including diabetes, should talk to their doctor about getting vaccinated. For these risk groups, vaccination is recommended and people are now more protected due to vaccination initiatives [26, 45].

The HBV vaccine gives healthy infants, children and adults a protective concentration of anti-HBs in 90-100% of the cases if following the vaccination schedule properly. The vaccine is typically given in a three-dose series. Persons who are immunosuppressed or over 40 years old are less likely to develop protective concentrations [63]. It is not known if the HBV vaccine gives lifelong protection against HBV and if boosters are necessary. However, it is known that the protection is long lasting, at least 15 - 20 years, if the vaccination schedule is followed correctly [28, 65].

A study about the vaccination achievements for the last three decades has been made, over the past 30 years investments in the primary prevention have been done to increase the coverage of the universal vaccination program s with great result. In the eighties the HBV vaccine was only given to persons with a great risk of getting the infection but today it is different. there were 179 countries in the world have vaccination against the infection in their routine vaccination program and are given to all infants [65]. The vaccination has proven to give good protection and it is a safe and effective way to prevent populations from developing acute or chronic hepatitis B. The current vaccination has an efficacy over 90 %, after the complete treatment with three doses. The vaccine can be used against all HBV genotypes and serotypes. The vaccine can be used against all HBV genotypes and serotypes. Point out that there still are big challenges to deal with, such as the occurrence of breakthrough infections, the effectiveness of the universal HBV vaccination and the effect of natural boosting [65].

2.5.3. Prevention of Perinatal Transmission

The most impactful strategy for reducing mother to new born transmission of HBV is incorporating the birth dose into the hepatitis B vaccine schedule. A birth dose followed by 2 more doses of hepatitis B vaccine can reduce the prevalence of chronic HBV in the infant by approximately 90% in infants of HBeAg-positive mothers and almost all HBeAg-negative mothers. This birth dose is especially important in areas of the world where a significant proportion of HBsAg-positive mothers are also positive for HBeAg, such as in China, south east Asia, and the Pacific Islands. In these areas, if the birth dose is not given, the effectiveness of hepatitis B vaccine could be reduced to as low as only 50% to 75% [48, 66]. In regions such as sub-Saharan Africa and Russia where less than 25% of HBsAg-positive pregnant women are also HBeAg positive [67], the impact of missing the birth dose is not as severe but is still significant. Including a dose of Hepatitis B Immune Globulin (HBIG) at birth to infants born to HBsAg-positive mothers can further reduce the risk of transmission to less than 5%. Beasley and his colleagues showed in a randomized-controlled trial that with administration of the birth dose plus HBIG to infants born to HBsAg/HBeAg-positive mothers only 6% of those infants became HBsAg-positive verses 88% of infants who received placebo [28, 48].

2.5.4. Prevention of Horizontal Transmission

Prevention of horizontal transmission requires education, appropriate infection-control practices, and vaccination of hepatitis B household contacts and other persons at high risk of hepatitis B [48].

Thus we can conclude that the HBV is transmitted through body fluids from a person who is infected with the hepatitis B virus enter the body of someone who is not infected, such as blood, semen, vaginal fluids and mucous membranes and others [27, 44]. And the most common ways of transmission are:

- Unsafe sex or sexual contact with an infected person, where among adults, hepatitis B is often spread through sexual contact.
- Unsafe blood transfusions or direct contact with infected or contaminated blood, even in tiny amounts too small to see.
- Direct contact with open sores of an infected person.
- Unsafe use of needles, or sharing personal items, such as toothbrushes, razors, syringes, or glucose monitors that have even microscopic amounts of blood on them.
- From an infected mother to her baby during pregnancy and at birth. Worldwide, most people with Hepatitis B were infected with the virus as an infant.
- Close household contact and between children in early childhood [26, 68].
- Outbreaks, while uncommon, poor infection control has resulted in outbreaks of Hepatitis B in healthcare settings.

Sexual transmission of hepatitis B may occur, particularly in unvaccinated men who have sex with men and heterosexual persons with multiple sex partners or contact with sex workers. Infection in adulthood leads to chronic hepatitis in less than 5% of cases. Transmission of the virus may also result from accidental inoculation of minute amounts of blood or fluid during medical, surgical and dental procedures, or from razors and similar objects contaminated with infected blood [43].

Although the virus can be found in saliva, it is not believed to be spread through sneezing, coughing, kissing, hugging, breastfeeding, food or water, hand holding or sharing eating utensils [26, 44]. Also HBV cannot be transmitted by any insect bites including mosquitos [27].

HBV is unique compared to other sexually transmitted diseases, because it can be prevented with vaccine [27]. All HBV infections do not give symptoms,

meaning that there is a risk that people are contagious without knowing it [27, 43]. However some people may experience acute symptoms like jaundice, fatigue, loss of appetite, nausea and/or abdominal pain. For almost all adults, 90%, the infection heals and they become healthy, but for infants and young children, there is a 90% and 30-50% risk respectively that the infection leads to chronic hepatitis B [27]. This provides an increased risk, approximately 25% that they later in life will suffer from liver cirrhosis and/or liver cancer, if the infection is not medically managed [27, 69]. The patients who are diagnosed with acute hepatitis B will receive symptomatic treatment since there is no cure available. Patients diagnosed with chronic hepatitis B can be treated with interferons, which suppress the HBV and help the immune system to enhance the protection against HBV [27, 28].

2.5.5. The Global Vaccine Policy

In 1991, the Global Advisory Group of the Expanded Program me on Immunization (EPI) recommended integration of hepatitis B vaccination into national immunization program s by 1995 in countries with an HBV carrier prevalence of 8% or higher, and by 1997 in countries with a lower prevalence [70]. By the end of 2014, hepatitis B vaccine had been introduced nationwide in 184 countries [70, 71].

There are 5 key (WHO) strategic areas for hepatitis B prevention through vaccination summarised in a WHO policy document from the Western Pacific region. The key strategic areas for hepatitis b prevention through vaccination are: vaccination of infants, vaccination of priority adult population groups, vaccine supply and quality, advocacy and social mobilization and measurement of programme performance and impact [27].

2.5.6. Vaccination of Infants

The WHO recommends the use of monovalent HBV vaccination within 24 hours of birth, followed by completion of the HBV vaccine series within 6 to 12 months as the most cost-effective strategy for the prevention and control of hepatitis

B [35, 69, 70]. This strategy provides the earliest possible protection to future birth cohorts and reduces the pool of chronic carriers in the population. Timely vaccination of new born infants can prevent perinatal HBV transmission. Strengthening of routine immunization services to achieve and sustain high coverage with 3 doses of hepatitis B vaccine by 1 year of age is the most important strategy for hepatitis B control. Mathematical modelling suggests that very high vaccine coverage rates (≥ 90%) are needed to interrupt transmission and prevent deaths, with the goal to protect the entire birth cohort and achieve health equity [48, 72].

Delivery of a timely birth dose also provides an opportunity to link immunization delivery systems with maternal health program s, and to ensure that HBV vaccine is included in the essential care package for new born infants, and to harmonize training and program matic issues, including where, when, and by whom the birth dose is given [48].

2.5.7. Hepatitis B Immune Globulin (HBIG)

Where resources allow, HBIG may be given in addition to the vaccine to children born to HBsAg-positive mothers. However, the option for HBIG is conditional on the existence of a comprehensive antenatal screening program for hepatitis B infection, and is of limited value in settings with poor antenatal coverage [73].

2.5.8. Catch-up Vaccination

The WHO also recommends catch-up vaccination for older children who missed immunization as infants as a secondary strategy after routine vaccination reaches target levels. This strategy depends on whether a country has additional financial and human resources for enhanced hepatitis B control, and should be based on careful epidemiologic and economic analysis [48].

2.5.9. Adult Immunization

Priority or high-risk population groups include health care workers, contacts of HBsAg-positive persons, men who have sex with men, sex workers, people who inject drugs, frequent recipients of blood/plasma transfusions, and any other population groups coming in regular contact with blood and blood products. Incidence of acute HBV is highest among adolescents and adults, although the risk of developing chronic HBV is low compared with infants and children. Vaccination program s targeting high-risk adults can be difficult to implement because of challenges in identifying and vaccinating persons engaged in high-risk activity before they become infected. Universal vaccination of health care workers is an effective strategy to protect high-risk adult groups from HBV infection [48, 74].

2.5.10. Vaccine Supply and Quality

Key goals are elimination of vaccine stock-outs at the national and district levels through improved training in vaccine management, prevention of vaccine freezing through improved training in temperature monitoring, and promotion of the use of controlled temperature chain for hepatitis B birth dose delivery [73].

2.5.11. Advocacy and Social Mobilization

The primary goal is to increase awareness among decision makers, health care workers, and caretakers of the risks and consequences of HBV infection and the need for hepatitis B vaccination through community and civil society engagement, use of media outlets, education materials, and mass awareness campaigns such as World Hepatitis Day and World immunization week [48, 73].

2.6. Epidemiology of HBV

2.6.1. Global Hepatitis B Virus Burden

Hepatitis B virus (HBV) infection is a global public health problem [70, 71]. Despite the fact that since 1982 there is a vaccine against HBV that gives 90-100% protection against infection, there are in the world today more than 2 billion people have been infected with HBV, and that 350 million of these people are chronically infected (defined as hepatitis B surface antigen [HBsAg] positivity), so there are 350 million people living with chronic hepatitis B worldwide. About 15% to 25% of persons with chronic HBV infection die from cirrhosis or liver cancer [27, 75, 76]. The Global Burden of Disease study estimated that there were about 686,000 deaths caused by hepatitis B in 2013 and a 5.9 per 100,000 age-standardized death rate globally, of which 300,000 deaths were attributed to liver cancer and 317,400 deaths to cirrhosis of the liver secondary to hepatitis B [34, 27]. Globally everyone is in risk of getting hepatitis B [77]. The virus is transmitted differently between geographic regions and countries depending on how endemic the HBV is there. In regions where the endemicity is low, it is more common that the virus is transmitted through horizontal routes such as injecting drug use, high-risk sexual behaviour and receiving blood products [76]. This rate represents a substantial global burden, with wide global geographic variation. Hepatitis B prevalence (HBsAg) is highest in the sub-Saharan African and western Pacific regions, considered high-intermediate to high endemicity countries (5% - $\geq$ 8% prevalence), and prevalence estimates exceed 15% in several countries. Low-intermediate regions (2% - 4.99%) include the eastern Mediterranean and European regions. The Americas and Western Europe regions are considered low endemicity, with HBsAg prevalence generally less than 2% [75, 78]. There has been an overall decrease in HBsAg prevalence over time in most countries, but with notable increases in African and eastern European countries [48, 75].

In a study which conducted in Singapore the authors looked into the health-seeking behaviours of those infected with HBV by interviewing 39 HBV infected individuals. Those who had a family member that had had HBV-related liver disease

or had liver abnormality themselves, were more likely to seek help. They wanted to know if their own livers were functioning normally, but were at the same time reluctant to find out the results of a test, in fear of it. The authors concluded that the low compliance to follow-up among the patients was partly due to a widespread perception that there was no efficient treatment to the disease Many patients preferred traditional medication such as herbs instead of western medication, which was perceived not to be as effective [47].

In the U.S. approximately 1.4 million residents are chronically infected with HBV [43, 46]. According to the fact that during the years 1974-2008 17.6 million people born in countries of intermediate or high prevalence of chronic hepatitis B have immigrated to the U.S., there is an increased burden of chronic hepatitis B in the country [79]. More than half of the estimated chronic hepatitis B cases were from the Western Pacific region, from countries such as the Philippines, China and Vietnam. These were the main countries of birth for imported cases of chronic hepatitis B. Africa was the second largest region for imported cases of chronic hepatitis B.

According to a systematic review migrants from East Asia, the Pacific and Sub-Saharan Africa represented a high seroprevalence of chronic hepatitis B, 10.3-11.3%, and migrants from Eastern Europe, Central Africa and South Asia were an intermediate seroprevalence. The seroprevalence of chronic hepatitis B was low among migrants from the Caribbean, Latin America, the Middle East and North Africa. Refugees and asylum seekers had higher seroprevalence of chronic hepatitis B compared to migrants [65].

2.6.2. Hepatitis B - situation in Africa

Africa has 54 sovereign countries, the most on any continent, and is the second largest continent in terms of both land area and population. Africa is bounded by the Mediterranean Sea to the north, by the Atlantic Ocean to the west, by the Red Sea to the northeast, and by the Indian Ocean to the southeast. Africa is a vast

continent spanning over 8,000km (5,000 mi) north to south and 7,500km (4,800 mi) east to west (not including islands) [80]. (Figure 2.1)

About 100 million persons in the World Health Organization (WHO) African Region have chronic hepatitis B virus (HBV) infection, and all countries in the Region have an intermediate (2%–7%) or high (≥ 8%) population prevalence of chronic HBV infection [81, 82]. In November 2014, the WHO African Regional Committee endorsed a resolution for a hepatitis B control goal to reduce chronic HBV infection prevalence to < 2% in children less than 5 years of age in all Members States by 2020 [83, 84]. Childhood hepatitis B vaccination All 47 countries in the WHO Africa Region have introduced HepB into the routine infant immunization schedule; 44 (94%) countries use pentavalent vaccine (diphtheria, tetanus, pertussis, Haemophilus influenza type B and hepatitis B vaccines) and 33 (70%) countries follow a three-dose schedule at 6, 10, and 14 weeks of age [85]. As of December 2016, nine countries, representing 28% of the regional birth cohort, have introduced a universal Hepatitis B-BD policy. Two countries, Sao Tome and Principe and Mauritius, only provide HepB-BD for babies born to HBsAg-positive mothers [86]. Regional reported coverage with 3 doses of Hepatitis B (HepB3) increased from 5% in 2000 to 76% in 2015. However, coverage has plateaued at 70 - 75% since 2009 [86]. This is below the 2015 global HepB3 coverage of 84%. Country-specific HepB3 coverage estimates for 2015 ranged from 16% in Equatorial Guinea to 98% in Rwanda, The Seychelles, Swaziland, and United Republic of Tanzania; 16 (34%) countries reported national HepB3 coverage of at least 90% [86]. Regional reported HepB-BD coverage increased from 0% in 2000 to 10% in 2015, although coverage has plateaued at 10% since 2010 [86]. This is below the 2015 global HepB-BD coverage of 39%. Among countries that have introduced the birth dose, HepB-BD coverage ranged from 19% in Angola to 99% in Algeria and Botswana [78]. Algeria, Botswana, Cabo Verde, and The Gambia, all of which had introduced the birth dose over a decade ago, reported at least 90% national HepB-BD coverage. A recent situational report of the WHO African Region indicated HepB-BD introduction has been recommended or is under consideration in Cameroon, Cote d'Ivoire, Guinea Bissau, Mozambique, Niger, the Republic of Congo, Sierra Leone,

South Africa, and Uganda [87]. In Ethiopia and Gabon, HepB-BD introduction has been proposed for the next comprehensive multi-year plan. In Rwanda, the national (EPI) reported that it has received approval from the Ministry of Health but is waiting for endorsement from the Interagency Coordination Committee (ICC). Ghana has included Hep-BBD introduction in its comprehensive multi-year strategic plan for immunization and the National Viral Hepatitis Control Plan, but so far, HepB-BD introduction has been postponed due to competing priorities [82, 87]. Countries have reported multiple barriers to HepB-BD introduction, including lack of financial support from GAVI, the vaccine alliance (10 countries), the need for evidence on the burden of chronic HBV infection and the risk of perinatal transmission in Africa (6 countries), insufficient cold chain storage (3 countries), lack of trained healthcare workers (HCWs) to attend births or conduct post-natal visits (2 countries), and a high proportion of home births (2 countries) [87, 83].

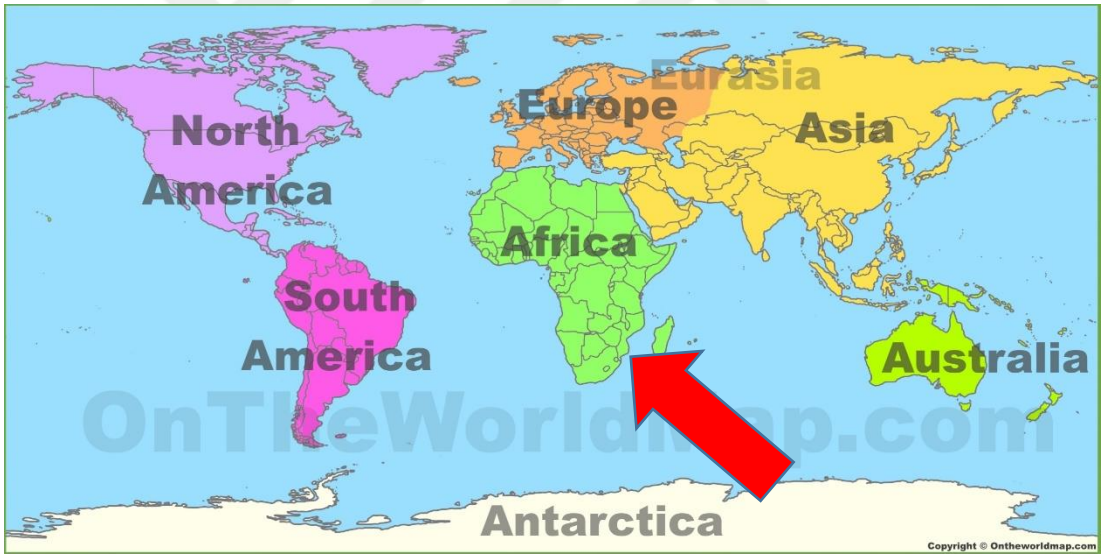

Figure 2.1. Map of World [80]

2.6.3. Challenges and Strategies for Improving Hepatitis B Vaccine Birth Dose Coverage in Africa

Despite the introduction of Hep B by all countries in the Region, for 31 countries (66%) HepB3 coverage is below the 90% recommended coverage level. Given the high chronic HBV infection prevalence throughout the Region, particularly among pregnant women, and the importance of perinatal and early

childhood transmission in intermediate and high endemicity settings, countries need to improve HepB3 coverage and those without a birth dose might need to consider introducing the HepB-BD to reach the regional hepatitis B control goal by 2020 [83, 88]. In African countries that have already introduced the HepB-BD, several challenges, including timely administration of the HepB-BD, high prevalence of home births, the lack of services available to reach infants born at home and unreliable vaccine supply have limited HepB-BD implementation [83].

2.6.4. Immunization Coverage in Sudan

Sudan located in the continent of Africa, covers 1,861,484 square kilometers of land, making it the 16th largest nation in terms of land area. The population of Sudan is 38.4 and the nation has a density of 18 people per square kilometer. Khartoum is the capital city of Sudan. It has a population of 1,974,647, and is located on a latitue of 15.55 and longitude of 32.53. The Republic of Sudan was composed of 18 states and 26 cities.

Sudan became an independent state in 1956, after gaining its sovereignty from The United Kingdom. The population of Sudan is 34,206,710 (2012) and the nation has a density of 18 people per square kilometre [89]. (Figure 2.2)

The infant HBV vaccination was introduced into vaccination schedule as a pentavalent vaccine (diphtheria, tetanus, pertussis, Haemophilus influenza type B and hepatitis B vaccines) in 2009 in Sudan [90]**.** A study which carried out among the healthcare workers in Wad Medani, Sudan, showed that more than 50% of health care workers were not vaccinated against HBV [91]. A study which carried out among the village midwives in Khartoum, Sudan revealed that 79.8% of the midwives have never been vaccinated for Hepatitis B virus [92]. A study which carried out among healthcare workers in Khartoum, Sudan which showed that only 27.4% of respondents were not vaccinated against HBV [93]. The study which carried out among healthcare workers in Omdurman Hospital, Sudan 71.69% of them knew vaccine prevention and only 32% of respondents were vaccinated against HBV [94]. So there are no certain number or percentage regarding vaccination against

HBV in our country, but many references estimated to vaccination coverage as low [92, 81, 95].

Figure 2.2. Map of Africa [89].

2.7. Knowledge Towards Hepatitis B and Vaccination

A study which was conducted among the students of the University of Kassala in Sudan, included a total of 395 students. The study revealed that, there was a general poorness knowledge about HBV among students. Concerning HBV viral infection, the students showed poor knowledge regarding virus, mode of transmission, symptoms and prevention measures. A significant difference was found between the students' knowledge of HBV towards the modes of transmission (P= 0.009), symptoms of disease (P=0.000) and prevention measures (P=0.000) [90].

A study which carried out among healthcare workers in Khartoum, Sudan, revealed that the mean scores of knowledge was 18.4. It is showed that doctors have the highest knowledge score comparing with other occupations. The knowledge score was found higher among vaccinated healthcare workers [93].

A study which conducted among the healthcare workers in Wad Medani, Sudan, revealed that, 97.2% of doctors, 98.6% of nurses, 94.8% of laboratory technicians and 95.7% of other paramedical knew that HBV transmitted via blood. More than 50% of the health care workers were not vaccinated against HBV. Healthcare workers had poor knowledge about Universal Standard Precautions Guidelines, and do not fully appreciate their occupational risk regarding hepatitis B infection [91].

A study which conducted among the village midwives in Khartoum, Sudan, reported that more than half of respondents (53.1%) of had heard about Hepatitis B virus, 79.8% of them were have ever been vaccinated for Hepatitis B virus. About 30.9% of the village midwives with adequate knowledge. The mean scores of knowledge showed significant association between ages [92].

The study which carried out among the university students in Bangladesh, to determine the knowledge level of students about Hepatitis B, their perception of risk factors and their knowledge about Hepatitis B vaccination. It was found that 89% respondents heard about Hepatitis B where 55% were female. Of students who were aware of hepatitis B infection, 30% mentioned blood transfusion as route of transmission of Hepatitis B, 20% and 17% marked mother to foetus and sharing infected needle & syringe respectively while 15% told that the disease can be transmitted through unprotected sex. Level of vaccination of university students was 47% and the rest of them did not complete the full dose vaccination or did not take vaccine due to the lack of free time, lack of belief and also informed that they have never thought about vaccination and its necessity [96].

A study which carried out among the medical students in Aljouf University in Saudi Arabia, said that majority of the students who were surveyed (62.0%)

perceived that they are at high risk of contracting and spreading HBV. A 63.0% of students considered vaccine is safe and 52.2% were vaccinated against HBV. About 92.4% of them agreed that needle stick can spread HBV, and 87.0% with blood. A significant relationship was found between students who had a history of training on universal precautions and knowledge about post needle stick injury ($P < 0.01$) [97]. The study which conducted among the university students in Lahore, Pakistan, More than half of students wanted to be vaccinated against hepatitis B and almost three quarters of them were willing to be screened against hepatitis B. The main source of information of students was television [98].

A study was carried out among students of Centre for Physical Education Health & Sports Science, in University of Sindh, Pakistan, revealed that majority of students (95%) have heard about hepatitis, and 78% of them knew that blood transfusion and reuse of syringes are the main sources of transmission. Interestingly, a reasonable number of students (32%) said thought hepatitis B could spread through hug, cough and sneeze of a patient. About half of them were aware that a vaccine is available against HBV [99].

A study which carried out among the Thai university students in Thailand, said that both genders had poor knowledge about hepatitis B, however 91.1 % of the students had heard about hepatitis B. About half of the students (55.4 %) knew correctly that hepatitis B is sexually transmitted and 40.0 % of the students knew that hepatitis B could cause liver cancer. There was no significant difference in knowledge between the genders [34].

A study which carried out among the medicine and health Sciences students in Ethiopia, reported that majority of the study participants (80 %) had an adequate knowledge on risk factors for HBV, its mode of transmissions, and preventions. Only 2 % of students had completed the three doses schedule of HBV vaccination [100].

Study conducted among nursing students of Government Nursing College in Jagdalpur, India, found that only 18.9% of the 1st year students are vaccinated [101].

A study which conducted mong dental and oral hygiene students at a University in Pretoria, South Africa, found that a significant number of students reported that the HBV could be transmitted through saliva ($P < 0.01$), through shaking hands ($P < 0.01$) and from sharing a toothbrush ($P = 0.02$) with an infected person., during the birth process from mother to child ($P = 0.03$). The majority of respondents (94%) stated that vaccinations should be taken to prevent infection with HBV and >90% of students reported having completed the vaccination schedule [102].

The study which carried out among the students of Vietnamese University in Ho Chi Minh, Vietnam, reported that majority of the university students (95.3%) had heard about hepatitis B virus (HBV). More than half (55.4%) knew correctly that HBV cannot be transmitted by sharing food with an infected person, and 58.4% knew that HBV can cause liver cancer. Only 47.6% knew that HBV can be sexually transmitted and 39.5% knew that HBV can be transmitted from mother to child at birth. More male than female students answered correctly that HBV can be transmitted by sharing a toothbrush with an infected person ($p= 0.026$). Almost all students (93.1%) thought that they would receive HBV vaccination [103].

Also study which conducted among medical students of Karachi, in Pakistan, stated that 85% of the respondents indicated that they were aware of availability of a vaccine for hepatitis B. Only 57.1% medical students showed excellent knowledge regarding the route of spread of hepatitis B. Half of the respondents (49.8%) showed good knowledge regarding spread of hepatitis by dental procedures. Seventy nine percent of the students reported that they were vaccinated for hepatitis B and 70.6% of them were completely vaccinated (3 doses) [104].

The study which carried out among Medical Students in University of Dammam, stated that the mean ±SD knowledge score of all the students was 17.63 ± 4.8. Almost 50% of the students had good knowledge; 39.6% and 10.1% had average and poor knowledge respectively. The level of knowledge about hepatitis B infection among male and female students was not statistically significantly different. There

was a significant relationship between marital status and hepatitis B knowledge (p<0.01) with more knowledge among unmarried students [105].

A study which conducted among Medical Students in Haramaya University, Ethiopia, reported that majority of the respondents (95.3%) were not fully vaccinated against Hepatitis B. Mean ±SD scores for knowledge was 11.52 ±2.37 [106].

A study which carried out among the dental students in Varna University in Bulgaria, reported that most of the participants (82, 3 %) considered hepatitis B as serious diseases. Almost 90 % considered that dental practice could enhance the risk of infection with HBV. Unfortunately, only 57, 4 % of students knew their vaccination status [107].

A study which carried out among medical students in Erbil City, Iraq, stated that a high proportion of the study participants (41%) had poor knowledge about HBV while 45% had acceptable knowledge and 14% had good knowledge. Only 45% of them were vaccinated against HBV. The vaccination rate was highest among those who had good knowledge (100%), in comparison to those with acceptable knowledge (53.3%) and poor knowledge (17.1%), p <0.001 [108].

The study which conducted at Sohag University, Egypt, reported that most of them (8%) were rural The level of knowledge in pre-test scores were poor in all students especially non-biological science compare to the post-test, the overall test scores were improved significantly. There was statistically significant correlation between knowledge and type of education, while the age, gender, and students residence were not found to have an important influence on their knowledge scores as well the study revealed that 7 6% of students were have family history of hepatitis [109].

Study which carried out among healthcare workers in Omdurman Hospital, Sudan, found that 96.22% of surgeons knew their increased risk for infection, and 71.69% of them knew vaccine prevention. The overall screening for the virus was 32.2%. Only 26.19% of those who received the vaccination had completed the doses.

Knowledge about risk and vaccination was very low among cleaning staff and none of them had vaccination [76].

A study which was carried out among clinical and medical students of Jhalawar Medical College, in Rajasthan, India, found that mean ±SD scores for knowledge was 15.66 ±1.9 over a total of 20 items for knowledge [110].

A study which conducted among dental clinical students in Ankara, Turkey, showed that infection control measures were learned primarily by means of faculty lessons (about 99% of students) and then also by independent research on the Internet (about 60% of students). In addition general success rate regarding knowledge of female students was higher (71.6%) than male students' (46.9%), which was statistically significant ($p \leq 0.05$) [111].

A study which conducted among medical students in the medical college in Ahmedabad, India, showed that 86.7 % of the medical students had correct knowledge about Hepatitis B virus, though only 66 % of students knew about the virus. Majority of the medical students had correct knowledge regarding mode of transmission. There were 29.3% of the medical students were not vaccinated for Hepatitis B [112].

A study which conducted among undergraduate students at college of dentistry, Madinah, Saudi Arabia, reported that mean ±SD knowledge score was 14.79 ±2.48 (min= 1, max= 20). There was a statistically significant difference between the years of study and their knowledge ($p \leq 0.05$). The senior students had significantly more knowledge than the junior students did with the clinical years having the highest scores. There were also statistical differences between the males and females with females having higher knowledge scores in second ($p = 0.00$) and third ($p = 0.17$) year compared to males. There were no significant differences in the genders for first and fourth year [113].

2.7.1. Responsibility of the Health Professionals

Health professionals play an important role in promoting public health. Traditionally, the focus of health promotion by health professionals has been on disease prevention and changing the behaviour of individuals with respect to their health. However, their role as promoters of health is more complex, since they have multi-disciplinary knowledge and experience of health promotion in their work practice [114].

The nurse's primary responsibilities are to promote health, prevent illness, restore health and ease suffering. The nurse is, together with the society, responsible for initiating and supporting activities that cater to a populations' health and social needs [115]. The role of nurses has included clinical nursing practices, consultation, follow-up treatment, patient education and illness prevention. This has improved the availability of health-care services, reduced symptoms of chronic diseases, increased cost-effectiveness and enhanced customers' experiences of health-care services [114]. Therefore, nurses play an important role in both public health and school health when it comes to inhibiting the spread of HBV by disseminating information on preventive measures, such as vaccination and information about the transmission of the disease [103].

In a study which investigated if health care providers, including nurses, physicians and other health care staff, had any influence whether parents decided to vaccinate their children or not. The study sample was parents to 7695 children 19-35 months old. The parents answered questions about knowledge and attitudes towards vaccination. Parents concerns about vaccination and the influence by health care providers were also evaluated. The result of the study showed that parents were more likely to believe that vaccine was safe for their children if they had had previous contact with a health care provider. Vaccination coverage was significantly higher among children of parents who were influenced by a health care provider compared to those who answered that they were not [116].

Nyamathi and co-workers (2009) evaluated the effect of a nursing-managed hepatitis A and B program me with 332 homeless adults in the U.S. The nursing-managed program me included educational sessions about the hepatitis B and A virus, ways of transmission, preventive practises, vaccination (a combined vaccine for hepatitis A and B), the administration schedule and possible side effects and more. The result was then compared to a control group of 533 homeless adults of who either got a 20 minute education session or no education at all. All participants in the study were offered to buy the vaccine for five dollars/shot of vaccine. In the intervention group 68% of the participants completed the vaccination, compared to 61% in the group receiving the 20 minute education session and 54% in the group which received no education. The difference was significant between the intervention group and the group with no HBV education at all, but not significant between the intervention group and the group receiving the 20 minute HBV educational session [117].

A study was made to investigate if patients educated by medical, nursing and pharmacy students', improved the patients' knowledge about hepatitis B. First- and second year medical, nursing and pharmacy students led the patient education. The education script included transmission risk factors, complications of the chronic infection, screening, vaccination and HBV symptoms. The authors evaluated the knowledge of the respondents at three times: before education, after the initial visit and one month after the education was finished. The result showed that the participants' score were 56.4 % before education, 66.6 % after initial visit and 68.3 % after the one month follow up. The authors' conclusion suggests that disease-specific preventive education could be effective in improving patients' health knowledge, which may lead to preventive behaviours [30,117].

3. MATERIALS AND METHODS

3.1. The Area of Study

In the research region, there are approximately 125,000 households, in the city of Nyala – South Darfur in Sudan. Although there is no exact figures, it is estimated that 1.5 million people live in Nyala City. Because of the civil war in Darfur now there is about 450,000 people living in camps. The city is divided into two districts, the northern and southern districts [89, 118]. (Figure 3.1)

In Sudan there are 39 public universities, 15 private universities and 81 private collages. And in the region of study there are two public universities and one private collage [119].

Figure 3.1. Map of Sudan [118].

The University of Nyala is one of the biggest universities in Darfur, and it is the only university in the state which is located in South Darfur State – South Nyala locality - Nyala city – SUDAN. It was established in 1994. It is a member of the

Federation of Sudanese universities, Federation of African Universities, Association of Arab Universities, World Association of Universities, universities gathered for innovation and the Union of Islamic universities in the world. It depends on the Ministry of High Education in Khartoum (Capital of Sudan).

