Chapter One

Introduction

1.1 Background to the Study

Hepatitis B is a viral infection that affects the liver, causing both acute and chronic diseases. The World Health Organization (WHO) identifies HBV as a major global health problem, with severe consequences such as liver cirrhosis and liver cancer[1]. The virus is transmitted through contact with the blood or other body fluids of an infected person, making it a significant occupational hazard, especially in environments with potential exposure to bodily fluids[1]. The hepatitis B virus (HBV) is the cause of the potentially fatal liver illness known as hepatitis B[1]. With over 290 million people suffering from the chronic form of the disease and 1.5 million new cases reported each year, it is a significant public health issue. Globally, the frequency varies, but the bulk of hepatitis B cases and deaths from end-stage chronic liver illnesses including hepatic cirrhosis and hepatocellular carcinoma occur in sub-Saharan Africa each year[2]. The sub-Saharan Africa region is at a disadvantage for a number of reasons, including low awareness, the chronic stage of the disease's asymptomatic nature, the high burden of HIV, low vaccination coverage, low uptake of HBV screening and treatment due to a lack of publicly focused funding and national HIV screening and treatment programs, limited access to the acute phase or end stage of the diseases, and the inability of affected people and their families to pay for treatment[3].

The World Health Organization and its partners are well-known for their efforts to eradicate viral hepatitis as a public health issue by 2030, in recognition of the widespread harm that Hepatitis B infection poses to the welfare of the human race. The goals include a 90% decrease in chronic hepatitis B and C new cases and a 65% decrease in death from HBV and HCV infection, both of

which depend on 80% of people with chronic HBV and HCV infections who are eligible for treatment being treated globally[4].

The effort to meet the global goal and contribute to the Sustainable Development Goals is based on a six-pronged strategy that includes: increasing awareness, fostering partnerships and mobilizing resources, developing evidence-based policy and data for action, enhancing health equity within the hepatitis response, preventing transmission, and scaling up screening, care, and treatment services[4].

Military personnel, inherently exposed to a diverse array of occupational hazards, confront a heightened risk of bloodborne infections due to the nature of their service[5]. Within this framework, the Nigerian Navy, a pivotal component of the nation's security apparatus, stands as a frontline institution requiring a workforce not only physically resilient but also astutely aware and vigilant concerning potential health threats. The multifaceted nature of military service, involving tasks ranging from maritime patrols to search and rescue missions, inherently entails exposure to physical injuries and, significantly, the potential transmission of bloodborne infections. Activities such as vessel boardings or responses to medical emergencies amplify the risk of contact with bodily fluids, underscoring the imperative for heightened awareness and proactive preventive measures within the military ranks[6].

Bloodborne infections, exemplified by the Hepatitis B Virus (HBV), emerge as a specific and formidable risk for military personnel[6]. Whether in the intensity of combat situations or the exigencies of routine activities, the potential for contact with contaminated blood or bodily fluids necessitates a heightened level of awareness and a stringent adherence to preventive measures. In this context, the Nigerian Navy's commitment to operational readiness is intricately linked to the health consciousness of its personnel[6].

Maintaining operational readiness is not solely a matter of strategic planning and technological prowess; it equally hinges on the health and well-being of military personnel[3]. A force susceptible to health-related impediments, including bloodborne infections, risks compromised effectiveness in executing critical missions. Thus, the cultivation of a health-conscious military force becomes imperative for the overall operational capability and preparedness of the Nigerian Navy[5].

Central to the prevention of bloodborne infections is the role of awareness among military personnel. An informed understanding of transmission modes, symptoms, and preventive measures related to infections such as HBV is foundational in fostering a culture of safety and health within the military community[6]. This awareness empowers personnel to take proactive measures to minimize risk and underscores the importance of timely medical intervention when necessary. The implications of the health status of military personnel extend beyond the confines of military installations. Given the mobility and interactions of military forces with civilian populations, the potential for the spread of infectious diseases becomes a matter of broader public health concern[5]. Addressing health risks within the military, therefore, aligns not only with internal military objectives but also with broader public health imperatives.

To mitigate the risks associated with bloodborne infections, including Hepatitis B, the Nigerian Navy implement targeted educational initiatives and training programs[6]. These initiatives encompass comprehensive information on disease transmission, prevention strategies, and the importance of regular medical check-ups. Integrating such educational modules into the training curriculum ensures that personnel are not only physically prepared for their duties but are also equipped with the necessary knowledge to safeguard themselves and their colleagues[6]. There is a need to provide an inclusive approach because of the uniqueness of societal peace, wellbeing,

and wholesomeness as well as the vulnerability of the military members. The knowledge and awareness of these groups concerning Hepatitis B, its risk factors, and its aftereffects must be assessed, nevertheless, in order to guarantee the efficiency of this global agenda. The aim of this study is to assess the level of hepatitis B knowledge and awareness among naval personnel. The study's findings are expected to inform both policy recommendations and the 6-prong approach's deployment in armed military contexts.

1.2 Statement of the Problem

According to estimates, 290 million individuals worldwide have chronic hepatitis B infection, which is a major contributor to hepatitis mortality and morbidity. One of the continents with the highest rates of liver cancer caused by hepatitis B is still Sub-Saharan Africa[5]. Even among those deemed to be at high risk, testing for hepatitis B is still uncommon despite these worrying projections[6]. More than 90% of people have undetected, untreated hepatitis B infections, which puts them at risk of developing cirrhosis and hepatocellular carcinoma (HCC)[2]. Additionally, studies suggest that there is a general lack of awareness among the populations at risk, with people living in high-prevalence areas having average to poor knowledge about hepatitis B virus infection and low coverage of the hepatitis vaccine [7].

Despite the high frequency of infections, research from throughout the world has revealed that most people in endemic areas are poorly informed about the signs and symptoms, consequences, and treatment options for hepatitis B and hepatitis C. This results in ineffective preventive measures[8,9]. While there is some information on the knowledge and awareness levels of the general public, especially with regard to the Nigerian Navy Personnel, little research has been done in this area outside of the setting of military personnel. In order to identify areas

of knowledge and awareness gaps that can inform targeted public health sensitization campaigns in the study area and generally in the future, this study sought to assess the knowledge and awareness of the hepatitis B virus among the Nigeria Navy Personnel. It did this by using the Nigeria Navy Barracks Ojo in Lagos as a case study.

1.3 Aim and Objectives of the Study

The study examined the knowledge and awareness of hepatitis B virus among Nigeria Navy personnel.

Specific Objectives

The specific objectives of the study were to:

i. assess the knowledge of hepatitis B infection, risks factors and sequel among Naval personnel.

ii. assess the awareness of hepatitis B, risk factors and sequel among the naval personnel.

1.4 Research Questions

The study answered the following research questions:

1. What is the level of knowledge of Hepatitis B infections, risk factors, and sequel among Naval Personnel?
2. What is the level of awareness Hepatitis B infections, risk factors, and sequel among Naval Personnel?

1.5 Justification of the Study

Despite the deliberate efforts undertaken by health sectors for prevention and control of communicable diseases, vaccine preventable diseases such as HBV is still considered the most

commonly reported infectious disease among adults in Nigeria. Military communities possess a number of factors determining their lifestyle placing them at increased risk of acquiring HBV. Many studies recommended wider scale studies to identify the seroprevalence of HBV, associated knowledge identifying the risk factors responsible for transmission. Appropriate education is effective in reducing the spread of infectious diseases[10]. An important starting point for designing such tools is to assess people's knowledge of a disease. Although vaccines are available, the incidence of infections is not decreasing - as evidenced in episodes of HBV. The uptake of complete vaccine doses: entailing more than one dose, such as, HBV, or one dose, such as Flu, is not optimized. Perceptions of vaccine compliance barriers and preventive measures could be contributing factors and, therefore, require further investigation.

No scientific data is available to understand the effectiveness and functionality of immunization practice and work environments or vaccine reactions. This is particularly relevant to the local military immunization programs in Nigeria. Therefore, findings from this research will inform facility managers and policymakers on the extent to which Naval Officers comply with HBV infection prevention measures. Also, gaps identified in this study would aid in the development of more specifically targeted health promotion, screening, and vaccination programmes for Naval officers and the military in Nigeria.

1.6 Significance of the Study

By conducting this study, the aim is to assess the extent of knowledge regarding Hepatitis B, including its transmission, prevention, symptoms, and available treatments. The findings will shed light on any gaps or misconceptions that exist among the Navy personnel regarding this viral infection. This study will help identify potential areas where educational interventions can

be implemented to enhance knowledge and awareness about Hepatitis B within the Nigerian Navy. Additionally, it will contribute to the development of targeted strategies to prevent the spread of Hepatitis B and ensure the well-being of the Navy personnel.

Furthermore, the results obtained from this study can also serve as a valuable reference for policymakers, healthcare professionals, and public health authorities in designing effective awareness campaigns and formulating policies related to Hepatitis B control and prevention in military settings. This study will play a significant role in improving the overall health and well-being of the Nigerian Navy personnel and contribute to the broader efforts to combat Hepatitis B in Nigeria..

1.7 Scope of the Study

The scope of this study was limited to the assessment of the knowledge and awareness of HBV among Nigeria Navy personnel. The study covers active members of the Nigerian Navy, including officers and enlisted personnel. The study also focuses on the sources of information on HBV, attitudes and practices towards HBV, and the level of knowledge and awareness of HBV among the participants.

The study did not include individuals outside the Nigeria Navy or those who are not active members of the Nigerian Navy. Additionally, the study did not include an in-depth analysis of other liver diseases or other viral infections that may cause liver disease. The focus was solely on HBV and its impact on the Nigerian Navy personnel.

1.8 Limitation of the Study

Self-reported data were used, which may be affected by social desirability and recall bias. The study is conducted at a specific point in time and captures a snapshot of knowledge and awareness levels. It may not account for changes or variations over time. A longitudinal study would be required to track changes in knowledge and awareness among the personnel.

1.9 Operational Definition of Terms

Hepatitis B Virus (HBV): Refers to a DNA virus that causes an infection in the liver, leading to the development of hepatitis B.

Knowledge of HBV: Refers to the understanding of the nature, transmission, signs and symptoms, prevention, and management of HBV among Nigeria Navy personnel.

Awareness of HBV: Refers to the recognition and understanding of the importance of HBV as a health issue among Nigeria Navy personnel.

Nigeria Navy Personnel: Refers to active members of the Nigerian Navy, including officers and enlisted personnel.

Attitudes towards HBV: Refers to the opinions and beliefs of Nigeria Navy personnel towards HBV and its impact on their health and well-being.

Practices towards HBV: Refers to the actions and behaviors of Nigeria Navy personnel towards HBV prevention and control.

Sources of Information on HBV: Refers to the various platforms and channels through which Nigeria Navy personnel acquire information on HBV

Endnotes

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Chapter Two

Literature Review

This chapter includes earlier research projects by researchers that are pertinent to this investigation under the guises of a theoretical framework, a theoretical review, an empirical review, a literature assessment, and a conceptual model, the review of the literature.

2.1 Conceptual Review

2.1.1 Hepatitis B Virus (HBV)

The Hepatitis B virus (HBV) infection continues to be one of the most worrisome diseases in the world, consistently impacting a large number of people. HBV is known as a silent killer and is acknowledged as the biggest risk to public health globally and among healthcare personnel specifically[1, 2.] HBV disease is a fearsome type of illness whose prevalence varies from nation to nation and is influenced by a complex interplay of behavioral, environmental, and host factors. The Middle East, North Africa, and the former Soviet Union have all been categorized as regions having an intermediate incidence of HBV infection, along with the whole Indian subcontinent[3,4,5]. HBV can cause a lifelong chronic infection that progresses to liver cirrhosis, liver malignancy, liver failure, and ultimately death[6,7].

It is commonly known that the Hepatitis B virus, a DNA virus, is 100 times more contagious than the HIV virus (human immunodeficiency virus)[8]. The Hepadnaviridae family of Deoxyribonucleic Acid (DNA) viruses includes the tiny, circular Hepatitis B virus (HBV). A lipid envelope containing Hepatitis B surface antigen makes up the spherical, double-shelled structure of the contagious HBV virion, which has a diameter of roughly 42 nm (HBsAg). An inner nucleocapsid made up of the viral DNA genome complexed with the Hepatitis B core antigen (HBcAg) is encased in this envelope. There are eight genotypes of HBV (A to H), and each has a unique geographic distribution[9].

HBV is contagious. HBVs are frequently and easily transferred from an infected person to another person or people by bodily fluids, such as blood[7]. Additionally, it has been established that the infection is spread by both sexual and non-sexual contact, mother-to-child transmission, and the use of unsterilized equipment[10,11]. HBV can spread through a number of different channels, but the most well-known ones are prenatal infection, skin and mucous membrane infections brought on by infected blood or bodily fluids, sexual contact, and injection. Additionally, the use of a syringe, dialysis, acupuncture, tattooing, and body piercing can all be ways for HBV to spread[7]. Contrarily, the transmission of HBV does not occur through holding hands, sharing meals, kissing, hugging, sneezing, or breastfeeding. HBV is still the principal cause of hepatocellular carcinoma and the tenth-largest cause of death worldwide. It is second on the list of known human carcinogenic agents after tobacco[12].

The usage of sharp objects by students in the latest fashion fads, such as body piercing and exploding make-up, has been connected to a significant risk of disease transmission in the student population[10,13.] Due to their frequent contact with blood and human fluids, healthcare workers have also been identified as the group of persons most at risk for HBV infection. Respiratory therapists, surgeons, doctors, and dentists, along with those working in operating rooms and clinical laboratories, oncology and chemotherapy nurses, hemodialysis staff, those in the medical, dental, and health technology fields, as well as nursing students, are at a high risk of contracting these diseases[14,15].

Acute viral hepatitis is connected to the hepatitis B virus. The symptoms of acute hepatitis include general malaise, lack of appetite, nausea, vomiting, body aches, a slight fever, and dark urine. As the condition progresses, jaundice develops. While only a small number of people may be diagnosed with severe liver illness and pass away as a result, itching of the skin has been

reported as the primary sign as a potential symptom of all types of hepatitis viruses. Although HVB infections may be completely asymptomatic and go unnoticed, chronic HBV can either be asymptomatic or accompany a long-term liver inflammation that eventually results in cirrhosis. Hepatocellular carcinoma incidence is greatly increased by this type of infection[16].

Human papillomavirus (HPV) is the most viral infection of the reproductive system[1]. Nearly everyone contracts HPV at some point in their lifetime[2]. HPV causes a wide range of illnesses in both men and women, including precancerous lesions that can develop into malignancies[3]. Specific HPV strains, mostly HPV16 and HPV18, can cause precancerous lesions in women that, if untreated, can develop into cervical cancer[4]. There are more than 200 different identified types of HPV and this number continues to rise[5,6].

2.2 Taxonomy of Human Papillomavirus

Human Papillomavirus belongs to the genus Papillomavirus of the Papillomaviridae family. The Classification of the Papillomaviridae family is according to the sequence identity of their proteins across the L1 open reading frame[7,8]. The Papillomaviridae family includes two subfamilies, Firstpapillomavirinae (which includes more than 50 genera and about 130 species) and Secondpapillomavirinae (with a single genus and species). Papillomavirus genera are named according to the Greek alphabet[9]. Based on their phylogenetic characteristics, they are classified into 5; Alphapapillomavirus (α-HPV), Betapapillomavirus (β-HPV), Gammapapillomavirus (γ-HPV), Mupapillomavirus (μ-HPV), and Nupapillomavirus (ν-HPV)[10].

2.3 Human Papillomavirus Protein and Structure

Human papillomavirus (HPV) is a small non-enveloped icosahedral deoxyribonucleic acid (DNA) virus, capable of replicating in the nucleus of squamous epithelium cells[11]. The virus is divided into three regions: a non-coding upstream regulator region (URR) that regulates gene expression; an early (E) region encoding genes involved in viral replication and cell transformation (E6, E7, E1, E4, E2, E5); and a late (L) region encoding the L1 and L2 capsid proteins that self-assemble to form the virion[12].

Based on its L1 capsid protein structure, HPV is classified according to its genotypes. Over 100 HPV genotypes have been identified, with about 40 being genital and being oncogenic or high-risk due to their link to anogenital neoplasia and ability to cause cancers[15]. Based on how strongly each HPV type is linked to ICC, the International Agency for Research on Cancer (IARC) divides them into different categories. Human cancer-causing HPV genotypes (HPV16, 18, 31, 33, 39, 35, 45, 51, 52, 56, 58, and 59) as well as those that are "probably carcinogenic" (HPV68) are considered high-risk. The potentially cancer-causing genotypes of HPV include 26, 53, 66, 69, 70, 73, and 82, while the recognized low-risk genotypes of HPV are 6, 11, 40, 43, 44, 54, 71, and 74[12].

2.4 Tissue Tropism of Human Papillomavirus

HPVs are species-specific viruses that have preferential tropism for epithelial tissues[14]. Although HPVs are linked to the development of a wide variety of benign and malignant skin and mucosal neoplasms and cancers, most of all, HPV infections clear off in about two years and do not result in any apparent lesions or disease[15]. However, human Pqapillomaviruses have been discovered in skin that may seem histologically normal and in other regions, including the oral, nasal, and

cervical mucosas and mucocutaneous epithelia, such as those found in the anal canal and the penis16 17.

Additionally, they have been identified in cases of anogenital warts and cervical intraepithelial lesions18. Furthermore, some prior research studies revealed that Gamma-PVs might be involved in developing skin warts premalignant cutaneous lesions, and head and neck cancer19 20.

HPVs are known and notorious for infecting not just the cutaneous epithelium but also the mucosal and mucocutaneous epithelium. So far, they have been discovered in various clinical samples. These clinical samples comprise benign and malignant cutaneous neoplasms, clinically normal skin, the oral cavity, the nasopharynx, and the anogenital area. In addition, HPVs have a very broad tissue tropism and can infect all different types of the epithelium (penis, cervix, and anal canal)21.

All human papillomaviruses (HPVs) are classified and placed into one of two categories, cutaneous or mucosal, according to the type of tissue they are most commonly found22 23.

2.4.1 Cutaneous Human Papillomavirus

Cutaneous HPVs are incredibly diverse, spanning all five genera of HPV, and are highly prevalent on skin tissues, accounting for more than 75 percent of all non-persistent HPV infections. Cutaneous HPVs can be spread through direct contact with infected skin24.

Most cutaneous HPV genotypes are gamma and beta papillomaviruses, and these genotypes are not associated with an increased risk of cervical cancer . However, it has also been established that cutaneous HPVs have a role in developing a range of skin lesions, including warts26. Plantar warts, common warts, flat warts, and butcher's warts are all skin conditions caused by low-risk genotypes of the human papillomavirus (lrHPV), which are present on the surface of the skin and

infect the cutaneous epithelial tissues. On the other hand, mounting evidence suggests that non-melanoma skin cancer may be caused partly by beta-human papillomaviruses (beta-HPVs) and ultraviolet (UV) exposure27.

The most typical symptom of cutaneous human papillomavirus infections in the genital area is the development of genital warts. Although HPV6 and HPV11 are often linked to about 90% of all genital warts, many other cutaneous HPV genotypes, such as HPV 2, 40, 42, 43, and 54, have also been implicated in genital warts28.

Genital wart prevalence among young women has decreased in nations with high HPV vaccination rates, such as Australia and England. In contrast, genital warts are more common and more frequently occurring in the general population in Europe and the US. On the other hand, Sub-Saharan Africa lacks knowledge regarding genital warts (SSA). Most genital wart research in SSA has focused on high-risk individuals, like those who visited STD clinics or had jobs in the commercial sex industry, or those with genital warts14.

Comparatively dissimilar to mucosal HPVs, mainly classified under the alpha-PV genera, cutaneous HPVs cover all five genera and account for more than 75% of all HPVs reported to date29.

2.4.2 Mucosal Human Papillomavirus

Mucosal HPV genotypes are associated with many diseases because they frequently infect parts of the body with mucosal epithelial tissues30. Alpha-HPVs make up a great majority of mucosal HPVs, which means they can cause cancer in sites where persistent HPV infection has occurred31.

Many of these HPVs are anogenital, infecting the genital tract. With more than 200 identified HPV genotypes, about 40 of these identified genotypes colonize the genital tract32. 13 of these

genotypes (16, 18, 31, 35, 33, 39, 45, 52, 51, 56, 58, 59, and 68) regarded as high-risk and 2 (HPV53 and HPV66) classified as probably high-risk33 34. Based on their carcinogenic characteristics, with HPV16 and HPV18 being the most virulent high-risk genotypes, accounting for over 70% of all cervical cancer cases6. However, the majority of HPV-positive oropharyngeal cancers—nearly 90%—are caused by HPV1635.

Field Survey 2022

Figure 2.1: Human Papillomavirus Types and Disease Association

2.5 Epidemiology of Human Papillomavirus Infection Worldwide

Infection with HPV, the primary cause of cervical cancer in women, has become increasingly prevalent worldwide36. Thereby making HPV a challenge of public health concern37. HPV infections remain one of the most common viral infections worldwide38.

The epidemiologic distribution of HPV infection and HPV-associated burden varies significantly around the world, and morbidity—as well as mortality—related factors include geographic, socioeconomic, cultural, and genetic factors related to the viral genome variability, as well as intrinsic individual factors like age, gender, anatomic site of infection, and health status39.

Among women with normal cervical cytology in 2007 and 2010, cervical cancer due to HPV prevalence was 10.4% and 11.7%, respectively, and thereafter, declined to 9.9% in 201938. While adolescent girls and women under 25 are the most infected, the global prevalence rate of genital HPV infection in men have similar patterns to that in women, as are the transmission rates. This is understandable, given that genital or mucosal HPV is primarily transmitted through sexual contact40.

The prevalence of HPV16 and HPV18 cervical HPV infection among women aged 15 to 44 years worldwide is 69.4%. About 2,869,000,000 women aged 15 years and above are at risk of cervical human papillomavirus. Out of which, 2,338,700,000 are in LMICs.

Annually, about 604, 127 new cervical cancer cases are recorded, of which LMICs record about 532,23919.

2.6 Human Papillomavirus Associated Diseases

In both men and women, Anogenital warts, recurrent respiratory papillomatosis, oropharyngeal carcinoma, and various anogenital cancers can all be caused by HPV (including penile, anal, vaginal, vulvar, and cervical cancers)41.

More than 80 percent of cases of cervical cancer are caused by HPV, with two strains, HPV16 and HPV18, accounting for about 70 percent of incidences. On the other hand, more than ninety percent of all HPV-positive oropharyngeal cancers may be traced back to HPV1642.

2.6.1 Genital Human Papillomavirus Infections

HPV is most commonly associated with genital infections, causing infection of the genital tract . HPV infections of the genital tract are the underlying cause of genital warts, squamous intraepithelial lesions, and cancer44. Sexual contact is the only way to transfer HPV strains that infect the anogenital tract45.

The International Agency for Research on Cancer (IARC) categorizes the forms of genital HPV according to the degree to which they are linked with invasive cervical malignancies. hrHPV kinds include those that are classified as 'carcinogenic to humans', such as HPV 16, 18, 33, 31, 35, 39, 45, 52, 51, 56, 58, 59, and 68, as well as those that have the potential to cause cancer in people (HPV53 and 66)46.

2.6.2 Genital Warts

Genital warts (Condyloma acuminatum) are the clinical symptoms of a sexually transmitted infection caused by many strains of human papillomavirus (HPV) referred to as low-risk HPV genotypes and they are typically transmitted from person to person through skin-to-skin contact, usually during sexual intercourse and activity47 48 49. They present themselves in clusters or separately and can be discovered in the genital or anal area of infected people including the penile shaft, scrotum, vagina, or labia majora50. They can also be present on the vaginal and anal interior surfaces51. They can manifest as filiform, pink, sessile, pedunculated papules, nodules, or soft growths as small as 5mm in diameter or as large masses in the vaginal or anal area52. Their color varies but tends to be skin-colored or more profound, and they may bleed spontaneously on occasion and can cause itching, redness, and swelling48. These lesions manifest asymptomatic and Exophytic growth, similar in appearance to cauliflower49.

Although the two most virulent low-risk mucosal HPV genotypes, HPV6 and HPV11, are linked with around 90 percent of all genital warts, multiple additional HPV genotypes, including HPV 2, 40, 42, 43, and 54, have been obtained from genital warts53.

2.6.3 Squamous Epithelial Lesions and Carcinoma

An abnormal region of tissue that can be found on an individual's intraepithelial tissues is referred to as a squamous intraepithelial lesion (SIL). It can also manifest in the back of the throat, the cervix, the vagina, the vulva, the anus, or the penis. These lesions have been classified as precancers, indicating that they are not cancerous but can potentially transform into cancer and spread to other tissues54.

Cervical intraepithelial neoplasia, more often known as CIN, is an early stage of cervix cancer that can be cured if discovered earlier55. There is an agreement among researchers from all over

the world that chronic infection with high-risk types of HPV, such as genotypes 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, and 68, is required for the progression of squamous intraepithelial lesions (SIL) and cervical intraepithelial neoplasia (CIN)56 57.

2.7 Natural History of Human Papillomavirus

HPV infection is primarily a sexually transmitted infection. As a result, both men and women are part of the virus's epidemiological chain, and they can simultaneously be asymptomatic carriers, transmitters, and sufferers of HPV infection58. In this regard, the risk factors for HPV infection are inextricably linked to an individual's sexual behaviour59. The most crucial are: early coitarche, having multiple sexual partners, and sexual interactions with high-risk persons such as prostitutes and people with multiple sexual partners. In addition, male circumcision and the appropriate use of condoms can reduce the risk of HPV transmission, though it will only prevent the risk of transmission between sexual partners60.

Female sex workers and people living with the Human Immunodeficiency Virus (HIV) belong to the high-risk groups61 62. Transmission occurs mainly through sexual contact; the organs most susceptible to infection are the cervix (transformation zone) and the pectineal line of the anal canal. HPV infections are commonly sheeting and HPV DNA can be discovered in the woman's cervix, vagina, and vulva, the glans, prepuce and skin of the penis and scrotum in the man, and the anal canal and perianal area in women and men63.

The viral type, the duration of the infection over time, and, most likely, the viral load per cellular unit, as well as the integration of viral DNA into cellular DNA, are all well-known indicators of the progression of infection64. HIV infection is a risk factor for HPV infection and neoplastic development, especially during immunosuppression65. Long-term usage of oral contraceptives, high parity, and cigarette smoking have also been identified as progression factors66. Other

possible factors include diet, in particular, diets poor in fruits and vegetables, and co-infection by other sexually transmitted agents such as Chlamydia trachomatis and Herpes Simplex Virus type 267.

HPV clearance took 9.4 months in women (both oncogenic and non-oncogenic strains) . After an incident infection with HPV 6 or 11, the median time to wart development was 6–10 months (range up to 18 months). This is longer than the earlier reported median period of 2.9 months for HPV type 6 or 11 infected women69.

Regression of warts among both women living with human immunodeficiency virus (HIV)/AIDS and HIV-negative women has been reported to be common even in the absence of treatment; 60% of women living with HIV/AIDS and 80% of HIV-negative women demonstrated regression of warts in the first year after diagnosis70.

Historical Background of HBV

The hepatitis B surface antigen, which was first known as the Australia antigen because it was detected in serum from an Australian patient, was found in 1965 by Blumberg and his coworkers, leading to the identification of the hepatitis B virus. The 1970s saw the complete description of the virus. We now have a better knowledge of the complexity of this uncommon virus because to the recent quick and ongoing viral disease discoveries made all around the world. Although the overall prevalence of HBV has not much decreased, there is hope that if current HBV immunizations are enhanced, the next generation will see a fall in both the global carrier rate and the frequency of new HBV infections[17].

2.1.2 Hepatitis B Infection

Hepatitis B is a serious liver condition thought to be brought on by the hepatitis virus, a DNA virus. Human bodily fluids like as saliva, blood, semen, and serum are used in the transmission

of the disease from one person to another. The disease is infectious, which makes it a global public health issue. The perinatal method of transmission, in which the virus is passed from mother to child, the use of contaminated piercing tools, such as razor blades, syringes, and brushes, and sexual contact are also included[18]. At some point in their lives, more than 2 billion people around the world have HBV infection, and roughly 350 million of those people have a chronic infection. About 25–30% of people with chronic infections pass away as a result of the infection. More than a million infected people per year pass away from liver cirrhosis and liver cancer, which puts them at a greater risk of developing the condition[10].

2.1.3 Hepatitis B

The hepatitis B is a little DNA virus with peculiar characteristics that resemble those of retroviruses. It is a member of the Hepadnaviridae family of viruses. In woodchucks, ground squirrels, tree squirrels, pecking ducks, and herons, among other animals, there are multiple related viruses that are essentially identical to the HBV virus[15]. Hepatitis B virus is divided into eight genotypes, namely hepatitis A through H, based on the comparison of the gene's sequences, and each genotype has a unique geographic distribution. While two of the viral particles are smaller spherical structures with a diameter of about 20 nm and filament of variable length with a width of about 22 nm, three viral particle types are discovered in infected serum using electron microscopy[10]. The spheres and filaments lack viral nucleic acid and are made of host-derived lipid and hepatitis B surface antigen (HBsAg), making them non-infectious. The Dane particle is the name for the contagious hepatitis B virus. A lipid envelope containing HBsAg surrounds an inner nucleocapsid that is made up of hepatitis B core antigen (HBcAg) combines with virally encoded polymerase and the viral DNA genome. The Dane particle has a spherical, double-shelled structure with a diameter of around 42 nm. The HBV genome is 3.2 kilobase (kb) pairs of

circulars, partly double-stranded DNA. The minus strand's 5 end has a covalent bond with the viral polymerase[18].

There are four overlapping open reading frames in the viral genome (ORFs: S, C, P, and X). The pre-S1, pre-S2, and S sections of the S ORF, which encodes the HBsAg viral surface envelope proteins, are physically and functionally distinct. The precure and core sections are found in the core, or C gene. The S and C genes, which produce similar but functionally different proteins, have several in-frame translation initiation codons.The viral nucleocapsid (HBcAg) or hepatitis B e antigen (HBeAg) are both encoded by the C ORF, depending on whether translation starts from the core or precore regions, respectively[14]. The core protein has a highly basic cluster of amino acids at its C terminus and has the intrinsic ability to self-assemble into a shape resembling a capsid. The logical role of HBxAg in the viral life-cycle is still not fully understood. The need for HBxAg for productive HBV infection in vivo and its ability to increase the oncogenicity of HBV are both well known facts, though[18].

In the endoplasmic reticulum, where the protein is further processed to create the secreted HBeAg, the translation product is directed by a signal peptide encoded by the precore ORF. Although it has been suggested that HBeAg serves as an immunological tolerogen, which promotes persistent infection, its exact role is still mostly unknown[15]. The reverse transcriptase (RT) domain, which catalyzes genome synthesis, the terminal protein domain, which is involved in encapsidation and the beginning of minus-strand synthesis, and the ribonuclease H domain, which degrades spliceogenic RNA and aids in replication, make up the large protein known as the polymerase (pol), which is encoded by the P ORF. The 16.5-kd protein (HBxAg) that the HBV XORF encodes performs a variety of tasks, including signal transduction, transcriptional activation, DNA repair, and protein degradation inhibition.The biological role of HBxAg in the

viral life cycle and the mechanism behind this activity are still completely unclear. The need for HBxAg for productive HBV infection in vivo and its ability to increase the oncogenicity of HBV are both well known facts, though[12].

Two direct repeats, DR1 and DR2, which are needed for strand-specific DNA synthesis during viral replication, are among other functionally significant components found in the HBV genome. The virus has two enhancer elements, En1 and En2, that allow viral gene products to express only in the liver. A polydenylation signal within the core gene, a glucocorticoid-responsive element (GRE) sequence within the S domain, and a post-transcriptional regulatory element that overlaps En1 and a portion of HBxAg OFR have also been discovered. Hepatitis B virus's first phase involves the maturation of virions and their attachment to the membranes of the host cell, most likely via the pre-S domain of the surface protein[20].