The university includes: Faculty of Veterinary Science, College of Education, College of Engineering Sciences, Faculty of Economics and Business Studies, Faculty of Law and Sharia, College of Postgraduate Studies, College of Technology and Community Development, College of Health Sciences, College of Community Science, Centres of researches and Services, Unity of Distance Education and Basic Integrity of the Study, Faculty of Medicine and Health Sciences and Faculty of Science and Information Technology which were shown in (Table 3.1). There are about 83 academicians in the university 12 professors, 34 doctors and 37 research assistants [120].

3.2. Population of Study

There were about 4576 undergraduate students including 1204 first year students in the University of Nyala. The university is divided in the departments which are shown in the following table (Table 3.1)

3.3. The Sample of Study

The sample of the study was not been calculated, all the first year students of the university. The population reached was 1054 (87.5%) students as shown in the table below (Table 3.1).

The distribution of the population and the reached participants by the college or faculty was presented in Table 3.1

Table 3.1. The distribution of the population and the sample by the college or faculty (Nyala University, Nyala - Sudan - 2017).

Faculty	**All student**	**First year student**	**Participants**	
	n	**n**	**n**	**%**
Faculty of Economics and Business Studies	674	168	144	85.71
Faculty of Law and Sharia	611	152	108	68.35
Faculty of Medicine and Health Sciences	79	79	73	92.40
Faculty of Science and Information Technology	86	86	80	93.02
Faculty of Veterinary Science	704	140	115	82.14
College of Ccommunity Sscience	254	66	63	95.45
College of Education	733	185	160	86.48
College of Engineering Sciences	619	123	119	96.74
College of Health spammersSciences	357	119	107	89.91
College of Technology and Community Development	321	80	80	100.00
Centres of Rresearches and Sservices	91	-	-	-
Unity of Ddistance Eeducation and Bbasic Iintegrity of the Sstudy	47	9	2	22.22
Total	**4576**	**1204**	**1054**	**87.54**

3.4. The Type of Study

This cross-sectional epidemiological study was conducted at Nyala University in Sudan. In all faculties and collages more than 80% of the participants have participated, just in two faculties less than 80% of the participants have participated. But this was not taken into account, because there was no comparison between the faculties colleges.

3.5. The Variables of Study

3.5.1. The Dependent Variables

- Information regarding prevention (Prevention measures were divided into two sections, Vaccination and Others).

- Information regarding transmission.

- Information regarding related diseases and other effects of Hepatitis B disease.

- General information about Hepatitis B disease.

3.5.2. The Independent Variables

- Age.

- Sex.

- College / Faculty.

- Parent's education level.

- Economic status (the student's and family's income level).

- Parent's working status.

- The student's work and marital status.

- Place of residence.

- Academic success.

- Health status.

- Participants' income.

- Family's income.

3.6. The Data Collection Materials

In this study, a data collection tool was developed to measure the level of knowledge of Hepatitis B. The data collection tool consisted of two parts:

First part of questionnaire: In this part there were 16 questions about some socio-demographic characteristics (personal information form) of the student. This part contained all the independent variables.

Second part of questionnaire: In this part of the data collection tool, there were 41 questions designed to measure the level of knowledge. The questions in the second part were formed by editing the questions which were used in a similar studies as a result of literature review [92, 102, 104, 76 and 110]. Questions that assess the information of the participants regarding Hepatitis B were evaluated one by one.

The correct answers and references of the information questions were presented in Table 3.2

Table 3.2. The correct answers and references of the information questions in four groups (Nyala University, Nyala - Sudan – 2017)

Information group		Correct answers and references
General Information About Disease		**İtem 1.** Hepatitis B is an infectious disease [2,26,37]. **İtem 2.** Hepatitis B occurs in adults [37, 28]. **İtem 3.** There is a laboratory test that detects hepatitis B [2, 122]. **İtem 4.** There is a treatment for Hepatitis B [26, 122]. **İtem 5.** Hepatitis B occurs in children [37,28]. **İtem 6.** Hepatitis B occurs in elders [37,28]. **İtem 7.** Hepatitis B occurs in infants [37,28]. **İtem 8.** Hepatitis B does not affect another organ than the liver [26].
Transmission		**İtem 9.** Hepatitis B is not transmitted with sweat [2]. **İtem 10.** Hepatitis B is not transmitted with breastfeeding [26, 122]. **İtem 11.** Hepatitis B is not transmitted with kissing cheek [26] **İtem 12.** Hepatitis B is not transmitted with common toilet-bath use [2, 121]. **İtem 13.** Hepatitis B is not transmitted by handshaking , hugging and skin contact [26]. **İtem 14.** Hepatitis B is not transmitted with foods and drinks [26,37,28]. **İtem 15.** Hepatitis B is not transmitted with personel items such as clothes and glass [26, 37]. **İtem 16.** Hepatitis B is not transmitted with insect bite [28, 121]. **İtem 17.** Hepatitis B is not transmitted with mosquito bites [28, 121]. **İtem 18.** Hepatitis B is transmitted with common tooth brush [26, 37, 121]. **İtem 19.** Hepatitis B is transmitted with common injectors [2,26]. **İtem 20.** Hepatitis B is transmitted with the use of the same syringe for two poeple [2,26, 37]. **İtem 21.** Hepatitis B is transmitted with blood [2,26,37, 121]. **İtem 26.** Hepatitis B is transmitted with unsafe sex [2,26,37, 121]. **İtem 37.** Hepatitis B is transmitted with common shaving blade [26,37, 121]. **İtem 28.** Hepatitis B is transmitted from mother to baby at birth [2,26,37,123]. **İtem 25.** Hepatitis B is transmitted from mother to baby during pregnancy [2,37,123]. **İtem 26.** Hepatitis B is transmitted with dental implants [2,26,37].
Related Diseases And Other Effects		**İtem 37.** Hepatitis B causes cirrhosis [2,26]. **İtem 28.** Hepatitis B causes liver cancer [2,26]. **İtem 29.** Hepatitis B causes hepatic failure [2,26]. **İtem 30.** Hepatitis B cannot be transformed into Hepatitis C [26, 123].
Prevention	**I-Vaccination**	**İtem 31.** Only one dose of Hepatitis B vaccine is not enough [122]. **İtem 32.** There is a vaccine for Hepatitis B [2, 122]. **İtem 33.** There are three doses of hepatitis B vaccine [2, 122]. **İtem 34.** The person who is infected with or vaccinated for hepatitis B is not been prevented against other types of hepatitis [26, 28]. **İtem 35.** It is not necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier it [123]. **İtem 36.** Vaccination is prevention from Hepatitis B [2,122].
	II-Other	**İtem 37.** The use of antiseptic solution does not prevention from Hepatitis B [26,122]. **İtem 38.** Hand washing does not prevention from Hepatitis B [121]. **İtem 39.** Balanced and adequate nutrition does not prevention from Hepatitis B [121, 122]. **İtem 40.** The HBV blood check prevents from Hepatitis B [2, 26, 50]. **İtem 41.** The use of condom during sexual contact prevents from Hepatitis B [26, 122].

The prevention measures were divided into two sub-sections, there were ‘Vaccination’ section and ‘Other’ section.

The questionnaire was developed in several stages as follows:

- The questionnaire form was developed in English.
- The questionnaire was translated from English into Arabic by the researcher, whose mother tongue is Arabic.
- Then it was translated again from Arabic to English by someone whose native language is Arabic, and he is an English language specialist.
- In order to ensure the validity of the translation, necessary adjustments were made.
- The Last Arabic version of the questionnaire was corrected by an Arabic language expert; then, it was distributed to participants for collecting data.

3.7. The Data Collection Method

The pre-test of the study (Pilot Study) was applied to another different group (20 students), they study in School of Management in Omdurman University – Branch of Nyala. A self-administered questionnaire was administered to assess knowledge of participants regarding the transmission and prevention methods of HBV disease and the related factors.

The data was collected by a team which was consisted of five persons (researcher and four university graduates). The other members of team were formed by the researcher. A standard method was determined (by the team) for application survey. Questionnaires were applied by the team according to the method which was determined before.

The data collection tool of the study was applied to all first year students at Nyala University during the 3rd and 4th of May 2017. The data collection tool was filled in by students during the class time, under the supervision of the survey team and course staff. The tool was applied for the students who were in the same

department at the same time. In the departments which had more than one classroom for the first year students, the data collection tool was applied in all classrooms at the same time.

3.8. Data Evaluation

- For statistical analysis of the data, the results was obtained by using the SPSS 20.0 (Chicago IL, USA) version. Descriptive statistics and binary analysis (chi-square) were analysed statistically. The results was evaluated for a 95% confidence interval and the level of significance was determined as $p < 0.05$.

- Kruskal-Wallis Test and Mann-Whitney Test were used to examine the relation between the knowledge score and the socio- demographic and background characteristics. The results was evaluated for a 95% confidence interval and the level of significance was determined as $p<0.05$.

- Logistic regression analysis was conducted to explore the independent factors associated with Hepatitis B disease knowledge scores. Hepatitis B disease related knowledge score was calculated, and every correct answer was given one score. The students who were not answered and who answered incorrectly, were not given score.

The respondents were then classified as having adequate or inadequate knowledge, using a cut-off score of the median (19) points or above (i.e., $\geq$ 47% correct) to define as inadequate knowledge. Because of the data was non parametric we used the median as a cut-off score. The knowledge score was divided into two groups according to the median (19) of knowledge score as following:

- Respondents have an inadequate knowledge (scores ≤ 19).

- Respondents have an adequate knowledge (scores ≥ 20).

The logistic regression analysis was applied by using forward conditional method.

The data evaluation was obtained by the researcher.

3.9. Permissions of Study

All official permissions which were obtained for the application of this study, are shown below:

3.9.1. Ethics Committee

The researchers applied to the Non-Invasive Clinical Research Ethics Committee of Hacettepe University. On 28.02.2017, an official response was made by the letter No. 16969557 -320, and decision No. GO 17/169 – 09, and the proposal was accepted as project No. GO 17/169 by the Non-Invasive Clinical Research Ethics Committee of Hacettepe University. (A copy of the letter was attached, Appendix 3, page 177)

3.9.2. Nyala University

The necessary written permission was obtained to administer the survey in the Nyala University administration. On 01.05.2017, an official response was made by the letter No. G.N/M.M/967154 -706 by the administration of University of Nyala, which agreed to collect the data of project No. GO 17/169.

On 02.05.2017 the verbal approval and comment on the letter of approval of the University of Nyala were taken from the Intelligence and Security Service Offices in Nyala City. (A copy of the letter was attached, Appendix 4, page 178)

3.9.3. Participants

All the verbal and written approvals were received from the participants regarding their participation in the study during data collection days on 3rd and 4th of May 2017 . The names and identity of participants were not asked in the survey.

3.10. Strengths and Limitations of Study

- This study included only first-level students for the 2016-2017 academic year at the University. Findings and results can not be be generalized to all Nyala University students.

- This study includes only Nyala University first class students in Nyala, South Darfur State, Republic of Sudan. Findings and results can not be be generalized to all university students.

- This study evaluated the level of some information related to hepatitis B transmission and prevention among the first year students of the university, and determines the factors related to the level of information about the infection and prevention of hepatitis B.

3.11. Time Schedule

The time schedule of the study was presented in Table 3.3

Table 3.3. The time schedule of the study (Nyala University, Nyala - Sudan - 2017).

	2017 year												2018 year				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Subject selection																	
planning of study																	
Literature review																	
collection of data																	
Analysis of data																	
Writing of report																	

4. FINDINGS

The results of this study were divided into three sections, as follows:

Section 1: Socio-demographic characteristics of participants.

Section 2: Participants' responses to Hepatitis B disease knowledge questions.

Section 3: Relation between some characteristics of participants and their Hepatitis B knowledge. This section is divided into three sub-sections, as the following:

A) Relation between the socio-demographic characteristics of participants and their responses to Hepatitis B disease knowledge questions.

B) Relation between some perceptions of the participants according to some background characteristics and their responses to Hepatitis B disease knowledge questions.

C) Hepatitis B knowledge score of participants and some related factors.

4.1. Socio-demographic Characteristics of participants

This section included some socio-demographic characteristics of 1054 students. The distribution of participants according to some socio-demographic features was presented in Table 4.1.

Table 4.1. The distribution of participants according to some socio-demographic features (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		**n**	**%**
Gender	Male	502	47.6
	Female	552	52.4
Age groups	Under 20	370	35.1
	20 - 24	575	54.6
	25 - 29	96	9.1
	30 and over	13	1.2
Mean age (± SD) 20.8 (± 2.8), Minimum age= 17 years	Median age=20.0 Maximum age =42 years		
Marital status	Single	980	93.0
	Married	74	7.0
Place of family residence	City	819	77.7
	Town*	66	6.3
	Village	169	16.0
Working status	Working	92	8.7
	Not working	962	91.3
Family type	Single Parent Family	575	54.6
	Nuclear Family	383	36.3
	Extended Family	96	9.1
Total		**1054**	**100.0**

*districts out side of city center.

Fifty-two point four percent of the participants were females. The majority of the participants' age groups was "20 -24" years (54.6%), 35.1% of them were "Under 20" years old and 9.1% of the participants were "25 - 29" years old. The maximum age was 42 years and the minimum age was 17 years, with the 20.8 (± 2.8) as a mean ±SD, and 20 is the median of age. The majority of the participants were single 93.0%, and 7% of them were married. Seventy seven point seven percent of the participants' families lived in cities, whereas the 16.0% of their families lived in villages. The majority of the participants 91.3% were not working. Finally 54.6% of the participants lived in single parent families, 36.3% lived in nuclear families, and 9.1% of them lived in extended families (Table 4.1).

The distribution of participants' parents according to some socio-demographic characteristics was presented in Table 4.2.

Table 4.2. The distribution of participants' parents according to some socio-demographic characteristics (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		**Mother**		**Father**	
		n	%**	n	%**
Education Level	Illiterate	245	23.2	97	9.2
(n=1054)	Literate	234	22.2	357	33.9
	Primary school graduate	185	17.6	146	13.9
	Secondary school graduate	119	11.3	140	13.3
	High school graduate	93	8.8	131	12.4
	University graduate/ Post graduate	178	16.9	183	17.4
Working Status*	Working	275	26.3	655	73.7
(n=1045)	Not working	770	73.7	234	26.3

* One hundred sixty three of the participants' fathers and nine of the participants' mothers not alive

** Percentage of column

Twenty three point two percent of the participants' mothers were illiterate, 22.2% were literate, 17.6% were primary school graduate, 11.3% were secondary school graduate and 16.9% were university graduate and post graduate. Nine point two of the participants' fathers were illiterate, 33.9% were literate, 13.9% were primary school graduate, 13.3% were secondary school graduate and 17.4% of them were university graduate and post graduate. Twenty six point three of all participants' mothers were working, and 73.7% of them were not working. Seventy three point seven of the participants' fathers were working, and 26.3% of them were not working (Table 4.2).

The distribution of perceptions of the participants according to some background characteristics was presented in Table 4.3.

Table 4.3. The distribution of perceptions of the participants according to some background characteristics (Nyala University, Nyala - Sudan - 2017).

Perception	**Good**		**Average**		**Bad**		**Total**
	n	%	n	%	n	%	n
Academic success	486	46.1	532	50.5	36	3.4	1054
Health status	762	72.5	246	23.4	43	4.1	1051*
Participants' income	169	16.0	489	46.4	396	37.6	1054
Family's income	218	20.7	544	51.6	292	27.7	1054

*4 participants did not respond and were not evaluated.

Fifty point five percent of the participants perceived their academic achievement level as "average" , 46.1% of them perceived it as "good" and 3.4% perceived it as "bad". Seventy two point five of the reached participants perceived their health as "good", 23.4% perceived it as "average" and 4.1% of them perceived their health as "bad". Thirty seven point six of the participants perceived their income as "bad", 46.4% as " average", and 16% of them perceived their income as "good". Fifty one point six of the participants perceived their family's income as "average", 27.7 % perceived it as "bad" and 20.7% of them perceived it as "good" (Table 4.3).

Thirteen point nine percent of the participants applied for receiving a health care service during the last 6 months, and the common reasons were malaria and urinary infections.

4.2. Participants Responses to Hepatitis B Disease Knowledge Questions

This section includes the questions regarding Hepatitis B disease. There were 28 students who did not answer the information questions. The knowledge questions were divided into four groups: Prevention (divided into two sections; Vaccination and Others), Transmission, Related Diseases and Other Effects, and General Information about Hepatitis B disease.

Fifty nine point six percent of the participants stated that they did not have any information about the Hepatitis B disease.

Only 40.4% (n = 398) of the participants were informed about Hepatitis B disease. For 12.2% (n = 102) of the informed participants, information source was the media, for 9.2% (n = 97) was the internet, 8.8% (n = 95) recieved information from school, book or university, 7.7% (n = 70) received of from health personnel and 2.5% (n = 34) from the family or friends.

Only 6.5% (n = 68) of the participants were vaccinated against Hepatitis B. The majority of participants 51.8% (n = 547) were not vaccinated, and 41.7% (n = 411) of them did not know their vaccination status./8/86

The distribution of participants according to their correct answers regarding some information about Hepatitis B disease was presented in Table 4.4.

Table 4.4. The distribution of participants according to their correct answers regarding Hepatitis B disease (Nyala University, Nyala - Sudan - 2017).

Information group	Correct answers	Correct (T) / False (F)	n*	%
General information about disease	Hepatitis B is infectious disease.	T	515	50.2
	Hepatitis B visible in adults.	T	408	39.8
	There is a laboratory test that detects hepatitis B.	T	381	37.1
	There is a treatment for Hepatitis B.	T	280	27.3
	Hepatitis B visible in children.	T	247	24.1
	Hepatitis visible in elders.	T	242	23.6
	Hepatitis B visible in infants.	T	198	19.3
	Hepatitis B does not affect another organ than the liver.	T	135	13.2
Transmission	Hepatitis B is transmitted with sweat.	F	995	97.0
	Hepatitis B is transmitted with breastfeeding.	F	968	94.3
	Hepatitis B is transmitted with kissing the cheek.	F	937	91.3
	Hepatitis B is transmitted with common toilet-bath use.	F	925	90.2
	Hepatitis B is transmitted with handshaking , hugging and skin contact.	F	919	89.6
	Hepatitis B is transmitted with foods and drinks.	F	914	89.1
	Hepatitis B is transmitted with Clothes, Glass, ...etc.	F	914	89.1
	Hepatitis B is transmitted with insect bite.	F	896	87.3
	Hepatitis B is transmitted with mosquito bites.	F	861	83.9
	Hepatitis B is transmitted with common tooth brush.	T	731	71.2
	Hepatitis B is transmitted with common injectors.	T	507	49.4
	Hepatitis B is transmitted with the use of the same syringe in two uses.	T	452	44.1
	Hepatitis B is transmitted with blood.	T	422	41.1
	Hepatitis B is transmitted with unsafe sex.	T	345	33.6
	Hepatitis B is transmitted with common shaving blade.	T	330	32.2

* : The participants who gave correct answers

Table 4.4. (continued). The distribution of participants according to their correct answers regarding some information about Hepatitis B disease (Nyala University, Nyala - Sudan - 2017).

Transmission	Hepatitis B is transmitted from mother to baby during the birth.	T	243	23.7
	Hepatitis B is transmitted from mother to baby during the pregnancy.	T	210	20.5
	Hepatitis B is transmitted with dental implants.	T	82	8.0
Related diseases and other effects	Hepatitis B causes Cirrhosis.	T	397	38.7
	Hepatitis B causes liver cancer.	T	393	38.3
	Hepatitis B causes Hepatic failure.	T	284	27.7
	Hepatitis B can be transformed into Hepatitis C.	F	70	6.8
Prevention I-Vaccination	Only one dose of Hepatitis B vaccine is enough.	F	356	34.7
	There is a vaccine for Hepatitis B.	T	486	47.4
	There are three doses of hepatitis B vaccine.	T	202	19.7
	The person who is infected with or applied a vaccine of hepatitis B is not prevented against other types of hepatitis.	F	110	10.7
	It is necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier .	F	108	10.5
	Vaccination is prevention from Hepatitis B.	T	447	43.6
II-Other	The use of antiseptic solution is prevention from Hepatitis B.	F	755	73.6
	Hand washing is prevention from Hepatitis B.	F	753	73.4
	Balanced and adequate nutrition is prevention from Hepatitis B.	F	696	67.8
	The HBV blood check is prevention from Hepatitis B.	T	477	46.5
	The use of condom during sexual contact is prevention from Hepatitis B.	T	256	25.0

* : The participants who gave correct answers.

Fifty point two percent of the participants knew that Hepatitis B disease is an infectious disease, 39.8% knew that Hepatitis B disease is occur in adults, 37.1% knew there is a laboratory test to determine Hepatitis B disease, 27.3% knew that Hepatitis B disease has a treatment, 24.1% knew that Hepatitis B disease is occur in children , 23.6% knew that Hepatitis B disease is occur in elders, 19.3% knew that

Hepatitis B disease is occur in infants, 13.2% knew that the Hepatitis B disease does not affect another human organs of other than liver.

Ninety seven percent of the participants knew that Hepatitis B disease cannot be transmitted by sweat, 94.3% knew it cannot be transmitted by breastfeeding, 91.3% knew that it cannot be transmitted by kissing the cheeks, 90.2% knew that it cannot be transmitted by common toilet-bath use, 89.6% knew that it cannot be transmitted by handshaking , hugging and skin contact, 89.1% knew that it cannot be transmitted by food and drinks, 89.1% knew that it cannot be transmitted by common clothes or glasses, 87.3% knew it cannot be transmitted by insect bite, 83.9% knew that it cannot transmitted by mosquito bites, 71.2% knew it can be transmitted by the common tooth brush, 49.4% knew that the Hepatitis B it can be transmitted by common injectors, 44.1% knew that can transmitted by sharing the same syringe by two persons, 41.1% knew that it can be transmitted by blood, 33.6% knew it can be transmitted by unsafe sex, 32.2% knew that it can be transmitted by common shaving blade, 23.7% knew it can be transmitted from the mother to baby during birth, 20.5% knew it can be transmitted from mother to baby during pregnancy period, 8% knew it can be transmitted by dental implants.

Thirty eight point seven percent of the participants knew that cirrhosis occurs because of the Hepatitis B disease, 38.3% knew that liver cancer occurs as a result of hepatitis B disease, 27.7% knew that hepatic failure can occur as a result of Hepatitis B, and 6.8% of them knew that Hepatitis B cannot transform into Hepatitis C disease.

Thirty four point seven percent of the participants knew that only one dose of Hepatitis B vaccine is insufficient for prevention against the Hepatitis B disease, 47.4% knew that there is a vaccine for Hepatitis B disease, 19.7% knew there are three doses of Hepatitis B vaccine, 10.7% knew that the Hepatitis B disease infection or vaccination does not prevent against other types of hepatitis disease, 10.5% of them knew there is no need to vaccinate the infected or carrier pregnant, and 43.6% knew that vaccination, preventive against Hepatitis B disease.

Seventy three point six percent of the participants knew that using of antiseptic solution does not prevention against Hepatitis B disease, 73.4% knew that hand washing does not prevent, 67.8% knew that balanced and adequate nutrition does not prevent, 46.5% knew that blood control can prevent against Hepatitis B, and 25.0% knew that the use of condom during sexual contact prevent from Hepatitis B disease. (Table 4.4)

4.3. Relation Between Some Characteristics of Participants and Their Hepatitis B Knowledge

This section shows :

- The relationship between some socio-demographic characteristics and background characteristics of participants and their responses regarding some information about Hepatitis B.

- The relationship between some background and socio-demographic characteristics of participants and their Hepatitis B knowledge score.

- The independent factors associated with HB disease knowledge scores.

This section is divided into three sub-sections, which are showed as the following:

4.3.1. Relation Between Socio-demographic Characteristics of Participants and Their Responses to Hepatitis B Disease knowledge Questions

This section shows the relationship between the socio-demographic characteristics of participants and their responses regarding some information about Hepatitis B, which was shown in section 2 above. The socio-demographic characteristics that were described in this section were: gender, age, marital status, place of residence and working status of the participants.

Correct answers of the first class students according to the gender were presented in Table 4.5.

Table 4.5. Correct answers of the first class students according to the gender (Nyala University, Nyala - Sudan - 2017).

Item	Gender				Binary analysis tables were presented in appendix 6
	Male (%)*%	Female (%)*	X^2	P value	
1	44.5	55.4	12.211	< **0.001**	Appen. 6 Table 1
2	31.1	47.8	29.656	< **0.001**	Appen. 6 Table 2
3	34.1	39.9	3.616	**0.033**	Appen. 6 Table 3
4	22.0	32.2	13.581	< **0.001**	Appen. 6 Table 4
5	80.3	71.9	9.825	**0.001**	Appen. 6 Table 5
6	22.6	24.5	0.552	0.252	Appen. 6 Table 6
7	15.4	22.8	9.002	**0.002**	Appen. 6 Table 7
8	12.2	14.0	0.767	0.217	Appen. 6 Table 8
9	96.7	97.2	0.172	0.408	Appen. 6 Table 9
10	95.1	93.6	1.064	0.185	Appen. 6 Table 10
11	91.3	91.4	0.005	0.515	Appen. 6 Table 11
12	6.7	12.7	10.480	**0.001**	Appen. 6 Table 12
13	92.1	87.3	6.335	**0.008**	Appen. 6 Table 13
14	85.0	92.9	16.536	< **0.001**	Appen. 6 Table 14
15	90.0	88.2	0.890	0.200	Appen. 6 Table 15
16	83.7	90.6	11.008	**0.001**	Appen. 6 Table 16
17	82.1	85.6	2.280	0.077	Appen. 6 Table 17
18	71.1	71.3	0.006	0.498	Appen. 6 Table 18
19	42.5	55.8	18.191	< **0.001**	Appen. 6 Table 19
20	38.0	49.6	14.022	< **0.001**	Appen. 6 Table 20
21	38.6	43.4	2.465	0.066	Appen. 6 Table 21
22	30.7	36.3	3.648	**0.033**	Appen. 6 Table 22
23	28.9	35.2	4.724	**0.017**	Appen. 6 Table 23
24	22.8	24.5	0.443	0.277	Appen. 6 Table 24
25	20.7	20.02	0.400	0.451	Appen. 6 Table 25
26	8.9	7.1	1.162	0.168	Appen. 6 Table 26
27	41.1	36.5	2.225	0.077	Appen. 6 Table 27
28	36.8	39.7	0.919	0.186	Appen. 6 Table 28
29	19.9	34.8	28.448	< **0.001**	Appen. 6 Table 29
30	5.1	8.4	4.509	**0.022**	Appen. 6 Table 30
31	33.5	35.8	0.563	0.247	Appen. 6 Table 31
32	43.7	50.7	5.105	**0.014**	Appen. 6 Table 32
33	16.7	22.5	5.458	**0.012**	Appen. 6 Table 33
34	12.6	9.0	3.492	**0.039**	Appen. 6 Table 34
35	9.6	11.4	0.951	0.191	Appen. 6 Table 35
36	37.0	49.6	16.630	< **0.001**	Appen. 6 Table 36
37	73.6	73.6	0.000	0.525	Appen. 6 Table 37
38	77.0	70.0	6.416	0.007	Appen. 6 Table 38
39	67.5	68.2	0.055	0.433	Appen. 6 Table 39
40	38.6	53.7	23.556	< **0.001**	Appen. 6 Table 40
41	23.8	26.0	0.692	0.224	Appen. 6 Table 41

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by gender, the correct responses to items (41) were as follows:

The percentage of correct female responders (55.4%) was higher than males (44.5%). The difference between the groups was statistically significant ($p < 0.001$). The percentage of correct female responders (47.8%) was higher than males (31.1%). The difference between the groups was statistically significant ($p < 0.001$). The percentage of correct female responders (39.9%) was higher than males (34.1%). The difference between the groups was statistically significant ($p = 0.033$). The percentage of correct female responders (32.2%) was higher than males (22%). The difference between the groups was statistically significant ($p < 0.001$). The percentage of correct male responders (80.3%) was higher than females (71.9%). The difference between the groups was statistically significant ($p = 0.001$). There was no statistically significant difference according to gender ($p = 0.252$). The percentage of correct female responders (22.8%) was higher than males (15.4%). The difference between the groups was statistically significant ($p = 0.002$). There was no statistically significant difference according to gender ($p = 0.217$). There was no statistically significant difference according to gender ($p = 0.408$). There was no statistically significant difference according to gender ($p = 0.185$). There was no statistically significant difference according to gender ($p = 0.515$). The percentage of correct female responders (12.7%) was higher than males (6.7%). The difference between the groups was statistically significant ($p = 0.001$). The percentage of correct male responders (92.1%) was higher than females (87.3%). The difference between the groups was statistically significant ($p = 0.008$). The percentage of correct female responders (92.9%) was higher than males (85%). The difference between the groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to gender ($p = 0.200$). The percentage of correct female responders (90.6%) was higher than males (83.7%). The difference between the groups was statistically significant ($p = 0.001$). There was no statistically significant difference according to gender ($p = 0.077$). There was no statistically significant difference according to gender ($p = 0.498$). The percentage of correct female responders (55.8%) was higher than males (42.5%). The difference

between the groups was statistically significant ($p < 0.001$). The percentage of correct female responders (49.6%) was higher than males (38%). The difference between the groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to gender ($p = 0.066$). The percentage of correct female responders (36.3%) was higher than males (30.7%). The difference between the groups was statistically significant ($p < 0.033$). The percentage of correct female responders (35.2%) was higher than males (28.9%). The difference between the groups was statistically significant ($p = 0.017$). There was no statistically significant difference according to gender ($p = 0.277$). There was no statistically significant difference according to gender ($p = 0.451$). There was no statistically significant difference according to gender ($p = 0.168$). There was no statistically significant difference according to gender ($p = 0.077$). There was no statistically significant difference according to gender ($p = 0.186$). The percentage of correct female responders (34.8%) was higher than males (19.9%). The difference between the groups was statistically significant ($p < 0.001$). The percentage of correct female responders (8.4%) was higher than males (5.1%). The difference between the groups was statistically significant ($p = 0.022$). There was no statistically significant difference according to gender ($p = 0.247$). The percentage of correct female responders (50.7%) was higher than males (43.7%). The difference between the groups was statistically significant ($p = 0.014$). the percentage of correct female responders (22.5%) was higher than males (16.7%). The difference between the groups was statistically significant ($p = 0.012$). the percentage of correct male responders (12.6%) was higher than females (9%). The difference between the groups was statistically significant ($p = 0.039$). There was no statistically significant difference according to gender ($p = 0.191$). the percentage of correct female responders (49.6%) was higher than males (37%). The difference between the groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to gender ($p = 0.525$). The percentage of correct male responders (77%) was higher than females (70 %). The difference between the groups was statistically significant ($p = 0.007$). There was no statistically significant difference according to gender ($p = 0.433$). The percentage of correct female responders (53.7%) was higher than males (38.6%). The difference between the

groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to gender ($p = 0.224$) (**Table 4.5**).

Correct answers of the first class students according to the age groups were presented in Table 4.6.

Table 4.6. Correct answers of the first class students according to the age groups (Nyala University, Nyala - Sudan - 2017).

Item	Age groups						Binary analysis tables were presented in appendix 6
	Under 20 (%)*	20 – 24 (%)*	25 - 29 (%)*	30 and over (%)*	X^2	P value	
1	43.9	52.7	63.4	23.1	17.484	**0.001**	Appen. 6 Table 1
2	36.0	45.7	22.6	7.7`	27.477	**<0.001**	Appen. 6 Table 2
3	38.5	37.0	35.5	15.4	3.053	0.384	Appen. 6 Table 3
4	40.2	19.2	30.1	-	53.889	**<0.001**	Appen. 6 Table 4
5	20.1	28.3	10.8	46.2	21.041	**<0.001**	Appen. 6 Table 5
6	19.6	26.2	24.7	15.4	5.844	0.119	Appen. 6 Table 6
7	12.8	24.7	14.0	-	25.018	**<0.001**	Appen. 6 Table 7
8	11.7	10.3	31.2	46.2	43.427	**<0.001**	Appen. 6 Table 8
9	97.5	97.9	89.2	100.0	21.197	**<0.001**	Appen. 6 Table 9
10	93.0	95.9	90.3	92.3	6.679	0.083	Appen. 6 Table 10
11	90.2	90.4	100.0	100.0	11.136	**0.011**	Appen. 6 Table 11
12	91.6	89.7	91.4	61.5	13.166	**0.004**	Appen. 6 Table 12
13	90.2	88.1	94.6	100.0	5.559	0.135	Appen. 6 Table 13
14	88.8	87.7	97.8	92.3	8.583	**0.035**	Appen. 6 Table 14
15	87.4	89.3	92.5	100	3.732	0.292	Appen. 6 Table 15
16	91.1	83.3	95.7	100.0	20.633	**< 0.001**	Appen. 6 Table 16
17	83.0	82.7	92.5	100.0	8.356	**0.039**	Appen. 6 Table 17
18	69.8	68.3	91.4	92.3	23.937	**<0.001**	Appen. 6 Table 18
19	46.9	54.4	33.3	15.4	22.227	**<0.001**	Appen. 6 Table 19
20	43.6	48.2	24.7	15.4	22.416	**<0.001**	Appen. 6 Table 20
21	38.3	47.3	19.4	7.7	34.35	**<0.001**	Appen. 6 Table 21
22	31.0	38.1	20.4	7.7	17.266	**0.001**	Appen. 6 Table 22
23	30.4	38.1	5.4	15.4	41.75	**< 0.001**	Appen. 6 Table 23
24	28.5	24.6	7.7	2.2	41.75	**< 0.001**	Appen. 6 Table 24
25	22.6	22.4	2.2	7.7	22.812	**< 0.001**	Appen. 6 Table 25
26	8.4	8.4	4.3	7.7	1.903	0.593	Appen. 6 Table 26
27	27.3	47.3	24.7	23.1	39.887	**<0.001**	Appen. 6 Table 27
28	37.4	39.9	36.6	7.7	5.964	0.113	Appen. 6 Table 28
29	25.1	30.8	17.2	38.5	9.710	**0.021**	Appen. 6 Table 29
30	8.1	6.9	-	15.4	9.241	**0.026**	Appen. 6 Table 30
31	36.6	34.5	31.2	15.04	3.222	0.359	Appen. 6 Table 31
32	45.0	47.0	60.2	38.5	7.430	0.059	Appen. 6 Table 32
33	17.9	21.0	19.4	15.4	1.510	0.680	Appen. 6 Table 33
34	14.5	9.4	5.4	-	10.727	**0.013**	Appen. 6 Table 34
35	7.3	13.2	2.2	46.2	32.658	**<0.001**	Appen. 6 Table 35
36	45.5	42.3	46.2	23.1	3.390	0.335	Appen. 6 Table 36
37	81.8	67.3	78.5	84.6	26.098	**<0.001**	Appen. 6 Table 37
38	73.7	70.3	87.1	100.0	16.459	**0.001**	Appen. 6 Table 38
39	76.0	59.1	84.9	100.0	49.290	**< 0.001**	Appen. 6 Table 39
40	49.7	50.9	11.8	15.4	55.847	**< 0.001**	Appen. 6 Table 40
41	22.9	30.6	2.2	-	40.535	**<0.001**	Appen. 6 Table 41

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by age groups, the correct responses to items (41) were as follows:

The percentage of correct responders in the "25 - 29" group (63.4%) was higher than other groups. The difference between the groups was statistically significant (p =0.001), and all the groups were different from each other. The percentage of correct responders in the "25 - 29" group (63.4%) was higher than other groups. The difference between the groups was statistically significant (p =0.001), and all the groups were different from each other. The percentage of correct responders in the "20 - 24" group (45.7%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other.). There was no statistically significant difference according to age groups ($p = 0.384$). The percentage of correct responders in the "Under 20" group (40.2%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other. The percentage of correct responders in the "30 and over" group (46.2%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and “20 - 24” and “30 and over” years group were the groups that created difference. There was no statistically significant difference according to age groups ($p = 0.119$). The percentage of correct responders in the "20 - 24" group (24.7%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the “20 - 24” years group a difference was created. The percentage of correct responders in the "30 and over" group (46.2%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and “25 - 29” and “30 and over” years group were the groups that created difference. The percentage of correct responders in the "30 and over" group (100%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) but in the “25 - 29” years group a difference was created. There was no statistically significant difference according to age group ($p =0.083$). The percentage of correct responders in the "30 and over" and "25 - 29" years group (100%) was higher than other groups. The difference between

the groups was statistically significant (p =0.011), but in the “25 - 29” years group a difference was created. The percentage of correct responders in the "Under 20" years group (91.6%) was higher than other groups. The difference between the groups was statistically significant (p =0.004), but in the “30 and over” group a difference was created. There was no statistically significant difference according to age groups (p = 0.135). The percentage of correct responders in the "25 - 29" years group (97.8%) was higher than other groups. The difference between the groups was statistically significant (p =0.035), but in the “25 - 29” years group a difference was created. There was no statistically significant difference according to age groups (p = 0.292). The percentage of correct responders in the "30 and over” group (100%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the“20 - 24” year’s group a difference was created. The percentage of correct responders in the "30 and over" group (100%) was higher than other groups. The difference between the groups was statistically significant (p =0.039), but in the “25 – 29” years group a difference was created. The percentage of correct responders in the "30 and over" group (92.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “25 - 29” years group a difference was created. The percentage of correct responders in the "20 - 24" group (54.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and all the groups were different from each other. The percentage of correct responders in the "20 - 24" group (48.2%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), “25 - 29” years and “30 and over” years groups were created the difference. The percentage of correct responders in the "20 - 24" group (47.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "20 - 24" group (38.1%) was higher than other groups. The difference between the groups was statistically significant (p =0.001) and all the groups were different from each other. The percentage of correct responders in the "20 - 24" group (38.1%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and “Under 20” and “25 - 29” year’s groups were created difference. The percentage of correct

responders in the "Under 20" years group (28.5%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the “25 - 29” years group a difference was created. The percentage of correct responders in the "Under 20" group (22.6%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the “25 - 29” year’s group a difference was created. There was no statistically significant difference according to age groups ($p = 0.593$). The percentage of correct responders in the "20 - 24" group (47.3%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the“20 - 24” years group a difference was created. There was no statistically significant difference according to age groups ($p = 0.113$). The percentage of correct responders in the "20 - 24" group (30.8%) was higher than other groups. The difference between the groups was statistically significant ($p =0.021$), but in the “25 - 29” years group a difference was created. The percentage of correct responders in the "30 and over" group (15.4%) was higher than other groups. The difference between the groups was statistically significant ($p =0.026$), but in the “25 - 29” years group a difference was created. There was no statistically significant difference according to age groups ($p = 0.359$). There was no statistically significant difference according to age groups ($p = 0.059$). There was no statistically significant difference according to age groups ($p = 0.680$). The percentage of correct responders in the "Under 20" years group (14.5%) was higher than other groups. The difference between the groups was statistically significant ($p =0.013$), but in the “Under 20” years group a difference was created. The percentage of correct responders in the "30 and over" group (46.2%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other. There was no statistically significant difference according to age groups ($p = 0.335$). The percentage of correct responders in the "30 and over" group (84.6%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and “Under 20” and “25 - 29” years group were the groups that created difference. the percentage of correct responders in the "30 and over" group (100%) was higher than other groups. The difference between the groups was statistically significant ($p =0.001$) and “25 - 29” and “30 and over” years group were the groups that created difference.

The percentage of correct responders in the "30 and over" group (100%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and “20 - 24” and “30 and over” years group were the groups that created difference. The percentage of correct responders in the "20 - 24" years group (50.9%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and “25 - 29” and “30 and over” years group were the groups that created difference. The percentage of correct responders in the "20 - 24" group (30.6%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other (Table 4.6).

Correct answers of the first class students according to the marital status were presented in Table 4.7.

Table 4.7. Correct answers of the first class students according to the marital status (Nyala University, Nyala - Sudan - 2017**).**

Item	Marital Status				Binary analysis tables were presented in appendix 6
	Single (%)*	Married (%)*	X^2	P value	
1	51.2	36.6	5.623	**0.012**	Appen. 6 Table 1
2	39.6	42.3	0.197	0.373	Appen. 6 Table 2
3	38.3	21.1	8.373	**0.002**	Appen. 6 Table 3
4	28.5	11.3	9.869	**0.001**	Appen. 6 Table 4
5	23.4	33.8	3.950	**0.036**	Appen. 6 Table 5
6	24.4	12.7	5.038	**0.014**	Appen. 6 Table 6
7	19.7	14.1	1.331	0.159	Appen. 6 Table 7
8	12.3	25.4	9.926	**0.003**	Appen. 6 Table 8
9	97.3	93.0	4.209	0.054	Appen. 6 Table 9
10	94.7	90.1	2.530	0.098	Appen. 6 Table 10
11	90.7	100.0	7.245	**0.001**	Appen. 6 Table 11
12	90.7	83.1	4.281	**0.038**	Appen. 6 Table 12
13	88.8	100.0	8.881	< **0.001**	Appen. 6 Table 13
14	89.0	90.1	0.088	0.479	Appen. 6 Table 14
15	89.0	90.1	0.088	0.479	Appen. 6 Table 15
16	86.4	100.0	11.067	< **0.001**	Appen. 6 Table 16
17	82.7	100.0	14.618	< **0.001**	Appen. 6 Table 17
18	70.9	76.1	0.861	0.216	Appen. 6 Table 18
19	49.2	52.1	0.222	0.364	Appen. 6 Table 19
20	45.3	26.8	9.256	**0.001**	Appen. 6 Table 20
21	40.7	46.5	0.901	0.204	Appen. 6 Table 21
22	33.5	35.2	0.086	0.431	Appen. 6 Table 22
23	32.1	31.0	0.048	0.470	Appen. 6 Table 23
24	23.6	25.4	0.117	0.413	Appen. 6 Table 24
25	20.0	26.8	1.856	0.115	Appen. 6 Table 25
26	7.6	12.7	2.276	0.104	Appen. 6 Table 26
27	39.5	28.2	3.562	**0.037**	Appen. 6 Table 27
28	38.4	36.6	0.092	0.433	Appen. 6 Table 28
29	25.7	54.9	28.293	< **0.001**	Appen. 6 Table 29
30	6.7	8.5	0.318	0.354	Appen. 6 Table 30
31	34.0	43.7	2.705	0.066	Appen. 6 Table 31
32	54.8	69.0	14.335	< **0.001**	Appen. 6 Table 32
33	19.6	21.1	0.100	0.426	Appen. 6 Table 33
34	11.3	2.8	4.979	**0.012**	Appen. 6 Table 34
35	10.4	12.7	0.374	0.327	Appen. 6 Table 35
36	42.6	56.3	5.060	**0.017**	Appen. 6 Table 36
37	73.6	73.2	0.005	0.521	Appen. 6 Table 37
38	72.0	91.5	12.878	< **0.001**	Appen. 6 Table 38
39	66.7	83.1	8.144	**0.002**	Appen. 6 Table 39
40	46.5	46.5	-	0.543	Appen. 6 Table 40
41	24.6	29.6	0.872	0.212	Appen. 6 Table 41

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by marital status, the correct responses to items (41) were as follows:

The percentage of correct single responders (51.2%) was higher than married responders (36.6%). The difference between the groups was statistically significant (p =0.012). There was no statistically significant difference according to marital status (p = 0.373). The percentage of correct single responders (38.3%) was higher than married responders (21.1%). The difference between the groups was statistically significant (p = 0.002). The percentage of correct single responders (28.5%) was higher than married responders (11.3 %). The difference between the groups was statistically significant (p =0.001). The percentage of correct married responders (33.8%) was higher than single reponders (23.4%). The difference between the groups was statistically significant (p =0.036). The percentage of correct single responders (24.4%) was higher than married reponders (12.7%). The difference between the groups was statistically significant (p =0.014). There was no statistically significant difference according to marital status (p = 0.159). The percentage of correct married responders (25.4%) was higher than single responders (12.3%). The difference between the groups was statistically significant (p =0.003). There was no statistically significant difference according to marital status (p =0.054). There was no statistically significant difference according to marital status (p =0.098). The percentage of correct married responders (100 %) was higher than single responders (90.7%). The difference between the groups was statistically significant (p =0.001). The percentage of correct single responders (90.7%) was higher than married responders (83.1%). The difference between the groups was statistically significant (p =0.038). The percentage of correct married responders (100 %) was higher than single responders (88.8 %). The difference between the groups was statistically significant (p < 0.001). There was no statistically significant difference according to marital status (p = 0.479). There was no statistically significant difference according to marital status (p = 0.479). The percentage of correct married responders (100%) was higher than single responders (86.4%).The difference between the groups was statistically significant (p < 0.001). The percentage of correct married responders (100%) was higher than single responders (82.7%). The difference between the

groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to marital status ($p = 0.216$). There was no statistically significant difference according to marital status ($p = 0.364$). The percentage of correct single responders (45.3%) was higher than married responders (26.8%). The difference between the groups was statistically significant ($p =0.001$). There was no statistically significant difference according to marital status ($p = 0.204$). There was no statistically significant difference according to marital status ($p = 0.431$). There was no statistically significant difference according to marital status ($p = 0.470$). There was no statistically significant difference according to marital status ($p = 0.413$). There was no statistically significant difference according to marital status ($p = 0.115$). There was no statistically significant difference according to marital status ($p = 0.104$). The percentage of correct single responders (39.5%) was higher than married responders (28.2%). The difference between the groups was statistically significant ($p =0.037$). There was no statistically significant difference according to marital status ($p = 0.433$). The percentage of correct married responders (54.9%) was higher than single responders (25.7%). The difference between the groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to marital status ($p = 0.354$). There was no statistically significant difference according to 'Marital status' ($p = 0.066$). The percentage of correct married responders (69%) was higher than single responders (54.8%). The difference between the groups was statistically significant ($p < 0.001$). There was no statistically significant difference according to marital status ($p = 0.426$). The percentage of correct single responders (11.3%) was higher than married reponders (2.8%). The difference between the groups was statistically significant ($p =0.012$). There was no statistically significant difference according to marital status ($p = 0.327$). The percentage of correct married responders (56.3%) was higher than single reponders (42.6%). The difference between the groups was statistically significant ($p = 0.017$). There was no statistically significant difference according to marital status ($p = 0.521$). The percentage of correct married responders (91.5%) was higher than single responders (72%). The difference between the groups was statistically significant ($p<0.001$). The percentage of correct married responders (83.1%) was higher than single reponders (66.7%). The difference between the groups was

statistically significant (p =0.002). There was no statistically significant difference according to marital status (p = 0.543). There was no statistically significant difference according to marital status (p = 0.212) (**Table 4.7**).

Correct answers of the first class students according to the place of residence were presented in Table 4.8.

Table 4.8. Correct answers of the first class students according to the place of residence (Nyala University, Nyala - Sudan - 2017).

Item	Place of residence					Binary analysis tables were presented in appendix 6
	City (%)*	Town (%)*	Village (%)*	X^2	P value	
1	50.6	38.5	52.7	4.063	0.131	Appen. 6 Table 1
2	40.7	21.5	42.4	9.795	**0.007**	Appen. 6 Table 2
3	41.1	18.5	25.5	24.660	**<0.001**	Appen. 6 Table 3
4	27.3	13.8	32.7	8.379	**0.015**	Appen. 6 Table 4
5	24.4	4.6	30.3	17.006	**<0.001**	Appen. 6 Table 5
6	23.4	6.2	31.5	16.736	**<0.001**	Appen. 6 Table 6
7	19.1	12.3	23.0	3.536	0.171	Appen. 6 Table 7
8	10.9	26.2	18.8	14.643	**<0.001**	Appen. 6 Table 8
9	97.6	92.3	95.8	6.773	**0.034**	Appen. 6 Table 9
10	95.6	90.8	89.7	10.604	**0.004**	Appen. 6 Table 10
11	90.6	100.0	91.5	6.743	**0.034**	Appen. 6 Table 11
12	89.8	90.8	91.5	0.470	0.791	Appen. 6 Table 12
13	89.3	90.8	90.3	0.248	0.884	Appen. 6 Table 13
14	89.4	93.8	85.5	3.859	0.145	Appen. 6 Table 14
15	88.8	95.4	87.9	2.957	0.228	Appen. 6 Table 15
16	87.2	84.6	89.1	0.910	0.634	Appen. 6 Table 16
17	86.2	73.8	77.0	13.809	**0.001**	Appen. 6 Table 17
18	72.1	56.9	72.7	6.976	**0.031**	Appen. 6 Table 18
19	50.1	75.4	35.8	30.011	**<0.001**	Appen. 6 Table 19
20	48.5	15.4	33.9	34.888	**<0.001**	Appen. 6 Table 20
21	44.5	18.5	33.9	20.990	**<0.001**	Appen. 6 Table 21
22	35.2	33.8	26.1	5.089	0.078	Appen. 6 Table 22
23	34.3	33.8	21.2	10.814	**0.004**	Appen. 6 Table 23
24	27.1	6.2	13.9	24.967	**<0.001**	Appen. 6 Table 24
25	23.4	6.2	12.1	19.352	**<0.001**	Appen. 6 Table 25
26	8.4	4.6	7.3	1.320	0.517	Appen. 6 Table 26
27	42.8	7.7	30.9	36.316	**<0.001**	Appen. 6 Table 27
28	37.6	29.2	45.5	6.019	**0.049**	Appen. 6 Table 28
29	28.3	13.8	30.3	6.918	**0.031**	Appen. 6 Table 29
30	6.7	18.5	3.0	17.617	**<0.001**	Appen. 6 Table 30
31	34.7	20.0	40.6	8.739	**0.013**	Appen. 6 Table 31
32	47.9	35.4	49.7	4.182	0.124	Appen. 6 Table 32
33	17.0	18.5	33.3	23.239	**<0.001**	Appen. 6 Table 33
34	11.2	15.4	6.7	4.486	0.106	Appen. 6 Table 34
35	11.8	3.1	7.3	7.075	**0.029**	Appen. 6 Table 35
36	45.5	38.5	36.4	5.353	0.069	Appen. 6 Table 36
37	75.5	66.2	67.3	6.735	0.340	Appen. 6 Table 37
38	74.0	67.7	72.7	1.267	0.531	Appen. 6 Table 38
39	68.7	66.2	64.2	1.345	0.510	Appen. 6 Table 39
40	49.5	30.8	38.2	13.930	**0.001**	Appen. 6 Table 40
41	24.9	12.3	30.3	8.075	**0.018**	Appen. 6 Table 41

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by place of residence, the correct responses to items (41) were as follows:

There was no statistically significant difference according to place of residence (p = 0.131). The percentage of correct responders in the "Village" group (42.4%) was higher than other groups. The difference between the groups was statistically significant (p = 0.007), but in the “Town” group a difference was created. The percentage of correct responders in the "City" group (41.1%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "Village" group (32.7%) was higher than other groups. The difference between the groups was statistically significant (p =0.015), but in the “Town” a difference was created. The percentage of correct responders in the "Village" group (30.3%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), but in the “City” group a difference was created. The percentage of correct responders in the "Village" group (31.5%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. There was no statistically significant difference according to place of residence (p = 0.171). The percentage of correct responders in the "Town" group (26.2%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "City" group (97.6 %) was higher than other groups. The difference between the groups was statistically significant (p = 0.034), but in the “Town” group a difference was created. the percentage of correct responders in the "City" group (95.6%) was higher than other groups, The difference between the groups was statistically significant (p =0.004), but in the “Village” group a difference was created. The percentage of correct responders in the "Town" group (100 %) was higher than other groups, The difference between the groups was statistically significant (p = 0.034), but in the “City” years group a difference was created. There was no statistically significant difference according to place of residence (p =

0.791). There was no statistically significant difference according to place of residence (p = 0.884). There was no statistically significant difference according to place of residence (p = 0.145). There was no statistically significant difference according to place of residence (p = 0.228). There was no statistically significant difference according to place of residence (p = 0.634). The percentage of correct responders in the "City" group (86.2%) was higher than other groups. The difference between the groups was statistically significant (p = 0.001), and all the groups were different from each other. The percentage of correct responders in the "village" group (72.7%) was higher than other groups, The difference between the groups was statistically significant (p = 0.031), but in the “Town” group a difference was created. The percentage of correct responders in the "Town" group (75.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "City" group (48.5%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "City" group (44.5%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. There was no statistically significant difference according to place of residence (p < 0.078). The percentage of Correct responders in the "City" group (34.3%) was higher than other groups. The difference between the groups was statistically significant (p = 0.004), but in the “Village” group a difference was created. The percentage of correct responders in the "City" group (27.1%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "City" group (23.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and all the groups were different from each other. There was no statistically significant difference according to place of residence (p = 0.517). The percentage of correct responders in the "City" group (42.8%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), and all the groups were different from each other. The percentage of correct responders in the "Village" group (45.5%) was higher than

other groups. The difference between the groups was statistically significant (p = 0.049), but in the“Village” group a difference was created. The percentage of correct responders in the "Village" group (30.3%) was higher than other groups The difference between the groups was statistically significant (p = 0.031), but in the “Town” group a difference was created. The percentage of correct responders in the "Town" group (18.5%) was higher than other groups, The difference between the groups was statistically significant (p < 0.001), but in the “Town” years group a difference was created. The percentage of correct responders in the "Village" group (40.6%) was higher than other groups. The difference between the groups was statistically significant (p =0.013), but in the “Town” group a difference was created. There was no statistically significant difference according to place of residence (p = 0.124). The percentage of correct responders in the "Village" group (33.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Village” group a difference was created. There was no statistically significant difference according to place of residence (p = 0.106). The percentage of correct responders in the "City" group (11.8%) was higher than other groups. The difference between the groups was statistically significant (p = 0.029), but in the“Town” group a difference was created. There was no statistically significant difference according to place of residence (p = 0.069). The percentage of correct responders in the "City" group (75.5%) was higher than other groups. The difference between the groups was statistically significant (p = 0.034), but in the“Village” group a difference was created. There was no statistically significant difference according to place of residence (p = 0.531). There was no statistically significant difference according to place of residence (p = 0.510). The percentage of correct responders in the "City" group (49.5%) was higher than other groups, The difference between the groups was statistically significant (p = 0.001) and all the groups weredifferent from each other. The percentage of correct responders in the "Village" group (30.3%) was higher than other groups. The difference between the groups was statistically significant (p = 0.018), but in the “Town” group a difference was created (Table 4.8).

Correct answers of the first class students according to the working status were presented in Table 4.9.

Table 4.9. Correct answers of the first class students according to the working status (Nyala University, Nyala - Sudan - 2017).

Item	Working Status				Binary analysis tables were presented in appendix 6
	working (%)*	Not working (%)*	X^2	P value	
1	38.0	51.4	5.969	**0.010**	Appen. 6 Table 1
2	41.3	39.6	0.100	0.417	Appen. 6 Table 2
3	29.3	37.9	2.625	0.064	Appen. 6 Table 3
4	15.2	28.5	7.424	**0.003**	Appen. 6 Table 4
5	18.5	24.6	1.731	0.116	Appen. 6 Table 5
6	30.4	22.9	2.630	0.070	Appen. 6 Table 6
7	32.6	18.0	11.497	**0.001**	Appen. 6 Table 7
8	18.5	12.6	2.504	0.082	Appen. 6 Table 8
9	95.7	97.1	0.607	0.300	Appen. 6 Table 9
10	97.8	94.0	2.294	0.091	Appen. 6 Table 10
11	88.0	91.6	1.374	0.163	Appen. 6 Table 11
12	93.5	89.8	1.257	0.175	Appen. 6 Table 12
13	91.3	89.4	0.325	0.361	Appen. 6 Table 13
14	67.4	91.2	48.903	< **0.001**	Appen. 6 Table 14
15	94.6	88.5	3.122	**0.048**	Appen. 6 Table 15
16	95.7	86.5	6.327	**0.005**	Appen. 6 Table 16
17	90.2	83.3	2.971	0.052	Appen. 6 Table 17
18	57.6	72.6	9.177	**0.002**	Appen. 6 Table 18
19	23.9	51.9	26.294	< **0.001**	Appen. 6 Table 19
20	26.1	45.8	13.238	< **0.001**	Appen. 6 Table 20
21	37.0	41.5	0.727	0.230	Appen. 6 Table 21
22	26.1	34.4	2.573	0.066	Appen. 6 Table 22
23	18.5	33.5	8.675	**0.002**	Appen. 6 Table 23
24	29.3	23.1	1.794	0.114	Appen. 6 Table 24
25	10.9	21.4	5.720	0.009	Appen. 6 Table 25
26	13.0	7.5	3.507	0.054	Appen. 6 Table 26
27	32.6	39.3	1.578	0.126	Appen. 6 Table 27
28	42.4	37.9	0.517	0.231	Appen. 6 Table 28
29	23.9	28.1	0.716	0.237	Appen. 6 Table 29
30	6.5	6.9	0.014	0.559	Appen. 6 Table 30
31	35.9	34.6	0.061	0.444	Appen. 6 Table 31
32	57.6	46.4	4.251	**0.025**	Appen. 6 Table 32
33	10.9	20.6	4.970	**0.014**	Appen. 6 Table 33
34	23.9	9.4	18.374	< **0.001**	Appen. 6 Table 34
35	5.4	11.0	2.782	0.060	Appen. 6 Table 35
36	45.7	43.4	0.673	0.376	Appen. 6 Table 36
37	48.9	76.0	31.654	< **0.001**	Appen. 6 Table 37
38	70.7	73.7	0.388	0.305	Appen. 6 Table 38
39	62.0	68.4	1.601	0.126	Appen. 6 Table 39
40	40.2	47.1	1.599	0.124	Appen. 6 Table 40
41	28.3	24.6	0.591	0.257	Appen. 6 Table 41

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by working status, the correct responses to items (41) were as follows:

The percentage of correct not working responders (51.4%) was higher than working responders (38%). The difference between the groups was statistically significant (p = 0.010). There was no statistically significant difference according to working status (p = 0.417). There was no statistically significant difference according to working status (p = 0.064). The percentage of correct not working responders (28.5%) was higher than working responders (15.2%). The difference between the groups was statistically significant (p = 0.003). There was no statistically significant difference according to working status (p = 0.116). There was no statistically significant difference according to working (p = 0.07). The percentage of correct working responders (32.6%) was higher than not working responders (18%). The difference between the groups was statistically significant (p = 0.001). There was no statistically significant difference according to working status (p = 0.082). There was no statistically significant difference according to working status (p = 0.3). There was no statistically significant difference according to working status (p = 0.091). There was no statistically significant difference according to working status (p = 0.163). There was no statistically significant difference according to working status (p = 0.175). There was no statistically significant difference according to working status (p = 0.361). The percentage of correct not working responders (91.2%) was higher than working responders (67.4%). The difference between the groups was statistically significant (p < 0.001). The percentage of correct working responders (94.6%) was higher than not working responders (88.5%). The difference between the groups was statistically significant (p = 048). The percentage of correct working responders (95.7%) was higher than not working responders (86.5%). The difference between the groups was statistically significant (p = 0.005). There was no statistically significant difference according to working status (p = 0.052). The percentage of correct not working responders (72.6%) was higher than working responders (57.6%). The difference between the groups was statistically significant (p = 0.002). The percentage of correct not working responders (51.9%) was higher than working responders (23.9%). The difference between the groups was statistically significant (p < 0.001). The percentage of correct not working responders (45.8%) was higher than working responders (26.1%). The difference between the groups was statistically significant (p < 0.001). There was no statistically significant

difference according to working status (p = 0.230). There was no statistically significant difference according to working status (p = 0.066). The percentage of correct not working responders (33.5%) was higher than working responders (18.5%). The difference between the groups was statistically significant (p = 0.002). There was no statistically significant difference according to working status (p = 0.114). The percentage of correct not working responders (21.4%) was higher than working responders (10.9%). The difference between the groups was statistically significant (p = 0.009). There was no statistically significant difference according to working status (p = 0.054). There was no statistically significant difference according to working (p = 0.126). There was no statistically significant difference according to working status (p = 0.231). There was no statistically significant difference according to working status (p = 0.237). There was no statistically significant difference according to working status (p = 0.559). There was no statistically significant difference according to working status (p = 0.444). The percentage of correct working responders (57.6%) was higher than not working responders (46.4%). The difference between the groups was statistically significant (p = 0.025). The percentage of correct Not working responders (20.6%) was higher than working responders (10.9%). The difference between the groups was statistically significant (p = 0.014). The percentage of correct working responders (23.9%) was higher than not working responders (9.4 %). The difference between the groups was statistically significant (p < 0.001). There was no statistically significant difference according to working status (p = 0.06). There was no statistically significant difference according to working status (p = 0.376). The percentage of correct not working responders (76.0%) was higher than working responders (48.9%). The difference between the groups was statistically significant (p < 0.001). There was no statistically significant difference according to working status (p = 0.305). There was no statistically significant difference according to working status (p = 0.126). There was no statistically significant difference according to working status (p = 0.124). There was no statistically significant difference according to working status (p = 0.257) (Table 4.9).

4.3.2. Relation Between Some Perceptions of the Participants According to Some Background Characteristics and Their Responses to Hepatitis B Disease knowledge Questions

This section shows the relationship between some background characteristics of participants and their responses regarding some information about Hepatitis B which was shown in section 2 above. The background characteristics that were described in this section are: academic success, health , income of the participants and their family's income.

Correct answers of the first class students according to their academic success status were presented in Table 4.10.

Table 4.10. Correct answers of the first class students according to the academic success status (Nyala University, Nyala - Sudan - 2017).