2.1.4 Stages of HBV Infection

Understanding of the three (3) primary natural stages of HBV infection in hosts—acute infection, chronic asymptomatic, and chronic symptomatic stages has advanced remarkably. All HBV-infected patients do not, however, go through all three stages. As a patient moves from an acute to a chronic stage of the infection, their risk of developing liver-related problems like cirrhosis and hepatocellular carcinomas rises. Indeed, the majority of HBV infections (about 90%) remain at the acute stage, with a few moving on to the chronic stage[16].

2.1.4.1 Acute HBV Infection

Every HBV-infected patient goes through this stage of the illness at the beginning, albeit not every patient advances past it. Serologically, the early stages of this stage of the infection are defined by the presence of HBsAg, high serum HBV DNA, HBeAg, normal serum

aminotransferase level (ALT), and low or negligible inflammation on liver biopsy[22]. Increased serum titres of anti-HBsAg IgG (HBsAb), anti-HBcAg IgG, decreased or absence of HBsAg and HBV DNA, and normal liver histology characterize a later phase, also known as the immunity phase[21].

This holds true for individuals who completely recover from the sickness after developing a complete and lifelong immunity through exposure. Patients' experiences with any phase's duration vary, although it typically lasts between 5-8 months. However, people who are unable to mobilize sufficient immune response elements to fight the infection end up having to live with the condition for the rest of their lives. It is claimed that the illness in this case has progressed to chronicity[22]. The physical signs and symptoms would appear, even though they would only last a short while before they are resolved once the patient has recovered, including jaundice, fever, black urine production, and nausea. In general, the transition from the acute stage to the chronic stage is influenced by a number of variables, including host immunological capacity, virus genotype, age, and gender[23].

2.1.4.2 Chronic HBV infection

This happens as a progression of the acute HBV infection's early stage because the host was unable to build the required immune response to enable complete viral clearance and the subsequent resolution of the illness. It is characterized serologically by either normal or substantial liver damage as detected by ultrasonography, disappearance or decreased titers of anti-HBsAgIgG, and a relative elevation in serum anti-HBcAg IgG levels. Additionally, aspartate amino transferase (AST) and alanine amino transferase (ALT) levels and other indicators of hepatic integrity may be normal or raised at this stage of the disease[20].

In all stages of the illness, HBeAg has a real serological presence. An enhanced viral load (HBV DNA > 10 3 copies/ml) and greater ALT (> 60 IU/l) are both signs of viral activity, replication, and infectivity. The presence of this antigen is also a strong indicator of these factors. Patients who exhibit these symptoms are given retroviral. HBeAg seroconversion is a significant development in the normal course of HBeAg-positive CHB patients. It is thought that liver disease remission and the termination of HBV replication go hand in hand with seroconversion of HBeAg to HBeAb. Numerous investigations have demonstrated that in the majority of patients, seroconversion is associated with a biochemical and histological remission of inflammatory activity and a considerable reduction in HBV replication[13].

2.1.5 Signs and Symptoms

Whether a person has an acute or chronic hepatitis B infection will determine their specific hepatitis B symptoms[23].

2.1.5.1 Acute Hepatitis

After the incubation phase, acute hepatitis appears and is characterized by prolonged elevations in alanine transaminase (ALT) values of 4 to 12 weeks. For the most part, during the acute infection phase, no symptoms are present. Some people, however, experience an acute sickness with symptoms that linger for several weeks. These symptoms include right upper quadrant abdominal pain, excessive exhaustion, dark urine, and pale feces. Acute liver failure can occur in a tiny percentage of people with acute hepatitis, which can be fatal[16].

2.1.5.2 Chronic hepatitis

A failure of the immune system to destroy the virus is demonstrated by the progression from acute to chronic infection. Serologically speaking, HBsAg positive for longer than six months is

the definition of chronic hepatitis B (CHB). The age at which the individual contracts the virus affects how quickly the illness progresses to CHB. 30–50% of children who are infected before the age of six develop chronic infections, and 80–90% of infants who are infected during the first year of life do as well. Immunological tolerance is caused by the immune system's inability to recognize the virus and the high rate of viral reproduction. In adults, a cell-mediated response to foreign HBV proteins causes acute hepatitis, which may be asymptomatic. In all but 1-5% of patients, the reaction results in the elimination of the infection. Hepatitis B virus can, in some persons, lead to a persistent liver infection that eventually progresses to cirrhosis (liver scarring) or liver cancer[16].

2.1.6 Serological Markers

Hepatitis B Surface Antigen (HBsAg): a virus's outer-surface protein. High quantities of it can be found in the serum with acute or chronic HBV infection. The presence of HBsAg suggests that the individual is contagious. This is the first sign of infection that can be seen, and it appears during the incubation phase. Hepatitis B vaccine is produced using the antigen HBsAg[13].

Hepatitis B Surface Antibody (Anti-HBs): As part of the normal immunological response to infection, the body routinely generates antibodies against HBsAg. This antibody's existence implies immunity and recovery from HBV infection. A person who has received a successful hepatitis B vaccination also develops anti-HBs.

Total Hepatitis B Core Antibody (anti-HBc): appears with the start of acute hepatitis B symptoms and lasts a lifetime. The presence of anti-HBc indicates a recent or ongoing hepatitis infection over an ambiguous time period.

IgM antibody to hepatitis B core antigen (IgM anti-HBc): This antibody's presence indicates a recent, acute HBV infection.

IgG Antibody Tohepatitis B core antigen (IgG anti-HBc): Its presence indicates chronic infection since it is the most accurate indicator of past HBV exposure.

Hepatitis B e-Antigen (HBeAg): during both acute and chronic HBV infection, an antigen is discovered in the blood. A positive HBeAg test shows that HBV is actively reproducing and that the patient has high quantities of the virus in their body.

Antibody to Hepatitis B e-Antigen (anti-HBe): During an acute HBV infection, this antibody is produced briefly. It is also produced often during or right after a burst of viral replication. A person is more likely to experience long-term virus clearance if they switch from having positive HBeAg to having anti-HBe. Anti-HBe signals the end of HBV replication and the beginning of recovery[7].

Table 2.1 Interpretation of Hepatitis B Serologic Test Results

Serological marker	Status	Clinical interpretation
HBsAg	Negative	Susceptible
anti-HBc	Negative	
anti HBs	Negative	
HBsAg	Negative	Immune due to natural infection
anti-HBc anti-	Positive	
HBs	Positive	
HBsAg	Negative	Immune due to hepatitis B vaccination
anti-HBc anti-	Negative	
HBs	Positive	

HBsAg anti-HBc IgM anti-HBc anti-HBs	Positive Positive Positive Negative	Acute infection
HBsAg anti-HBc IgM anti-HBc anti-HBs	Positive Positive Negative Negative	Chronic infection
HBsAg anti-HBc anti-HBs	negative positive negative	Interpretation unclear; four possibilities 1 Resolved infection (most common) 2 False-positive anti-HBc, thus susceptible 3 "Low level" chronic infection 4 Resolving acute infection

Source[18]

2.1.7 Epidemiology of Hepatitis B Virus

With more than 2 billion people worldwide affected, hepatitis B infection is regarded as a disease of substantial health relevance. About 40% of all hepatitis cases in the United States were caused

by the illness. Hepatitis B cases in the United States are at risk for being spread by heterosexual activity (36%), intravenous drug use or injections (13%), homosexual activity (11%), domestic contact with contaminated objects (3%), and employment in the health care sector (2%), while 33% of cases are due to unknown causes[24].

The actual percentage of each category varies between sources; however, this figure illustrates the infection's general pattern. Children born to hepatitis B-positive mothers, homosexual men, intravenous drug users, hemodialysis patients, household contacts, institutionalized populations, sexual partners of infected people, those who receive certain plasma-derived products, and people who live in areas where the disease is endemic are among the high-risk groups that are generally recognized around the world. Approximately 89% of HBV cases in the United States alone are found in adults between the ages of 15 and 44, however vertical transmission is extremely common[25]. Additionally, the hepatitis B virus poses a threat to healthcare professionals as it is responsible for 300 of their fatalities each year[26].

Blood and blood-derived materials like serum and plasma are the means of horizontal transmission of the illness[27]. Due to extensive serological screening procedures and the reduction of utilizing blood from paid donors, the risk of HBV infection contracted through blood transfusion was substantially reduced to roughly 0.002%[28]. A minor skin break or casual touch with an infectious fluid can potentially result in the spread of the hepatitis B virus. On the other hand, it was discovered that roughly 6-24% of the cases were caused by the risk of hepatitis B through contaminated needle sticks and exposure of medical personnel[29]. The minimal infectious dose of infected sera is 1x10-6 ml. They also claim that the infectious levels of the virus are present in feces, urine, saliva, serum, semen, and vaginal secretions[29].

2.1.7 Risk Factors to Hepatitis B

2.1.7.1 Transmission of Hepatitis B Virus

HBV can endure for at least 7 days without the body. A person who is not immune to the virus throughout this period is nonetheless susceptible to infection. HBV takes an average of 75 days to incubate, ranging from 30 to 180 days. HBV is transmitted through mucosal or percutaneous contact with infected blood and a variety of bodily fluids, including saliva, menstrual, vaginal, and seminal fluids. Additionally, it is sexually transmissible. Through the use of tools contaminated with diseased blood and bodily fluids, infection can happen during medical, surgical, and dental operations[30].

Vertical or perinatal transmission occurs when an infected mother gives birth to an infected child. Horizontal transmission occurs when people are in close proximity to one another. Parenteral transmission occurs when an infected person receives an injection or undergoes another invasive medical procedure or sustains an injury. Sexual transmission occurs when two people have sex[31]. HBV is most frequently conveyed horizontally (exposure to contaminated blood and other bodily fluids) or from mother to child at birth in highly endemic areas, particularly during the first five years of life when infected children are caring for uninfected children. Direct contact with contaminated body fluids is unavoidable since infected kids can transfer the virus to other kids if there is frequent interaction (as on the playground). Children who tested positive for HBeAg had high quantities of HBV DNA in their saliva, suggesting that saliva may be a means of horizontal transmission of HBV among children[32]. According to one study, children with chronic hepatitis B virus infection shed tears that can spread the disease[33].

HBV can spread from one patient to another, from one patient to a health care worker, and from a health care worker to a patient in a hospital setting. The three primary routes of transmission are direct contact of non-intact skin or mucous membrane with infected blood or body fluids, needle-

stick injuries (NSIs) resulting in the direct transmission of infected blood or body fluids, and indirect contact of a contaminated surface with non-intact skin or mucous membrane. The research of transmission channels revealed that the most common methods for transmitting the hepatitis B virus from patient to patient are the administration of medications using multiple vial components and capillary blood collection[34]. There are still certain nations where donors are not checked for HBV, making blood transfusions, organ transplants, and other medical procedures extremely risky. The risk of infection is minimal in the vast majority of nations with screening programs. Therefore, in order to ensure blood safety and prevent unintentional transmission to users of blood and blood products, WHO strongly advises that all blood donations be tested for HBV[7].

The most frequent means of patient to HCW transfer involves injuries caused by infected needles. Between 1997 and 1998, there were more than 385,000 NSIs every year in the US. 37% of nurses in the UK had experienced an NSI injury at some point in their employment[35]. Sharps injuries are the cause of 40–60% of occupational HBV infections in underdeveloped nations. A typical NSI injects around the same volume of blood that might potentially contain up to 100 infectious doses of HBV. The degree of contact with infected material and the source's HBeAg status both play a role in the transmission of HBV. When blood tests for both HBsAg and HBeAg are positive, there is a substantial probability of HBV transmission (32%–67%). However, when HBeAg is negative, the probability of transmission is less than 6%[35].

As much as HCWs run the risk of contracting HBV from infected patients, they also run the risk of spreading the infection to patients. Enhanced percutaneous injury precautions, such as double-gloving during surgery, the adoption of standard (universal) measures, and routine HBV vaccination of HCWs have all led to a drop in the frequency of published cases of HBV

transmission from HCW to patient. The HCW must be viremic and there must be direct contact of blood or body fluid for there to be a risk of spreading HBV infection to a patient. Therefore, the only elements that would indicate this type of transmission are a high level of viremia, the clinical setting of an exposure-prone surgery, or the degree of contact with blood and body fluid[35].

Despite the fact that the HBV is more resilient and 50–100 times more contagious than the HIV, the HBI can be spread using the same methods. The virus can endure outside the body for at least 7 days, unlike HIV. If the virus enters the body of a person who is not affected during that time, it can nevertheless result in infection. Hepatitis B virus transmission is caused by contact with infectious blood or bodily fluids[30]. Unprotected sexual blood transfusions, the reuse of contaminated needles and syringes, and vertical transfer from mother to child during birthing are just a few examples of possible transmission routes. Without treatment, there is a 20% chance that a mother who tests positive for HBsAg would infect her unborn child[34].

If the mother also tests positive for HBeAg, this risk might be as high as 90%. Families within homes can contract the HBV virus from one another, probably through contact with non-intact skin or mucous membranes that have been exposed to HBV-infected fluids or saliva. However, at least 30% of adult cases of hepatitis B that are recorded cannot be linked to a specific risk factor. The patterns of transmission in many industrialized nations (such as those in North America and Western Europe) differ from those previously stated. The majority of diseases are now spread in these nations during the early stages of adulthood through drug use and sex[30]. A significant occupational risk for health professionals is HBV. HBV cannot be shared casually in the workplace and cannot be disseminated through tainted food or water. The average time for a

virus to incubate is 90 days, although it can be anywhere between 30 and 180 days. HBV can be found 30 to 60 days after infection and can linger for a variety of lengths of time[36].

The most common methods of human transmission for the hepatitis B virus include mucosal or percutaneous exposure to infected blood and other body fluids such saliva, vaginal, menstrual, and seminal fluids. Hepatitis B can be sexually transmitted, especially to unvaccinated individuals who have sex with men and heterosexual individuals who have several sex partners, as well as through contact with sex workers[37]. Less than 5% of adult patients with HVB infection develop chronic hepatitis. The virus can also spread through the use of sharp and piercing objects, such as razor blades, needles, or similar items contaminated with infected blood or fluid, during surgical, medical, or dental procedures. The virus can also spread through the following procedures: getting tattoos, abusing intravenous and topical drugs, using improperly sterilized syringes and needles, getting body piercings, and acupuncture[38].

2.1.7.2 Perinatal Transmission of HBV

The primary method of HBV transmission in many parts of the world is perinatal transmission, which is also a significant element in sustaining the infection reservoir in several regions, particularly in China and South East Asia. Many viraemic mothers, especially those who are HBeAg positive, pass the virus to their infants during or soon after birth in the absence of protective therapy for the illness[39]. If the mother develops acute hepatitis B during the second or third trimester of pregnancy or within two months of birth, the risk of perinatal infection increases. HBV can, however, affect the fetus inside the uterus, however this seems to be uncommon and is typically linked to placental rips and ante-partum hemorrhage. Between the ages of 6 months and 5 years, the probability of getting chronic infection falls to roughly 20–60% from about 90% following prenatal infection[40].

2.1.7.3 Horizontal Transmission of HBV

HBV can spread horizontally from family to household and even within families, especially from kid to child. Prior to the introduction of neonatal immunization, the frequency peaked among children between the ages of 7 and 14 in many endemic countries, accounting for around 50% of the infection in children[41].

2.1.7.4 Transmission Route of Hepatitis B Virus

Hepatitis B infection is spread mostly by contact with infected blood, semen, and other fluids. Children born to a mother who has hepatitis B Having sex with a person who has hepatitis B Sharing infected items like syringes, needles, razor blades, or injectable equipment[42].

2.1.7.4 Person at Risk

1. Offspring of a mother who has hepatitis B
2. a sexual partner of an infected individual
3. a person who has had multiple sexual partners
4. a person who has an STD infection
5. homosexual men
6. A drug user who injects drugs
7. Domestic exposure to an infected individual
8. Blood-exposed healthcare and public safety workers
9. Hemodialysis patients
10. Those who live and work in facilities for people with developmental disabilities.
11. Visitors to areas where hepatitis B infection rates are high or moderate[42].

2.1.8 Treatment and Prevention of Hepatitis B

According to various reviews, there is no specific treatment for acute Hepatitis-B. The major and most effective method for controlling and preventing these diseases, it has been discovered, is to take safety measures against the viral hepatitis epidemic. Therefore, the best method to stop the spread of these viruses is to have the necessary knowledge, facts, and information as well as to stay educated and practice the proper attitudes and behaviors[43,24]. Every person must be sufficiently informed and educated about this disease for this to be effective. The creation of knowledge, education, and communication for the prevention and control of hepatitis-B will be aided by and guided by these types of education. The chronic HBV infection can be treated with medication, including anti-viral oral pharmaceuticals, despite the fact that some HBV vaccines have been shown to be 95%–98.8% effective in avoiding infections associated with HBV and its chronic sequelae [44].

Knowing the factors involved in disease transmission, especially in the endemic zone, is one of the top priorities for preventing, managing, and eliminating HBV. Other preventative measures, however, include the use of condoms during sexual activity, hand washing, avoiding sharing of needles and personal care items like toothbrushes and razors, using protective barriers like gloves, and avoiding tattooing as much as possible, particularly when the sterility of the tattooing equipment is not assured, appropriate sterilization of medical equipment, and an appropriate hospital waste management system. Students are at significant danger of getting sick and spreading the disease because of the newest fashion fads, which include body piercing and exploding cosmetics using sharp items[45].

The best defense against the spread of viral hepatitis remains adequate knowledge of the route of transmission and prevention. To stop the spread of HBV, it is essential to be aware of these facts and to behave and think appropriately toward the disease. Although numerous research has

evaluated the level of HBV knowledge among various populations worldwide and in Nigeria, no study has been conducted among the Naval staff. It is hoped that the data from this study would contribute to the understanding and awareness of naval personnel on Hepatitis B, its risk factors, and its aftereffects[44].

Since 1995, the WHO Extended Programme for Immunization (EPI), which includes improved strategies for the prevention of mother-to-child transmission, has been gradually implementing the HBV vaccine across Africa. The total population incidence of HBV infection is still high across many settings in SSA (> 8%) despite the introduction of the vaccination more than 20 years ago, which has been crucial for lowering infections in children[46]. The fact that HBV is the only STD that may be prevented by vaccination should serve as a reminder to us even if it has grown to be a significant cause of health concern on a global scale. Recent years have seen a rise in the importance of HBV prevention among influential political figures and decision-makers worldwide. The safe and effective vaccine, which was made available in 1982 as a result of financing and the development of hepatitis B immunization campaigns, prevents the disease. Before the development of the vaccine, HBV prevention strategies focused on avoiding risky blood exposure or preventing transmission. Unsafe blood transfusions have played a significant role in the global spread of HBV[47].

A rule governing blood donation and management in blood banks around the globe has actively fought against this HBV transmission vector. Despite this, recent studies have shown that blood transfusion is once again one of the key risk factors for the global spread of HBV. This discovery is explained by the fact that blood donors have occult HBV infection (OHBVI)[48]. It is also important to note that the prevalence of HBV infections brought on by hazardous injections has significantly decreased after the auto-disposable syringe (ADS) was accepted on a global scale.

Iatrogenic HBV infections are also less common now that invasive medical procedures are used so frequently[49]. There have also been rumors that if precautions are not followed, dental procedures that have the potential to harm the oral mucous membrane will increasingly serve as a primary method of HBV transmission[50].

Since there is no long-term cure for HBV, prevention is the best defense against the epidemic. Even while two therapeutic medicines, such as interferon alpha (IFNa) and lamivudine, are currently utilized by many nations to treat the disease, there hasn't been any global agreement on pharmaceuticals used for the short-term treatment of HBV.A powerful cytokine with antiviral and immunomodulating properties, interferon-alpha is produced in response to viral infection[51]. Therefore, temporary therapy of the illness aims to limit viral replication, decrease the likelihood of developing severe liver disease or liver inflammation, and prevent the emergence of consequences like liver failure or liver cancer[48]. Therefore, managing chronic hepatitis B is far easier than treating it. Avoiding: is one of the general HBV management techniques that medical professionals advise:

1. Abundant alcohol use.
2. Unprotected sexual contact with non-immunized partners.
3. Sharing of toothbrushes, shavers, or other possibly blood-contaminated goods.
4. Blood or organ donation.
5. Screening of family members and sexual partners for HBV infection and vaccination of those who are sero-negative.
6. Long-term follow-up, patient education, routine liver biochemistry testing, and monitoring for hepatocellular carcinoma in high-risk populations.

2.1.9 Hepatitis B Vaccines

About 80–100% of hepatitis infections or clinical hepatitis can be treated with the hepatitis B vaccine. Hepatitis B vaccines come in two main categories:

i. Plasma-derived vaccines
ii. Re-combinant vaccines[52].

While their thermo-stability is quite comparable, these two vaccines don't differ in terms of reactogenicity, duration, or effectiveness of protection. Both vaccine types can withstand temperatures of up to 450 C for a week and up to 370 C for a month without affecting their immunogenicity or rectogenicity[53]. The purified HBsAg from the blood plasma of an infected +person with persistent HBV infection is used to make the plasma-derived vaccinations. Since 1982, the vaccinations have been offered for sale on a global scale[54]. The vaccine has undergone considerable purification, so any potential infectious particles left over are destroyed through a number of inactivation procedures[55]. Thiomersal is also employed as a preservative together with aluminum hydroxide or aluminum phosphate in the vaccine as an adjuvant and for multidose vials[56].

However, the recombinant hepatitis B vaccination uses HBsAg that is produced in yeast or mammalian cells that have had the HBsAg gene introduced by plasmids. Large tubes are used to cultivate the transformed cells, and the expressed HBsAg self-assembles into immunogenic, spherical particles that expose the immunogenic A antigen. The only way the recombinant particles and native ones diverge is in the glycosylation of HBsAg. Alum is introduced after full removal of host cell components. The amount of HBsAg protein per dose of vaccination that will elicit a protective immunological response varies among the various vaccine preparations

because of variations in the manufacturing process of the vaccine[57]. As a result, the vaccine potency represented in pg HBsAg protein per ml has no international standard. Additionally, the DTwP, DTaP, and IPV vaccines as well as monovalent versions of the hepatitis B vaccine are available. Only monovalent hepatitis B vaccine should be used for newborn immunization against the hepatitis B virus; other antigens contained in combination vaccinations are currently not recommended for infant immunization[49].

2.1.9.1 Hepatitis B Vaccination

The mainstay of hepatitis B prevention is the hepatitis B vaccine. More than 95% of newborns, kids, and young people have protective antibody levels after receiving the full immunization series. Protection is likely lifetime and lasts at least 20 years[51]. The hepatitis B vaccine should be given to all newborns as soon as feasible after birth, ideally within 24 hours. In children under the age of five, the prevalence of HBV infection was approximately 1.3% in 2015, compared to approximately 4.7% in the pre-vaccination era[53]. If not already immunized, individuals in high-risk categories should additionally receive vaccinations. These high-risk populations include those who frequently need blood and blood products, dialysis patients, solid organ transplant recipients, injectable drug users, people who live with people who have chronic HBV infection, HCWs and others who might come into contact with blood and other bodily fluids while working, and visitors to endemic regions who have not finished their series of HB vaccinations[56].

All people should ideally be immunized as a precaution before entering the medical field because HBV is a disorder that can be prevented by vaccination. HCWs should be tested for anti-HBs after vaccination to see if they have responded to the vaccine. After the three-dose series has been finished, testing for anti-HBs should be done one to two months later. Despite the

great effectiveness of the HBV vaccination, about 5% of immunocompetent people do not respond to the first series of HBV vaccines[50].

Prior to the discovery of the HBV vaccine, HCW infection rates were greater than those of the general population; however, with the widespread use of the vaccination, this situation has changed. Research in the US revealed a remarkable drop in HBV infections among HCWs who are now at lower risk of HBV infection than the general US population and an increase in the number of HCWs who are fully immunized since the launch of the HBV vaccine in 1982[57].

2.1.9.2 Injection Safety

One of the most often performed medical procedures is the injection. 90% of injections are administered for curative therapy, 5% are for vaccinations, and the remaining 1% are for other indications include intravenous medication and fluid delivery, injectable contraceptive administration, and transfusion of blood and blood products. A safe injection is one that does not result in injury to the recipient, exposes the HCW to no preventable risks, and produces no waste that is likely to have a significant negative impact on the community[58]. Eliminating unneeded and risky injections can be a useful strategy to prevent the spread of HBV.

2.1.9.3 Screening of Blood and Blood Products

A vital component of patient management in healthcare delivery systems is blood transfusion, which can save lives. HBV transmission can be stopped by implementing blood safety measures like quality-controlled screening of all donated blood and blood components used in transfusions. 97% of blood donations were vetted and quality-assured globally in 2013, yet there are still loopholes. Infections with transfusion-associated HBV (TAHBV) can arise as a result of these gaps. In India, individuals receiving numerous transfusions have a significant risk of TAHBV[52].

Up to 8% of Zambian blood donors had a persistent HBV infection. The prevalence of antibodies to the hepatitis B surface antigen (anti-HBs) among black, Asian, and Caucasian blood donors, respectively, is 42.9%, 3.4%, and 1.2%, with the black population of South Africa having the greatest rate of infection[53].

The Francistown Regional Blood Transfusion in Botswana does HBV screening using HBsAg as the sole indicator of a current infection. The detection of anti-HBc is of minimal utility in the vast majority of HB patients because HBsAg is already present. However, in rare circumstances, HBsAg may decrease to undetectable levels as the infection resolves[52]. It has been proven that certain people who are HBsAg-negative and anti-HBc positive nevertheless replicate HBV. Therefore, the absence of circulating HBV may not be guaranteed by the presence of negative HBsAg in the blood of an apparently healthy donor, making the blood infectious[29]. Identifying people who are anti-HBc reactive due to a prior, resolved, natural HBV infection and are therefore non-infectious from those who have an unresolved HBV infection and are therefore potentially infectious would be important if anti-HBc screening were to become widely used. Although systematic anti-HBc screening is not advised, nations should decide if anti-HBc screening is necessary based on the prevalence and incidence of HBV infection[43].

Since anti-HBs is protective, all anti-HBc reactive donations must undergo anti-HBs testing in order to distinguish between infectious and noninfectious donors. Blood donations that are HBsAg negative, anti-HBc reactive, and have anti-HBs levels of 100 mIU/mL or higher are typically considered to be safe and acceptable for release for clinical or manufacturing use. A level of anti-HBs at 100 mIU/mL is typically accepted as the minimum protective level in the context of blood screening. The use of highly accurate and focused screening tests is advised[55].

2.1.9.4 Post-Exposure Prophylaxis

HBV occupational exposures may happen at a medical facility. Appropriate and prompt prophylaxis can stop HBV infection after exposure to the virus. Post-exposure prophylaxis (PEP) is primarily based on HBIG passive immunization and active immunization with the HB vaccine. The immediate availability of significant quantities of antibody is the main benefit of passive immunization with premade antibodies. Hepatitis B vaccination is the cornerstone of PEP, although in some cases, HBIG (hepatitis B immunoglobulin) is also advised for supplemental protection. When administered within 7 days, and preferably within 48 hours of exposure, the hepatitis B vaccination is quite efficient at avoiding acute illness. The HCW's level of immunization and the source's HBV status both influence post-exposure care. It may be necessary to complete an accelerated course of the HB vaccine, which includes doses at 0, 1, and 2 months[59].

Only in cases when the receiver is a known non-responder to HBV immunization and the source is known to be HBsAg positive is HBIG recommended. Ideally, HBIG should be administered within 48 hours of exposure, but no later than 7 days. The HBIG and HB vaccination doses are administered at distinct injection sites simultaneously[39].

Exposure to Hbsag Positive Source

Unvaccinated individuals should get HBIG and start an expedited course of the HB vaccination. HBIG with a dose of the hepatitis B vaccination should be administered at the same time to individuals who have a history of not responding to the full course of the vaccine. HCWs who have had all three rounds of vaccination but who's anti-HBs status is unknown should receive the HBV vaccine dosage and HBIG if their anti-HBs level is less than 10 mIU/ml[59].

Exposure to Unknown HBsag Source

People who have never had vaccinations should start an expedited course of the HB vaccine. Individuals who are fully immunized but have unknown HB antigens, those who are not fully immunized, and those who did not respond to the HB vaccine series should receive a dose of the HB vaccine. HBIG could be taken into account in non-responders. Additionally, the source should be tested in every way possible. HCWs who are known HBV vaccine responders in both exposures (anti-HBs 10mIU/ml) are protected and do not require additional vaccine doses, however for non-responders, a different vaccination approach may be necessary[49].

2.1.9.6 Standard Precautions

These are industry standards designed to lower the danger of spreading blood-borne and other diseases from known and unknown sources. Health care professionals are mandated by "standard precautions" to treat every patient's blood and bodily fluids as a potential source of infection, regardless of diagnosis or assumed infectious state. Diseases that are spread through contact, droplets, or the air require extra precautions. "Additional (transmission-based) precautions" are what these are known as. Patients, healthcare professionals, and visitors are well-protected when standard measures are taken. Use of personal protective equipment when handling blood, body fluids, excretions, and secretions, proper handling of patient care equipment and soiled linens, prevention of needle-stick and other sharp-edged injuries, environmental cleaning and spill-management, and proper handling of waste are some of these[60].

2.2 Theoretical Framework

2.2.1 Health Belief Model

The "health belief model" (HBM) is a theory that links behavior to the likelihood of contracting a particular disease or infection[61]. The HBM uses six fundamental ideas to forecast why people choose to control, prevent, or screen for certain medical diseases. Perceived susceptibility, benefits, severity, barriers, cues to action, and self-efficacy are the main principles[62]. According to the Health Belief Model, an individual's risk of developing a disease or illness and belief in the effectiveness of therapy for their current condition imply the likelihood that they will seek treatment or decide not to[63].

HBM is based on two theories: one about psychology and one about behavior. These two theories play a significant role in the study of human behavior that is related to health. The psychological component of the HBM is a person's belief in a particular treatment's efficacy and its ability to treat and prevent illness and disease. The behavior a person exhibits to avoid getting sick or, if they already have a sickness, to try to recover from it makes up the behavioral side of the model[63].One thing a person can do to advance their health is to adopt the advised health activity, such as receiving the hepatitis B vaccination[60].

Three componentsthreat perception, behavioral assessment, and sociodemographic and psychological variables—were the initial emphasis of the HBM. Health-related motivation and cues for action were later added[64]. Health motivations refer to an individual's readiness to be concerned about health issues; cues to action refer to internal and external factors that influence action (mass media, family, illness symptoms); and threat perception refers to beliefs on the impact and consequences of illness (perceived severity and susceptibility to illness or health problem)[65]. It is possible to identify studies that used the HBM. Studies have revealed, for

instance, that people living with endemic malaria do not view the illness as a serious condition, and that mosquito nets are ineffective at preventing the disease because mosquitoes attack both during the day and at night[66]. The threat perception and behavior evaluation parts of the HBM were used in this study to assist explain its results. HBM predicts that someone who considers HIV/AIDS to be serious, perceives the benefits of ART outweighing the drawbacks, and has confidence in taking the medication even in challenging circumstances like when drinking or using drugs will adhere to the regimen[67].

It is a cognitive and interpersonal strategy that sees people as rational beings that take actions to lessen what they perceive to be a threat (such disease symptoms) and increase what they consider to be advantages (e.g., adherence to treatment)[68]. According to the Health Belief Model (HBM), a person's beliefs of the threat posed by a health problem and the perceived benefits of taking action to reduce that threat have an impact on their decision to seek health care[69]. A person's beliefs regarding the potential costs and advantages of taking medications are described by the construct known as "Beliefs about Medicines" which was formed from the elaboration of HBM[70].

2.2.2 Bronfenbrenner's Ecological Theory

The Ecological Theory proposes that developmental changes are due to reciprocal interactions among individuals and their immediate environments. This theory emphasizes that individuals do not live in isolation and that the reciprocal relationships with their immediate social contexts are influenced by different ecological systems and societal factors. The individual system consists of characteristics and roles of individuals (e.g., individuals' beliefs, knowledge and attitudes towards the HPV vaccine)[65] .The microsystem refers to the relation between individuals and their immediate social contexts as well as their socioeconomic status (e.g., parents, friends,

and family annual income and how they relate to individuals' beliefs, attitudes, knowledge and barriers of the HPV vaccine use).The mesosystem level refers to the interconnections among the microsystem. The exosystem level consists of the settings that are not experienced directly by individuals but impact their beliefs, knowledge, attitudes, and acceptance of the HPV vaccine, and finally the macrosystem level refers to the broad system that reflects the patterns of the culture, values, and societal forces that influence and shape individuals' beliefs knowledge, attitudes, and acceptance of the HPV vaccine. These ecological levels are connected, influence the others, and shape interpersonal relationship processes. Thus, if a change occurred in any of these systems, it could lead to a change in the others systems.