Item	Academic success					Binary analysis tables were presented in appendix 6
	Bad (%)*	Average (%)*	Good (%)*	X^2	P value	
1	27.8	52.0	49.9	7.947	**0.019**	Appen. 6 Table 42
2	25.0	44.5	35.7	11.452	0.311	Appen. 6 Table 43
3	11.1	38.5	37.6	10.920	**0.004**	Appen. 6 Table 44
4	38.9	23.9	30.1	7.400	**0.025**	Appen. 6 Table 45
5	13.9	28.7	19.7	12.972	0.222	Appen. 6 Table 46
6	-	27.2	21.4	16.005	0.145	Appen. 6 Table 47
7	38.9	21.8	15.1	16.308	0.100	Appen. 6 Table 48
8	27.8	10.6	14.9	10.909	0.94	Appen. 6 Table 49
9	100.0	98.3	95.3	8.430	0.115	Appen. 6 Table 50
10	100.0	93.4	94.9	3.216	0.200	Appen. 6 Table 51
11	100.0	92.9	89.0	8.312	0.116	Appen. 6 Table 52
12	100.0	90.9	88.5	5.688	0.558	Appen. 6 Table 53
13	86.1	89.4	90.0	0.579	0.794	Appen. 6 Table 54
14	100.0	88.4	89.0	4.641	0.980	Appen. 6 Table 55
15	86.1	88.4	90.0	0.674	0.614	Appen. 6 Table 56
16	100.0	85.0	89.0	8.963	**0.011**	Appen. 6 Table 57
17	75.0	85.2	83.2	2.885	0.236	Appen. 6 Table 58
18	86.1	74.2	66.9	10.451	**0.005**	Appen. 6 Table 59
19	36.1	43.2	57.3	22.462	**<0.001**	Appen. 6 Table 60
20	28.7	48.7	40.1	11.455	**0.003**	Appen. 6 Table 61
21	13.9	43.0	41.2	11.757	**0.003**	Appen. 6 Table 62
22	44.4	29.9	36.9	7.498	**0.024**	Appen. 6 Table 63
23	27.8	34.7	29.7	3.111	0.211	Appen. 6 Table 64
24	13.9	29.3	18.3	18.595	**<0.001**	Appen. 6 Table 65
25	13.9	27.2	13.6	28.963	**<0.001**	Appen. 6 Table 66
26	-	7.7	8.9	3.733	0.155	Appen. 6 Table 67
27	13.9	44.5	34.2	20.778	0.100	Appen. 6 Table 68
28	13.9	43.4	34.6	17.402	**<0.001**	Appen. 6 Table 69
29	25.0	27.2	28.5	0.338	0.845	Appen. 6 Table 70
30	13.9	5.2	8.1	6.120	0.466	Appen. 6 Table 71
31	13.9	38.7	31.8	12.200	0.222	Appen. 6 Table 72
32	25.0	46.2	50.3	9.133	**0.010**	Appen. 6 Table 73
33	30.6	18.3	20.4	3.461	0.177	Appen. 6 Table 74
34	13.9	14.1	6.8	14.031	0.111	Appen. 6 Table 75
35	-	16.2	5.1	36.630	**<0.001**	Appen. 6 Table 76
36	13.9	44.5	44.8	13.374	0.114	Appen. 6 Table 77
37	58.3	74.6	73.7	4.567	0.102	Appen. 6 Table 78
38	86.1	72.4	73.5	3.221	0.200	Appen. 6 Table 79
39	72.2	62.2	73.7	15.134	0.111	Appen. 6 Table 80
40	30.6	47.2	46.9	3.817	0.143	Appen. 6 Table 81
41	13.9	27.4	23.1	4.784	0.191	Appen. 6 Table 82

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by academic success status, the correct responses to items (41) were as follows:

The percentage of correct responders in the "Average" group (52%) was higher than other groups. The difference between the groups was statistically significant (p =0.019), but in the “Bad” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.311). The percentage of correct responders in the "Average" group (38.5%) was higher than other groups. The difference between the groups was statistically significant (p = 0.004), but in the “Bad” group a difference was created. The percentage of correct responders in the "Bad" group (38.9%) was higher than other groups. The difference between the groups was statistically significant (p =0.025), but in the “Average” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.222). There was no statistically significant difference found between the academic success status (p = 0.145). There was no statistically significant difference found between the academic success status (p = 0.100). There was no statistically significant difference found between the academic success status (p = 0.94). There was no statistically significant difference found between the academic success status (p = 0.115). There was no statistically significant difference found between the academic success status (p = 0.200). There was no statistically significant difference found between the academic success status (p = 0.116). There was no statistically significant difference found between the academic success status (p = 0.558). There was no statistically significant difference found between the academic success status (p = 0.794). There was no statistically significant difference found between the academic success status (p = 0.980). There was no statistically significant difference found between the academic success status (p = 0.614). The percentage of correct responders in the "Bad" group (100.0%) was higher than other groups. The difference between the groups was statistically significant (p = 0.011), but in the “Bad” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.236). The percentage of correct responders in the "Bad" group (86.1%) was higher than other groups. The difference between the

groups was statistically significant (p =0.005), but in the “Good” group a difference was created. The percentage of correct responders in the "Good" group (57.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Good” group a difference was created. The percentage of correct responders in the "Average" group (48.7%) was higher than other groups. The difference between the groups was statistically significant (p =0.003), but in the “Average” group a difference was created. The percentage of correct responders in the "Average" group (43%) was higher than other groups. The difference between the groups was statistically significant (p =0.003), but in the “Bad” group a difference was created. The percentage of correct responders in the "Bad" group (44.4%) was higher than other groups. The difference between the groups was statistically significant (p =0.024), but in the “Average” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.211). The percentage of correct responders in the "Average" group (29.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Average” group a difference was created. The percentage of correct responders in the "Average" group (27.2%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Average” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.155). There was no statistically significant difference found between the academic success status (p = 0.100). The percentage of correct responders in the "Average" group (43.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and all the groups were different from each other. There was no statistically significant difference found between the academic success status (p = 0.845). There was no statistically significant difference found between the academic success status (p = 0.466). There was no statistically significant difference found between academic success (p = 0.222). The percentage of correct responders in the "Good" group (50.3%) was higher than other groups. The difference between the groups was statistically significant (p =0.010), but in the “Bad” group a difference was created. There was no statistically significant difference found between the academic success

status (p = 0.177). There was no statistically significant difference found between the academic success status (p = 0.111). The percentage of correct responders in the "Average" group (16.2%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Average” group a difference was created. There was no statistically significant difference found between the academic success status (p = 0.114). There was no statistically significant difference found between the academic success status (p = 0.102). There was no statistically significant difference found between the academic success status (p = 0.200). There was no statistically significant difference found between the academic success status (p = 0.111). There was no statistically significant difference found between the academic success status (p = 0.143). There was no statistically significant difference found between the academic success status (p = 0.191) (Table 4.10).

Correct answers of the first class students according to their health status were presented in Table 4.11.

Table 4.11. Correct answers of the first class students according to the health status (Nyala University, Nyala - Sudan - 2017).

Item	Health status					Binary analysis tables were presented in appendix 6
	Bad (%)*	Average (%)*	Good (%)*	X^2	P value	
1	32.5	39.8	54.5	20.873	**<0.001**	Appen. 6 Table 42
2	35.0	26.1	44.4	25.822	0.185	Appen. 6 Table 43
3	27.5	30.7	39.7	8.010	**0.018**	Appen. 6 Table 44
4	37.5	17.8	29.8	15.305	**<0.001**	Appen. 6 Table 45
5	37.5	20.7	24.4	5.456	0.650	Appen. 6 Table 46
6	10.0	16.2	26.7	15.463	0.512	Appen. 6 Table 47
7	20.0	16.2	20.3	1.965	0.374	Appen. 6 Table 48
8	15.0	12.4	13.3	0.236	0.889	Appen. 6 Table 49
9	100.0	92.1	98.4	25.752	0.471	Appen. 6 Table 50
10	75.0	97.5	94.4	32.594	<0.001	Appen. 6 Table 51
11	85.0	90.0	92.1	3.058	0.217	Appen. 6 Table 52
12	90.0	88.8	90.6	0.671	0.715	Appen. 6 Table 53
13	87.5	84.6	91.3	8.754	0.113	Appen. 6 Table 54
14	82.5	90.9	88.9	2.617	0.271	Appen. 6 Table 55
15	90.0	84.2	90.6	7.638	**0.022**	Appen. 6 Table 56
16	87.5	84.6	88.2	2.064	0.356	Appen. 6 Table 57
17	75.0	80.9	85.4	5.132	0.177	Appen. 6 Table 58
18	70.0	69.7	71.8	0.425	0.809	Appen. 6 Table 59
19	52.5	49.0	49.4	0.172	0.918	Appen. 6 Table 60
20	40.0	44.0	44.3	0.285	0.867	Appen. 6 Table 61
21	60.0	42.3	39.7	6.626	**0.036**	Appen. 6 Table 62
22	22.5	24.9	37.0	14.354	**0.001**	Appen. 6 Table 63
23	22.5	34.4	31.9	2.300	0.317	Appen. 6 Table 64
24	42.5	14.5	25.6	20.599	0.412	Appen. 6 Table 65
25	32.5	15.4	21.5	7.897	0.019	Appen. 6 Table 66
26	20.0	12.9	5.8	20.614	0.611	Appen. 6 Table 67
27	32.5	33.6	40.7	4.501	0.105	Appen. 6 Table 68
28	55.0	34.4	38.7	6.280	0.430	Appen. 6 Table 69
29	25.0	29.5	27.2	0.595	0.743	Appen. 6 Table 70
30	12.5	2.9	7.8	8.934	0.111	Appen. 6 Table 71
31	45.0	27.8	36.4	7.859	0.220	Appen. 6 Table 72
32	20.0	40.2	51.1	21.170	0.174	Appen. 6 Table 73
33	35.0	11.2	21.6	18.645	0.181	Appen. 6 Table 74
34	40.0	9.5	9.5	37.277	**<0.001**	Appen. 6 Table 75
35	25.0	10.0	9.9	9.258	0.110	Appen. 6 Table 76
36	45.0	42.7	43.8	0.112	0.946	Appen. 6 Table 77
37	70.0	77.9	73.0	1.071	0.585	Appen. 6 Table 78
38	60.0	76.3	73.2	4.774	0.920	Appen. 6 Table 79
39	87.5	75.1	64.4	16.885	0.119	Appen. 6 Table 80
40	57.5	42.7	47.1	3.429	0.180	Appen. 6 Table 81
41	40.0	20.3	25.6	7.771	**0.021**	Appen. 6 Table 82

* Percentage of correct response.

When the knowledge of participants regarding HBV questions **(Table 3.2)** was analyzed by health status, the correct responses to items (41) were as follows:

The percentage of correct responders in the "Good" group (54.5%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other. There was no statistically significant difference found between the health status ($p = 0.185$). The percentage of correct responders in the "Good" group (39.7%) was higher than other groups. The difference between the groups was statistically significant ($p = 0.018$), but in the “Average” group a difference was created. The percentage of correct responders in the "Bad" group (37.5%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the “Average” group a difference was created. There was no statistically significant difference found between the health status ($p = 0.650$). There was no statistically significant difference found between the health status ($p = 0.512$). There was no statistically significant difference found between the health status ($p = 0.374$). There was no statistically significant difference found between the health status ($p = 0.889$). There was no statistically significant difference found between the health status ($p = 0.471$). The percentage of correct responders in the "Average" group (97.5%) was higher than other groups. The percentage of correct responders in the "Average" group (97.5%) was higher than other groups. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other. The difference between the groups was statistically significant ($p < 0.001$) and all the groups were different from each other. There was no statistically significant difference found between the health status ($p = 0.217$). There was no statistically significant difference found between the health status ($p = 0.715$). There was no statistically significant difference found between the health status ($p = 0.113$). There was no statistically significant difference found between the health status ($p = 0.271$). The percentage of correct responders in the "Good" group (90.6%) was higher than other groups. The difference between the groups was statistically significant ($p = 0.022$), but in the “Average ” group a difference was created. There was no statistically significant difference found between the health status ($p = 0.356$). There was no statistically significant difference found between the health status ($p = 0.177$). There was no statistically significant difference found between the health status ($p = 0.809$). There was no statistically significant difference found between the health

status (p = 0.918). There was no statistically significant difference found between the health status (p = 0.867). The percentage of correct responders in the "Bad" group (60%) was higher than other groups. The difference between the groups was statistically significant (p =0.036), but in the “Bad” group a difference was created. The percentage of correct responders in the "Good" group (37%) was higher than other groups. The difference between the groups was statistically significant (p =0.001), but in the “Average” group a difference was created. There was no statistically significant difference found between the health status (p = 0.317). There was no statistically significant difference found between the health status (p = 0.412). The percentage of correct responders in the "Bad" group (32.5%) was higher than other groups. The difference between the groups was statistically significant (p =0.019), but in the “Average” group a difference was created. There was no statistically significant difference found between the health status (p = 0.611). There was no statistically significant difference found between the health status (p = 0.105). There was no statistically significant difference found between the health status (p = 0.430). There was no statistically significant difference found between the health status (p = 0.743). There was no statistically significant difference found between the health status (p = 0.111).). There was no statistically significant difference found between the health status (p = 0.220). There was no statistically significant difference found between the health status (p = 0.174). There was no statistically significant difference found between the health status (p = 0.181). The percentage of correct responders in the "Bad" group (40%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Bad” group a difference was created. There was no statistically significant difference found between the health status (p = 0.110). There was no statistically significant difference found between the health status (p = 0.946). There was no statistically significant difference found between the health status (p = 0.585). There was no statistically significant difference found between the health status (p = 0.920). There was no statistically significant difference found between the health status (p = 0.119). There was no statistically significant difference found between the health status (p = 0.180). The percentage of correct responders in the "Bad" group (40%) was higher than other

groups. The difference between the groups was statistically significant (p =0.021), but in the "Bad" group a difference was created **(Table 4.11)**.

Correct answers of the first class students according to their participants' income status were presented in Table 4.12.

Table 4.12. Correct answers of the first class students according to the participants' income status (Nyala University, Nyala - Sudan - 2017).

Item	Participants' income					Binary analysis tables were presented in appendix 6
	Bad (%)*	Average %)*	Good (%)*	X^2	P value	
1	48.8	51.2	50.6	0.474	0.789	Appen. 6 Table 42
2	32.6	44.7	42.2	13.285	0.301	Appen. 6 Table 43
3	29.7	37.9	53.1	28.278	0.714	Appen. 6 Table 44
4	29.8	23.7	31.9	6.098	**0.047**	Appen. 6 Table 45
5	24.5	26.6	15.7	8.169	**0.017**	Appen. 6 Table 46
6	20.6	22.0	34.9	14.389	0.123	Appen. 6 Table 47
7	6.5	6.3	9.0	1.545	0.462	Appen. 6 Table 48
8	11.7	11.1	22.3	14.527	0.784	Appen. 6 Table 49
9	96.1	97.1	98.8	2.929	0.231	Appen. 6 Table 50
10	95.6	92.2	97.6	8.291	**0.016**	Appen. 6 Table 51
11	89.6	92.2	92.8	2.459	0.293	Appen. 6 Table 52
12	90.3	88.7	94.0	3.916	0.141	Appen. 6 Table 53
13	82.2	94.5	92.2	35.847	0.221	Appen. 6 Table 54
14	89.3	89.7	86.7	1.153	0.562	Appen. 6 Table 55
15	87.2	88.5	95.2	7.919	0.019	Appen. 6 Table 56
16	87.5	86.0	91.0	2.804	0.246	Appen. 6 Table 57
17	90.3	88.7	94.0	3.916	0.141	Appen. 6 Table 58
18	68.1	72.7	74.1	2.979	0.225	Appen. 6 Table 59
19	46.7	50.3	53.0	2.113	0.348	Appen. 6 Table 60
20	35.2	49.9	47.6	19.496	**<0.001**	Appen. 6 Table 61
21	36.0	45.3	41.0	7.512	**0.023**	Appen. 6 Table 62
22	31.9	35.0	33.7	0.950	0.622	Appen. 6 Table 63
23	30.8	36.7	22.3	12.215	**0.002**	Appen. 6 Table 64
24	17.8	28.3	24.1	13.093	**0.001**	Appen. 6 Table 65
25	13.6	24.3	25.3	17.899	**<0.001**	Appen. 6 Table 66
26	9.1	8.4	4.2	4.002	0.135	Appen. 6 Table 67
27	34.5	42.6	37.3	6.016	0.449	Appen. 6 Table 68
28	33.4	43.0	36.0	8.600	0.114	Appen. 6 Table 69
29	25.3	31.0	23.5	5.183	0.175	Appen. 6 Table 70
30	6.5	6.3	9.0	1.545	0.462	Appen. 6 Table 71
31	25.6	37.9	46.4	26.280	**<0.001**	Appen. 6 Table 72
32	38.4	53.7	50.0	20.464	0.252	Appen. 6 Table 73
33	20.6	18.4	21.1	0.881	0.644	Appen. 6 Table 74
34	7.0	10.5	19.9	19.969	0.554	Appen. 6 Table 75
35	5.0	15.1	10.2	23.179	**<0.001**	Appen. 6 Table 76
36	34.7	49.7	46.4	19.976	0.514	Appen. 6 Table 77
37	68.9	76.5	75.9	6.844	0.333	Appen. 6 Table 78
38	67.4	76.9	77.1	11.377	0.132	Appen. 6 Table 79
39	68.1	67.1	69.3	0.298	0.862	Appen. 6 Table 80
40	44.1	49.1	44.6	2.368	0.306	Appen. 6 Table 81
41	25.1	24.5	25.9	0.129	0.938	Appen. 6 Table 82

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by participants' income status, the correct responses to items (41) were as follows:

There was no statistically significant difference found between the participants' income status (p = 0.789). There was no statistically significant difference found between the participants' income status (p = 0.301). There was no statistically significant difference found between the participants' income status (p = 0.714). The percentage of correct responders in the "Good" group (31.9%) was higher than other groups. The difference between the groups was statistically significant (p =0.047), but in the "Average" group a difference was created. The percentage of correct responders in the "average" group (26.6%) was higher than other groups. The difference between the groups was statistically significant (p =0.017), but in the "Good" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.123). There was no statistically significant difference found between the participants' income status (p = 0.462). There was no statistically significant difference found between the participants' income status (p = 0.784). There was no statistically significant difference found between the participants' income status (p = 0.231). The percentage of correct responders in the "Good" group (97.6%) was higher than other groups. The difference between the groups was statistically significant (p =0.016), but in the "Average" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.293). There was no statistically significant difference found between the participants' income status (p = 0.141). There was no statistically significant difference found between the participants' income status (p = 0.221). There was no statistically significant difference found between the participants' income status (p = 0.562). The percentage of correct responders in the "Good" group (95.2%) was higher than other groups. The difference between the groups was statistically significant (p = 0.019), but in the "Good" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.246). There was no statistically significant difference found between the participants'

income status (p = 0.141). There was no statistically significant difference found between the participants' income status (p = 0.225). There was no statistically significant difference found between the participants' income status (p = 0.348). The percentage of correct responders in the "Average" group (49.9%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the "Bad" group a difference was created. The percentage of correct responders in the "Average" group (45.3%) was higher than other groups. The difference between the groups was statistically significant (p =0.023), but in the "Bad" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.622). The percentage of correct responders in the "Average" group (36.7%) was higher than other groups. The difference between the groups was statistically significant (p =0.002), but in the "Good" group a difference was created. The percentage of correct responders in the "Average" group (28.3%) was higher than other groups. The difference between the groups was statistically significant (p =0.001), but in the "Bad" group a difference was created. The percentage of correct responders in the "Good" group (25.3%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the "Bad" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.135). There was no statistically significant difference found between the participants' income status (p = 0.449). There was no statistically significant difference found between the participants' income status (p = 0.114). There was no statistically significant difference found between the participants' income status (p = 0.175). There was no statistically significant difference found between the participants' income status (p = 0.462). The percentage of correct responders in the "Good" group (46.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the "Bad" group a difference was created. There was no statistically significant difference found between the participants' income status (p = 0.252). There was no statistically significant difference found between the participants' income status (p = 0.644). There was no statistically significant difference found between the participants' income status (p = 0.554). The percentage of correct responders in the "Average" group (15.1%) was

higher than other groups. The difference between the groups was statistically significant ($p < 0.001$), but in the “Bad” group a difference was created. There was no statistically significant difference found between the participants’ income status ($p = 0.514$). There was no statistically significant difference found between the participants’ income status ($p = 0.333$). There was no statistically significant difference found between the participants’ income status ($p = 0.132$). There was no statistically significant difference found between the participants’ income status ($p = 0.862$). There was no statistically significant difference found between the participants’ income status ($p = 0.306$). There was no statistically significant difference found between the participants’ income status ($p = 0.938$) **(Table 4.12)**.

Correct answers of the first class students according to their family’s income status were presented in Table 4.13.

Table 4.13. Correct answers of the first class students according to the family's income status (Nyala University, Nyala - Sudan - 2017).

Item	Family's income					Binary analysis tables were presented in appendix 6
	Bad (%)*	Average (%)*	Good (%)*	X^2	P value	
1	42.8	52.3	55.0	9.060	0.611	Appen. 6 Table 42
2	36.1	43.0	36.5	4.849	0.897	Appen. 6 Table 43
3	32.3	35.3	48.3	15.006	**0.001**	Appen. 6 Table 44
4	28.8	27.5	24.6	1.077	0.584	Appen. 6 Table 45
5	22.1	16.0	23.7	7.681	0.221	Appen. 6 Table 46
6	36.1	43.0	36.5	4.849	0.189	Appen. 6 Table 47
7	24.9	23.0	25.6	0.699	0.705	Appen. 6 Table 48
8	14.4	12.8	12.3	0.555	0.758	Appen. 6 Table 49
9	96.5	97.2	97.2	0.320	0.852	Appen. 6 Table 50
10	93.7	92.8	99.1	11.279	**0.004**	Appen. 6 Table 51
11	91.2	92.1	89.6	1.197	0.550	Appen. 6 Table 52
12	89.8	87.2	98.1	20.380	**<0.001**	Appen. 6 Table 53
13	86.0	92.3	87.7	8.892	0.112	Appen. 6 Table 54
14	87.0	90.8	87.7	3.202	0.202	Appen. 6 Table 55
15	90.2	87.7	91.0	2.132	0.344	Appen. 6 Table 56
16	87.7	85.7	91.0	3.936	0.140	Appen. 6 Table 57
17	79.3	85.8	85.3	6.274	**0.043**	Appen. 6 Table 58
18	75.8	70.2	67.8	4.404	0.111	Appen. 6 Table 59
19	44.9	50.6	52.6	3.452	0.178	Appen. 6 Table 60
20	34.4	44.7	55.5	22.022	**<0.001**	Appen. 6 Table 61
21	33.7	46.6	37.4	14.270	**0.001**	Appen. 6 Table 62
22	27.7	36.4	34.6	6.392	**0.041**	Appen. 6 Table 63
23	27.0	37.9	24.6	16.988	**<0.001**	Appen. 6 Table 64
24	16.1	25.5	29.4	13.703	0.122	Appen. 6 Table 65
25	13.0	23.4	23.2	13.586	**0.001**	Appen. 6 Table 66
26	12.3	6.6	5.7	10.042	0.653	Appen. 6 Table 67
27	34.4	38.9	44.1	4.813	0.900	Appen. 6 Table 68
28	37.9	37.7	40.3	0.443	0.801	Appen. 6 Table 69
29	27.7	28.1	26.5	0.187	0.911	Appen. 6 Table 70
30	8.4	6.6	5.2	2.045	0.360	Appen. 6 Table 71
31	27.0	34.2	47.4	20.310	**<0.001**	Appen. 6 Table 72
32	41.4	48.7	52.1	6.354	**0.042**	Appen. 6 Table 73
33	25.6	17.4	17.5	8.767	**0.012**	Appen. 6 Table 74
34	15.1	7.9	11.8	10.288	0.610	Appen. 6 Table 75
35	10.9	10.6	10.0	0.112	0.946	Appen. 6 Table 76
36	29.8	48.5	49.8	30.412	0.285	Appen. 6 Table 77
37	74.4	73.2	73.5	0.135	0.935	Appen. 6 Table 78
38	73.3	70.9	79.6	5.820	0.546	Appen. 6 Table 79
39	66.3	67.9	69.7	0.628	0.730	Appen. 6 Table 80
40	44.6	45.8	50.7	2.025	0.363	Appen. 6 Table 81
41	19.3	27.0	27.5	6.755	0.341	Appen. 6 Table 82

* Percentage of correct response.

When the knowledge of participants regarding HBV questions (Table 3.2) was analyzed by family's income status, the correct responses to items (41) were as follows:

The percentage of correct responders in the "Good" group (55%) was higher than other groups. The difference between the groups was statistically significant (p =0.011), but in the "Bad" group a difference was created. There was no statistically significant difference found between the family's income status (p = 0.897). The

percentage of correct responders in the "Good" group (48.3%) was higher than other groups. The difference between the groups was statistically significant (p =0.001), but in the “Good” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.584). There was no statistically significant difference found between the family’s income status (p = 0.221). There was no statistically significant difference found between the family’s income status (p = 0.189). There was no statistically significant difference found between the family’s income status (p = 0.705). There was no statistically significant difference found between the family’s income status (p = 0.758). There was no statistically significant difference found between the family’s income status (p = 0.852). The percentage of correct responders in the "Good" group (99.1%) was higher than other groups. The difference between the groups was statistically significant (p =0.004), but in the “Good” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.550). The percentage of correct responders in the "Good" group (98.1%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Good” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.112). There was no statistically significant difference found between the family’s income status (p = 0.202). There was no statistically significant difference found between the family’s income status (p = 0.344). There was no statistically significant difference found between the family’s income status (p = 0.140). The percentage of correct responders in the "Average" group (85.8%) was higher than other groups. The difference between the groups was statistically significant (p =0.043), but in the “Bad” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.111). There was no statistically significant difference found between the family’s income status (p = 0.178). The percentage of correct responders in the "Good" group (55.5%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and all the groups were different from each other. The percentage of correct responders in the "Average" group (46.6%) was higher than other groups. The difference between the groups was statistically significant (p

=0.001), but in the “Average” group a difference was created. The percentage of correct responders in the "Average" group (36.4%) was higher than other groups. The difference between the groups was statistically significant (p =0.041), but in the “Bad” group a difference was created. The percentage of correct responders in the "Average" group (37.9%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001), but in the “Average” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.122). The percentage of correct responders in the "Average" group (23.4%) was higher than other groups. The difference between the groups was statistically significant (p=0.001), but in the “Bad” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.653). There was no statistically significant difference found between the family’s income status (p = 0.900). There was no statistically significant difference found between the family’s income status (p = 0.801). There was no statistically significant difference found between the family’s income status (p = 0.911). There was no statistically significant difference found between the family’s income status (p = 0.360). The percentage of correct responders in the "Good" group (46.4%) was higher than other groups. The difference between the groups was statistically significant (p < 0.001) and all the groups were different from each other. The percentage of correct responders in the "Good" group (52.1%) was higher than other groups. The difference between the groups was statistically significant (p =0.042), but in the “Bad” group a difference was created. The percentage of correct responders in the "Bad" group (25.6%) was higher than other groups. The difference between the groups was statistically significant (p =0.012), but in the “Bad” group a difference was created. There was no statistically significant difference found between the family’s income status (p = 0.610). There was no statistically significant difference found between the family’s income status (p = 0.946). There was no statistically significant difference found between the family’s income status (p = 0.285). There was no statistically significant difference found between the family’s income status (p = 0.935). There was no statistically significant difference found between the family’s income status (p = 0.546). There was no statistically significant difference found between the family’s income status (p =

0.730). There was no statistically significant difference found between the family's income status (p = 0.363). There was no statistically significant difference found between the family's income status (p = 0.341) (Table 4.13).

4.3.3. Hepatitis B Knowledge Score of Participants and Some Affecting Factors

This section shows:- The relationship between some background and socio-demographic characteristics of participants which was shown in section 1 above, and their Hepatitis B knowledge score.

- The independent factors associated with HB disease knowledge scores.

The socio-demographic and background characteristics were described in this section are: gender, age groups, marital status, place of residence, working status, academic success, health , participants' income and their family's income.

Hepatitis B related knowledge score was calculated, and every correct answer was given one score. The descriptive statistics for the knowledge score according to the information groups was presented in Table 4.14.

Table 4.14. Descriptive statistics for knowledge score of first class students according to the information groups (Nyala University, Nyala - Sudan – 2017).

Groups		Knowledge Score			
		Mean ±SD	**Median**	**Min-Max**	**Correctly answered questions (%)**
Prevention	Vaccination (6)	1.6 (±1.4)	2.0	0 - 5	27,7
	Others (5)	2.8 (±1.0)	3.0	0 - 5	57.2
	Pr. total (11)	4.5 (±1.8)	4.0	1 - 10	41,1
Transmission (18)	-	11.3 (±2.0)	11.0	6 - 17	63.1
Related diseases and other effects (4)	-	1.1 (±1.0)	1.0	0 - 4	28.0
General information about disease (8)	-	2.3 (±1.9)	2.0	0 - 8	29.4
Total (41)	-	19.3 (±5.1)	19.0	11-37	47.1

When the score of knowledge regarding Hepatitis B disease was analyzed by the group of prevention, the mean and standard deviation of 'Vaccination' section were 1.6 (±1.4) and the median was 2.0 (min= 0 and max= 5), and the percentage of correctly answered questions was 27.7%.

The mean and standard deviation of 'Others' section were 2.8 (±1.0), the median was 3.0 (min= 0 and max= 5), and the percentage of correctly answered questions was 57.2%. The mean and standard deviation of 'Total' of the prevention group were 4.5 (±1.8), the median was 4.0 (min= 1 and max= 10), and the percentage of correctly answered questions was 41.1%. When it was analyzed by the group of 'Transmission', the mean and standard deviation were 11.3 (±2.0), the median was 11.0 (min= 6 and max= 17), and the percentage of correctly answered questions was 63.1%. When it was analyzed by the group of 'Related disease and other effects', the mean and standard deviation were 1.1 (±1.0), the median was 1.0 (min= 0 and max= 4), and the percentage of correctly answered questions was 28%. And when it was analyzed by the group of 'General information about disease', the mean and standard deviation were 2.3 (±1.9), the median was 2.0 (min= 0 and max= 8), and the percentage of correctly answered questions was 29.4%. Finally, the mean and standard deviation of the total of groups were 19.3 (±5.1), the median was 19.0 (min= 11 and max= 37), and the percentage of correctly answered questions was 47.1 %. (Table 4.14)

The relation between some socio-demographic characteristics and mean knowledge score of participants were presented in Table 4.15.

Table 4.15. Relation between some socio-demographic characteristics and mean knowledge score of first class students (Nyala University, Nyala - Sudan – 2017).

Socio -demographic characteristics			Knowledge Score			
		n	Mean (±SD)	Median	Min-max	x^2/ u value
Gender	Male	492	18.4 (± 5.0)	18.5	11 - 37	<0.001
	Female	534	20.1 (± 5.0)	20.0	11 - 32	
Age groups	Under 20	358	19.2 (± 5.3)	18.0	12 - 31	0.004
	20 - 24	562	19.6 (± 5.1)	20.0	11 – 37	
	25 - 29	93	17.8 (± 3.0)	19.0	13 - 24	
	30 and over	13	17.0 (± 5.2)	16.0	13 - 28	
Marital Status	Single	955	19.2 (± 5.0)	19.0	11 - 37	0.151
	Married	71	20.3 (± 5.5)	19.0	13 - 32	
Place of Residence	City	796	19.7 (± 5.1)	20.0	11 - 37	<0.001
	Town	65	16.4 (± 4.3)	14.0	11 - 27	
	Village	165	18.6 (± 4.6)	19.0	12 - 30	
Working Status	Working	92	18.1 (± 3.4)	19.0	12 - 28	0.035
	Not working	934	19.4 (± 5.2)	19.0	11 - 37	
Total		**1026**	**19.3** (± 5.1)	**19.0**	**11 -37**	-

When the score of knowledge regarding Hepatitis B disease was analyzed by the gender, the mean and standard deviation of males were 18.4 (± 5.0), the median was 18.5 (min= 11 and max= 37), and the mean and standard deviation of females were 20.1 (± 5.0), the median was 20.0 (min= 11 and max= 32).The difference between the groups was statistically significant (u < 0.001). When it was analyzed by age groups the mean and standard deviation of 'Under 20' group were 19.2 (± 5.3), the median was 18.0 (min= 12 and max= 31), the mean and standard deviation of '20 – 24' group were 19.6 (± 5.1), the median was 20.0 (min= 11 and max= 37), the mean and standard deviation of '25 – 29' group were 17.8 (± 3.0), the median was 19.0 (min= 13 and max= 24), the mean and standard deviation of '30 and over' group were 17.0 (± 5.2), the median was 16.0 (min= 13 and max= 28). The difference between the groups was statistically significant (x^2 = 0.004). There was no statistically significant difference found between the marital status and score of knowledge (u = 0.151). When the score of knowledge was analyzed by the place of residence, the mean and standard deviation of 'City' group were 19.7 (± 5.1), the median was 20.0 (min= 11 and max= 37), the mean and standard deviation of

'Town' group were 16.4 (± 4.3), the median was14.0 (min= 11 and max= 27), the mean and standard deviation of 'Village' group were 18.6 (± 4.6), the median was 19.0 (min= 12 and max= 30). The difference between the groups was statistically significant (x^2 < 0.001). Finally when it was analyzed by the working status, the mean and standard deviation of working participants were 18.1 (± 3.4), the median was 19.0 (min= 12 and max= 28), and the mean and standard deviation of not working status were 19.4 (± 5.2), the median was 19.0 (min= 11 and max= 37). The difference between the groups was statistically significant (u = 0.035). **(Table 4.15)**

The relation between some background characteristics and mean knowledge score of participants were presented in Table 4.16.

Table 4.16. Relation between some background characteristics and mean knowledge score of first class students (Nyala University, Nyala - Sudan – 2017).