The theory also argues that "these four systems or ecological levels are nested and affect each other in a reciprocal and dynamic manner". Consequently, there are three assumptions that guide the theory[71]. The first assumption is that "this theory accepts diverse structures and broad definitions of it"; therefore, this theory is a useful framework to study multicultural and diverse populations such as naval personnel. Second, this theory assumes that cultural diversity may possibly affect multicultural families' interaction and human development. Finally, this ecological theory presents "individual and family problems and relationships among them in relation to a larger society". According to this theory, the reciprocal interactions among these five systems are connected, influence, and affect the others.

The Individual System

The individual system is the innermost circle in the nested multi-level system found in Bronfenbrenner's ecological model. The individual system consists of characteristics and roles of individuals, and the interpersonal dynamics, knowledge, attitudes, barriers, and psychological factors that may impact individuals' behaviors and attitudes towards the HPV vaccine.

Regarding individuals' knowledge, previous studies have found that limited knowledge about HPV and lack of awareness of the severity of the HPV can be a major concern for young populations in the United States.

The Microsystem

The next ecological level is the microsystem. This system refers to the relation among individuals and their immediate social contexts (e.g., their parents and friends).

The Mesosystem

The third ecological level is the mesosystem. This level refers to the interconnections among the microsystem, as well as by the interrelation and interaction among major settings surrounding the individuals such as family-school, familyneighborhoods, individuals-peer relationships.

The Exosystem

The fourth ecological level is the exosystem. This level consists of the settings that are not experienced directly by individuals but impact their development, functioning, and sexual behavior. For instance, the exosystem includes the overall access to the HPV vaccine which may be affected by the number of health clinics found in the individuals' neighborhoods, sexual education courses that offer HPV vaccine information, if the HPV vaccine is mandatory in the military system or promoted by the government's healthcare providers, and in general, healthcare availability in the community for HPV.

The Macrosystem

The fifth level is the macrosystem. This level refers to the broad systems, contexts, and settings that reflect the patterns of the culture, values, and societal forces that influence and shape individuals' development and impact their sexual behaviors.

2.3 Empirical Studies

2.3.1 Global Burden of Hepatitis B

One of the most significant global public health issues is the hepatitis B virus (HBV). According to the World Health Organization, approximately one-third of the world's population has HBV infection[71]. More than 240 million people worldwide are infected with chronic hepatitis B (CHB), which encompasses a wide spectrum of the disease and results in 650,000 fatalities a year. There are 360 million chronic carriers among them, putting them at risk of developing liver conditions like cirrhosis and hepatocellular carcinoma[72].

Globally, 257 million people were thought to be carrying a chronic HBV infection in 2015. The WHO African Region and the Western Pacific Region are the two regions most impacted by the HBV epidemic[72]. The WHO Western Pacific Region and the WHO African Region had the highest rates of adult hepatitis B infection with 6.1% and 6.2%, respectively. 3.5% of the general population worldwide had HBV infection in 2015. The percentage of people who still have chronic HBV infection among those born before the hepatitis B vaccine was available is very significant. Of the 36.7 million people living with HIV worldwide, over 2.7 million also have HBV. In people with HIV, the incidence of HBV infection is 7.4% worldwide[72].

In 2019, it was estimated that 820,000 deaths were related to hepatitis, which affects liver cells and can lead to the formation of hepatocellular carcinomas (HCC). Chronic HBV infection is estimated to afflict 3.6% of the world's population. Despite being a serious public health issue,

viral hepatitis was not given priority until recently. In 2016, the World Health Organization (WHO) established the Global health sector strategy on viral hepatitis, which set the target of eliminating viral hepatitis as a public health issue by 2030 and ensuring that 90% of infected people have received a diagnosis. The 67th World Health Assembly of the WHO similarly underlined the importance of tracking viral hepatitis prevention, diagnostic, and treatment advancements on a national and international level[47].

There are roughly 2,000,000 (two billion) Hepatitis-B virus-infected individuals worldwide, and 391 million/5% of those individuals have chronic HBV infection. Worldwide, it is estimated that 30,000,000 persons contract HBV infection for the first time. According to a recent study, the prevalence of chronic HBV in people of all ages worldwide ranged from 3.5% to 5.6%. WHO estimated that HBV infection causes 887,000 deaths worldwide in 2020. (From cirrhosis and liver cancer)[37].

The largest frequency of HBV (5%–8% of adults) is seen in Central and East Asia, Sub-Saharan Africa, and the Pacific regions. HBV is typically contracted during infancy or at a young age. In the US, between 565,000 to 1,130,000 people (0.3%) have chronic HBV infection. However, higher prevalence rates are seen in areas with sizable immigrant populations from countries with high prevalence rates as well as in areas with sizable populations of people who are at high risk, such as those who inject drugs, are in prison, and men who have sex with males[73].

2.3 Burden of Hepatitis B in Sub-Saharan Africa

In sub-Saharan Africa, an account of roughly 87,890 hepatitis B-related deaths each year has been created and documented. On the other hand, because liver biopsy is not a common operation and non-invasive transient elastography is not widely accessible, longitudinal research on the prevalence of cirrhosis in people in sub-Saharan Africa have proven challenging.

Researchers have found that sub-Saharan Africa has a high incidence of hepatocellular carcinoma and nearly 80% of instances of HBV infection. Hepatocellular carcinoma has an age-standardized incidence of up to 41.2 per 100 000 individuals per year in sub-Saharan Africa, with Mozambique having the highest recorded incidence[74].

The available incidences of hepatocellular carcinoma may also understate the true incidence because there aren't enough cancer registries. A family history of hepatocellular carcinoma, cirrhosis, high HBsAg concentration, high HBV DNA concentration, HBV genotypes A and C, basal core-promoter mutations, and aflatoxin exposure, according based on a Cohort studies, have been reported as significant risk factors for hepatocellular carcinoma in sub-Saharan Africa. Kew (2012) observed a poor prognosis for patients with hepatocellular carcinoma, with 92% of patients dying within one year following the onset of symptoms in under-resourced regions of sub-Saharan Africa. This is due to the absence of investigative programs for tiny tumors[29].

An estimated 60 million people in Africa have chronic HBV infection, with a prevalence of 6.2%, according to reports. Children were found to have the highest infection rates, and perinatal routes continue to be the main means of transmission. During the vaccination era, which lasted from the 1980s to the early 2000s, chronic HBV infection among children under five years of age decreased from 5% to less than 1% in 2019[75].

In Southern Africa, research of patients from South Africa and Zambia found a 7.4% HIV/HBV co-infection rate; a study of patients from South Africa and Botswana found a nearly identical 7.0% HIV/HBV coinfection rate[76]. 8% of Southern Africa's population overall may have HBV infection. In Zambia, chronic HBV infection is a widespread disease. Chronic HBV prevalence is 10-12% in an HIV group[77].

In South Africa, 1.8% of nurses tested positive for HBsAg, and they were all black nurses. In South Africa, HBV is pervasive. According to a study done in Nigeria, 2.5% of midwives who caught HBV through practice were either unvaccinated or had violated general precautions. In the same study, it was found that 36.7% of participants had not had hepatitis B immunization and 30.8% did not follow universal precautions. HBV infection was the most common transfusion transmissible illness (TTI) found in all blood units collected in the nation, with a detection rate of 6.2% and accounting for 42% of all TTIs, according to a report from Tanzania National Blood Transfusion Services (TNBTS). Another study conducted in Tanzania found that 7.0% of HCWs had chronic HBV infection. Seroprevalence of HBsAg has been estimated to be 10.1% in the general blood donor population in Cameroon, 10.2% in pregnant women, and 23.7% in HIV-positive patients[77].

About 5.3% and 5.1% of participants in two related investigations on HIV/HBV co-infection in Botswana tested positive for HBsAg. According to a study done on HIV-positive women in Botswana and South Africa, the combined cohort's HBsAg prevalence was 7.0%, whereas the Botswana cohort's prevalence was 3.8%[48].

2.3.2 Burden of Hepatitis B in Nigeria

Approximately 120,000 people in Nigeria have hepatitis B, more than 50,000 have a chronic illness that lasts their entire lives, and more than 12,000 people die each year from HBV-related infections, according to the Centers for Disease Control[78].

Nigeria is one of the African nations with the highest prevalence of HBV infection. However, due to a lack of funding, political will, and public awareness regarding Nigeria's HBV problem, around nine out of ten Nigerians who have chronic HBV are ignorant of their infection status and

are not included in international public health statistics. According to the International Agency for Research on Cancer, with an age-standardized incidence estimate of 2.6 to 5.1 cases per 100,000 person years, Nigeria has the highest rates of HBV-related cancer in West Africa. Lack of accessible diagnostics and the out-of-pocket costs for vulnerable communities have been identified as potential barriers to eliminating viral hepatitis B in Nigeria, making HBV a serious danger to public health[79].

A study only projected the prevalence without stressing at-risk sub-groups and specific populations to which interventions should be mostly directed, and these limitations suggested a research gap that calls for an up-to-date wide-ranging investigation. The worldwide estimation of chronic HBV prevalence conducted was limited in scope due to inadequate information of the sources of data for each country[80].

2.3.3 Prevalence of Hepatitis B Virus in Nigeria

2.3.3.1 Prevalence of hepatitis B virus among blood donors

According to a study, blood donors who are anti-HBc positive but HBsAg negative could prevent HBV transmission by having their blood tested. Between different patient demographics and geographical areas, the prevalence of HBV varies. At a centralized blood service center in Nigeria, 300 voluntary blood donors were tested for the presence of the hepatitis B virus; the results revealed that 33 (13.8%) of first-time donors tested positive for hepatitis B markers, while all retained donors tested sero-negative. In this investigation, 3 (1.3%) HBeAg reactions and 32 (13.3%) sero-positive reactions to HBsAg were noted[81].

About 14.3% of blood donors in a study in Jos tested positive for HBsAg, compared to a higher 25.9% of HIV-positive patients. Donors (51–60 years old) have a higher infection rate of 44%

and a frequency of 28% (31-40 years). The study Seroprevalence of hepatitis B e antigen (HBe antigen) and B core antibodies among hepatitis B surface antigen positive blood donors at a Tertiary Center in Nigeria discovered a seroprevalence of 8.2% (22 of 267) HBeAg, 4 of 267 (1.5%) were indeterminate, and 241 (90.3%) of their subjects tested negative Just 27 out of 267 donors (10.1%) had IgM anti-HBcore positive tests, 234 (87.6%) had negative tests, and 6 (2.2%) had unclear results. IgG anti-HBcore testing revealed a higher number of positive results (162 out of 267) than negative results (105 out of 267), at 60.7%. According to the study's findings, South West Nigeria has comparatively high IgG anti-HBcore and IgM anti-HBcore rates and low seroprevalence rates of chronic hepatitis that is HBeAg-positive[82].

While a study reported a prevalence of 8.6% HBsAg in Maiduguri, Northeast Nigeria with anti HBc IgM in 18.4%, suggesting that donors negative for HBsAg are not necessarily uninfected with HBV and recoil, a study among blood donors in North Central Nigeria at the Bishop Murray Medical Centre in Makurdi reported age group prevalence of HBV at 11.90%, 13.05%, and 6.53% within the age range[83].

A study in Southwest Nigeria confirmed the presence of additional HBV indicators among HBsAg negative blood donors and advised routine testing for markers like antibodies to the HBC antigen in donor blood prior to transfusion. An investigation found a 32.6% frequency of transfusion-transmissible infections overall, with 19.6% HBsAg positivity, 13.0% HBC antibody reactivity, and 8.9% detection of HBeAg, a marker of the virus' infectivity that occurs in blood following HBsAg[84].

According to a study done in the Nigerian city of Benin, where TTIS prevalence was found to be 14% overall, routine blood screening may not be effective in lowering the prevalence of HBV infections. Blood donors were found to have significant levels of HBsAg (22.0%) and HBeAg

(6.64%) in far-northern Nigeria. Only 11.6% and 1.39% of the pregnant women in their study's subgroup tested positive for HBsAg and HBeAg, respectively[85].

2.3.3.2 Prevalence of Hepatitis B Virus among Pregnant Women

In a study that examined the prevalence of the hepatitis B virus among pregnant women visiting the antenatal clinic at the General Hospital in Minna, Niger State, the findings showed that 13 (or 6.5%) of the 200 participants examined tested positive for the virus. According to the distribution of HBV infection by age among the respondents, those between the ages of 20 and 29 had the highest rate of infection—10.3%—followed, in decreasing order, by those between the ages of 40 and 49 (4.5%), 30-39 (4.2%), and 10 to 19 (0.0%). Conduct a cross-sectional study over a 3-month period to determine the relationship between the prevalence of the virus and the individuals' low level of awareness and poor standard of life. By employing computer-generated random numbers, a simple random sample method was used to determine the prevalence and distribution of hepatitis B among 480 women attending prenatal clinics in Nnewi, Nigeria. 40 of them had HBsAg positive tests, making up 8.3% of the sample population. The study's participants ranged in age from 14 to 45 years old (mean age: 24.3 years), and the mean parity was 2.18. The co-infection rate for HIV and HBV was 4.2%[86].

Among 200 pregnant women attending an antenatal clinic in Gwagwalada, Abuja, a study also assessed the incidence of hepatitis B virus surface antigen (HBsAG) and hepatitis C (HCV) antibodies. 19 (9.5%) and 1 (0.5%) of the 200 blood samples examined tested positive for hepatitis B and C, respectively. In the tested pregnant women, neither virus appeared to have co-infected. During research on the incidence of hepatitis B virus (HBsAg) antibodies in expectant mothers Out of 836 expectant mothers, this was discovered in Akure, Ondo State. There were

just forty (4.7%) positive responses, and 820 (95.3%) negative ones, yielding a prevalence of 4.7% overall[87].

Three hundred (300) pregnant women in Makurdi were tested for Hepatitis B Virus (HBV) infection and carrier status. All HBsAg positive samples were examined for the presence of the hepatitis B e antigen to establish the status of maternal HBV infection (HBeAg). A total of 33 (11%) pregnant women were found to be HBV carriers, and 10 of the 33 (30.3%) of these women tested positive for HBeAg. As a result, it was discovered that 3.3% of the whole research group had significant viral replication as well as high risk of passing HBV to their unborn children[88].

2.3.3.3 Prevalence of Hepatitis B Virus Co-Infections with Other Disease

A study looked at the prevalence of hepatitis B virus and human immunodeficiency virus co-infection in Nigerian children (2 months to 15 years old). Three hundred and ninety-four (87.2%) of the 452 children who were screened for HIV were HIV mono-infected, while 58 (12.8%) were HIV and HBV (HIV/HBV) co-infected. The seminary in Jos discovered a 15.5% hepatitis B surface antigen positive reaction among their participants who were a low-risk blood donor group while researching seropositivity to hepatitis B, C, and the human immunodeficiency viruses among clergy men in training. In this investigation, they also noted a prevalence of 22.1% for crude transfusion-transmissible infections and a co-infection rate of 0.4% for HIV and HBV[89].

A study done at General Hospital Minna in central Nigeria studied the seroprevalence of malaria and hepatitis B (HBsAg) among pregnant women attending antenatal clinics. Out of the 269

pregnant women screened, 216 (80.30%) tested positive for malaria, 22 (8.18%) tested positive for hepatitis B, 21 (7.81%) tested positive for malaria and hepatitis B co-infection, and 10 tested negatives, whereas out of the 100 non-pregnant women screened, 51 (51.0%) tested positive for malaria, 8 (8.00%) tested positive for hepatitis B, and 6 (6.00%) tested positive for malaria. It was discovered that out of 1535 sampled individuals analyzed for the hepatitis B virus (HBV), 1319 (85.1%) showed a serological evidence of exposure to HBV infection, some through natural infection (22.7%) and others (13.0%) through vaccination; 12.0% of the exposed were presumed to be currently infected and 91.2% were chronically infected.2.7% of those who tested positive for HBsAg also had HDV antigen, which was more common (6.7%) in people with acute hepatitis than in people with chronic illness[90].