Background characteristics		**Knowledge Score**				
		n	**Mean (±SD)**	**Median**	**Min-max**	**x^2 value**
Academic success	Bad	36	17.1 (± 5.4)	16.0	13 - 30	
	Average	519	19.7 (± 5.4)	20.0	11 - 37	
	Good	471	19.0 (± 4.6)	19.0	11 - 31	0.002
Health	Bad	40	20.0 (± 4.2)	19.0	13 - 26	
	Average	241	18.1 (± 5.1)	17.0	11 - 32	
	Good	745	19.7 (± 5.0)	21.0	11 - 37	<0.001
Participants' income	Bad	383	18.0 (± 4.8)	20.0	11 - 37	
	Average	477	20.0 (± 5.2)	19.0	11 - 31	
	Good	166	20.3 (± 4.5)	18.0	13 - 29	<0.001
Family's income	Bad	285	18.4 (± 4.9)	18.0	11 - 37	
	Average	530	19.4 (± 5.2)	19.0	11- 32	
	Good	211	20.1 (± 4.9)	20.0	12 - 29	<0.001
Total		**1026**	**19.3** (± 5.1)	**19.0**	**11 -37**	-

When the score of knowledge regarding Hepatitis B disease was analyzed by the academic success, the mean and standard deviation of 'Bad' group were 17.1 (± 5.4), the median was 16.0 (min= 13 and max= 30), the mean and standard deviation of ' Average' group were 19.7 (± 5.4), the median was 20.0 (min= 11 and max= 37), and the mean and standard deviation of 'Good' group were 19.0 (± 4.6), the median was 19.0 (min= 11 and max= 31). The difference between the groups was

statistically significant (x^2 = 0.002). When it was analyzed by the health, the mean and standard deviation of 'Bad' group were 20.0 (± 4.2), the median was 19.0 (min= 13 and max= 26), the mean and standard deviation of 'Average' group were 18.1 (± 5.1), the median was 17.0 (min= 11 and max= 32), and the mean and standard deviation of 'Good' group were 19.7 (± 5.0), the median was 21.0 (min= 11 and max= 37). The difference between the groups was statistically significant (x^2 < 0.001). When it was analyzed by the participants' income, the mean and standard deviation of 'Bad' group were 18.0 (± 4.8), the median was 20.0 (min= 11 and max= 37), the mean and standard deviation of 'Average' group were 20.0 (± 5.2), the median was 19.0 (min= 11 and max= 31), and the mean and standard deviation of 'Good' group were 20.3 (± 4.5), the median was 18.0 (min= 13 and max= 29). The difference between the groups was statistically significant (x^2 < 0.001).

When it was analyzed by the family's income, the mean and standard deviation of 'Bad' group were 18.4 (± 4.9), the median was 18.0 (min= 11 and max= 37), the mean and standard deviation of 'Average' group were 19.4 (± 5.2), the median was 19.20 (min= 11 and max= 32), and the mean and standard deviation of 'Good' group were 20.1 (± 4.9), the median was 20.0 (min= 12 and max= 29). The difference between the groups was statistically significant (x^2 < 0.001). (Table 4.16)

Logistic regression analysis was used to explore the independent factors associated with Hepatitis B disease knowledge scores. Knowledge score was divided into two groups according to the median (19) of knowledge scores.

The analysis included eight independent variables, age (as a continuous variable), gender , place of residence, working status, academic success, health, participants' income and family's income status as a categorical variables. The references of the catogerical variables were determined as follow:

- Reference of gender is male category.
- Reference of place of residence is (town + village) category.
- Reference of working status is working category.

- Reference of academic success is good category.

- Reference of health and family's income status is (bad + average) category.

- Reference of academic participants' income status is bad category.

There was no statistically significant difference was found regarding the health status, place of residence, family income status and age variables.

The independent factors associated with Hepatitis disease knowledge scores were presented in Table 4.17.

Table 4.17. The independent factors associated with Hepatitis B disease knowledge scores. (Nyala University, Nyala - Sudan – 2017).

Factor		n	B	SE	P value	Exp (B)	(95%) C. I for Exp (B)	
							Lower	Upper
Gender	Female	534	0.36	0.13	<0.01	1.43	1.10	1.85
	Male (ref.)	492				1.00		
Working Status	Not working	934	0.68	0.24	<0.01	1.98	1.24	3.17
	Working (ref.)	92				1.00		
Academic success	Bad+ Average	555	0.44	0.13	<0.01	1.56	1.21	2.02
	Good (ref.)	471				1.00		
Participants' income	Bad (ref.)	383				1.00		
	Average	477	0.46	0.14	<0.01	1.58	1.19	2.09
	Good	166	1.15	0.20	<0.01	3.15	2.16	4.67
Constant		-	-1.55	0.27	<0.01	0.21	-	-

When the knowledge score of hepatitis B disease was analysed by gender, the knowledge score of females have a 1.4 times greater than their males (OR= 1.4; 95% C.I. 1.10, 1.85). The ifference between the groups was statistically significant ($p < 0.01$). When it was analysed by working status, the knowledge score of participants who were not working had a 1.9 times more knowledge than their participants who were working (OR=1.9; 95% C.I.1.24, 3.17). The difference between the groups was statistically significant ($p < 0.01$). When the knowledge score of hepatitis B disease was analysed by an academic success, the participants who had a bad and an average academic success had 1.5 times more knowledge than their participants who had a good success status (OR=1.5; 95% C.I.1.21, 2.02). The difference between the

groups was statistically significant ($p < 0.01$). When it was analysed by participants' income status, the participants who had a good income status had three times more knowledge than bad group (OR=3.0; 95% C.I.2.16, 4.56). The difference between the groups was statistically significant ($p < 0.001$). Also the participants who had an average income status had 1.5 times greater knowledge than bad group (OR=1.5; 95% C.I. 1.19, 2.09). The difference between the groups was statistically significant ($p < 0.01$). (Table 4.17).

5. DISCUSSION

This study was conducted to assess the level of information regarding transmission and prevention modes of hepatitis B disease among the first classs students at Nyala University, and to determine the factors affecting level of information of the students.

The present study showed that only 40.4% of the respondents have heard about the Hepatitis B disease. There are studies that reach similar results in the literature. The result of a study which conducted among the village midwives in Khartoum, Sudan reported that half of the village midwives (53.1%) heard about Hepatitis B virus [92]. There are also studies that reach different results in the literature. The result of the study which was carried out among the university students in Bangladesh showed that majority of the population (89%) have heard about Hepatitis B [96]. This result also differs from the study that was carried out among students of Centre for Physical Education Health & Sports Science, in University of Sindh, Pakistan, which found that majority of students (95%) have heard about hepatitis B [99]. Different results were seen in the study conducted among nursing students of Government Nursing College in Jagdalpur, India, which reported that more than 95% of the total study participants had heard about Hepatitis B infection [101]. As a result of our study, the hearing rate of hepatitis B in university students were found to be very low. This result may be attributed to lack of formal school based health education and promotion in our country [90].

Only 40.4% of the participants were informed about the Hepatitis B disease. For 12.2% of the informed participants, their information source was media, 9.2% received by internet, 8.8% from the school, book or university, 7.7% their information source was a health personnel and 2.5% from family or friends. There are studies that reach similar results in the literature. The result of a study which was conducted among the university students in Lahore, Pakistan, the main source of information regarding HB was television [97]. Also the result of the study which was conducted at Sohag University, Egypt, showed major source of information regarding hepatitis B was from classroom lectures, doctors, family, friends,

neighbours and teachers [109]. This result ao may be attributed to lack of formal school based health education in our country [90].

In the current study vaccine coverage was very low; only 6.5% of the participants vaccinated against Hepatitis B disease. More than half of participants (51.8%) were not vaccinated, and 41.7% of them did not know if they were vaccinated or not. There are studies that show low vaccine coverage among their responders in the literature. A study which was carried out among healthcare workers in Wad Medani, Sudan, showed that more than 50% of health care workers were not vaccinated against HBV [90]. A study which was carried out among the village midwives in Khartoum, Sudan revealed that 79.8% of the midwives have never been vaccinated for Hepatitis B virus [92]. A study which was conducted among medical students in University of Dammam, Eastern Region of Saudi Arabia stated that only 28.1% of the respondents reported that they were vaccinated against hepatitis B vaccine [105]. The study which was conducted among medical students in Haramaya University, Ethiopia showed that only 4.7% of the students were fully vaccinated against Hepatitis B [106]. In the study which was carried out among medical students in Erbil City, Iraq, less than half (45%) of students were vaccinated against HBV infection [108]. It is normal that the level of knowledge among health workers is higher than that of medical students. On the other side, there are also studies that reach different results in the literature. A study which was carried out among healthcare workers in Khartoum, Sudan showed that only 27.4% of respondents were not vaccinated against HBV [93]. A study which was carried out among medical students in Aljouf University in Saudi Arabia found that majority of the students were vaccinated against HBV [97]. The study which was conducted among medical students in the medical college in Ahmedabad, India, showed that 63% of the students were vaccinated against Hepatitis B disease [112]. In this study vaccine coverage was very low, this may be attributed to vaccine was introduced into routine vaccination for newborns in Sudan in 2009.

The mean ±SD knowledge score was 19.3 ±5.1 (min= 11 and max= 37) over a total of 41 points, so we considered this results as an inadequate knowledge level. There are studies that showed poor level of knowledge in the literature, but because

of the difference between scoring methods of studies we can not compare. A study which was conducted among the students of the University of Kassala in Sudan, also showed that there was a weakness in general knowledge about HBV among students [90]. A study which was carried out among clinical and medical students of Jhalawar Medical College, in Rajasthan, India, found the mean ±SD knowledge score of the study 15.7 ± 1.9 over a total of 20 items for knowledge, that was considered as poor knowledge [110]. And the mean ±SD knowledge score of students in a study which was conducted among undergraduate students at college of dentistry, Madinah, Saudi Arabia was 14.8 ± 2.48 (min= 1, max= 20) over total of 20 questions , which was lower than knowledge score of our participants [113]. The lack of health education and health promotion in our country is considered as the main reason of the weakness of knowledge regarding hepatitis B disease.

Our study revealed that the respondents had poor knowledge about the related disease and other effects of disease (only 28% of the questions of this information group was answered correctly), the nature of disease (only 29.4% of the questions of the general information group was answered correctly) and preventive measures (only 41.1% of the questions of preventive group answered correctly). There are studies that reach similar results in the literature. A study which was conducted among the students of the University of Kassala in Sudan, reported poor knowledge on HBV of infectious nature of the disease, causative agents, mode of transmission, symptoms and preventive measures [90]. A study which was carried out among clinical and medical students of Jhalawar Medical College, in Rajasthan, India, showed poor knowledge related to the transmission, treatment and vaccination of the HBV [110]. This refers to the general low level of knowledge of participants regarding the disease, even in medical students.

Regarding the mode of transmission, 63.1% of the questions about the ways of HBV transmission were answered correctly in this study. 41.1% of the respondents said that the virus can be transmitted via blood (more of studies confirmed that HBV is transmitted via blood) [2, 26,27] the majority of our respondents 58.9% answered incorrectly, also 20.5% of the participants said HBV can be transmitted from infected mother to baby during the pregnancy (several

studies revealed that HBV can transmitted with infected mother to baby during the pregnancy period) [2, 27, 123] so the surprised result is the majority of our participants (79.5) answered incorrectly; 44.1% of the respondents stated the use of the same syringe for two poeple as a way of transmission (several studies it was found that sharing personal items, such as syringes is one of the transmission modes of HBV) [2, 26, 27] this study, the participants who answered incorrectly were more than correct ones; 33.6% told unprotected sex (a lot of studies confirmed that unprotected sex contact is one of the important ways of HBV transmission) [2, 26, 27, 121]. The majority of the respondents answered this question incorrectly, and only 8% said with dental implants (some studies confirmed dental implants as one of the risk factors of the HBV transmission) [2, 26, 27], 92% of the participants answered incorrectly, which is considered as a big gap in knowledge regarding hepatitis B disease. There are studies that reach similar results in the literature. The study, which was carried out among the university students in Bangladesh found that 30% of the students suggested that the virus can be transmitted with blood, 20% from mother to fetus, 17% by sharing infected syringe, 15% by unprotected sex and 9% knew that dental visits was a risk factor of hepatitis B [96]. A study, which was carried out among medical students in Erbil City, Iraq showed that HBV can be transmitted through sexual contact [108]. There are also studies that reach different results in the literature. The study, which was conducted among the healthcare workers in Wad Medani, Sudan revealed that, 97.2% of doctors, 98.6% of nurses, 94.8% of laboratory technicians and 95.7% of other paramedicals knew that HBV transmitted via blood [90]. Also in the study, which was carried out among the medical students in Aljouf University in Saudi Arabia, there was a very strong agreement about transmission via blood (87.0% of the respondents agreed that) [97]. In a study, which was conducted among medical students in University of Dammam, Eastern Region of Saudi Arabia showed the majority of respondents agreed that sexual contact and dental procedure were modes of transmission of HBV by 70.5% and 73.4% respectively [105]. The study which was conducted among medical students in Haramaya University, Ethiopia found that the transmission of hepatitis B through sexual route was agreed by 65.5% of the students, used needles and syringes by 71.7% and blood transfusion by 89.8% [106]. In the study which was

carried out among dental students in Varna University in Bulgaria, broken skin-blood transmission was recognized as risk by 90,6% of the students [107]. Majority of respondents (80%) in the study, which was carried out among medical students in Erbil City, Iraq knew that HBV can be contracted from blood transfusion, 71.5% of them reported infected needles [108]. In the study which was carried out among clinical and medical students of Jhalawar Medical College, in Rajasthan, India, 77.7% knew that Hepatitis B can be transmitted from unsafe sex [110]. In our study there is a serious gap in knowledge regarding important modes of transmission of hepatitis B disease. But in the studies which was conducted among health workers and medical students showed high results, it may be attributed to their education.

In the current study, only 32.2% of the respondents reported that hepatitis B can be transmitted with common shaving blade (sharing personal items, such as shaving blades) [26, 27, 121]. In the current study, the majority of the students answered incorrectly . This result differs from the study, which was conducted among the university students in Lahore, Pakistan, where students regarded blood transfusion, unsterilized syringes and blades of barbers as major modes of transmission [79]. So the majority of our respondents were not aware about the serious risk of sharing personal things such as blades.

In our present study, 89.6% of the respondents stated that hepatitis B cannot be transmitted with handshaking, hugging and skin contact (the study revealed that Hepatitis B is not spread through hugging or kissing) [26]. The majority of the respondents answered correctly, 71.2 % stated it can be transmitted with common tooth brush (some studies revealed that Hepatitis B is spread through sharing personal items, such as toothbrushes) [26, 27 and 121], 23.7% of the students stated that it can be transmitted from mother to baby during birth (where some references confirmed that HB can spread through the vertical routes) [2, 26, 27 and 121]. The number of participants, which answered correctly was very low. There are studies that reach similar results in the literature. A study, which was conducted among dental and oral hygiene students at a university in Pretoria, South Africa, found that a significant number of students incorrectly stated that HBV could be spread through shaking hands with an infected persons (incorrect students, $p<0.01$), more students

correctly reported that HBV can be transmitted with sharing a toothbrush with an infected person (correct responders, P = 0.02) and more clinical students were aware that HBV can be transmitted at birth process (aware students, P = 0.03) [102]. In a study, which was carried out among the students of Vietnamese University in Ho Chi Minh, Vietnam, 39.5% knew that HBV can be transmitted from mother to child at birth [103]. In a study, which was carried out among medical students in University of Dammam, 58.3% of the students agreed that HBV can be transmitted with sharing toothbrush with an infected person [105]. In another study which was carried out among the dental students in Varna University in Bulgaria, 90.6% of the students said that HBV cannot be transmitted by skin contact [107]. A study, which was carried out among medical students in Erbil City, Iraq, found that 60% of the students stated HB can transmitted via sharing toothbrush and 28% by holding hands [108]. There are also studies that reach different results in the literature. In a study, which was carried out among medical students in University of Dammam, 73.4% of the students agreed that HBV can be transmitted by vertical ways [105]. In the study which was conducted among medical students in Haramaya University, Ethiopia, 55.9% of the participants agreed that HB can be transmitted through vertical transmission [106]. In the study, which was carried out among medical students in Erbil City, Iraq, 28% stated that it can be transmitted by holding hands [108]. Most of our participants were not aware of the transmission of hepatitis B with vertical modes.

In addition, this study found that 89.1% of respondents stated that food and drinks cannot transmit HBV (some studies stated that HBV is not spread via food) [22, 27, 27]. The majority of our participants answered correctly, and 94.3% of our respondents said the hepatitis B cannot be transmitted with breastfeeding (Hepatitis B is not spread through breastfeeding) [26, 122], the majority of our participants answered correctly. There is a study that reach similar results in the literature. A study which was carried out among healthcare workers in Khartoum, Sudan found that 70% of the respondents answered correctly that the food cannot transmit HBV [93]. There is also a study that reach different results in the literature. A study which was carried out among Medical Students in University of Dammam, found that only

25.2% was aware of that breast milk of infected mother does not transmit HBV [105]. The participants have more knowledge regarding some things that cannot be transmit hepatitis B disease such as food, drinks, holding hand and breastfeeding.

As for the complications of the HBV, according to this study, 38.7% of the respondents confirmed that hepatitis B infection causes cirrhosis (some studies stated that HBV causes cirrhosis) [2, 26], the majority of the participants answered incorrectly, 38.3% said causes liver cancer (some studies stated that HBV causes liver cancer) [2, 26], the majority of the participants answered incorrectly and 27.7% said causes hepatic failure (some studies stated that HBV causes hepatic failure) [2, 26], the majority of the participants answered incorrectly. There are studies that reach different results in the literature. The study which was conducted among the university students in Bangladesh found 69% of students confirmed that chronic hepatitis B infection may lead to liver cirrhosis and liver cancer [96]. Another study which was carried out among the medicine and health sciences students in Ethiopia, showed that 81.3 % of the students knew that HBV infection is associated with liver cancer [100]. Also 62.4% of the participants of the study which was conducted among medical students in Haramaya University, Ethiopia knew that HB can cause liver cancer [106]. The study which was carried out among medical students in Erbil City, Iraq, found that 64.5% of the students mentioned that HBV can cause liver cancer [108]. In the study which was carried out among clinical and medical students of Jhalawar Medical College, in Rajasthan, India, 72.3 % of the participant said that HB can cause liver cancer [110]. Our participants had very low knowledge towards the complications of hepatitis B disease, which refers to important shortage of the health education of the serious viral diseases in Sudan including HBV.

During this study, in terms of knowledge on vaccination, 43.6% of respondents answered that vaccine was protectable against Hepatitis B infection (some studies confirmed that HB vaccine is protected against HBV) [2, 122], less than half of our students answered correctly. There are studies that reach different results in the literature. The study which was carried out among healthcare workers in Omdurman Hospital, Sudan 71.69% of them knew vaccine prevention [93]. The study which was conducted among the university students in Bangladesh 81% of

students answered that vaccine was protectable against HBV [96]. And the study which was carried out among the medical students in Aljouf University in Saudi Arabia reported that most of the students 63.0% said vaccine protects against HB [97]. Another study which was carried out among the medicine and health sciences students in Ethiopia, found 84.6 % of the respondents were aware of HBV vaccine and that it provides protection against HBV infection [100]. This result refers to the shortage knowledge of the population of our study regarding vaccination of HBV and it is importance.

Regarding factors affecting the knowledge of respondents about HB, in the present study nine factors were examined. The marital status factor has no statistically significant difference in the binary analysis. But there is a study that reach different result in the literature. The study which was carried out among medical students in University of Dammam, found that there was a significant relationship between marital status and hepatitis B knowledge ($P < 0.01$) with more knowledge among unmarried students [105]. The majority of the participants in our study was single, where is no difference between knowledge and marital status have been created.

Age groups, health status, place of residence and the family income status factors were statistically significant in all the binary analysis, but they were involved in our logistic regression model, but there was no statistically significant difference found. There are study that reach similar results in the literature. The study which was conducted at Sohag University, Egypt, there was no statistically significant association between age years of students and their knowledge scores, also there was no statistically significant association between residence of students and their knowledge scores [109]. There is a study that reach different results in the literature. In the study which was conducted among medical students in Erbil City, Iraq, there was statistically significant association between age years of students and their knowledge scores [108]. Some factors have not been found to create any difference in knowledge score regarding the HB disease such as age groups, health status, place of residence and the family income status.

The gender factor was statistically significant in the binary analysis, and also it was involved in the logistic regression model. Females tend to have 1.4 times better knowledge about HB than males (OR=1.4; 95% C.I. =1.1-1.9). There are studies that reach similar results in the literature. The result which confirmed there is a significant relation between gender and vaccination status (p=0.014) in the study which was carried out among healthcare workers in Omdurman Hospital, Sudan [93]. Also study which was conducted among medical students of Karachi, in Pakistan, stated that female students showed significantly higher awareness regards than male students (p=0.023) [98]. A study which was conducted among dental clinical students in Ankara, Turkey, found a statistically significant association between gender of students and their knowledge scores ($p<0.05$), which is general success rate of female students was higher (71.6%) than male students' (46.9%) [111]. And study which was conducted among undergraduate students at college of dentistry, Madinah, Saudi Arabia, reported a statistically significant association between gender of students and their knowledge scores (females had more knowledge compared to males) [113]. Also there are studies that reach different results in the literature. A study which was carried out among the Thai university students in Thailand, reported there was no significant difference in knowledge between the genders [34]. The study which was conducted among dental and oral hygiene students at a University in Pretoria, South Africa, stated there were no significant differences between the genders [102]. The study which was carried out among medical students in University of Dammam, found that there was no statistically significant difference between males and females in knowledge level about hepatitis B [105]. Also there was no statistically significant association between gender of students and their knowledge scores in the study which was conducted among medical students in Erbil City, Iraq [108]. And in the study which was conducted at Sohag University, Egypt, there was no statistically significant association between gender of students and their knowledge scores [93]. In the current study the knowledge of female participants is found to be better than knowledge of male participants.

There was a significant difference towards working status factor in the binary analysis. The working status factor was involved in the logistic regression model, where respondents who were not working have a 1.9 times more knowledge than respondents who were working (OR=1.9; 95% C.I. =1.2, 3.2). The not working participants have been found to have more knowledge than working participants.

As for the academic success status of the respondents, there was a significant difference in the binary analysis. And also the academic success status factor was involved into the logistic regression model. The respondents who perceived their academic success as bad and average have a 1.5 times great knowledge than respondents who perceived their academic status as good (OR=1.5; 95% C.I.=1.2-2.0). The academic success status was assessed by the participants as a personal perception.

The participants' income status factor was statistically significant in the binary analysis, and was involved in the logistic regression model. The respondents who perceived their income status as good have a 3 times more knowledge than who perceived their income status as bad (OR=3.0; 95% C.I.=2.2-4.6). Also the participants who perceived their income level as an average have a 1.5 times greater knowledge than who perceived it as bad (OR=1.5; 95% C.I.=1.2-2.1). It is similar to study which was conducted among dental clinical students in Ankara, Turkey. There was statistically significant association between the income level of the students and their knowledge scores ($p<0.05$) [111]. The participants' income status was assessed by the participants as a personal perception.

From this study, it can be concluded that there was an inadequate knowledge level regarding HB among the participants. The most common independent factors associated with hepatitis B disease knowledge scores were gender, working status, academic success and participants' income status were found to be significant factors. In order to minimise the risk of the infectious with HB, health education program mes concerning mode of transmission and prevention of viral hepatitis should be conducted. This can be promoted through print and multimedia education targeting Universities, schools, youth centres, and clubs.

6. CONCLUSION and RECOMMENDATIONS

- A total of 1054 students responded to the study, but 1026 of them completed all the parts of the questionnaire on knowledge regarding infection and prevention modes of hepatitis B disease. Among these, 502 (47.6%) were males and 552 (52.4%) were females with ages ranging from 17 to 42 years (mean ±SD : 20.83 ± 2.86).

- The overall study revealed that there was a general weakness in knowledge towards hepatitis B disease among students, mean ±SD knowledge score was 19.3 ±5.1 over a total of 41 points. The mean and standard deviation of the knowledge groups are as following :

  - ‘Prevention’ group 4.52 ±1.8 (Min= 1, max= 10)
  - ‘Transmission’ group 11.36 ±2.0 (Min= 6, max= 17)
  - ‘Related disease and other effects’, group 1.12 ±1.0 (Min= 0, max= 4)
  - ‘General information about disease’ 2.35 ±1.9 (Min= 0, max= 8)

- More than half (59.6%) of the respondents have never heard about the Hepatitis B disease.

- Out of the all respondents only 6.5% were vaccinated against Hepatitis B disease, 51.8% were not vaccinated, and 41.7% of them did not know if they were vaccinated or not.

- During the study, it was found that, 44.1% mentioned the use of the same syringe for two poeple as a way of transmission, 41.1% of the respondents said that the virus can be transmitted via blood, 33.6% told unprotected sex, 32.2% regarded that can be transmitted with common shaving blade, 23.7% can be transmitted from mother to baby during the birth, 20.5% said by mother to baby during the pregnancy and only 8% said can be transmitted with dental implants.

- There were 89.6% of the respondents stated that hepatitis B cannot be transmitted with handshaking , hugging and skin contact, 71.2 % cannot be transmitted with common tooth brush, and 89.1% of respondents said that food and drinks cannot transmit HBV.

- Regarding complications of the HB, 38.7% of the respondents confirmed that hepatitis B infection causes cirrhosis, 38.3% said causes liver cancer and 27.7% said causes hepatic failure.

- Only 13.2% of the respondents were aware about the hepatitis B does not affect another organ of non – liver.

- In term of knowledge towards vaccination, 43.6% of respondents answered that vaccine was protectable against Hepatitis B infection.

- Female respondents tend to have better knowledge about HB than males (OR=1.4; 95% C.I. =1.1-1.9).

- Respondents who were not working have better knowledge than respondents who were working (OR=1.9; 95% C.I. =1.2 - 3.2).

- The respondents who perceived their income status as good have better knowledge than who perceived their income status as bad (OR=3.0; 95% C.I. =2.2-4.6). Also the participants who perceived their income level as average have more knowledge than who perceived it as bad (OR=1.5; 95% C.I. =1.2-2.1).

- The respondents who perceived their academic success as bad and average have more knowledge than respondents who perceived their academic status as good. (OR=1.5; 95% C.I. =1.2-2.0).

The above findings illustrates the necessity of persistent health education on HBV infection and prevention strategies. Therefore, we recommend the following:

- In order to decrease the risk of the hepatitis B disease infections, health education program mes with regard to ways of transmission and prevention of HBV

should be carried out. This can be implemented through print education targeting Universities, schools and youth centres.

- Interventions regarding health promotion should promote awareness, and increase knowledge of the riskiness of this disease.

- It is useful to assess the awareness of other university students regarding prevention and transmission of diseases.

- A strategy should be executed to carry out to grantee that all the required vaccinations are completed for all students of the university.

- More efforts should be done to evolve strategies of vaccination, particularly among the non- medical students in order to decrease the risks and effects of this disease.

- Different types of seminar and lectures on Hepatitis B, can be conducted by university to increase the mean of knowledge of the students.

- Government and different health related organizations should take necessary steps to increase knowledge towards Hepatitis B virus and it is prevention.

- School health lesson should be located between school curriculum.

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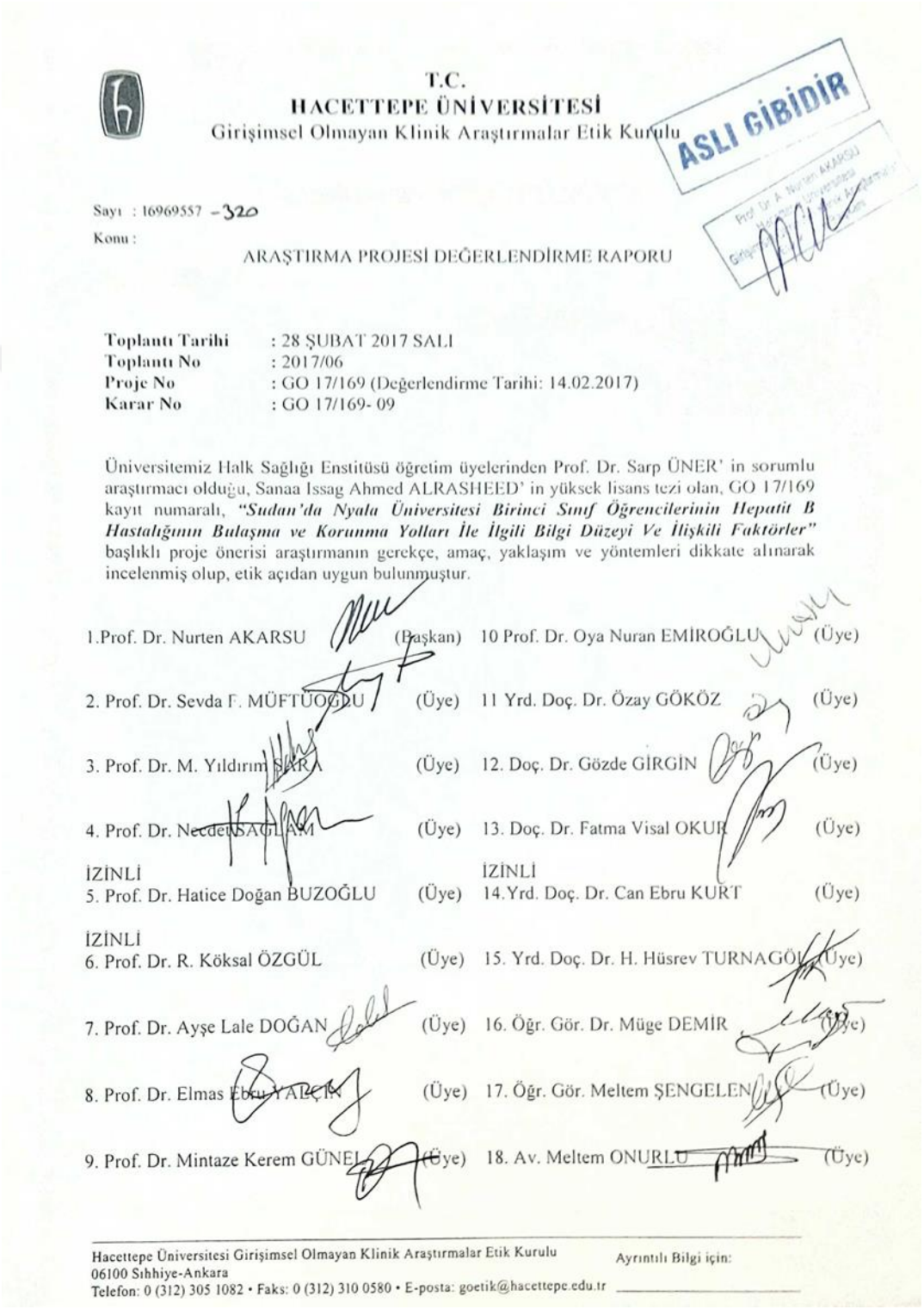
8. APPENDICES

Appendix-1. Approval of the Ethics Commitee of Hacettepe University



T.C.
HACETTEPE ÜNİVERSİTESİ
Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu

ASLI GİBİDİR

Sayı : 16969557 -320
Konu :

ARAŞTIRMA PROJESİ DEĞERLENDİRME RAPORU

Toplantı Tarihi : 28 ŞUBAT 2017 SALI
Toplantı No : 2017/06
Proje No : GO 17/169 (Değerlendirme Tarihi: 14.02.2017)
Karar No : GO 17/169- 09

Üniversitemiz Halk Sağlığı Enstitüsü öğretim üyelerinden Prof. Dr. Sarp ÜNER' in sorumlu araştırmacı olduğu, Sanaa Issag Ahmed ALRASHEED' in yüksek lisans tezi olan, GO 17/169 kayıt numaralı, ***"Sudan'da Nyala Üniversitesi Birinci Sınıf Öğrencilerinin Hepatit B Hastalığının Bulaşma ve Korunma Yolları İle İlgili Bilgi Düzeyi Ve İlişkili Faktörler"*** başlıklı proje önerisi araştırmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş olup, etik açıdan uygun bulunmuştur.

1.Prof. Dr. Nurten AKARSU	(Başkan)	10 Prof. Dr. Oya Nuran EMİROĞLU	(Üye)
2. Prof. Dr. Sevda F. MÜFTÜOĞLU	(Üye)	11 Yrd. Doç. Dr. Özay GÖKÖZ	(Üye)
3. Prof. Dr. M. Yıldırım SARA	(Üye)	12. Doç. Dr. Gözde GİRGİN	(Üye)
4. Prof. Dr. Necdet SAĞLAM	(Üye)	13. Doç. Dr. Fatma Visal OKUR	(Üye)
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Ayrıntılı Bilgi için:

Appendix-2. Digital Receipt

turnitin

Dijital Makbuz

Bu makbuz ödevinizin Turnitin'e ulaştığını bildirmektedir. Gönderiminize dair bilgiler şöyledir:

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T.C.
REPUBLIC OF TURKEY
HACETTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES

KNOWLEDGE REGARDING INFECTION AND PREVENTION MODES OF HEPATITIS B DISEASE AND ASSOCIATED FACTORS A MONG FIRST CLASS STUDENTS OF NYALA UNIVERSITY IN SUDAN

Sanaa Issag Ahmed ELRASHEED

Program of Public Health
MASTERS OF PUBLIC HEALTH THESIS

ANKARA
2018

Appendix-3. The Originality Report of Thesis

KNOWLEDGE REGARDING INFECTION AND PREVENTION MODES OF HEPATITIS B DISEASE AND ASSOCIATED FACTORS A MONG FIRST CLASS STUDENTS OF NYALA UNIVERSITY IN SUDAN

ORIJINALLIK RAPORU

%9	%7	%4	%3
BENZERLIK ENDEKSI	İNTERNET KAYNAKLARI	YAYINLAR	ÖĞRENCI ÖDEVLERI

BIRINCIL KAYNAKLAR

1	www.panafrican-med-journal.com İnternet Kaynağı	%1
2	www.diva-portal.se İnternet Kaynağı	%1
3	Noele P. Nelson, Philippa J. Easterbrook, Brian J. McMahon. "Epidemiology of Hepatitis B Virus Infection and Impact of Vaccination on Disease", Clinics in Liver Disease, 2016 Yayın	<%1
4	onlinelibrary.wiley.com İnternet Kaynağı	<%1
5	eujournal.org İnternet Kaynağı	<%1
6	Submitted to International Health Sciences University Öğrenci Ödevi	<%1

Appendix-4. The Questionnaire in English

Knowledge Regarding Hepatitis B Disease's Infection and Prevention Modes Amongst Undergraduate First year Students of Nyala University in Sudan.