Using ELISA, 200 HIV-positive people who had been recruited in a row—97 men and 103 women were examined for HBsAg. A total of 53 patients had HBsAg positive tests, yielding a prevalence rate of 26.5% overall. This was significantly higher (p 0.001) than the 10.4% figure for non-HIV-infected people. Male co-infection rates (24.7%) did not substantially differ from female co-infection rates (28.2%). In contrast to the 19 years, where there were no cases of co-infection, co-infection was most prevalent in the age range of 40-49 years (41.6%). Businessmen had the highest rate of coinfection among the various occupational groups (44%) followed by long-distance truckers (39.5%)[91].

In terms of marital status, individuals who were divorced or widowed had the highest percentage of coinfection (53%) after those who were not married (32.5%) and married (21.6%). The scientists confirm that HIV-infected patients had a higher prevalence of HBV co-infection than people who do not have the virus. Therefore, it is necessary to test for HBV infection in all HIV-positive individuals. In Lagos State University Teaching Hospital (LASUTH) patients, Taiwo et

al. (2012) found that 4 (3.9%) HIV-positive patients had both dual HBsAg and anti-HCV positivity, whereas 29 (28.4%) and 15 (14.7%) patients had recurrent HBsAg and anti-HCV reactivity. HBsAg and anti-HCV prevalence in HIV-negative blood donor controls was (22) 6.0% and (3) 0.8%, respectively[92].

Male research participants 16 (50%) had a greater rate of hepatitis co-infection than female participants 32 (45.7%). In a tertiary healthcare facility in Ile-Ife, Nigeria, researchers have examined the prevalence and trends of HBsAg, anti-HCV, anti-HIV, and VDRL in blood donors over the previous three and a half years. 14,500 donors in total bled; 7.50% tested positive for HBsAg, 0.96 percent for HIV, 0.86 percent for HCV, and 2.61 percent for VDRL. The prevalence rate of HBsAg gradually decreased from 9.20% in 2006 to 8.37 and 6.25%, before increasing to 6.32%. Similar to this, HIV prevalence increased to 0.96% in the first half of 2009 after declining to 0.94% in 2007 and 0.66%[93].

The prevalence of HCV varied over the course of the investigation. Syphilis prevalence decreased from 2.93% to 1.92%. In a study conducted in Lagos, Nigeria, the sero-prevalence of HCV in children with HIV was examined. 132 children with blood HIV positivity between the ages of 1 and 15 years underwent serological testing for HCV. Six samples from the 132 HIV sero-positive ones had HCV, with a frequency of 4.54%. Age groups 1-3 years saw zero prevalence, while age groups 12 to 15 years saw a sero-prevalence of 20%. A study assessed the prevalence of hepatitis B virus and human immunodeficiency virus co-infection in Nigerian children (2 months to 15 years old). Three hundred and ninety-four (87.2%) of the 452 children who were screened for HIV were HIV mono-infected, whereas 58 (12.8%) were HIV and HBV (HIV/HBV) co-infected[94].

In a study, 97 male and 103 female HIV-positive participants who had been recruited in a row were examined for HBsAg. 53 patients in all tested positive for HBsAg, with a prevalence rate of 26.5% overall. The male coinfection percentage (24.7%) did not differ substantially from the female coinfection rate (28.2%). In contrast to the 19 years, where there were no cases of co-infection, co-infection was most prevalent in the age range of 40-49 years (41.6%). Businessmen had the greatest co-infection rate (44%) of all the occupational groups, followed by long-distance truckers (39.5%)[95].

A study that looked at the prevalence of HIV/HBV-positive patients in Kano State discovered that 54/440 of them also had HB-HIV. In addition, a study examined the prevalence of HIV-HBV patients in Kano State and discovered that 54/440 of them were also co-infected with HB and HIV. The study also examined the prevalence of HIV-HBV patients in Kano State and discovered that 211/300 of them were also co-infected with HB and HIV, and it examined the prevalence rate of HB and C infections among HIV-infected patients seeking care at the HIV and AIDS section of the University of Ilorin Teaching 114 (32.0%) and 14 (3.9%) of the 356 HIV-positive patients tested positive for HBsAg and anti-HCV antibody, respectively[96].

2.3.3.4 Prevalence of Hepatitis B Virus among Healthy Individuals

A study was conducted in Jagindi Tasha, Kaduna State, Nigeria, to evaluate the sero-prevalence of hepatitis B surface antigen (HBsAg) and related risk factors among pupils of a secondary school. 35 (18.4%) of 190 students who appeared to be in good health and were examined for HBsAg were sero-positive. Male participants reported a positivity rate of 25.5% compared to 10.9% for female subjects, while subjects between the ages of 13 and 15 registered 6.8%

positivity. Male subjects had a risk factor for blood transfusion at a rate of 32.0% compared to female subjects' 30.0%[97].

In a research, urban Nigerians who appeared healthy were examined for Hepatitis B viral infections. 957 (50.6%) men and 934 (49.4%) women made up the 1,891 participants. A total of 114 people (6.0%) tested positive, with 71 (7.4%) men and 43 (4.6%) women. Males were more likely to contract the virus than females, and those between the ages of 21 and 30 had the highest infection rate. In Toro, North-Eastern Nigeria, 182 Fulani nomads were studied, and it was discovered that the gender-specific seroprevalence of HBsAg was around 2:1 among men and women. The age group of 30-37 years had the second-highest infection rate (6.0%), followed by those between 25 and 29 years (8.2%)[98].

Addtionally, a study done in Yola, Nigeria, 595 randomly selected volunteers who gave blood voluntarily were examined for hepatitis B and C virus infections. Only 14 male donors (2.4%) were HBsAg and anti-HCV positive. The study examined the prevalence of hepatitis B surface antigen among newly admitted students at the University of Jos in Nigeria and came to the conclusion that there is a low seroprevalence of hepatitis B and C virus infection among voluntary blood donors in Yola, Nigeria. 50 (16.7%) of the 300 newly accepted students who underwent screening for HBsAg were seropositive. Males aged 34 (11.33%) had a greater prevalence of HBsAg than girls aged 16 (5.33%). The age range 15–19 years had the lowest age specific prevalence, with 12(17.39%), whereas the age range 25–29 had a much higher rate of 16(28.57%)[99].

In a study, 188 members of the medical community—including nurses, doctors, medical laboratory scientists, technicians and assistants, pharmacists, and ward helpers—were tested for the HBV surface antigen (HBsAg). from among the 128 respondents that underwent screening.

32 people, or 17.0%, were found to be seropositive, with female respondents reporting a prevalence of 17.3% compared to male subjects' (16.7%). In a rural area of Nigeria, 124 unvaccinated Dutch missionaries and their family members were the subjects of an epidemiological study by Frank et al. in 2004. 5 (9.8%) of 51 adults and 9 (12.3%) of 73 children (incidence rate, 1.7 per 1000 person-months at risk [PMAR]) were found to have antibodies to the hepatitis B core antigen (incidence rate, 2.8 per 1000 PMAR)[100].

2.3.4 Impact of Knowledge and Awareness on Hepatitis B

According to various reviews, there is no specific treatment for acute Hepatitis-B. The major and most effective method for controlling and preventing these diseases, it has been discovered, is to take safety measures against the viral hepatitis epidemic. Therefore, the best method to stop the spread of these viruses is to have the necessary knowledge, facts, information, and to always be up to speed, along with the proper attitudes and behaviors. Every person must be sufficiently informed and educated about this disease for this to be effective. The creation of knowledge, education, and communication for the prevention and control of hepatitis-B will be aided by and guided by these types of education. A persistent and ongoing effort to increase community understanding and awareness of HBV transmission and prevention will be extremely important, especially among adults. Since the beginning of sexual connections is made and people tend to discover and experiment with sex, which is a risk factor of contracting and transmitting hepatitis B, it will be crucial to expose adults and people to HBV knowledge and facts. While the majority of harmful lifelong habits and behaviors, which serve as risk factors for acquiring HBV infections, are also widespread[101].

The sole defense against the viral hepatitis epidemic is adequate knowledge of the route of

transmission and prevention. It is essential to have awareness of these facts and to behave and think appropriately if you want to stop the sickness from spreading. Few studies have examined the awareness of HBV among other tertiary students, despite the fact that several have been conducted among medical students worldwide and in Nigeria. It is envisaged that the knowledge gained from this study would be valuable in creating instructional resources on the Hepatitis B virus that are tailored to specific needs[94].

In a study conducted in Kabul, Afghanistan, health care workers' knowledge, attitudes, and practices regarding the prevention of the hepatitis B virus were evaluated (HCWs). The results demonstrated that HCWs in Kabul, Afghanistan, are at a significant risk of contracting HBV due to low vaccination rates and insufficient infection control. The study suggested that all HCWs receive vaccinations in order to enhance their attitudes toward HBV infection and achieve successful infection control[102].

An evaluation of police trainees' knowledge and awareness of the Hepatitis B virus (HBV) and Hepatitis C virus was conducted at the police training college Ongole in the Prakasam District of India (HCV). The study made use of a cross-sectional survey that was done among police recruits in the Andhra Pradesh district of Prakasam. There were 186 police trainees used in total. The results showed a startling lack of knowledge of HBV among the general people, which continues to be the key factor in the rapid spread of viral illnesses in developing nations. The study also revealed that the surveyed police trainees had very little knowledge of how these viruses spread and what can be done to avoid them[103].

A community-based cross-sectional study was used in three distinct sites inside Khartoum state with a total of 197 participants to examine the knowledge and awareness of hepatitis B among the Sudanese people there recently. The study's findings revealed a high prevalence of Hepatitis

B among the population categories it examined, along with lower vaccination rates and a variety of misconceptions about people's knowledge and awareness of Hepatitis B. To close the gaps in hepatitis B treatment, the report advised that policymakers give this issue substantial thought. The analyzed population's poor external validity and generalizability, however, placed restrictions on this study. Hepatitis B is more prevalent in some research areas of Sudan than in others. One potential drawback is that the questionnaire's reliability test was not conducted[104].

Additionally, a study investigated the practices of medical professionals in Rivers State, Nigeria with regard to the prevention and treatment of hepatitis B and C, as well as their knowledge and attitudes toward those diseases. He investigates the use of personal protective equipment, universal precaution, and provision in the research population. A self-administered questionnaire was used to interview around 150 (150) doctors from the private and public sectors on their knowledge and status of vaccination, viral hepatitis treatment, and their use of general safety precautions for viral hepatitis B and C. The results of this study show that doctors have a poor understanding of how to treat viral hepatitis, and despite the widespread usage of safety precautions, personal protective equipment is not always available, putting healthcare workers at risk for infections[105].

Police trainees in the Ongole, Prakasam District, police training college have a general understanding of the hepatitis B and C viruses. The purpose of the study was to evaluate these police trainees' knowledge and awareness of the transmission of the hepatitis B and c viruses as well as their familiarity with the symptoms, complications, and significance of the hepatitis b vaccine. A cross-sectional observational study was carried out among the police recruits enrolled in the district police training college in Ongole, Andhra Pradesh's Prakasam district. These police trainees were also evaluated on their socio-demographic information, knowledge of hepatitis B

and C viruses' mechanisms of transmission, prevention measures, symptoms, and sequelae, as well as their knowledge of hepatitis B vaccination. Most police trainees are aware of hepatitis B and C infection and have heard of hepatitis B vaccination availability, but none of the participants were aware of the hepatitis B vaccine zero dose schedule. It was advised that effective health program management divisions assume responsibility for HBV education, transmission, testing, and vaccination accessibility and availability[73].

A study evaluated dental medicine students (DMS) at the university of Zagreb on their knowledge of hepatitis B virus (HBV) and hepatitis C virus (HCV), estimated the prevalence of needle stick injuries (NSI) and reporting practice, and examined how enrollment in required and optional courses affected knowledge and NSI reporting practice. Questionnaires based on the general handouts from the Centers for Disease Control were used to gauge knowledge. The understanding of significant occupational infections among dental medicine students (DMS) is low, and reporting of needle stick injuries (NSI) is not practiced to a high standard. Additionally, the findings showed that formal education has not been able to considerably increase student competency, and that theoretical understanding does not necessarily convert into more diligent injury reporting practice. We should explore for more effective ways to raise students' understanding and awareness of this subject. The study was limited since our data did not allow us to draw any conclusive conclusions about causality. Although there were 206 participants in the study, it cannot be said that their replies are entirely representative of all dental medicine students at the University of Zagreb because the study was questionnaire-based and participation was optional[106].

A study looked into community attitudes on vaccination and awareness of the Hepatitis A virus in the United Arab Emirates. The purpose of this study was to evaluate the level of hepatitis A

awareness, attitudes, and vaccination practices in the United Arab Emirates and determine whether or not it should be included to the local immunization schedule. Between January and March 2020, data from the four most populated cities in the U.A.E. were gathered using a self-administered, 50-item questionnaire. 458 replies in total were gathered and examined. Overall, there was a dearth of understanding about diseases, but there were also good attitudes and bad habits. The National Immunization Program is well trusted, and local awareness initiatives have the potential to improve bad habits[107].

According to a study, visitors to the gastroenterology clinic of a tertiary care center in Pakistan were asked about their knowledge and awareness of hepatitis B and C infections. This study evaluated the general public's knowledge of HBV and HCV infections, their transmission, and methods of prevention, as well as their relationships to racial, socioeconomic, and educational status. From August 2016 to December 2016, a cross-sectional analytical investigation was carried out at the gastroenterology clinic of the Sindh Institute of Urology and Transplantation in Karachi. All visitors to the GI-OPD who were older than 18 years old were enrolled. A pre-made survey was completed. The study found that people who come to the GI clinic from diverse parts of the country had very little general awareness of the ways that HBV and HCV are transmitted and prevented. The study emphasizes the necessity of raising general community awareness of HBV/HCV infection in Pakistan. The study suggests holding public education sessions with a focus on the risk factor control strategies and the route of HBV/HCV infection transmission. The study was constrained in that it was impossible to evaluate the efficacy of open seminars among the study population. Additionally, there are no questions regarding HBV immunization[108].

In a study done in India, researchers looked at dental students in Bangalore, India, and their knowledge of hepatitis C. The goal of the study was to determine how well-informed third- and

fourth-year dentistry students from several dental colleges in Bangalore, Karnataka, India, were about Hepatitis C. A descriptive cross-sectional study involving 400 students who were enrolled in the third and fourth years of study at various dental colleges in Bangalore was carried out. There were 11 items in a closed-ended, organized questionnaire that was given out. The study revealed that the students had low levels of knowledge of Hepatitis C, indicating that dental students need to be educated about HCV infection[109].

A study evaluated the student nurses' knowledge and behavior on the prevention of Hepatitis-B virus infection. The purpose of the study was to evaluate the degree of practice and understanding of nursing students in Bangladesh about HBV infection prevention. Three nursing colleges in Sylhet, Bangladesh, underwent a cross-sectional descriptive type of study. In order to evaluate knowledge and practice regarding the prevention of HBV infection, a pre-tested self-administered structured questionnaire with an observation checklist was developed and put into use. In all, 150 nursing students from three nursing schools took part in the study. The study's findings showed that most respondents had adequate knowledge of and experience with preventing HBV infection. Even those with sound understanding did not all follow best procedures for preventing HBV infections at work. Therefore, it is advised that the Authority monitor vaccination records and regular training programs to maintain a high level of proficiency in knowledge and practice for the prevention of HBV infection[110].

A study in Ghana assesses the students' knowledge, attitudes, and behaviours about hepatitis B infection and vaccination. At the University of Health and Allied Sciences in Ghana, this study evaluated students' knowledge, attitudes, and practices about hepatitis B infection and immunization. Using a multi-stage sampling technique, a cross-sectional quantitative descriptive survey was carried out among 262 students studying public health at the University of Health

and Allied Science in the Volta region of Ghana. The participants' information was gathered through the use of a standardized questionnaire. Students had a remarkably high degree of knowledge of Hep-B illness and the availability of a vaccination to prevent it. The majority of responders believed they did not require protection against Hep-B infection, though. Education about the value of vaccination as a powerful tool for preventing the spread of hepatitis is advised. The descriptive survey and structured data collection tool employed in this study have certain limitations because they prevented participants from speaking openly, which restricted the researchers' capacity to elicit information. The self-reported vaccination status was not corroborated by immunization data[111].