Dear participant,

This study aimes to determine the level of knowledge regarding transmission and prevention methods of hepatitis B disease and related factors among the first year students of the university. It is very important that your participation in this study, leads to the interventions which are be carried out in the future. It is required to present your correct thoughts about the questions and to answer all of the questions in order to verify the results of the study. Personal information (name, address, telephone number) is not asked in the questionnaire. Your responses will be kept confidential and will only be evaluated by researchers, and also will not be used for any reason other than for research purposes.

You can contact Sanaa ISHAG AHMED ELRASHEED by phone or e-mail below if you have any question regarding the study.

Tel: 00905396233019 - 00249126188416

e-mail: senaishak188@gmail.com

Sanaa Ishag Ahmed Elrasheed.

I agree to participate in this study (…..)

Form no: ……

Date: / / 2017

1. Date of birth (day/month /year) ……/……/…….

2. Gender:

1) Male 2) Female

3. At which school are you studying?

1) Faculty of veterinary science.

2) College of education.

3) College of engineering sciences.

4) Faculty of economics and business studies.

5) Faculty of Law and Sharia.

6) College of technology and community development.

7) College of health sciences.

8) College of community science.

9) Unity of distance education and basic integrity of the study.

10) Faculty of medicine and health sciences.

11) Faculty of science and information technology.

4. How do you evaluate your success at school?

1) Bad 2)Average 3)Good

5. What is your marital status?

1) Single 2) Married 3) Other
(specify)……..

6. Indicate the settlement where your family is currently living:

1)City (city center) 2) Town (districts outside the city center) 3)Village

7. Who are you staying with at home? (More than one option can be selected).

1) Mother 2) Father 3) Brother/s or Sister/s 4) Grandfather / Grandmother

5) Others (Specify……)

8. What is your mother's education status?

1) Illiterate 2) Literate 3) Primary school graduate 4) Seondary school graduate 5) High school graduate 6) University graduate and Post graduate.

9. Does your mother work in an income-generating business?

1) yes she works (please specify) ……..

2) No she does not work

3) No retired

4) No housewife

5) Other (explain) ……

10. What is your father's education status?

1) Illiterate 2) Literate 3) Primary school graduate 4) Seondary school graduate 5) High school graduate 6) University graduate and Post graduate.

11. Does your father work in a paid work?

1) yes he works (please specify) ……..
2) No he does not work
3) No retired
4) Other (explain) ……

12. How do you interpret your family income situation?

1) Very bad 2) Bad 3)Average 4) Good 5) Very good

13. Do you work in a revenue-generating business?

1)Yes 2)No

14. How do you interpret your own income situation?

1) Very bad 2) Bad 3)Average 4) Good 5) Very good

15. How do you interpret your health right now?

1)Very good 2)Good 3)Average 4) Bad 5) Very bad

16. Did you consult a health care provider to get health care service in the last six months?

1) No

2) Yes (Where .....)

(Why.....)

17. Do you have any information about hepatitis B?

1) No (Go to Question 19) 2) Yes

18. Where did you get information about hepatitis B?

1) Newspaper 2) Television 3) Radio 4) İnternet

5) Friend 6) Family 7) Heath Personnel 8) School or University 9) Book

19. Is Hepatitis B infectious disease?

1) Infectious 2)Not infectious 3) I don't know

20. Is there a treatment for Hepatitis B disease?

1) Yes, there is 2)No, there is not 3)I don't know

21. Hepatitis B is transmitted by whichever of the following? (you can tick more than one)

1) Common injector 2) Insect bite

3) Using the same syringe in two uses 4) Breastfeeding

5) Common dress, glass usage 6) Shaving blade

7) From mother to baby during pregnancy period. 8) Blood

9) Unsafe sex 10) Mosquito bites

11) common toothbrush 12) Tooth implants13) Mother to baby during the birth 14) Foods and drinks

15) Common bathroom / toilet use 16) kissing the cheeks

17) Handshaking , hugging and skin contact 18) Sweat

19) I do not know

22. Is there a laboratory test that detects hepatitis B?

1) Yes, there is 2) No, there is not 3) I don't know

23. Hepatitis B disease can cause either of the following (you can mark more than one)

1) Liver cancer 2) Cirrhosis 3) Hepatic failure 4) I don't know

24. Is there a vaccine for Hepatitis B ?

1) Yes there is 2) No there is not 3) I don't know

25. Does Hepatitis B affect another organ than the liver?

1) Effects 2) Does not effect 3) I don't know

26. Which one of the following protects you from hepatitis B disease (you can mark more than one)

1) HBV Blood check 2) Hand washing

3) Use of antiseptic solution 4) Balanced and adequate nutrition

5) use of condom during sexual contact 6)Vaccination

7) I don't know

27. Can Hepatitis B disease be transformed into Hepatitis C disease?

1) Can be transformed 2) Can not be transformed 3) I don't know

28. What age groups does hepatitis B disease visable in? (you can mark more than one)

1) Infants 2) Children 3) Adults 4) Elders 5) I don't know

29. Is Hepatitis B vaccine enough if only one dose is given?

1) Enough 2) Not enough 3) I don’t know

30. Does the person who is infected in hepatitis B or has a vaccine protected against other types of hepatitis ?

1) Protected 2) Does not protected 3) I don’t know

31. Is it necessary to apply Hepatitis B vaccine to a pregnant woman who is carrier?

1) Necessary 2) Not necessary 3) I don’t know

32. How many doses of hepatitis B vaccine ?

1) One 2) Two 3) Three 4) Four 5) I don’t know

33. Did you ever applyed a vaccine against hepatitis B?

1) Yes, I did 2) No, I did not 3) I don’t know

Thank you for participating in the study.

Appendix-5. The Questionnaire in Arabic

بسم الله الرحمن الرحيم

دراسة حول مستوى معرفة طلاب جامعة نيالا المستوى الأول بطرق إنتقال والوقاية من مرض إلتهاب الكبد الفيروسي الوبائي ب والعوامل ذات الصلة

التاريخ: \ \ 2017 رقم الاستمارة

: .....

1.ما هو تاريخ ميلادك؟ (يوم \شهر\عام) .....\.....\.....

2.النوع :

1) ذكر 2)أنثى

3. ماهي الكلية التي تدرس فيها؟

1)كلية العلوم البيطرية 7)كلية الاطرالصحية

2)كلية التربية 8)كلية تنمية المجتمع

3)كلية العلوم الهندسية 9) وحدة التعليم عن بعد

4)كلية الاقتصاد والدراسات التجارية 10) كلية الطب

5)كلية القانون والشريعة 11) كلية العلوم وتقانة المعلومات

6)كلية التقانة والتنمية البشرية

4. كيف تقيم مستواك الأكاديمي ؟

1) ضعيف 2) وسط 3) جيد

5.ما هي حالتك الإجتماعية ؟

1) أعزب 2) متزوج 3) أخرى (وضح).....

6. ما هو المكان الذي تعيش فيه أسرتك الآن ؟

1) مدينة 2) دامرة 3)قرية

7. مع من تعيش من أفراد أسرتك ؟ (يمكنك ان تضع إشارة على أكثر من خيار)

1) أم 2) أب 3) أخ \ أخت أو أخوة \أخوات 4) جدة \ جد

5) أخرون (وضح)

.....

8. ما هو المستوى الأكاديمي لوالدتك ؟

1) لاتعرف القراءة ولا الكتابة 2) تعرف القراءة والكتابة 3) المرحلة الإبتدائية

4) المرحلة المتوسطة 5) المرحلة الثانوية 6) البكالريوس او ما فوقه

9. هل تعمل والدتك في أي وظيفة ذات دخل ثابت ؟

1) نعم تعمل (حدد الوظيفة) .....

2) لا تعمل

3) متقاعدة عن العمل (بالمعاش)

4) ربة منزل

5) أخري (حدد) .....

10. ما هو المستوى الأكاديمي لوالدك ؟

1) لايعرف القراءة ولا الكتابة 2) يعرف القراءة والكتابة 3) المرحلة الإبتدائية

4) المرحلة المتوسطة 5) المرحلة الثانوية 6) المرحلة الجامعية او ما فوقها

11. هل يعمل والدك في أي وظيفة ذات دخل ثابت ؟

1) نعم يعمل (حدد الوظيفة) .....

2) لا يعمل

3) متقاعد عن العمل (بالمعاش)

4) أخري (حدد).....

12. كيف تقيم مستوى دخل أسرتك ؟

1) ضعيف جدا 2) ضعيف 3) متوسط 4) جيد 5) جيد جدا

13. هل تعمل أنت في وظيفة مدرة للدخل ؟

1) نعم 2) لا

14. كيف تقيم مستوى دخلك المادي ؟

1) جيد جدا 2) جيد 3) متوسط 4)ضعيف 5) ضعيف جدا

15. كيف تقيم وضعك الصحي الآن؟

1) جيد جدا 2) جيد 3) متوسط 4)سيئ 5) سيئ جدا

16. هل قمت بزيارة اي مؤسسة صحية للحصول على خدمة صحية خلال الستة أشهر الماضية؟

1) لا

2) نعم (أين .....)

(لماذا .....)

17. هل لديك أي معلومة عن إلتهاب الكبد الفيروسي الوبائي ب ؟

1) لا (انتقل الى السؤال رقم 19) 2) نعم

18. ما هو المصدر الذي اخذت منه المعلومة التي تتعلق بالتهاب الكبد الفيروسيالوبائي ب؟

1) مجلة
2)التلفزيون
3)الراديو
4الإنترنت
5)صديق
6) الأسرة
7) موظف صحي (طبيب، ممرض.....)
8) المدرسة أو الجامعة
9) كتاب

19. هل إلتهاب الكبد الفيروسي الوبائي ب هو مرض معدي ؟

1) معدي 2) غير معدي 3) لا أعرف

20. هل هناك علاج نهائي لإلتهاب الكبد الفيروسي الوبائي ب؟

1)هناك علاج نهائي 2) لايوجد علاج نهائي 3)لاأعرف

21. أي من الآتي يمكن ان يؤدي الى نقل إلتهاب الكبد الفيروسي الوبائي ب ؟ (يمكنك إختيار اكثر من واحد)

1) المحاقن المشتركة
2) عض الحشرات
3) إستخدام نفس ابرة الحقن لشخصين
4)الرضاعة الطبيعية
5)الملابس ، المناشف والأواني المشتركة
6) أمواس الحلاقة المشتركة
7)من الأم للطفل أثناء فترة الحمل
8) عن طريق الدم الملوث
9) العلاقة الجنسية (الجماع) غير الآمنة
10) عض البعوض
11)استخدام فرش الأسنان المشتركة
12) خلع الأسنان (بواسطة الطبيب)
13) من الأم للطفل أثناء الولادة
14) الأطعمة والأشربة
15) الحمام والمرحاض المشترك
16) التقبيل على الخد
17) المصافحة ، الإحتضان والتماس الجلدي المباشر
18) العرق
19) لا أعرف

22. هل يوجد هناك إختبار معملي معين لتثبيت وجود إلتهاب الكبد الفيروسي الوبائي ب؟

1) يوجد 2) لا يوجد 3) لا أعرف

23 أي مما يلي يمكن أن يسببه إلتهاب الكبد الفيروسي ب (يمكنك إختيار اكثر من واحد)

1) سرطان الكبد 2) تليف الكبد 3) فشل الكبد 4) لاأعرف

24. هل يوجد هناك لقاح (تطعيم) ضد إلتهاب الكبد الفيروسي الوبائي ب؟

1) يوجد 2) لا يوجد 3) لا أعرف

25. هل يؤثر إلتهاب الكبد الفيروسي الوبائي ب على أي عضو آخر غير الكبد ؟

1) يؤثر 2) لا يؤثر 3) لا اعرف

26. أي من الآتي يؤدي للحماية من إلتهاب الكبد الفيروسي الوبائي ب؟ (يمكنك إختيار أكثر من واحد)

1) نقل الدم الآمن 2) غسل اليدين
3) استخدام محلول مطهر 4)التغذية المتوازنة والكافية
5) إستخدام الواقي الذكري أثناء الجماع 6) التلقيح (التطعيم)
7) لا أعرف

27.هل يمكن أن يتحول إلتهاب الكبد الفيروسي الوبائي ب الى إلتهاب الكبد الفيروسي الوبائي ج؟

1) يتحول 2) لا يتحول 3) لا أعرف

28. في أي مرحلة من العمر يظهر إلتهاب الكبد الفيروسي الوبائي ب ؟ (يمكنك إختيار أكثر من واحد)

1) حديثي الولادة 2) الأطفال 3) البالغين 4) المسنين 5) لا أعرف

29. هل تكفي جرعة واحدة من اللقاح للتطعيم ضد إلتهاب الكبد الفيروسي الوبائي ب ؟

1) كافية 2) غير كافية 3) لا أعرف

30. هل الإصابة بإلتهاب الكبد الفيروسي الوبائي ب او التطعيم ضده يحمي من الإصابة بأنواع إلتهاب الكبد الفيروسي الوبائي الأخرى؟

1) يحمي 2) لا يحمي 3) لا أعرف

31. هل يجب تطعيم المراة الحامل المصابة بإلتهاب الكبد الفيروسي الوبائي ب بلقاح إلتهاب الكبد الفيروسي الوبائي ب ؟

1) يجب 2) لا يجب 3) لا أعرف

32. توجد كم جرعة لقاح ضد إلتهاب الكبد الفيروسي الوبائي ب؟

1) جرعة واحدة 2) جرعتان 3) ثلاث جرعات 4) أربع جرعات
5) لا أعرف

33. هل تم تطعيمك ضد إلتهاب الكبد الفيروسي الوبائي ب؟

1) نعم 2) لا 3) لا أعرف

شكرا لمشاركتكم في جمع بيانات الدراسة .

Appendix-6. Binary Analysis Tables

Table 1. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is infectious or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B is infectious disease						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	219	44.5	273	55.5	492	48.0	12.211	**< 0.001**
	Female	296	55.4	238	44.6	534	52.0		
Age groups	Under 20	157	43.9	201	56.1	358	34.9	17.484	**0.001**
	20 - 24	296	52.7	266	47.3	562	54.8		
	25 - 29	59	63.4	34	36.6	93	9.1		
	30 and over	3	23.1	10	76.9	13	1.2		
Marital status	Single	489	51.2	466	48.8	955	93.1	5.623	**0.012**
	Married	26	36.6	45	63.4	71	6.9		
Place of residence	City	403	50.6	393	49.4	796	77.6	4.063	0.131
	Town	25	38.5	40	61.5	65	6.3		
	Village	87	52.7	78	47.3	165	16.1		
Working status	Working	35	38.0	57	62.0	92	9.0	5.969	**0.010**
	Not working	480	51.4	454	48.6	934	91.0		
Total		**515**	**50.2**	**511**	**49.8**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column

Table 2. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is occurs in adults or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease occurs in adults.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	153	31.1	339	68.9	492	48.0	29.656	< **0.001**
	Female	255	47.8	279	52.2	534	52.0		
Age groups	Under 20	129	36.0	229	64.0	358	34.9	27.477	< **0.001**
	20 - 24	257	45.7	305	54.3	562	54.8		
	25 - 29	21	22.6	72	77.4	93	9.1		
	30 and over	1	7.7`	12	92.3	13	1.2		
Marital status	Single	378	39.6	577	60.4	955	93.1	0.197	0.373
	Married	30	42.3	41	57.7	71	6.9		
Place of residence	City	324	40.7	472	59.3	796	77.6	9.795	**0.007**
	Town	14	21.5	51	78.5	65	6.3		
	Village	70	42.4	95	57.6	165	16.1		
Working status	Working	38	41.3	54	58.7	92	9.0	0.100	0.417
	Not working	370	39.6	564	60.4	934	91.0		
Total		**408**	**39.8**	**618**	**60.2**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 3. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it has a laboratory test that detects it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		There is a laboratory test that detects hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	168	34.1	324	65.9	492	48.0	3.616	**0.033**
	Female	213	39.9	321	60.1	534	52.0		
Age groups	Under 20	138	38.5	220	61.5	358	34.9	3.053	0.384
	20 - 24	208	37.0	354	63.0	562	54.8		
	25 - 29	33	35.5	60	64.5	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	366	38.3	589	61.7	955	93.1	8.373	**0.002**
	Married	15	21.1	56	78.9	71	6.9		
Place of residence	City	327	41.1	469	58.9	796	77.6	24.66	**<0.001**
	Town	12	18.5	53	81.5	65	6.3		
	Village	42	25.5	123	74.5	165	16.1		
Working status	Working	27	29.3	65	70.7	92	9.0	2.625	0.064
	Not working	354	37.9	580	62.1	934	91.0		
Total		**381**	**37.1**	**645**	**62.9**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column

Table 4. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it has a treatment or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		There is a treatment for Hepatitis B disease						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	108	22.0	384	78.0	492	48.0	13.581	**<0.001**
	Female	172	32.2	362	67.8	534	52.0		
Age groups	Under 20	144	40.2	214	59.8	358	34.9	53.889	**<0.001**
	20 - 24	108	19.2	454	80.8	562	54.8		
	25 - 29	28	30.1	65	69.9	93	9.1		
	30 and over	-	-	13	100.0	13	1.2		
Marital status	Single	272	28.5	683	71.5	955	93.1	9.869	**0.001**
	Married	8	11.3	63	88.7	71	6.9		
Place of residence	City	217	27.3	579	72.7	796	77.6	8.379	**0.015**
	Town	9	13.8	56	86.2	65	6.3		
	Village	54	32.7	111	67.3	165	16.1		
Working status	Working	14	15.2	78	84.8	92	9.0	7.424	**0.003**
	Not working	266	28.5	668	71.5	934	91.0		
Total		**280**	**27.3**	**746**	**72.7**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 5. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is occurs in children or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease occurs in children.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	395	80.3	97	19.7	492	48.0	9.825	**0.001**
	Female	384	71.9	150	28.1	534	52.0		
Age groups	Under 20	72	20.1	286	79.9	358	34.9	21.041	**<0.001**
	20 - 24	159	28.3	403	71.7	562	54.8		
	25 - 29	10	10.8	83	89.2	93	9.1		
	30 and over	6	46.2	7	53.8	13	1.2		
Marital status	Single	223	23.4	732	76.6	955	93.1	3.950	**0.036**
	Married	24	33.8	47	66.2	71	6.9		
Place of residence	City	194	24.4	602	75.6	796	77.6	17.006	**<0.001**
	Town	3	4.6	62	95.4	65	6.3		
	Village	50	30.3	115	69.7	165	16.1		
Working status	Working	17	18.5	75	81.5	92	9.0	1.731	0.116
	Not working	230	24.6	704	75.4	934	91.0		
Total		**247**	**24.1**	**779**	**75.9**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 6. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is occurs in elders or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease occurs in elders. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	111	22.6	381	77.4	492	48.0	0.552	0.252
	Female	131	24.5	403	75.5	534	52.0		
Age groups	Under 20	70	19.6	288	80.4	358	34.9	5.844	0.119
	20 - 24	147	26.2	415	73.8	562	54.8		
	25 - 29	23	24.7	70	75.3	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	233	24.4	722	75.6	955	93.1	5.038	**0.014**
	Married	9	12.7	62	87.3	71	6.9		
Place of residence	City	186	23.4	610	76.6	796	77.6	16.736	**<0.001**
	Town	4	6.2	61	93.8	65	6.3		
	Village	52	31.5	113	68.5	165	16.1		
Working status	Working	28	30.4	64	69.6	92	9.0	2.630	0.070
	Not working	214	22.9	720	77.1	934	91.0		
Total		**242**	**23.6**	**784**	**76.4**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column

Table 7. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is occurs in infants or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease occurs in infants. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	76	15.4	416	84.6	492	48.0	9.002	**0.002**
	Female	122	22.8	412	77.2	534	52.0		
Age groups	Under 20	46	12.8	312	87.2	358	34.9	25.018	**< 0.001**
	20 - 24	139	24.7	423	75.3	562	54.8		
	25 - 29	13	14.0	80	86.0	93	9.1		
	30 and over	-	-	13	100.0	13	1.2		
Marital status	Single	188	19.7	767	80.3	955	93.1	1.331	0.159
	Married	10	14.1	61	85.9	71	6.9		
Place of residence	City	152	19.1	644	80.9	796	77.6	3.536	0.171
	Town	8	12.3	57	87.7	65	6.3		
	Village	38	23.0	127	77.0	165	16.1		
Working status	Working	30	32.6	62	67.4	92	9.0	11.497	**0.001**
	Not working	168	18.0	766	82.0	934	91.0		
Total		**198**	**19.3**	**828**	**80.7**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column**.**

Table 8. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it does not affect another organ than the liver or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B does not affect another organ than the liver.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	60	12.2	432	87.8	492	48.0	0.767	0.217
	Female	75	14.0	459	86.0	534	52.0		
Age groups	Under 20	42	11.7	316	88.3	358	34.9	43.427	**<0.001**
	20 - 24	58	10.3	504	89.7	562	54.8		
	25 - 29	29	31.2	64	68.8	93	9.1		
	30 and over	6	46.2	7	53.8	13	1.2		
Marital status	Single	117	12.3	838	87.7	955	93.1	9.926	**0.003**
	Married	18	25.4	53	74.6	71	6.9		
Place of residence	City	87	10.9	709	89.1	796	77.6	14.643	**<0.001**
	Town	17	26.2	48	73.8	65	6.3		
	Village	31	18.8	134	81.2	165	16.1		
Working status	Working	17	18.5	75	81.5	92	9.0	2.504	0.082
	Not working	118	12.6	816	87.4	934	91.0		
Total		**135**	**13.2**	**891**	**86.8**	**1026**	**100.0**	**-**	

* Percentage of row. ** Percentage of column.

Table 9. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with sweat or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with sweat.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	476	96.7	16	3.3	492	48.0	0.172	0.408
	Female	519	97.2	15	2.8	534	52.0		
Age groups	Under 20	349	97.5	9	2.5	358	34.9	21.197	**<0.001**
	20 - 24	550	97.9	12	2.1	562	54.8		
	25 - 29	83	89.2	10	10.8	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	929	97.3	26	2.7	955	93.1	4.209	0.054
	Married	66	93.0	5	7.0	71	6.9		
Place of residence	City	777	97.6	19	2.4	796	77.6	6.773	**0.034**
	Town	60	92.3	5	7.7	65	6.3		
	Village	158	95.8	7	4.2	165	16.1		
Working status	Working	88	95.7	4	4.3	92	9.0	0.607	**0.300**
	Not working	907	97.1	27	2.9	934	91.0		
Total		**995**	**97.0**	**31**	**3.0**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 10. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with breastfeeding or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with breastfeeding						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	468	95.1	24	4.9	492	48.0	1.064	0.185
	Female	500	93.6	34	6.4	534	52.0		
Age groups	Under 20	333	93.0	25	7.0	358	34.9	6.679	0.083
	20 - 24	539	95.9	23	4.1	562	54.8		
	25 - 29	84	90.3	9	9.7	93	9.1		
	30 and over	12	92.3	1	7.7	13	1.2		
Marital status	Single	904	94.7	51	5.3	955	93.1	2.530	0.098
	Married	64	90.1	7	9.9	71	6.9		
Place of residence	City	761	95.6	35	4.4	796	77.6	10.604	**0.004**
	Town	59	90.8	6	9.2	65	6.3		
	Village	148	89.7	17	10.3	165	16.1		
Working status	Working	90	97.8	2	2.2	92	9.0	2.294	0.091
	Not working	878	94.0	56	6.0	934	91.0		
Total		**968**	**94.3**	**58**	**5.7**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 11. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with kissing the cheek or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with kissing the cheek.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	449	91.3	43	8.7	492	48.0	0.005	0.515
	Female	488	91.4	46	8.6	534	52.0		
Age groups	Under 20	323	90.2	35	9.8	358	34.9	11.136	**0.011**
	20 - 24	508	90.4	54	9.6	562	54.8		
	25 - 29	93	100.0	-	-	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	866	90.7	89	9.3	955	93.1	7.245	**0.001**
	Married	71	100.0	-	-	71	6.9		
Place of residence	City	721	90.6	75	9.4	796	77.6	6.743	**0.034**
	Town	65	100.0	-	-	65	6.3		
	Village	151	91.5	14	8.5	165	16.1		
Working status	Working	81	88.0	11	12.0	92	9.0	1.374	0.163
	Not working	856	91.6	78	8.4	934	91.0		
Total		**937**	**91.3**	**89**	**8.7**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 12. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with common toilet-bath use or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with common toilet-bath use.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	33	6.7	459	93.3	492	48.0	10.480	**0.001**
	Female	68	12.7	466	87.3	534	52.0		
Age groups	Under 20	328	91.6	30	8.4	358	34.9	13.166	**0.004**
	20 - 24	504	89.7	58	10.3	562	54.8		
	25 - 29	85	91.4	8	8.6	93	9.1		
	30 and over	8	61.5	5	38.5	13	1.2		
Marital status	Single	866	90.7	89	9.3	955	93.1	4.281	**0.038**
	Married	59	83.1	12	16.9	71	6.9		
Place of residence	City	715	89.8	81	10.2	796	77.6	0.470	0.791
	Town	59	90.8	6	9.2	65	6.3		
	Village	151	91.5	14	8.5	165	16.1		
Working status	Working	86	93.5	6	6.5	92	9.0	1.257	0.175
	Not working	839	89.8	95	10.2	934	91.0		
Total		**925**	**90.2**	**101**	**9.8**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 13. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with handshaking, hugging and skin contact or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with handshaking, hugging and skin contact.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	453	92.1	39	7.9	492	48.0	6.335	**0.008**
	Female	466	87.3	68	12.7	534	52.0		
Age groups	Under 20	323	90.2	35	9.8	358	34.9	5.559	0.135
	20 - 24	495	88.1	67	11.9	562	54.8		
	25 - 29	88	94.6	5	5.4	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	848	88.8	107	11.2	955	93.1	8.881	< **0.001**
	Married	71	100.0	-	-	71	6.9		
Place of residence	City	711	89.3	85	10.7	796	77.6	0.248	0.884
	Town	59	90.8	6	9.2	65	6.3		
	Village	149	90.3	16	9.7	165	16.1		
Working status	Working	84	91.3	8	8.7	92	9.0	0.325	0.361
	Not working	835	89.4	99	10.6	934	91.0		
Total		**919**	**89.6**	**107**	**10.4**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 14. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with foods and drinks or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with foods and drinks.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	418	85.0	74	15.0	492	48.0	16.536	< **0.001**
	Female	496	92.9	38	7.1	534	52.0		
Age groups	Under 20	318	88.8	40	11.2	358	34.9	8.583	**0.035**
	20 - 24	493	87.7	69	12.3	562	54.8		
	25 - 29	91	97.8	2	2.2	93	9.1		
	30 and over	12	92.3	1	7.7	13	1.2		
Marital status	Single	850	89.0	105	11.0	955	93.1	0.088	0.479
	Married	64	90.1	7	9.9	71	6.9		
Place of residence	City	712	89.4	84	10.6	796	77.6	3.859	0.145
	Town	61	93.8	4	6.2	65	6.3		
	Village	141	85.5	24	14.5	165	16.1		
Working status	Working	62	67.4	30	32.6	92	9.0	48.903	< **0.001**
	Not working	852	91.2	82	8.8	934	91.0		
Total		**914**	**89.1**	**112**	**10.9**	**102**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 15. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with personel items such as clothes and glass or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with personel items such as clothes and glass.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	443	90.0	49	10.0	492	48.0	0.890	0.200
	Female	471	88.2	63	11.8	534	52.0		
Age groups	Under 20	313	87.4	45	12.6	358	34.9	3.732	0.292
	20 - 24	502	89.3	60	10.7	562	54.8		
	25 - 29	86	92.5	7	7.5	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	850	89.0	105	11.0	955	93.1	0.088	0.479
	Married	64	90.1	7	9.9	71	6.9		
Place of residence	City	707	88.8	89	11.2	796	77.6	2.957	0.228
	Town	62	95.4	3	4.6	65	6.3		
	Village	145	87.9	20	12.1	165	16.1		
Working status	Working	87	94.6	5	5.4	92	9.0	3.122	0.048
	Not working	827	88.5	107	11.5	934	91.0		
Total		**914**	**89.1**	**112**	**10.9**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 16. Knowledge status of the first class students according to some socio-demographic charactetceristics regarding Hepatitis B disease (whether it is transmitted with insect bite or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with insect bite						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	412	83.7	80	16.3	492	48.0	11.008	**0.001**
	Female	484	90.6	50	9.4	534	52.0		
Age groups	Under 20	326	91.1	32	8.9	358	34.9	20.633	< **0.001**
	20 - 24	468	83.3	94	16.7	562	54.8		
	25 - 29	89	95.7	4	4.3	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	825	86.4	130	13.6	955	93.1	11.067	< **0.001**
	Married	71	100.0	-	-	71	6.9		
Place of residence	City	694	87.2	102	12.8	796	77.6	0.910	0.634
	Town	55	84.6	10	15.4	65	6.3		
	Village	147	89.1	18	10.9	165	16.1		
Working status	Working	88	95.7	4	4.3	92	9.0	6.327	**0.005**
	Not working	808	86.5	126	13.5	934	91.0		
Total		**896**	**87.3**	**130**	**12.7**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 17. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with mosquito bites or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is not transmitted with mosquito bites.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%	n	%*	n	%**		
Gender	Male	404	82.1	88	17.9	492	48.0	2.280	0.077
	Female	457	85.6	77	14.4	534	52.0		
Age groups	Under 20	297	83.0	61	17.0	358	34.9	8.356	**0.039**
	20 - 24	465	82.7	97	17.3	562	54.8		
	25 - 29	86	92.5	7	7.5	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	790	82.7	165	17.3	955	93.1	14.618	**<0.001**
	Married	71	100.0	-	-	71	6.9		
Place of residence	City	686	86.2	110	13.8	796	77.6	13.809	**0.001**
	Town	48	73.8	17	26.2	65	6.3		
	Village	127	77.0	38	23.0	165	16.1		
Working status	Working	83	90.2	9	9.8	92	9.0	2.971	0.052
	Not working	778	83.3	156	16.7	934	91.0		
Total		**861**	**83.9**	**165**	**16.1**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 18. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with common tooth brush or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with common tooth brush.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	350	71.1	142	28.9	492	48.0	0.006	0.498
	Female	381	71.3	153	28.7	534	52.0		
Age groups	Under 20	250	69.8	108	30.2	358	34.9	23.937	**<0.001**
	20 - 24	384	68.3	178	31.7	562	54.8		
	25 - 29	85	91.4	8	8.6	93	9.1		
	30 and over	12	92.3	1	7.7	13	1.2		
Marital status	Single	677	70.9	278	29.1	955	93.1	0.861	0.216
	Married	54	76.1	17	23.9	71	6.9		
Place of residence	City	574	72.1	222	27.9	796	77.6	6.976	**0.031**
	Town	37	56.9	28	43.1	65	6.3		
	Village	120	72.7	45	27.3	165	16.1		
Working status	Working	53	57.6	39	42.4	92	9.0	9.177	**0.002**
	Not working	678	72.6	256	27.4	934	91.0		
Total		**731**	**71.2**	**295**	**28.8**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 19. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with common injectors or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with common injectors						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	209	42.5	283	57.5	492	48.0	18.191	**<0.001**
	Female	298	55.8	236	44.2	534	52.0		
Age groups	Under 20	168	46.9	190	53.1	358	34.9	22.227	**<0.001**
	20 - 24	306	54.4	256	45.6	562	54.8		
	25 - 29	31	33.3	62	66.7	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	470	49.2	485	50.8	955	93.1	0.222	0.364
	Married	37	52.1	34	47.9	71	6.9		
Place of residence	City	399	50.1	397	49.9	796	77.6	30.011	**<0.001**
	Town	49	75.4	16	24.6	65	6.3		
	Village	59	35.8	106	64.2	165	16.1		
Working status	Working	22	23.9	70	76.1	92	9.0	26.294	**<0.001**
	Not working	485	51.9	449	48.1	934	91.0		
Total		**507**	**49.4**	**519**	**50.6**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 20. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with the use of the same syringe for two poeple or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with the use of the same syringe in two uses.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	187	38.0	305	62.0	492	48.0	14.022	**<0.001**
	Female	265	49.6	269	50.4	534	52.0		
Age groups	Under 20	156	43.6	202	56.4	358	34.9	22.416	**<0.001**
	20 - 24	271	48.2	291	51.8	562	54.8		
	25 - 29	23	24.7	70	75.3	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	433	45.3	522	54.7	955	93.1	9.256	**0.001**
	Married	19	26.8	52	73.2	71	6.9		
Place of residence	City	386	48.5	410	51.5	796	77.6	34.888	**<0.001**
	Town	10	15.4	55	84.6	65	6.3		
	Village	56	33.9	109	66.1	165	16.1		
Working status	Working	24	26.1	68	73.9	92	9.0	13.238	**<0.001**
	Not working	428	45.8	506	54.2	934	91.0		
Total		**452**	**44.1**	**574**	**55.9**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 21. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with blood or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with blood						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	190	38.6	302	61.4	492	48.0	2.465	0.066
	Female	232	43.4	302	56.6	534	52.0		
Age groups	Under 20	137	38.3	221	61.7	358	34.9	34.35	**<0.001**
	20 - 24	266	47.3	296	52.7	562	54.8		
	25 - 29	18	19.4	75	80.6	93	9.1		
	30 and over	1	7.7	12	92.3	13	1.2		
Marital status	Single	389	40.7	566	59.3	955	93.1	0.901	0.204
	Married	33	46.5	38	53.5	71	6.9		
Place of residence	City	354	44.5	442	55.5	796	77.6	20.99	**<0.001**
	Town	12	18.5	53	81.5	65	6.3		
	Village	56	33.9	109	66.1	165	16.1		
Working status	Working	34	37.0	58	63.0	92	9.0	0.727	0.230
	Not working	388	41.5	546	58.5	934	91.0		
Total		**422**	**41.1**	**604**	**58.9**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 22. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with unsafe sex or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with unsafe sex						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	151	30.7	341	69.3	492	48.0	3.648	**0.033**
	Female	194	36.3	340	63.7	534	52.0		
Age groups	Under 20	111	31.0	247	69.0	358	34.9	17.266	**0.001**
	20 - 24	214	38.1	348	61.9	562	54.8		
	25 - 29	19	20.4	74	79.6	93	9.1		
	30 and over	1	7.7	12	92.3	13	1.2		
Marital status	Single	320	33.5	635	66.5	955	93.1	0.086	0.431
	Married	25	35.2	46	64.8	71	6.9		
Place of residence	City	280	35.2	516	64.8	796	77.6	5.089	0.078
	Town	22	33.8	43	66.2	65	6.3		
	Village	43	26.1	122	73.9	165	16.1		
Working status	Working	24	26.1	68	73.9	92	9.0	2.573	0.066
	Not working	321	34.4	613	65.6	934	91.0		
Total		**345**	**33.6**	**681**	**66.4**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 23. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with common shaving blade or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with common shaving blade						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	142	28.9	350	71.1	492	48.0	4.724	**0.017**
	Female	188	35.2	346	64.8	534	52.0		
Age groups	Under 20	109	30.4	249	69.6	358	34.9	41.75	< **0.001**
	20 - 24	214	38.1	348	61.9	562	54.8		
	25 - 29	5	5.4	88	94.6	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	308	32.3	647	67.7	955	93.1	0.048	0.470
	Married	22	31.0	49	69.0	71	6.9		
Place of residence	City	273	34.3	523	65.7	796	77.6	10.814	**0.004**
	Town	22	33.8	43	66.2	65	6.3		
	Village	35	21.2	130	78.8	165	16.1		
Working status	Working	17	18.5	75	81.5	92	9.0	8.675	**0.002**
	Not working	313	33.5	621	66.5	934	91.0		
Total		**330**	**32.2**	**696**	**67.8**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 24. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted from mother to baby during birth or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted from mother to baby during the birth.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	112	22.8	380	77.2	492	48.0	0.443	0.277
	Female	131	24.5	403	75.5	534	52.0		
Age groups	Under 20	102	28.5	256	71.5	358	34.9	30.511	< **0.001**
	20 - 24	138	24.6	424	75.4	562	54.8		
	25 - 29	2	7.7	91	97.8	93	9.1		
	30 and over	1	2.2	12	92.3	13	1.2		
Marital status	Single	225	23.6	730	76.4	955	93.1	0.117	0.413
	Married	18	25.4	53	74.6	71	6.9		
Place of residence	City	216	27.1	580	72.9	796	77.6	24.967	< **0.001**
	Town	4	6.2	61	93.8	65	6.3		
	Village	23	13.9	142	86.1	165	16.1		
Working status	Working	27	29.3	65	70.7	92	9.0	1.794	0.114
	Not working	216	23.1	718	76.9	934	91.0		
Total		**243**	**23.7**	**783**	**76.3**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 25. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted from mother to baby during pregnancy or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted from mother to baby during the pregnancy.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	102	20.7	390	79.3	492	48.0	0.40	0.451
	Female	108	20.2	426	79.8	534	52.0		
Age groups	Under 20	81	22.6	277	77.4	358	34.9	22.812	< **0.001**
	20 - 24	126	22.4	436	77.6	562	54.8		
	25 - 29	2	2.2	91	97.8	93	9.1		
	30 and over	1	7.7	12	92.3	13	1.2		
Marital status	Single	191	20.0	764	80.0	955	93.1	1.856	0.115
	Married	19	26.8	52	73.2	71	6.9		
Place of residence	City	186	23.4	610	76.6	796	77.6	19.352	< **0.001**
	Town	4	6.2	61	93.8	65	6.3		
	Village	20	12.1	145	87.9	165	16.1		
Working status	Working	10	10.9	82	89.1	92	9.0	5.720	**0.009**
	Not working	200	21.4	734	78.6	934	91.0		
Total		**210**	**20.5**	**816**	**79.5**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 26. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it is transmitted with dental implants or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease is transmitted with dental implants.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	44	8.9	448	91.1	492	48.0	1.162	0.168
	Female	38	7.1	496	92.9	534	52.0		
Age groups	Under 20	30	8.4	328	91.6	358	34.9	1.903	0.593
	20 - 24	47	8.4	515	91.6	562	54.8		
	25 - 29	4	4.3	89	95.7	93	9.1		
	30 and over	1	7.7	12	92.3	13	1.2		
Marital status	Single	73	7.6	882	92.4	955	93.1	2.276	0.104
	Married	9	12.7	62	87.3	71	6.9		
Place of residence	City	67	8.4	729	91.6	796	77.6	1.320	0.517
	Town	3	4.6	62	95.4	65	6.3		
	Village	12	7.3	153	92.7	165	16.1		
Working status	Working	12	13.0	80	87.0	92	9.0	3.507	0.054
	Not working	70	7.5	864	92.5	934	91.0		
Total		**82**	**8.0**	**944**	**92.0**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 27. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it causes Cirrhosis or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B causes Cirrhosis.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	202	41.1	290	58.9	492	48.0	2.225	0.077
	Female	195	36.5	339	63.5	534	52.0		
Age groups	Under 20	105	29.3	253	70.7	358	34.9	39.887	**<0.001**
	20 - 24	266	47.3	296	52.7	562	54.8		
	25 - 29	23	24.7	70	75.3	93	9.1		
	30 and over	3	23.1	10	76.9	13	1.2		
Marital status	Single	377	39.5	578	60.5	955	93.1	3.562	**0.037**
	Married	20	28.2	51	71.8	71	6.9		
Place of residence	City	341	42.8	455	57.2	796	77.6	36.316	**<0.001**
	Town	5	7.7	60	92.3	65	6.3		
	Village	51	30.9	114	69.1	165	16.1		
Working status	Working	30	32.6	62	67.4	92	9.0	1.578	0.126
	Not working	367	39.3	567	60.7	934	91.0		
Total		**397**	**38.7**	**629**	**61.3**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 28. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it causes liver cancer or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B causes liver cancer.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	181	36.8	311	63.2	492	48.0	0.919	0.186
	Female	212	39.7	322	60.3	534	52.0		
Age groups	Under 20	134	37.4	224	62.6	358	34.9	5.964	0.113
	20 - 24	224	39.9	338	60.1	562	54.8		
	25 - 29	34	36.6	59	63.4	93	9.1		
	30 and over	1	7.7	12	92.3	13	1.2		
Marital status	Single	367	38.4	588	61.6	955	93.1	0.092	0.433
	Married	26	36.6	45	63.4	71	6.9		
Place of residence	City	299	37.6	497	62.4	796	77.6	6.019	**0.049**
	Town	19	29.2	46	70.8	65	6.3		
	Village	75	45.5	90	54.5	165	16.1		
Working status	Working	39	42.4	53	57.6	92	9.0	0.714	0.231
	Not working	354	37.9	580	62.1	934	91.0		
Total		**393**	**38.3**	**633**	**61.7**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 29. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it causes Hepatic failure or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B causes Hepatic failure.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	98	19.9	394	80.1	492	48.0	28.448	< **0.001**
	Female	186	34.8	348	65.2	534	52.0		
Age groups	Under 20	90	25.1	268	74.9	358	34.9	9.710	**0.021**
	20 - 24	173	30.8	389	69.2	562	54.8		
	25 - 29	16	17.2	77	82.8	93	9.1		
	30 and over	5	38.5	8	61.5	13	1.2		
Marital status	Single	245	25.7	710	74.3	955	93.1	28.293	< **0.001**
	Married	39	54.9	32	45.1	71	6.9		
Place of residence	City	225	28.3	571	71.7	796	77.6	6.918	**0.031**
	Town	9	13.8	56	86.2	65	6.3		
	Village	50	30.3	115	69.7	165	16.1		
Working status	Working	22	23.9	70	76.1	92	9.0	0.716	0.237
	Not working	262	28.1	672	71.9	934	91.0		
Total		**284**	**27.7**	**742**	**72.3**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 30. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether can be transformed into Hepatitis C disease or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hepatitis B disease cannot be transformed into Hepatitis C disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	25	5.1	467	94.9	492	48.0	4.509	**0.022**
	Female	45	8.4	489	91.6	534	52.0		
Age groups	Under 20	29	8.1	329	91.9	358	34.9	9.241	**0.026**
	20 - 24	39	6.9	523	93.1	562	54.8		
	25 - 29	-	-	93	100	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	64	6.7	891	93.3	955	93.1	0.318	0.354
	Married	6	8.5	65	91.5	71	6.9		
Place of residence	City	53	6.7	743	93.3	796	77.6	17.617	< **0.001**
	Town	12	18.5	53	81.5	65	6.3		
	Village	5	3.0	160	97.0	165	16.1		
Working status	Working	6	6.5	86	93.5	92	9.0	0.014	0.559
	Not working	64	6.9	870	93.1	934	91.0		
Total		**70**	**6.8**	**956**	**93.2**	**1026**	**100**	-	

* Percentage of row. ** Percentage of column.

Table 31. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether only one dose of vaccine is enough or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Only one dose of Hepatitis B vaccine is not enough.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	165	33.5	327	66.5	492	48.0	0.563	0.247
	Female	191	35.8	343	64.2	534	52.0		
Age groups	Under 20	131	36.6	227	63.4	358	34.9	3.222	0.359
	20 - 24	194	34.5	368	65.5	562	54.8		
	25 - 29	29	31.2	64	68.8	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	325	34.0	630	66.0	955	93.1	2.705	0.066
	Married	31	43.7	40	56.3	71	6.9		
Place of residence	City	276	34.7	520	65.3	796	77.6	8.739	**0.013**
	Town	13	20.0	52	80.0	65	6.3		
	Village	67	40.6	98	59.4	165	16.1		
Working status	Working	33	35.9	59	64.1	92	9.0	0.061	0.444
	Not working	323	34.6	611	65.4	934	91.0		
Total		**356**	**34.7**	**670**	**65.3**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 32. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether it has a vaccine or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		There is a vaccine for Hepatitis B disease. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	215	43.7	277	56.3	492	48.0	5.105	**0.014**
	Female	271	50.7	263	49.3	534	52.0		
Age groups	Under 20	161	45.0	197	55.0	358	34.9	7.430	0.059
	20 - 24	264	47.0	298	53.0	562	54.8		
	25 - 29	56	60.2	37	39.8	93	9.1		
	30 and over	5	38.5	8	61.5	13	1.2		
Marital status	Single	437	54.8	518	54.2	955	93.1	14.335	**<0.001**
	Married	49	69.0	22	31.0	71	6.9		
Place of residence	City	381	47.9	415	52.1	796	77.6	4.182	0.124
	Town	23	35.4	42	64.6	65	6.3		
	Village	82	49.7	83	50.3	165	16.1		
Working status	Working	53	57.6	39	42.4	92	9.0	4.251	**0.025**
	Not working	433	46.4	501	53.6	934	91.0		
Total		**486**	**47.3**	**540**	**52.7**	**1026**	**100.0**	**-**	

* Percentage of row. ** Percentage of column.

Table 33. Knowledge status of the first class students according to some socio-demographic characteristics regarding doses of Hepatitis B vaccine (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		There are three doses of hepatitis B vaccine. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	82	16.7	410	83.3	492	48.0	5.458	**0.012**
	Female	120	22.5	414	77.5	534	52.0		
Age groups	Under 20	64	17.9	294	82.1	358	34.9	1.510	0.680
	20 - 24	118	21.0	444	79.0	562	54.8		
	25 - 29	18	19.4	75	80.6	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	187	19.6	768	80.4	955	93.1	0.100	0.426
	Married	15	21.1	56	78.9	71	6.9		
Place of residence	City	135	17.0	661	83.0	796	77.6	23.239	**< 0.001**
	Town	12	18.5	53	81.5	65	6.3		
	Village	55	33.3	110	66.7	165	16.1		
Working status	Working	10	10.9	82	89.1	92	9.0	4.970	**0.014**
	Not working	192	20.6	742	79.4	934	91.0		
Total		**202**	**19.7**	**824**	**80.3**	**1026**	**100**	**-**	

* Percentage of row. ** Percentage of column.

Table 34. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether the person who is infected or applied a vaccine of hepatitis B was prevented against other types of hepatitis disease or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		The person who is infected in or applied a vaccine of hepatitis B has not been prevented against other types of hepatitis disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	62	12.6	430	87.4	492	48.0	3.492	**0.039**
	Female	48	9.0	486	91.0	534	52.0		
Age groups	Under 20	52	14.5	306	85.5	358	34.9	10.727	**0.013**
	20 - 24	53	9.4	509	90.6	562	54.8		
	25 - 29	5	5.4	88	94.6	93	9.1		
	30 and over	-	-	13	100	13	1.2		
Marital status	Single	108	11.3	847	88.7	955	93.1	4.979	**0.012**
	Married	2	2.8	69	97.2	71	6.9		
Place of residence	City	89	11.2	707	88.8	796	77.6	4.486	0.106
	Town	10	15.4	55	84.6	65	6.3		
	Village	11	6.7	154	93.3	165	16.1		
Working status	Working	22	23.9	70	76.1	92	9.0	18.374	< **0.001**
	Not working	88	9.4	846	90.6	934	91.0		
Total		**110**	**10.7**	**916**	**89.3**	**1026**	**100**	**-**	

* Percentage of row. ** Percentage of column.

Table 35. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (if it is necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		It is not necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier .						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	47	9.6	445	90.4	492	48.0	0.951	0.191
	Female	61	11.4	473	88.6	534	52.0		
Age groups	Under 20	26	7.3	332	92.7	358	34.9	32.658	<**0.001**
	20 - 24	74	13.2	488	86.8	562	54.8		
	25 - 29	2	2.2	91	97.8	93	9.1		
	30 and over	6	46.2	7	53.8	13	1.2		
Marital status	Single	99	10.4	856	89.6	955	93.1	0.374	0.327
	Married	9	12.7	62	87.3	71	6.9		
Place of residence	City	94	11.8	702	88.2	796	77.6	7.075	**0.029**
	Town	2	3.1	63	96.9	65	6.3		
	Village	12	7.3	153	92.7	165	16.1		
Working status	Working	5	5.4	87	94.6	92	9.0	2.782	0.060
	Not working	103	11.0	831	89.0	934	91.0		
Total		**108**	**10.5**	**918**	**89.5**	**1026**	**100.0**	**-**	

* Percentage of row. ** Percentage of column.

Table 36. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether vaccination prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Vaccination is prevent against Hepatitis B disease. Correct responders		Wrong responders		Total		X^2	P value
		n	%*	n	%*	n	%**		
Gender	Male	182	37.0	310	63.0	492	48.0	16.63	**<0.001**
	Female	265	49.6	269	50.4	534	52.0		
Age groups	Under 20	163	45.5	195	54.5	358	34.9	3.390	0.335
	20 - 24	238	42.3	324	57.7	562	54.8		
	25 - 29	43	46.2	50	53.8	93	9.1		
	30 and over	3	23.1	10	76.9	13	1.2		
Marital status	Single	407	42.6	548	57.4	955	93.1	5.060	**0.017**
	Married	40	56.3	31	43.7	71	6.9		
Place of residence	City	362	45.5	434	54.5	796	77.6	5.353	0.069
	Town	25	38.5	40	61.5	65	6.3		
	Village	60	36.4	105	63.6	165	16.1		
Working status	Working	42	45.7	50	54.3	92	9.0	0.673	0.376
	Not working	405	43.4	529	56.6	934	91.0		
Total		**447**	**43.6**	**579**	**56.4**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 37. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether the use of antiseptic solution prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		The use of antiseptic solution is not prevent from Hepatitis B disease. Correct responders		Wrong responders		Total		X^2	P value
		n	%*	n	%*	n	%**		
Gender	Male	362	73.6	130	26.4	492	48.0	-	0.525
	Female	393	73.6	141	26.4	534	52.0		
Age groups	Under 20	293	81.8	65	18.2	358	34.9	26.098	**<0.001**
	20 - 24	378	67.3	184	32.7	562	54.8		
	25 - 29	73	78.5	20	21.5	93	9.1		
	30 and over	11	84.6	2	15.4	13	1.2		
Marital status	Single	703	73.6	252	26.4	955	93.1	0.005	0.521
	Married	52	73.2	19	26.8	71	6.9		
Place of residence	City	601	75.5	195	24.5	796	77.6	6.735	**0.034**
	Town	43	66.2	22	33.8	65	6.3		
	Village	111	67.3	54	32.7	165	16.1		
Working status	Working	45	48.9	47	51.1	92	9.0	31.654	**<0.001**
	Not working	710	76.0	224	24.0	934	91.0		
Total		**755**	**73.6**	**271**	**26.4**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 38. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether hand washing prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Hand washing is not prevent from Hepatitis B disease. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	379	77.0	113	23.0	492	48.0	6.416	**0.007**
	Female	374	70.0	160	30.0	534	52.0		
Age groups	Under 20	264	73.7	94	26.3	358	34.9	16.459	**0.001**
	20 - 24	395	70.3	167	29.7	562	54.8		
	25 - 29	81	87.1	12	12.9	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	688	72.0	267	28.0	955	93.1	12.878	**< 0.001**
	Married	65	91.5	6	8.5	71	6.9		
Place of residence	City	589	74.0	207	26.0	796	77.6	1.267	0.531
	Town	44	67.7	21	32.3	65	6.3		
	Village	120	72.7	45	27.3	165	16.1		
Working status	Working	65	70.7	27	29.3	92	9.0	0.388	0.305
	Not working	688	73.7	246	26.3	934	91.0		
Total		**753**	**73.4**	**273**	**26.6**	**1026**	**100**	**-**	

* Percentage of row. ** Percentage of column.

Table 39. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether balanced and adequate nutrition prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		Balanced and adequate nutrition is not prevent from Hepatitis B disease. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Gender	Male	332	67.5	160	32.5	492	48.0	0.055	0.433
	Female	364	68.2	170	31.8	534	52.0		
Age groups	Under 20	272	76.0	86	24.0	358	34.9	49.290	**< 0.001**
	20 - 24	332	59.1	230	40.9	562	54.8		
	25 - 29	79	84.9	14	15.1	93	9.1		
	30 and over	13	100.0	-	-	13	1.2		
Marital status	Single	637	66.7	318	33.3	955	93.1	8.144	**0.002**
	Married	59	83.1	12	16.9	71	6.9		
Place of residence	City	547	68.7	249	31.3	796	77.6	1.345	0.510
	Town	43	66.2	22	33.8	65	6.3		
	Village	106	64.2	59	35.8	165	16.1		
Working status	Working	57	62.0	35	38.0	92	9.0	1.601	0.126
	Not working	639	68.4	295	31.6	934	91.0		
Total		**696**	**67.8**	**330**	**32.2**	**1026**	**100.0**	**-**	

* Percentage of row. ** Percentage of column.

Table 40. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether HBV blood check prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		The HBV blood check is prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	190	38.6	302	61.4	492	48.0	23.556	< **0.001**
	Female	287	53.7	247	46.3	534	52.0		
Age groups	Under 20	178	49.7	180	50.3	358	34.9	55.847	< **0.001**
	20 - 24	286	50.9	276	49.1	562	54.8		
	25 - 29	11	11.8	82	88.2	93	9.1		
	30 and over	2	15.4	11	84.6	13	1.2		
Marital status	Single	444	46.5	511	53.5	955	93.1	-	0.543
	Married	33	46.5	38	53.5	71	6.9		
Place of residence	City	394	49.5	402	50.5	796	77.6	13.930	**0.001**
	Town	20	30.8	45	69.2	65	6.3		
	Village	63	38.2	102	61.8	165	16.1		
Working status	Working	37	40.2	55	59.8	92	9.0	1.599	0.124
	Not working	440	47.1	494	52.9	934	91.0		
Total		**477**	**46.5**	**549**	**53.5**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 41. Knowledge status of the first class students according to some socio-demographic characteristics regarding Hepatitis B disease (whether use of condom during sexual contact prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Socio-demographic features		The use of condom during sexual contact is prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Gender	Male	117	23.8	375	76.2	492	48.0	0.692	0.224
	Female	139	26.0	395	74.0	534	52.0		
Age groups	Under 20	82	22.9	276	77.1	358	34.9	40.535	<**0.001**
	20 - 24	172	30.6	390	69.4	562	54.8		
	25 - 29	2	2.2	91	97.8	93	9.1		
	30 and over	-	-	13	100	13	1.2		
Marital status	Single	235	24.6	720	75.4	955	93.1	0.872	0.212
	Married	21	29.6	50	70.4	71	6.9		
Place of residence	City	198	24.9	598	75.1	796	77.6	8.075	**0.018**
	Town	8	12.3	57	87.7	65	6.3		
	Village	50	30.3	115	69.7	165	16.1		
Working status	Working	26	28.3	66	71.7	92	9.0	0.591	0.257
	Not working	230	24.6	704	75.4	934	91.0		
Total		**256**	**25.0**	**770**	**75.0**	**1026**	**100.0**	-	

* Percentage of row. ** Percentage of column.