In Nigeria, a study assesses the level of knowledge on Hepatitis-B transmission mechanisms and preventative measures. among Nigerian university students. In this study, undergraduate students in Lagos, Nigeria were asked about their awareness of hepatitis B prevention methods and transmission modes. A multi-stage sampling strategy was utilized to choose 300 respondents from three tertiary institutions in Lagos State in 2019 using a cross-sectional descriptive research methodology. Data were gathered using the Hepatitis B Knowledge Questionnaire, which has a reliability rating of 0.74. The findings showed that a significant portion of the respondents had little awareness about hepatitis B transmission and prevention. According to the study, there is no conclusive link between gender and hepatitis B.To lessen Lagos' load, it was advised that there be a crucial level of public awareness and vaccination coverage, particularly among students[112].

In Kabul, Afghanistan, a study evaluated the awareness, outlook, and behavior of healthcare professionals on the prevention of the hepatitis B virus. This study's objective was to assess the knowledge, attitude, and practice (KAP) of HCWs in Kabul, Afghanistan, regarding hepatitis B infection. A straightforward random sampling technique was used to perform a cross-sectional

study on 502 HCWs between November 2018 and January 2019. An independently conducted structured questionnaire was used to gather the data. This questionnaire was used to evaluate the demographic traits and KAP of HCWs. According to this study, HCWs in Kabul, Afghanistan, have a high risk of contracting HBV because of low vaccination rates and poor infection management. Therefore, to enhance HCWs' attitudes and awareness of HBV infection and to ensure successful infection management, the study strongly recommends offering an accessible and mandatory vaccination program[113].

In a study, medical students in Vietnam were asked about their knowledge, attitudes, and behaviors about hepatitis B virus infection. Using a systematic random sampling technique, a cross-sectional study was carried out at eight medical universities from the northern, central, and southern areas of the nation between May and November 2020. The study revealed a lack of confidence in the safety of the hepatitis B vaccine as well as in the counseling, testing, and management of patients with chronic hepatitis B. The results of our study highlighted the urgent need to enhance the curriculum of medical schools in Vietnam so that students are prepared for hepatitis B prevention and management. The study had certain limitations because the participants' self-reported data, which could not be confirmed, formed the basis of the study's data. Similar to this, there was no attempt to validate the participant-reported replies used to estimate testing and vaccination coverage, as well as seroprevalence of HBsAg[114].

A survey is conducted on the public in Hong Kong's knowledge, attitudes, and behavior about viral hepatitis. In order to maximize local efforts in reaching the World Health Organization's goal of eliminating viral hepatitis, the study sought to uncover gaps in the Hong Kong public's knowledge, attitudes, and behaviors about viral hepatitis. A descriptive, cross-sectional, self-reported web-based survey was given to 500 people in Hong Kong who were above the age of 18.

All age groups and educational levels showed gaps in knowledge as well as a likelihood of seeking screening. It is advised that a thorough hepatitis education strategy be created to address misconceptions about social stigmatization of viral hepatitis and the value of preventative interventions, such as vaccination and screening when exposed to risk factors, among the Hong Kong public. However, some of the restrictions include the inability to do data validation and the inability to establish causal relationships. The number of respondents who have access to the internet or are accustomed to doing online surveys may be underrepresented. Additionally, this study did not take into account variables like respondents' health consciousness, vaccination status, or hepatitis status that could have an impact on respondents' levels of knowledge of, awareness of, or attitudes toward HBV and HCV. The correlations between respondents' characteristics and the gaps in knowledge, awareness, and/or practices about hepatitis B and C could not be found in this study since statistical analyses were not carried out to analyze these issues[115].

HCWs were found to be highly knowledgeable about the HB vaccine. In India, 95% of nurses, 93.4% of health care workers, and 85% of health care workers. In Nigeria, just 5.2% of HCWs were knowledgeable about the hepatitis B vaccine, and 11.9% were unaware of how many doses are needed to provide full protection. In Ethiopia, 48.2% of nurses reported favorable knowledge, while the remaining nurses had unfavorable knowledge[116].

A report from Iran analyzed college students' knowledge and awareness of Hepatitis B, Hepatitis C, and human immunodeficiency viruses. The goal of this study was to ascertain the college students' knowledge about HIV/AIDS, hepatitis B virus (HBV), and hepatitis C virus (HCV) in terms of fundamental facts, transmission, and prevention. The study covered a total of 810 students from 7 universities. Three groups were created out of all participants (medical, biology,

and other fields). An objective questionnaire was used to gauge the subjects' performance. According to the survey, there is a good degree of knowledge of HBV and a stunning amount on HIV. On the other hand, there was a lack of awareness of HCV. It was indicated that teaching programs for this significant disease are required, especially for university students, given the low levels of awareness or information of HCV. On the other hand, the fact that participants had a high level of knowledge regarding HBV and HIV/AIDS could be attributed to Iranian students' educational programs operating effectively. The probable drawbacks of this study were the sheer quantity of participants and its brief (7-month) timeframe[117].

During a study, nursing students' knowledge, attitudes, and practices surrounding Hepatitis-B were assessed. This study aims to evaluate nursing students' Hepatitis-B knowledge, attitudes, and practices. On the nursing students at the College of Nursing, SVBP Hospital, Meerut, a cross-sectional study was done. On the day of data collection, nursing students from all four years who were present and gave their consent were recruited for the study. The knowledge, attitude, and practices of Hepatitis-B among nursing students were evaluated using a pre-designed, pre-tested, self-administered questionnaire. The study found that there were many misconceptions regarding how the Hepatitis B virus spreads from patient to community whether it be through handshakes, eating together, or breastfeeding despite the fact that we know enough about its causes and routes of transmission. Since nurses are the primary provider of patient care in hospitals, it is possible to dispel these myths and misconceptions with the right information. Additionally, it will enable them to provide patients with better care and health information. The data in this study were self-reported by the participants, so they may not accurately reflect the level. The outcomes of the study cannot be generalized because only one nursing college was examined[118].

A study investigate health care professionals' attitudes and knowledge regarding hepatitis B infection in the city of North India. The purpose of this study was to evaluate the attitudes and knowledge of health care workers in Bareilly city regarding HBV infection. Students from Institute of Dental Sciences, Bareilly, and Rohilkh Medical College and Hospital who were studying medicine, nursing, and dentistry, respectively, participated in a cross-sectional observational study. This study showed that none of the medical, dentistry, or nursing students had a thorough understanding of all aspects of HBV infection, and their level of immunization was found to be inadequate, increasing their chance of contracting the disease. Thus, there is a need for ongoing, frequent awareness campaigns for all students, and it is advised that the Hepatitis B vaccination schedule be made mandatory for all students in their first year of college[119].

In Mogadishu, Somalia, a cross-sectional study was conducted to evaluate healthcare personnel' knowledge, attitudes, and practices regarding hepatitis B virus infection. This study seeks to evaluate healthcare workers' (HCW) knowledge, attitudes, and practices (KAP) regarding HBV infection in Mogadishu, Somalia. The purpose of the cross-sectional study on HCW was to evaluate KAP toward HBV infection. 470 HCW from five hospitals were selected for the study, and they all received standardized questionnaires. Positive correlation between the KAP variables was found to be significant (P 0.01). The association between mean KAP and professional cadre and married status was discovered (P 0.001). This study found that the HCW had an adequate level of KAP and might serve as a source of participants for a Somalian awareness campaign against HBV infection. Only HCW with direct patient contact were included in this study; all other hospital employees were excluded. The results of this survey are not indicative of the KAP for all the HCW in Mogadishu, Somalia, as it did not use a probability

sample technique. This poll provided some insight into the extent of knowledge about the HBV infection, and more costly research will be carried out in the future[120].

A cross-sectional study was undertaken at Debre Berhan University in North Shewa, Ethiopia on the assessment of knowledge, practices, and associated factors toward prevention of hepatitis B virus infection among students of medicine and health sciences. This study evaluated the attitudes and routines of medical and health science students regarding HBV prevention and identified factors. A cross-sectional investigation was conducted.In total, 355 students studying for a career in healthcare were contacted for the study using a straightforward random selection method. Using a pre-validated self-administered structured questionnaire, data on HBV were evaluated. This study discovered that due to the poor HBV vaccine uptake rate and high rate of unintentional blood exposure, health profession trainees are at a very high risk of developing HBV infection throughout their training. As a result, the study advises that all health profession students receive vaccinations before beginning their careers. This study offers advantages of its own. It started by identifying elements related to practice and knowledge. In order to pinpoint gaps between several departments, it also involves students from various departments. Several restrictions. First, because this study was conducted in many departments, each department's knowledge and practice may differ due to its unique clinical experience, necessitating multilevel analysis. However, social desirability bias may have occurred because participants may have tried to reply to questions on their knowledge of preventing hepatitis B infection in a way that would be seen favorably. Due to the study's limited sample size, it is possible that the results cannot be applied to all students studying in the nation as a whole[121].

In a cross-sectional study, the knowledge, attitudes, and vaccination status of high school students in Hohoe, Ghana regarding the hepatitis B virus are evaluated. In the Hohoe

Municipality of the Volta Region of Ghana, the aim of this study was to evaluate students' knowledge of the Hepatitis B Virus (HBV) in order to identify and describe their risk of infection, attitude, test results, and vaccination status. In the two Senior High Schools, a descriptive cross-sectional survey was carried out. 244 students, aged one through three, including boys and girls, participated in the survey. A stratified simple random sample strategy was used for recruitment. Given that the majority of students in the Hohoe municipality had only limited understanding about HBV, the study's findings indicated that high school students (teenagers) have a variety of misconceptions regarding the disease. Given the poor vaccination rates reported in the study, it was also determined that teenagers are at risk of catching the virus. Given that there were only two senior high schools included and one municipality in the region was studied, the results of the current study should be interpreted accordingly. The findings of this study can only be extrapolated to student populations with a comparable makeup[122].

A study examines the knowledge, attitudes, and practices of pregnant patients receiving antenatal treatment at the University of Gondar Comprehensive Specialized Hospital in Northwest Ethiopia regarding the Hepatitis B virus. The purpose of the study is to ascertain how pregnant women receiving antenatal treatment feel about HBV in terms of knowledge, attitude, and practice. A cross-sectional study was carried out at the University of Gondar Comprehensive Specialized Hospital. This study comprised a total of 354 pregnant women who were chosen using rigorous random sampling. KAP of HBV MTCT patients was evaluated utilizing a standardized questionnaire. Pregnant women's understanding of HBV as well as their attitudes and practices were found to be lacking. Therefore, it was suggested that pregnant women should receive intensive health education to raise their awareness of HBV infection and that all pregnant women should be checked for HBV as part of ANC follow-up[123].

A study in Lusaka, Zambia, 97.0% of health care workers (HCWs) would be willing to obtain the vaccine if it were made available in their setting. However, a number of studies have found that HCWs had unfavorable opinions toward the HBV immunization. HCWs have given a variety of explanations for why vaccine compliance is low, including busy schedules, lost time (and maybe income) while receiving the immunization, procrastination, ignorance of the vaccine's effectiveness, impression of low risk, and the discomfort of an aching arm. Iranian dentists cited reluctance and worry about side effects as justifications for non-vaccination. Unvaccinated HCWs in Tanzania reported that they were extremely cautious and took all necessary safety procedures while working. In research conducted in Ethiopia, nurses cited being a new employee and being afraid of the vaccine's negative effects as two reasons why they had not received the vaccination[124].

On the understanding and awareness of Hepatitis B virus infection in Nigeria, a study was undertaken. The purpose of this study was to evaluate people's knowledge of Hepatitis B Virus (HBV) infection across three states in Nigeria. A descriptive cross-sectional study with 758 individuals chosen at random for convenience was carried out. Consenting participants were given structured questions to complete. With a mean knowledge score of 4.85 2.69 out of a possible maximum score of 9.00, respondents demonstrated mediocre knowledge. According to this study, there is an immediate need for action to increase public knowledge about HBV infection and the existence of a vaccination. The study's biggest limitation was that it didn't examine how gender affected knowledge and vaccination among the study population. There was no direct measurement of respondents' perceived risk, which might have an impact on their understanding of the various research groups[125].

In a study conducted at Egypt's Zagazig University Hospitals, the hepatitis B virus protective intervention was assessed among interns. The study's objectives were to assess how an HBV protection intervention affected interns at Zagazig University Hospitals in terms of their knowledge, attitudes, and immune responses to the HB vaccine as well as to determine the variables influencing their compliance and immune responses. Three phases of a quasi-experimental investigation were carried out during a 10-month period. Phase 1 involves determining one's level of knowledge, attitude, and HCV/HBV immunity. Phase 2 includes the launch of an HBV prevention campaign, the administration of the vaccination, and health information sessions. Phase 3: evaluation of the vaccine's immunological response and the impact on knowledge and attitude [126].

The study showed that a thorough HBV prevention program is a useful tool. The study recommended the need for a vaccine requirement. It is critically necessary to implement a post-vaccination monitoring program that includes protection measures for vaccine non-responders and strict surveillance of at-risk groups. When checking for an immunological response to the vaccine, occult HB V instances shouldn't be disregarded. A single University hospital served as the study's setting. However, it is the only hospital that annually accepts the majority of freshly minted physicians. Randomization for the interns who were a part of the study was tough. However, the findings are a worrying indicator that other healthcare authorities should take into account to increase vaccine compliance[127].

A cross-sectional study looked at Southeast Asia's awareness, knowledge, and practices about hepatitis B infection. The study looked at Southeast Asia's perceptions about, familiarity with, and behaviors surrounding the treatment of HBV infection. A cross-sectional survey of people from six Southeast Asian countries Myanmar, Thailand, Vietnam, Cambodia, the Philippines, and

Singapore. Personnel in the healthcare and non-healthcare fields made up the study population. Results: An online poll was completed by 1079 non-healthcare employees and 799 members of the healthcare industry. The study found that non-healthcare workers in Southeast Asian populations were generally unaware of HBV infection. According to the study, spreading more hepatitis B awareness campaigns is essential for curing viral hepatitis in the area[128].

The knowledge, understanding, attitude, and practices of healthcare workers in Saudi Arabia with regard to the hepatitis B virus and immunization are evaluated by a study there. The purpose of the study was to look into the attitudes, practices, and knowledge of HCPs towards hepatitis B vaccine. From January to April 2015, a cross-sectional survey was conducted in seven important Saudi cities using a pre-tested, validated questionnaire. Four categories made up the questionnaire: demographics, knowledge, awareness of hepatitis B infection, and HCPs' attitudes regarding HBV. Although there is a noticeable hepatitis B vaccination rate among HCPs, the levels actually seen fall short of international norms. It is thought that obstacles preventing non-vaccinated HCPs from receiving vaccinations ought to be removed[129].

The study offers a number of advantages; it is the first to evaluate the coverage, attitudes, and practices around the HBV vaccination in seven cities across several Saudi Arabian provinces. It includes all tiers of care, including primary, secondary, and tertiary. A decent response rate for this study is regarded to be a high response rate, or 95.2%. Limitations: Because it was a retrospective study, there were a number of biases present, including recall and researcher biases[110].

The knowledge, attitudes, and practices of nurses and midwives in two maternity hospitals in Khartoum, Sudan, regarding hepatitis B infection. This study's objective was to assess the knowledge, attitude, and practice (KAP) level of nurses and midwives concerning HBV viral

infection in Khartoum, Sudan. In the Sudanese state of Khartoum, two public maternity hospitals (Saudi and Saad Abul-Eleella hospitals) underwent a cross-sectional descriptive hospital-based study. To assess KAP's attitude about HBV infection, a pre-tested structured questionnaire was developed and put into use. In Saudi Arabian and Saad Abul-Eleella hospitals, the majority of nurses and midwives were aware of HBV infection. But a sizable majority of the participants lacked the necessary understanding of after exposure treatment[111].

The study found a high risk of needle stick injuries and a poor level of HBV vaccination coverage rate. It is strongly advised to implement further workplace exposure prevention measures, implement training programs on HBV infection, including post-exposure prophylaxis, and raise the vaccination rate of all HCWS. The cross-sectional design of this study, which was conducted at two sites, may restrict the generalizability of the findings to all settings across the nation. These limitations must be taken into account when interpreting the study's findings. Additional research is required to determine the risk variables that affect HCWs' KAP levels in relation to HBV infections[111].