Table 42. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is infectious or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B is infectious disease						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	10	27.8	26	72.2	36	3.5	7.947	0.019
	Average	270	52.0	249	48.0	519	50.5		
	Good	235	49.9	236	50.1	471	46.0		
Health	Bad	13	32.5	27	67.5	40	3.9	20.873	**<0.001**
	Average	96	39.8	145	60.2	241	23.5		
	Good	406	54.5	339	45.5	745	72.6		
Participants' income	Bad	187	48.8	196	51.2	383	37.3	0.474	0.789
	Average	244	51.2	233	48.8	477	46.5		
	Good	84	50.6	82	49.4	166	16.2		
Family's income	Bad	122	42.8	163	57.2	285	27.8	9.060	**0.011**
	Average	277	52.3	253	47.7	530	51.7		
	Good	116	55.0	95	45.0	211	20.5		
Total		515	50.2	511	49.8	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 43. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is occurs in adults or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease occurs in adults.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	9	25.0	27	75.0	36	3.5	11.452	0.311
	Average	231	44.5	288	55.5	519	50.5		
	Good	168	35.7	203	64.3	471	46.0		
Health	Bad	14	35.0	26	65.0	40	3.9	25.822	0.185
	Average	63	26.1	178	73.9	241	23.5		
	Good	331	44.4	414	55.6	745	72.6		
Participants' income	Bad	125	32.6	258	67.4	383	37.3	13.285	0.301
	Average	213	44.7	264	55.3	477	46.5		
	Good	70	42.2	96	57.8	166	16.2		
Family's income	Bad	103	36.1	182	63.9	285	27.8	4.849	0.897
	Average	228	43.0	302	57.0	530	51.7		
	Good	77	36.5	134	63.5	211	20.5		
Total		408	39.8	618	60.2	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 44. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it has a laboratory test that detects it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		There is a laboratory test that detects hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	4	11.1	32	88.9	36	3.5	10.920	**0.004**
	Average	200	38.5	319	61.5	519	50.5		
	Good	177	37.6	294	62.4	471	46.0		
Health	Bad	11	27,5	29	72,5	40	3.9	8.010	**0.018**
	Average	74	30,7	167	69,3	241	23.5		
	Good	296	39,7	449	60,3	745	72.6		
Participants' income	Bad	112	29.2	271	708	383	37.3	28.278	0.714
	Average	181	37.9	296	62.1	477	46.5		
	Good	88	53.0	78	47.0	166	16.2		
Family's income	Bad	92	32.3	193	67.7	285	27.8	15.006	**0.001**
	Average	187	35.3	343	64.7	530	51.7		
	Good	102	48.3	109	51.7	211	20.5		
Total		381	37.1	645	62.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 45. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it has a treatment or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		There is a treatment for Hepatitis B disease						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	14	38.9	22	61.1	36	3.5	7.400	**0.025**
	Average	124	23.9	395	76.1	519	50.5		
	Good	142	30.1	329	69.9	471	46.0		
Health	Bad	15	37,5	25	62,5	40	3.9	15.305	**<0.001**
	Average	43	17,8	198	82,2	241	23.5		
	Good	222	29,8	523	70,2	745	72.6		
Participants' income	Bad	114	29.8	269	70.2	383	37.3	6.098	**0.047**
	Average	113	23.7	364	76.3	477	46.5		
	Good	53	31.9	113	68.1	166	16.2		
Family's income	Bad	82	28.8	203	71.2	285	27.8	1.077	0.584
	Average	146	27.5	384	72.5	530	51.7		
	Good	52	24.6	159	75.4	211	20.5		
Total		280	27.3	746	72.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 46. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is occurs in children or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease occurs in children.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	12.972	0.222
	Average	149	28.7	370	71.3	519	50.5		
	Good	93	19.7	378	80.3	471	46.0		
Health	Bad	15	37.5	25	62.5	40	3.9	5.456	0.650
	Average	50	20.7	191	79.3	241	23.5		
	Good	182	24.4	563	75.6	745	72.6		
Participants' income	Bad	94	24.5	289	75.5	383	37.3	8.169	0.017
	Average	127	26.6	350	73.4	477	46.5		
	Good	26	15.7	140	84.3	166	16.2		
Family's income	Bad	63	22.1	222	77.9	285	27.8	7.681	0.221
	Average	85	16.0	445	84.0	530	51.7		
	Good	50	23.7	161	76.3	211	20.5		
Total		247	24.1	779	75.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 47. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is occurs in elders or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease occurs in elders.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	-	-	36	100.0	36	3.5	16.005	0.145
	Average	141	27.2	378	72.8	519	50.5		
	Good	101	21.4	370	78.6	471	46.0		
Health	Bad	4	10.0	36	90.1	40	3.9	15.463	0.512
	Average	39	16.2	202	83.8	241	23.5		
	Good	199	26.7	546	73.3	745	72.6		
Participants' income	Bad	79	20.6	304	79.4	383	37.3	14.389	0.123
	Average	105	22.0	372	78.0	477	46.5		
	Good	58	34.9	108	65.1	166	16.2		
Family's income	Bad	103	36.1	182	63.9	285	27.8	4.849	0.189
	Average	228	43.0	302	57.0	530	51.7		
	Good	77	36.5	134	63.5	211	20.5		
Total		242	23.6	784	76.4	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 48. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is occurs in infants or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease occurs in infants.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	14	38.9	22	61.1	36	3.5	16.308	0.100
	Average	113	21.8	406	78.2	519	50.5		
	Good	71	15.1	400	84.9	471	46.0		
Health	Bad	8	20.0	32	80.0	40	3.9	1.965	0.374
	Average	39	16.2	202	83.8	241	23.5		
	Good	151	20.3	594	79.8	745	72.6		
Participants' income	Bad	25	6.5	358	93.5	383	37.3	1.545	0.462
	Average	30	6.3	447	93.7	477	46.5		
	Good	15	9.0	151	91.0	166	16.2		
Family's income	Bad	71	24.9	214	75.1	285	27.8	0.699	0.705
	Average	122	23.0	408	77.0	530	51.7		
	Good	54	25.6	157	74.4	211	20.5		
Total		198	19.3	828	80.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 49. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether does not affect another organ than the liver or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B does not affect another organ than the liver.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	10	27.8	26	72.2	36	3.5	10.909	0.94
	Average	55	10.6	464	89.4	519	50.5		
	Good	70	14.9	401	85.1	471	46.0		
Health	Bad	6	15.0	34	85.0	40	3.9	0.236	0.889
	Average	30	12.4	211	87.6	241	23.5		
	Good	99	13.3	646	86.7	745	72.6		
Participants' income	Bad	45	11.7	338	88.3	383	37.3	14.527	0.784
	Average	53	11.1	424	88.9	477	46.5		
	Good	37	22.3	129	77.7	166	16.2		
Family's income	Bad	41	14.4	244	85.6	285	27.8	0.555	0.758
	Average	68	12.8	462	87.2	530	51.7		
	Good	26	12.3	185	87.7	211	20.5		
Total		135	13.2	891	86.8	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 50. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with sweat or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with sweat.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	36	100.0	-	-	36	3.5	8.430	0.115
	Average	510	98.3	9	1.7	519	50.5		
	Good	449	95.3	22	4.7	471	46.0		
Health	Bad	40	100.0	-	-	40	3.9	25.752	0.471
	Average	222	92.1	19	7.9	241	23.5		
	Good	733	98.4	12	1.6	745	72.6		
Participants' income	Bad	368	96.1	15	3.9	383	37.3	2.929	0.231
	Average	463	97.1	14	2.9	477	46.5		
	Good	164	98.8	2	1.2	166	16.2		
Family's income	Bad	275	96.5	10	3.5	285	27.8	0.320	0.852
	Average	515	97.2	15	2.8	530	51.7		
	Good	205	97.2	6	2.8	211	20.5		
Total		995	97.0	31	3.0	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 51. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with breastfeeding or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with breastfeeding						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	36	100.0	-	-	36	3.5	3.216	0.200
	Average	485	93.4	34	6.6	519	50.5		
	Good	447	94.9	24	5.1	471	46.0		
Health	Bad	30	75,0	10	25,0	40	3.9	32.594	**<0.001**
	Average	235	97,5	6	2,5	241	23.5		
	Good	703	94,4	42	5,6	745	72.6		
Participants' income	Bad	366	95.6	17	4.4	383	37.3	8.291	**0.016**
	Average	440	92.2	37	7.8	477	46.5		
	Good	162	97.6	4	2.4	166	16.2		
Family's income	Bad	267	93.7	18	6.3	285	27.8	11.279	**0.004**
	Average	492	92.8	38	7.2	530	51.7		
	Good	209	99.1	2	0.9	211	20.5		
Total		968	94.3	58	5.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 52. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with kissing the cheek or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with kissing the cheek. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Academic success	Bad	36	100.0	-	-	36	3.5	8.312	0.116
	Average	482	92.9	37	7.1	519	50.5		
	Good	419	89.0	52	11.0	471	46.0		
Health	Bad	34	85.0	6	15.0	40	3.9	3.058	0.217
	Average	217	90.0	24	10.0	241	23.5		
	Good	686	92.1	59	7.9	745	72.6		
Participants' income	Bad	343	89.6	40	10.4	383	37.3	2.459	0.293
	Average	440	92.2	37	7.8	477	46.5		
	Good	154	92.8	12	7.2	166	16.2		
Family's income	Bad	260	91.2	25	8.8	285	27.8	1.197	0.550
	Average	488	92.1	42	7.9	530	51.7		
	Good	189	89.6	22	10.4	211	20.5		
Total		937	91.3	89	8.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 53. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with common toilet-bath use or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with common toilet-bath use. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Academic success	Bad	36	100.0	-	-	36	3.5	5.688	0.558
	Average	472	90.9	47	9.1	519	50.5		
	Good	417	88.5	54	11.5	471	46.0		
Health	Bad	36	90.0	4	10.0	40	3.9	0.671	0.715
	Average	214	88.8	27	11.2	241	23.5		
	Good	675	90.6	70	9.4	745	72.6		
Participants' income	Bad	346	90.3	37	9.7	383	37.3	3.916	0.141
	Average	423	88.7	54	11.3	477	46.5		
	Good	156	94.0	10	6.0	166	16.2		
Family's income	Bad	256	89.8	29	10.2	285	27.8	20.380	**<0.001**
	Average	462	87.2	68	12.8	530	51.7		
	Good	207	98.1	4	1.9	211	20.5		
Total		925	90.2	101	9.8	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 54. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with handshaking, hugging and skin contact or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with handshaking, hugging and skin contact.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	31	86.1	5	13.9	36	3.5	0.579	0.794
	Average	464	89.4	55	10.6	519	50.5		
	Good	424	90.0	47	10.0	471	46.0		
Health	Bad	35	87.5	5	12.5	40	3.9	8.754	0.113
	Average	204	84.6	37	15.4	241	23.5		
	Good	680	91.3	65	8.7	745	72.6		
Participants' income	Bad	315	82.2	68	17.8	383	37.3	35.857	0.221
	Average	451	94.5	26	5.5	477	46.5		
	Good	153	92.2	13	7.8	166	16.2		
Family's income	Bad	245	86.0	40	14.0	285	27.8	8.892	0.112
	Average	489	92.3	41	7.7	530	51.7		
	Good	185	87.7	26	12.3	211	20.5		
Total		919	89.6	107	10.4	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 55. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with foods and drinks or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with foods and drinks.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	36	100.0	-	-	36	3.5	4.641	0.980
	Average	459	88.4	60	11.6	519	50.5		
	Good	419	89.0	52	11.0	471	46.0		
Health	Bad	33	82.5	7	17.5	40	3.9	2.617	0.271
	Average	219	90.9	22	9.1	241	23.5		
	Good	662	88.9	83	11.1	745	72.6		
Participants' income	Bad	342	89.3	41	10.7	383	37.3	1.153	0.562
	Average	428	89.7	49	10.3	477	46.5		
	Good	144	86.7	22	13.3	166	16.2		
Family's income	Bad	248	87.0	37	13.0	285	27.8	3.202	0.202
	Average	481	90.8	49	9.2	530	51.7		
	Good	185	87.7	26	12.3	211	20.5		
Total		914	89.1	112	10.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 56. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with personel items such as clothes and glass or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with personel items such as clothes and glass.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	31	86.1	5	13.9	36	3.5	0.674	0.614
	Average	459	88.4	60	11.6	519	50.5		
	Good	424	90.0	47	10.0	471	46.0		
Health	Bad	36	90,0	4	10,0	40	3.9	7.638	**0.022**
	Average	203	84,2	38	15,8	241	23.5		
	Good	675	90,6	70	9,4	745	72.6		
Participants' income	Bad	334	87.2	49	12.8	383	37.3	7.919	**0.019**
	Average	422	88.5	55	11.5	477	46.5		
	Good	158	95.2	8	4.8	166	16.2		
Family's income	Bad	257	90.2	28	9.8	285	27.8	2.132	0.344
	Average	465	87.7	65	12.3	530	51.7		
	Good	192	91.0	19	9.0	211	20.5		
Total		914	89.1	112	10.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 57. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with insect bite or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with insect bite						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	36	100.0	-	-	36	3.5	8.963	**0.011**
	Average	441	85.0	78	15.0	519	50.5		
	Good	419	89.0	52	11.0	471	46.0		
Health	Bad	35	87.5	5	12.5	40	3.9	2.064	0.356
	Average	204	84.6	37	15.4	241	23.5		
	Good	657	88.2	88	11.8	745	72.6		
Participants' income	Bad	335	87.5	48	12.5	383	37.3	2.804	0.246
	Average	410	86.0	67	14.0	477	46.5		
	Good	151	91.0	15	9.0	166	16.2		
Family's income	Bad	250	87.7	35	12.3	285	27.8	3.936	0.140
	Average	454	85.7	76	14.3	530	51.7		
	Good	192	91.0	19	9.0	211	20.5		
Total		896	87.3	130	12.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 58. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with mosquito bites or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is not transmitted with mosquito bites.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	27	75.0	9	25.0	36	3.5	2.885	0.236
	Average	442	85.2	77	14.8	519	50.5		
	Good	392	83.2	79	16.8	471	46.0		
Health	Bad	30	75.0	10	25.0	40	3.9	5.132	0.177
	Average	195	80.9	46	19.1	241	23.5		
	Good	636	85.4	109	14.6	745	72.6		
Participants' income	Bad	346	90.3	37	9.7	383	37.3	3.916	0.141
	Average	423	88.7	54	11.3	477	46.5		
	Good	156	94.0	10	6.0	166	16.2		
Family's income	Bad	226	79.3	59	20.7	285	27.8	6.274	**0.043**
	Average	455	85.8	75	14.2	530	51.7		
	Good	180	85.3	31	14.7	211	20.5		
Total		861	83.9	165	16.1	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 59. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with common tooth brush or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with common tooth brush.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	31	86.1	5	13.9	36	3.5	10.451	**0.005**
	Average	385	74.2	134	25.8	519	50.5		
	Good	315	66.9	156	33.1	471	46.0		
Health	Bad	28	70.0	12	30.0	40	3.9	0.425	0.809
	Average	168	69.7	73	30.3	241	23.5		
	Good	535	71.8	210	28.2	745	72.6		
Participants' income	Bad	261	68.1	122	31.9	383	37.3	2.979	0.225
	Average	347	72.7	130	27.3	477	46.5		
	Good	123	74.1	43	25.9	166	16.2		
Family's income	Bad	216	75.8	69	24.2	285	27.8	4.404	0.111
	Average	372	70.2	158	29.8	530	51.7		
	Good	143	67.8	68	32.2	211	20.5		
Total		731	71.2	295	28.8	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 60. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with common injectors or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with common injectors.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	13	36.1	23	63.9	36	3.5	22.462	**<0.001**
	Average	224	43.2	295	56.8	519	50.5		
	Good	270	57.3	201	42.7	471	46.0		
Health	Bad	21	52.5	19	47.5	40	3.9	0.172	0.918
	Average	118	49.0	123	51.0	241	23.5		
	Good	368	49.4	377	50.6	745	72.6		
Participants' income	Bad	179	46.7	204	53.3	383	37.3	2.113	0.348
	Average	240	50.3	237	49.7	477	46.5		
	Good	88	53.0	78	47.0	166	16.2		
Family's income	Bad	128	44.9	157	55.1	285	27.8	3.452	0.178
	Average	268	50.6	262	49.4	530	51.7		
	Good	111	52.6	100	47.4	211	20.5		
Total		507	49.4	519	50.6	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 61. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with the use of the same syringe for two poeple or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with the use of the same syringe in two uses.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	10	27.8	26	72.2	36	3.5	11.455	**0.003**
	Average	253	48.7	266	51.3	519	50.5		
	Good	189	40.1	282	59.9	471	46.0		
Health	Bad	16	40.0	24	60.0	40	3.9	0.285	0.867
	Average	106	44.0	135	56.0	241	23.5		
	Good	330	44.3	415	55.7	745	72.6		
Participants' income	Bad	135	35.2	248	64.8	383	37.3	19.496	**<0.001**
	Average	238	49.9	239	50.1	477	46.5		
	Good	79	47.6	87	52.4	166	16.2		
Family's income	Bad	98	34.4	187	65.6	285	27.8	22.022	**<0.001**
	Average	237	44.7	293	55.3	530	51.7		
	Good	117	55.5	94	44.5	211	20.5		
Total		452	44.1	574	55.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 62. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with blood or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with blood						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	11.757	**0.003**
	Average	223	43.0	296	57.0	519	50.5		
	Good	194	41.2	277	58.8	471	46.0		
Health	Bad	24	60,0	16	40,0	40	3.9	6.626	**0.036**
	Average	102	42,3	139	57,7	241	23.5		
	Good	296	39,7	449	60,3	745	72.6		
Participants' income	Bad	138	36.0	245	64.0	383	37.3	7.512	**0.023**
	Average	216	45.3	261	54.7	477	46.5		
	Good	68	41.0	98	59.0	166	16.2		
Family's income	Bad	96	33.7	189	66.3	285	27.8	14.270	**0.001**
	Average	247	46.6	283	53.4	530	51.7		
	Good	79	37.4	132	62.6	211	20.5		
Total		422	41.1	604	58.9	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 63. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with unsafe sex or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with unsafe sex						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	16	44.4	20	55.6	36	3.5	7.498	**0.024**
	Average	155	29.9	364	70.1	519	50.5		
	Good	174	36.9	297	63.1	471	46.0		
Health	Bad	9	22,5	31	77,5	40	3.9	14.354	**0.001**
	Average	60	24,9	181	75,1	241	23.5		
	Good	276	37,0	469	63,0	745	72.6		
Participants' income	Bad	122	31.9	261	68.1	383	37.3	0.950	0.622
	Average	167	35.0	310	65.0	477	46.5		
	Good	56	33.7	110	66.3	166	16.2		
Family's income	Bad	79	27.7	206	72.3	285	27.8	6.392	**0.041**
	Average	193	36.4	337	63.6	530	51.7		
	Good	73	34.6	138	65.4	211	20.5		
Total		345	33.6	681	66.4	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 64. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with common shaving blade or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with common shaving blade						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	10	27.8	26	72.2	36	3.5	3.111	0.211
	Average	180	34.7	339	65.3	519	50.5		
	Good	140	29.7	331	70.3	471	46.0		
Health	Bad	9	22.5	31	77.5	40	3.9	2.300	0.317
	Average	83	34.4	158	65.6	241	23.5		
	Good	238	31.9	507	68.1	745	72.6		
Participants' income	Bad	118	30.8	265	69.2	383	37.3	12.215	**0.002**
	Average	175	36.7	302	63.3	477	46.5		
	Good	37	22.3	129	77.7	166	16.2		
Family's income	Bad	77	27.0	208	73.0	285	27.8	16.988	**<0.001**
	Average	201	37.9	329	62.1	530	51.7		
	Good	52	24.6	159	75.4	211	20.5		
Total		330	31.2	696	68.8	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 65. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted from mother to baby during birth or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted from mother to baby during the birth.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	18.595	**<0.001**
	Average	152	29.3	367	70.7	519	50.5		
	Good	86	18.3	385	81.7	471	46.0		
Health	Bad	17	42.5	23	57.5	40	3.9	20.599	0.412
	Average	35	14.5	206	85.5	241	23.5		
	Good	191	25.6	554	74.4	745	72.6		
Participants' income	Bad	68	17.8	315	82.2	383	37.3	13.093	**0.001**
	Average	135	28.3	342	71.7	477	46.5		
	Good	40	24.1	126	75.9	166	16.2		
Family's income	Bad	46	16.1	239	83.9	285	27.8	13.703	0.122
	Average	135	25.5	395	74.5	530	51.7		
	Good	62	29.4	149	70.6	211	20.5		
Total		243	23.7	783	76.3	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 66. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted from mother to baby during pregnancy or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted from mother to baby during the pregnancy. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Academic success	Bad	5	13.9	31	86.1	36	3.5	28.963	**<0.001**
	Average	141	27.2	378	72.8	519	50.5		
	Good	64	13.6	407	86.4	471	46.0		
Health	Bad	13	32,5	27	67,5	40	3.9	7.897	**0.019**
	Average	37	15,4	204	84,6	241	23.5		
	Good	160	21,5	585	78,5	745	72.6		
Participants' income	Bad	52	13.6	331	86.4	383	37.3	17.899	**<0.001**
	Average	116	24.3	361	75.7	477	46.5		
	Good	42	25.3	124	74.7	166	16.2		
Family's income	Bad	37	13.0	248	87.0	285	27.8	13.586	**0.001**
	Average	124	23.4	406	76.6	530	51.7		
	Good	49	23.2	162	76.8	211	20.5		
Total		210	20.5	816	79.5	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 67. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it is transmitted with dental implants or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease is transmitted with dental implants. Correct responders n	%*	Wrong responders n	%*	Total n	%**	X^2	P value
Academic success	Bad	-	-	36	0.100	36	3.5	3.733	0.155
	Average	40	7.7	479	92.3	519	50.5		
	Good	42	8.9	429	91.1	471	46.0		
Health	Bad	8	20.0	32	80.0	40	3.9	20.614	0.611
	Average	31	12.9	210	87.1	241	23.5		
	Good	43	5.8	702	94.2	745	72.6		
Participants' income	Bad	35	9.1	348	90.9	383	37.3	4.002	0.135
	Average	40	8.4	437	91.6	477	46.5		
	Good	7	4.2	159	95.8	166	16.2		
Family's income	Bad	35	12.3	250	87.7	285	27.8	10.042	0.653
	Average	35	6.6	495	93.4	530	51.7		
	Good	12	5.7	199	94.3	211	20.5		
Total		82	8.0	944	92.0	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 68. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it causes Cirrhosis or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B causes Cirrhosis.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	20.778	0.100
	Average	231	44.5	288	55.1	519	50.5		
	Good	161	34.2	310	65.8	471	46.0		
Health	Bad	13	32.5	27	67.5	40	3.9	4.501	0.105
	Average	81	33.6	160	66.4	241	23.5		
	Good	303	40.7	442	59.3	745	72.6		
Participants' income	Bad	132	34.5	251	65.5	383	37.3	6.016	0.449
	Average	203	42.6	274	57.4	477	46.5		
	Good	62	37.3	104	62.7	166	16.2		
Family's income	Bad	98	34.4	187	65.6	285	27.8	4.813	0.900
	Average	206	38.9	324	61.1	530	51.7		
	Good	93	44.1	118	55.9	211	20.5		
Total		397	38.7	632	61.3	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 69. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it causes liver cancer or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B causes liver cancer.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	17.402	**<0.001**
	Average	225	43.4	294	56.6	519	50.5		
	Good	163	34.6	308	65.4	471	46.0		
Health	Bad	22	55.0	18	45.0	40	3.9	6.280	0.430
	Average	83	34.4	158	65.6	241	23.5		
	Good	288	38.7	457	61.3	745	72.6		
Participants' income	Bad	128	33.4	255	66.6	383	37.3	8.600	0.114
	Average	205	43.0	272	57.0	477	46.5		
	Good	60	36.1	106	63.9	166	16.2		
Family's income	Bad	108	37.9	177	62.1	285	27.8	0.443	0.801
	Average	200	37.7	330	62.3	530	51.7		
	Good	85	40.3	126	59.7	211	20.5		
Total		393	38.3	633	61.7	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 70. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it causes Hepatic failure or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B causes Hepatic failure.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	9	25.0	27	27.0	36	3.5	0.338	0.845
	Average	141	27.2	378	72.8	519	50.5		
	Good	134	28.5	337	71.5	471	46.0		
Health	Bad	10	25.0	30	75.0	40	3.9	0.595	0.743
	Average	71	29.5	170	70.5	241	23.5		
	Good	203	27.2	542	72.8	745	72.6		
Participants' income	Bad	97	25.3	286	74.7	383	37.3	5.183	0.175
	Average	148	31.0	329	69.0	477	46.5		
	Good	39	23.5	127	76.5	166	16.2		
Family's income	Bad	79	27.7	206	72.3	285	27.8	0.187	0.911
	Average	149	28.1	381	71.9	530	51.7		
	Good	56	26.5	155	73.5	211	20.5		
Total		284	27.7	742	72.3	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 71. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it can be transformed into Hepatitis C disease or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hepatitis B disease cannot be transformed into Hepatitis C disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	6.120	0.466
	Average	27	5.2	492	94.8	519	50.5		
	Good	38	8.1	433	91.9	471	46.0		
Health	Bad	5	12.5	35	87.5	40	3.9	8.934	0.111
	Average	7	2.9	234	97.1	241	23.5		
	Good	58	7.8	687	92.2	745	72.6		
Participants' income	Bad	25	6.5	358	93.5	383	37.3	1.545	0.462
	Average	30	6.3	447	93.7	477	46.5		
	Good	15	9.0	151	91.0	166	16.2		
Family's income	Bad	24	8.4	261	91.6	285	27.8	2.045	0.360
	Average	35	6.6	495	93.4	530	51.7		
	Good	11	5.2	200	94.8	211	20.5		
Total		70	6.8	956	93.2	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 72. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether only one dose of vaccine is enough or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Only one dose of Hepatitis B vaccine is not enough.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	12.20	0.222
	Average	201	38.7	318	61.3	519	50.5		
	Good	150	31.8	321	68.2	471	46.0		
Health	Bad	18	45.0	22	55.0	40	3.9	7.859	0.220
	Average	67	27.8	174	72.2	241	23.5		
	Good	271	36.4	474	63.6	745	72.6		
Participants' income	Bad	98	25.6	285	74.4	383	37.3	26.28	**<0.001**
	Average	181	37.9	296	62.1	477	46.5		
	Good	77	46.4	89	53.6	166	16.2		
Family's income	Bad	77	27.0	208	73.0	285	27.8	20.31	**<0.001**
	Average	181	34.2	349	65.8	530	51.7		
	Good	98	46.4	113	53.6	211	20.5		
Total		356	34.7	670	65.3	1026	100		

* Percentage of row. ** Percentage of column.

Table 73. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether it has a vaccine or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		There is a vaccine for Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	9	25.0	27	75.0	36	3.5	9.133	**0.010**
	Average	240	46.2	279	53.8	519	50.5		
	Good	237	50.3	234	49.7	471	46.0		
Health	Bad	8	20.0	32	80.0	40	3.9	21.170	0.174
	Average	97	40.2	144	59.8	241	23.5		
	Good	381	51.1	364	48.9	745	72.6		
Participants' income	Bad	147	38.4	236	61.6	383	37.3	20.464	0.252
	Average	256	53.7	221	46.3	477	46.5		
	Good	83	50.0	83	50.0	166	16.2		
Family's income	Bad	118	41.4	167	58.6	285	27.8	6.354	**0.042**
	Average	258	48.7	272	51.3	530	51.7		
	Good	110	52.1	101	47.9	211	20.5		
Total		486	47.4	540	52.6	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 74. Knowledge status of the first class students according to some background characteristics regarding doses of Hepatitis B vaccine (Nyala University, Nyala - Sudan - 2017).

Perceptions		There are three doses of hepatitis B vaccine.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	11	30.6	25	69.4	36	3.5	3.461	0.177
	Average	95	18.3	424	81.7	519	50.5		
	Good	96	20.4	375	79.6	471	46.0		
Health	Bad	14	35.0	26	65.0	40	3.9	18.645	0.181
	Average	27	11.2	214	88.8	241	23.5		
	Good	161	21.6	584	78.4	745	72.6		
Participants' income	Bad	79	20.6	304	79.4	383	37.3	0.881	0.644
	Average	88	18.4	389	81.6	477	46.5		
	Good	35	21.1	131	78.9	166	16.2		
Family's income	Bad	73	25.6	212	74.4	285	27.8	8.767	**0.012**
	Average	92	17.4	438	82.6	530	51.7		
	Good	37	17.5	174	82.5	211	20.5		
Total		202	19.7	824	80.3	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 75. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether the person who is infected with or applied a vaccine was prevented against other types of hepatitis disease or not) (Nyala University, Nyala - Sudan - 2017

Perceptions		The person who is infected in or applied a vaccine of hepatitis B has not been prevented against other types of hepatitis disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	14.031	0.111
	Average	73	14.1	446	85.9	519	50.5		
	Good	32	6.8	439	93.2	471	46.0		
Health	Bad	16	40,0	24	60,0	40	3.9	37.277	**<0.001**
	Average	23	9,5	218	90,5	241	23.5		
	Good	71	9,5	674	90,5	745	72.6		
Participants' income	Bad	27	7.0	356	93.0	383	37.3	19.969	0.554
	Average	50	10.5	427	89.5	477	46.5		
	Good	33	19.9	133	80.1	166	16.2		
Family's income	Bad	43	15.1	242	84.9	285	27.8	10.288	0.610
	Average	42	7.9	488	92.1	530	51.7		
	Good	25	11.8	186	88.2	211	20.5		
Total		110	10.7	916	89.3	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 76. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (if it is necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier) (Nyala University, Nyala - Sudan - 2017).

Perceptions		It is not necessary to apply a Hepatitis B vaccine to a pregnant woman who is carrier .						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	-	-	36	100.0	36	3.5	36.630	**<0.001**
	Average	84	16.2	435	83.8	519	50.5		
	Good	24	5.1	447	94.9	471	46.0		
Health	Bad	10	25.0	30	75.0	40	3.9	9.258	0.110
	Average	24	10.0	217	90.0	241	23.5		
	Good	74	9.9	671	90.1	745	72.6		
Participants' income	Bad	19	5.0	364	95.0	383	37.3	23.179	**<0.001**
	Average	72	15.1	405	84.9	477	46.5		
	Good	17	10.2	149	89.8	166	16.2		
Family's income	Bad	31	10.9	254	89.1	285	27.8	0.112	0.946
	Average	56	10.6	474	89.4	530	51.7		
	Good	21	10.0	190	90.0	211	20.5		
Total		108	10.5	918	89.5	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 77. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether vaccination prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Vaccination is prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	13.374	0.114
	Average	231	44.5	288	55.5	519	50.5		
	Good	211	44.8	260	55.2	471	46.0		
Health	Bad	18	45.0	22	55.0	40	3.9	0.112	0.946
	Average	103	42.7	138	57.3	241	23.5		
	Good	326	43.8	419	56.2	745	72.6		
Participants' income	Bad	133	34.7	250	65.3	383	37.3	19.976	0.514
	Average	237	49.7	240	50.3	477	46.5		
	Good	77	46.4	89	53.6	166	16.2		
Family's income	Bad	85	29.8	200	70.2	285	27.8	30.412	0.285
	Average	257	48.5	273	51.5	530	51.7		
	Good	105	49.8	106	50.2	211	20.5		
Total		447	43.6	579	56.4	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 78. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether the use of antiseptic solution prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		The use of antiseptic solution is not prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	21	58.3	15	41.7	36	3.5	4.567	0.102
	Average	387	74.6	132	25.4	519	50.5		
	Good	347	73.7	124	26.3	471	46.0		
Health	Bad	28	70.0	12	30.0	40	3.9	1.071	0.585
	Average	183	75.9	58	24.1	241	23.5		
	Good	544	73.0	201	27.0	745	72.6		
Participants' income	Bad	264	68.9	119	31.1	383	37.3	6.844	0.333
	Average	365	76.5	112	23.5	477	46.5		
	Good	126	75.9	40	24.1	166	16.2		
Family's income	Bad	212	74.4	73	25.6	285	27.8	0.135	0.935
	Average	388	73.2	142	26.8	530	51.7		
	Good	155	73.5	56	26.5	211	20.5		
Total		755	73.6	271	26.4	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 79. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether hand washing prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Hand washing is not prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	31	86.1	5	13.9	36	3.5	3.221	0.200
	Average	376	72.4	143	27.6	519	50.5		
	Good	346	73.5	123	26.5	471	46.0		
Health	Bad	24	60.0	16	40.0	40	3.9	4.774	0.920
	Average	184	76.3	57	23.7	241	23.5		
	Good	545	73.2	200	26.8	745	72.6		
Participants' income	Bad	258	67.4	125	32.6	383	37.3	11.377	0.132
	Average	367	76.9	110	23.1	477	46.5		
	Good	128	77.1	38	22.9	166	16.2		
Family's income	Bad	209	73.3	76	26.7	285	27.8	5.820	0.546
	Average	376	70.9	154	29.1	530	51.7		
	Good	168	79.6	43	20.4	211	20.5		
Total		753	73.4	273	26.6	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 80. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether balanced and adequate nutrition prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		Balanced and adequate nutrition is not prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	26	72.2	10	27.8	36	3.5	15.134	0.111
	Average	323	62.2	196	37.8	519	50.5		
	Good	347	73.7	124	26.3	471	46.0		
Health	Bad	35	87.5	5	12.5	40	3.9	16.885	0.119
	Average	181	75.1	60	24.9	241	23.5		
	Good	480	64.4	265	35.6	745	72.6		
Participants' income	Bad	261	68.1	122	31.9	383	37.3	0.298	0.862
	Average	320	67.1	157	32.9	477	46.5		
	Good	115	69.3	51	30.7	166	16.2		
Family's income	Bad	189	66.3	96	33.7	285	27.8	0.628	0.730
	Average	360	67.9	170	32.1	530	51.7		
	Good	147	69.7	64	30.3	211	20.5		
Total		696	67.8	330	32.2	1026	100.0		

* Percentage of row. ** Percentage of column.

Table 81. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether HBV blood check prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		The HBV blood check is prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	11	30.6	25	69.4	36	3.5	3.817	0.143
	Average	245	47.2	274	52.8	519	50.5		
	Good	221	46.9	250	53.1	471	46.0		
Health	Bad	23	57.5	17	42.5	40	3.9	3.429	0.180
	Average	103	42.7	138	57.3	241	23.5		
	Good	351	47.1	394	52.9	745	72.6		
Participants' income	Bad	169	44.1	214	55.9	383	37.3	2.368	0.306
	Average	234	49.1	243	50.9	477	46.5		
	Good	74	44.6	92	55.4	166	16.2		
Family's income	Bad	127	44.6	158	55.4	285	27.8	2.025	0.363
	Average	243	45.8	287	54.2	530	51.7		
	Good	107	50.7	104	49.3	211	20.5		
Total		477	46.5	549	53.5	1026	100.0		

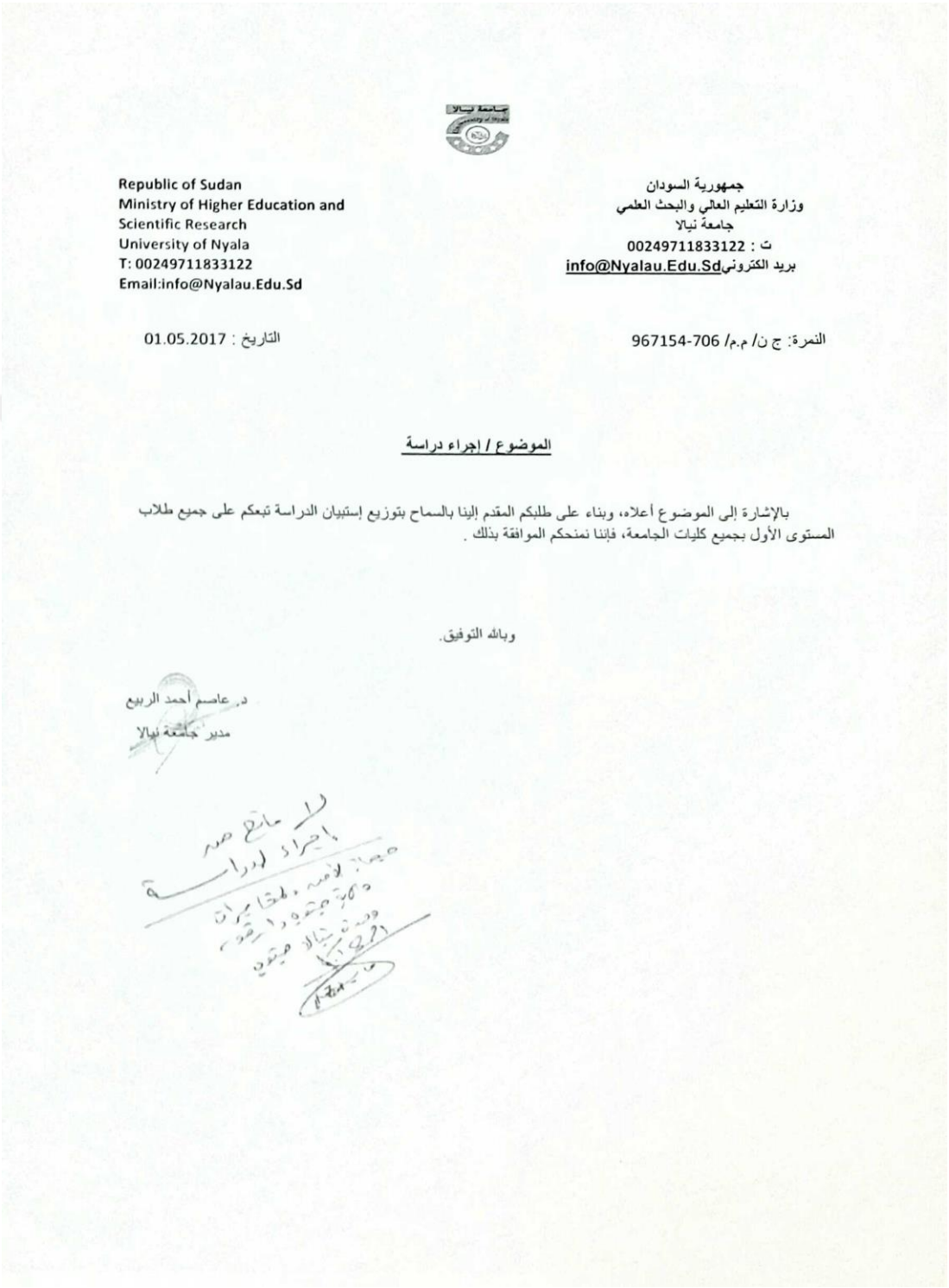
* Percentage of row. ** Percentage of column.

Table 82. Knowledge status of the first class students according to some background characteristics regarding Hepatitis B disease (whether use of condom during sexual contact prevents against it or not) (Nyala University, Nyala - Sudan - 2017).

Perceptions		The use of condom during sexual contact is prevent from Hepatitis B disease.						X^2	P value
		Correct responders		Wrong responders		Total			
		n	%*	n	%*	n	%**		
Academic success	Bad	5	13.9	31	86.1	36	3.5	4.784	0.191
	Average	142	27.4	377	72.6	519	50.5		
	Good	109	23.1	362	76.9	471	46.0		
Health	Bad	16	40,0	24	60,0	40	3.9	7.771	**0.021**
	Average	49	20,3	192	79,7	241	23.5		
	Good	191	25,6	554	74,4	745	72.6		
Participants' income	Bad	96	25.1	287	74.9	383	37.3	0.129	0.938
	Average	117	24.5	360	75.5	477	46.5		
	Good	43	25.9	123	74.1	166	16.2		
Family's income	Bad	55	19.3	230	80.7	285	27.8	6.755	0.341
	Average	143	27.0	387	73.0	530	51.7		
	Good	58	27.5	153	72.5	211	20.5		
Total		256	25.0	770	75.0	1026	100.0		

* Percentage of row. ** Percentage of column.

Appendix-7. Approval of the Nyala University



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التاريخ : 01.05.2017

الموضوع / اجراء دراسة

بالإشارة إلى الموضوع أعلاه، وبناء على طلبكم المقدم إلينا بالسماح بتوزيع إستبيان الدراسة تبعكم على جميع طلاب المستوى الأول بجميع كليات الجامعة، فإننا نمنحكم الموافقة بذلك .

وبالله التوفيق.

د. عاصم أحمد الربيع
مدير جامعة نيالا

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