A study on knowledge, experience, and perceptions concerning Hepatitis B virus (HBV) infection in South Western Uganda. The study looked into any potential stigma associated with HBV and how it is perceived in Ugandan communities. In two locations in South Western Uganda—a community in the Kalungu district (site A) and a region on the outskirts of Masaka town—a qualitative formative study was conducted (site B). In order to understand how individuals describe HBV infection and their impressions of the virus, the study did a quick assessment. A total of 131 people were sampled for the study, and information was gathered through a transect walk, observations, community group discussions, and in-depth interviews. Inductive content analysis was employed in the study to identify important HBV-related themes.

According to the study's findings, there is no one word for HBV infection in regional languages, and there is a wide range of information about this virus. Some people had heard of HBV, whereas others were utterly unaware of HBV infection. Information was frequently obtained from radio. HBV was known to cause liver disease, but there was little information available about its causes, modes of transmission, and treatments. As a result of the community's inadequate knowledge and experience with HBV, stigma in HBV may be uncommon. The results confirmed the need for improved HBV knowledge and comprehension in this population[130].

It is essential to carefully disseminate accurate information to encourage adoption of treatments for treatment, diagnosis, and prevention. Strength of the study: This is the first investigation into attitudes, knowledge, and stigma associated with HBV infection in Uganda. Men and women from a variety of ages, urban and rural participants were chosen to allow for a comparison of the descriptions, experiences, and understanding of HBV. This method offers some insightful thoughts and perceptions on local perceptions and beliefs around HBV infection; however it only includes a small sample of adults who voluntarily choose to participate[131]

The knowledge, awareness, and vaccine compliance of hepatitis B among medical students at Riyadh's governmental universities were examined. The purpose of this study was to evaluate and compare pre-clinical medical students from four universities' HBV knowledge, awareness, and vaccination compliance. In Riyad, Saudi Arabia, the College of Medicine at the King Saud Bin Abdulaziz University for Health Sciences, King Saud University, Princess Noura University, and Imam Mohammed bin Saud Islamic University conducted a cross-sectional study. Materials and Methods include A questionnaire containing parts on demographics, HBV awareness, knowledge, and vaccination compliance was completed by 263 preclinical medical students. In general, the majority of participants had limited knowledge of HBV and low vaccination

compliance. Therefore, we advise the introduction of pre-clinical vaccination screening as well as a campaign to raise public knowledge of and avoid infectious diseases. This research had several restrictions. First of all, because the sample was drawn by convenience, it might not exactly represent the population. Second, the study used a self-report questionnaire that was dependent on the students' memory, which could have influenced the results[132].

An evaluation of pregnant women's attitudes and understanding of hepatitis B was conducted in Nellore, India, at a teaching hospital. This study assesses the lack of hepatitis B knowledge, attitude, and practice (KAP) among pregnant women in our nation. After distributing an informational pamphlet, a cross-sectional survey was undertaken to assess pregnant women's KAP toward hepatitis B. A conventional questionnaire with three sections was used to gather the data:

i. Population statistics
ii. knowledge questions and
iii. Questions about attitude and practice.

To reduce mother-to-child transmission, pregnant women's knowledge about HBV needs to be enhanced. It was suggested that educational programs should be personalized for the target group for higher acceptance. The study is limited by the fact that the majority of the participants had college degrees, making them possibly unrepresentative of the broader population's range of educational attainment. Hepatitis B's KAP may be exaggerated and perhaps worse in rural and less-educated areas[133].

At a private university of medicine in Senegal, a study evaluated the knowledge, attitudes, and practices of medical students about hepatitis B infection. The purpose of this study was to evaluate students' Knowledge, Attitudes, and Practices (KAP) regarding viral hepatitis B and to

pinpoint contributing variables. A cross-sectional, descriptive, and analytical study was carried out among pupils at the St. Christopher Iba Mar Diop School. Self-administered, the survey was. The survey's findings, which were given to students studying the health sciences, are usually disappointing. We recommend conducting awareness campaigns in addition to giving lectures on the hepatitis B virus and disseminating important messages via social media networks and student organizations to enhance the knowledge of students studying the health sciences[134].

2.5 Summary of Gaps in Literature Reviewed

In conclusion, based on these numerous reviews, it can be concluded that public education campaigns and mass immunization of children and adults at risk can reduce hepatitis B virus infection, while those who are already infected should receive immunostimulatory therapy and antiviral medications due to the high prevalence of the virus and the fact that it affects different geographic regions and genders differently and is more common in pregnant women. However, no study has been done to look into the knowledge and awareness of the Nigerian Naval Personnel on Hepatitis B. To the best of our knowledge, this study is the first to evaluate the Nigerian Naval Personnel's knowledge and awareness of hepatitis B. The goal of this study is to determine how much the naval personnel in Nigeria know and understand about hepatitis B.

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Methodology

This section provides more information about the research techniques applied in this study. It discusses the techniques and methods, such as the research design, sampling frame, the study population, sample size; sampling procedure; study location; research instrument; and the analytical method used for this study.

3.1 Research Design

A cross-sectional study was utilized for this research to assess the knowledge and awareness of hepatitis b virus among Naval personnel at the Nigerian Navy barracks, Ojo. Lagos. Convenient sampling technique was utilized (Random Sampling). This study was conducted among the Naval personnel in the Nigerian Naval Barracks located at Ojo, Lagos Nigeria

3.1.1 Description of Study Area

The study is centered around the Nigerian Navy Barracks situated in Ojo, Lagos, a location of paramount importance due to its pivotal role as a central hub for the activities of the Nigerian Navy. Geographically situated in Lagos State, this Barracks plays a crucial role in the nation's maritime security, strategically positioned along the coastline. Lagos, being a populous and cosmopolitan city, infuses the study area with a dynamic and diverse demographic landscape[1], presenting a unique context for examining the knowledge and awareness of Hepatitis B within the military community.

Functioning as a primary operational and residential base for Navy personnel, the Nigerian Navy Barracks in Ojo encompasses various facilities essential for naval operations. These include

administrative offices, living quarters, training facilities, and healthcare services. As a microcosm of the broader Navy community, the Barracks serves as an ideal setting to delve into the understanding of Hepatitis B among military personnel. The study area is characterized by a diversity of personnel, encompassing officers, enlisted personnel, and supporting staff. This diversity in ranks and roles within the military community is critical for obtaining a comprehensive and representative sample, ensuring that the study's findings accurately reflect the broader Navy population stationed at the Ojo Barracks.

The socio-economic and cultural fabric of Ojo, Lagos, further shapes the study area. Factors such as educational backgrounds, socio-economic statuses, and cultural practices contribute to the unique context within which the study unfolds[1]. These factors play a pivotal role in influencing perceptions and behaviors related to health and disease, providing a nuanced understanding of the knowledge and awareness levels of Hepatitis B within this military community. Within the study area, the healthcare infrastructure of the Nigerian Navy Barracks holds significance. This includes medical facilities and services available to Navy personnel, which are integral for assessing the existing infrastructure's capacity to address health challenges, particularly those related to Hepatitis B. Evaluating the availability of healthcare resources, such as screening and vaccination services, contributes to insights into the preparedness of the military health system within the study area.

Embedded in an urban environment, the study area benefits from the bustling activities, diverse population, and access to various services characteristic of Lagos. The urban context introduces additional dynamics, such as potential interactions with civilian populations, which may influence the spread of infectious diseases and the awareness levels of military personnel[1].

In essence, the Nigerian Navy Barracks in Ojo, Lagos, forms a comprehensive and dynamic study area that provides valuable insights into the knowledge and awareness of Hepatitis B among Navy personnel. The geographic, military, and socio-cultural dimensions of this area contribute to the study's depth and applicability, informing targeted interventions and policies within the context of military health and readiness.

3.2 Population of the Study

The participants of the study are the Naval personnel of the Nigerian Navy. The Navy personnel within the Nigerian Navy Barracks located at Ojo, Lagos State were the target population.

3.3 Sample Size and Sampling Techniques

The sample size is based on the number of the Naval Personnel residing in this Barrack, although a sample size of about 800 was a target and proposed respondents for the study. A systematic sampling technique was utilized to select respondents for the study.

The minimum sample size was determined using the Fishers' formula for the determination of sample size for descriptive studies that have a population greater than 10,000[5]. The sample size for this study than determined considering the following factors:

- A standard normal deviate of 1.96,
- 95% confidence interval
- Acceptable margin of error 5%.

Based on the Fisher's formula, that is

$$n = \frac{Z^2 p\,(1-p)}{d^2}$$

Where: n - minimum sample size required

d - Is margin of error 5%

z - Confidence level 95%

p - Estimated proportion of Hepatitis B virus,12.2%[2]

$$n = \frac{(1.96)^2 * 0.122(1- 0.122)}{(0.052)^2}$$

$$n = \frac{3.8416 * 0.122*0.878}{0.0025}$$

$$n = \frac{0.411}{0.0025}$$

n = 165

Correcting for a possible non- response rate of 10%, the final calculation was 165/0.9 = **183**

So a total of 183 Naval Personnel in Nigerian Navy Barracks Ojo, Lagos State were interviewed for this study.

3.3.1 Eligibility Criteria

Inclusion criteria are the participant which comprised only the personnel of the Nigeria Navy leaving in the Nigerian Navy Barracks Ojo, Lagos state. The exclusion criteria for this study were those who are sick and as a result could not respond to the question.

3.4 Description of Research Instruments

A standardized structured questionnaire was used for this study taken from a previous study. Which the questionnaire was reviewed and validated. These questionnaires were per-tested on 20 respondents and they were excluded from the main study. Just to assess their language, fluency, and understanding of the questions. After the pretest, the questionnaires was adjusted accordingly to achieve the desired goal of the study. The questionnaire contains questions to assess the Nigerian Navy personnel's' knowledge and awareness towards HBV infection. The questionnaire consists of three (3) parts. The first part will be data on the participants socio-demographic features, second part will aim to assess knowledge of hepatitis B virus among Naval personnel at the Nigerian Navy barracks, third part will deal with the Naval personnel at the Nigerian Navy barracks awareness towards the Hepatitis B Virus. The level of knowledge part had been scored into two categories, likes poor knowledge and good knowledge likewise the Awareness level which is also score good awareness and poor awareness

3.5 Validity of the Research Instruments

The validity of the instruments that was utilized for this study for clarity, appropriateness of the language of expression and accuracy of word, was done or validated by my research supervisor.

My supervisor ensures necessary comments and corrections in other to improve face, content and construct validity of the instrument.

3.6 Reliability of the Research Instruments

The reliability of this instrument was discovered through usage of test-retest technique through pilot study. Twenty copies of the questionnaire were given to twenty respondents who are not part of the study i.e., the exclusion criteria in this Navy Barack Ojo, Lagos State who share the same characteristics with the intended respondents of this study.

3.7 Method of Data Collection

Primary sources of data were utilized as techniques for Data collection. This was done through the use of questionnaire. The questionnaire was distributed to the Naval Personnel at the study area, monitored and retrieved immediately after the completion. Two (2) trained research assistants were recruited to assist me in data collection for effective monitoring and to ensure a complete retrieval of the entire questionnaire. Questionnaire distributed was retrieved on the spot this ensure high retrieval rate.

3.8 Method of Data Analysis

Data management, analysis and processing was executed through the use of the statistical package for social sciences (SPSS) version 22. Data collected was analyzed for descriptive statistics. The descriptive analysis was accomplished by means of frequencies, percentages and mean ± standard was presented in the form of text, figures, and tables and pie chart.

3.9 Ethical Consideration

Ethical approval for this study was obtained from the University Research Ethics Committee (HREC) of Lead City University, Ibadan, Ibadan, Oyo State and Nigerian Navy Ship Wey Barrack office Ojo Lagos State (WEY:020/126/VOL. VI/07). An information statement was provided to all participants prior to obtaining informed verbal consent. In addition, it was a survey, and the research involved no more than low risk. Participants were given the opportunity to ask questions prior to the interview. Participants were informed that their participation was voluntary and that they were free to decline participation or withdraw their consent at any time. It was made clear that participation in this study had no bearing on their receipt of clinical care. Further, participants were informed that they did not have to answer any question that they did not feel comfortable with, and they could withdraw at any time or simply choose not to answer a particular question. Anonymized data were stored on password-protected Laptops during data collection. Data were stored on secure and password-protected computers.

Endnote

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Chapter Four

Results and Discussion of Findings

This chapter presents the findings of the study and the discussion. The results are presented in the other, in which the objectives were stated in Chapter one of the study.

4.1. Demographic Data Analysis

Table 4.1 revealed that, a total of 183 respondents were surveyed based on the questionnaire distributed. The table shows that the mean age of the participants was 31.35. The male participants had a higher representation of 140 (77.3%) while the female have a lower representation of 41 (22.7%). Based on the educational attainment of the participants, most of the participants had a secondary holder of 81 (44.8%) followed by the participants with a tertiary holder of 71 (39.2%) while participants with a primary school have the lowest frequency of 4 (2.2%). 13.8% (25) of the participants has no educational background. Sequel to the previous HBV vaccine among the participant, the majority of 138 (76.2%) participants reported no previous hepatitis B vaccine while 43 (23.8%) had a previous HBV vaccination. 16 (8.8%) of the participant had a family HBV exposure with 110 (60.8%) without a family HBV exposure while 55 (30.4%) of the participants has no idea. HBgA high-frequency of 165 (91.2%) participants have no history of surgery while just a smaller number of 16 (8.8%) participants with a history of surgery. A larger number of 138 (76.2%) participants had no record of blood transfusion while 20 (11%) participants had undergone blood transfusion.

Based on the history of blood donation among the participants, 43 (23.8%) participants had donated blood before while a higher number 138 (76.2%) participant haven't. The participants

with a higher frequency of 164 (90.6%) are of HBsAg Negative followed by 15 (8.3%) participants with HBsAg Positive while 2 (1.1%) participants are not sure of theirs.

Table 4.1: Socio-Demographic Characteristics of Respondents

Variable	Frequency	Percent (%)
Age (n = 181)		
	181	
Mean ± SD	31.35 ± 6.55	
Educational Attainment (n = 181)		
None	25	13.8
Primary	4	2.2
Secondary	81	44.8
Tertiary	71	39.2
Sex(n=181)		
	140	77.3
	41	22.7
Previous HBV Vaccine		
No	138	76.2
Yes	43	23.8
Family HBV Exposure		
No	110	60.8
Yes	16	8.8
I Don't Know	55	30.4
History Of Surgery		
No	165	91.2
Yes	16	8.8
History Of Blood Transfusion		
No	161	89
Yes	20	11
History Of Blood Donation		
No	138	76.2
Yes	43	23.8
HBsAg		
Negative	164	90.6
Positive	15	8.3
Not Sure	2	1.1

Source: Field Survey, 2022

4.2 Presentation of Data

4.2.1 Research Question One:

The level of knowledge of Hepatitis B infections, risk factors among Naval Personnel

The table below shows, the assessment of knowledge towards hepatitis B among Naval Personnel was assessed by a questionnaire focused on hepatitis B etiology, signs and symptoms, transmission, treatment, and management. Individual participants were scored as correct or incorrect. The majority of the participants 154(85.1%) have the knowledge that Hepatitis is caused by a virus while 27(14.9) have not. 108(59.7%) and 134(74%) of the participants have the knowledge that Hepatitis B infection can affect the Brain and Kidneys respectively while 73(40.3%) and 47(26%) haven't the knowledge. A higher number of 105(58%) and 124(68%) respondents believed that Hepatitis B can be transmitted through eating or sharing food/utensils and sneezing/coughing respectively while a small number of 76(42%) and 57(31.5%) respondents believed that Hepatitis B can be transmitted through eating with or sharing food/utensils and sneezing/coughing respectively.

Based on the transmission of Hepatitis B virus, a higher number of 98(54.1%) and 145(80.1%) respondents believed that Hepatitis B can be transmitted through contaminated water and blood respectively while 83(45.9%) and 36(19.9%) of the respondents do not believe that Hepatitis B can be transmitted through contaminated water and through spectively. A higher number of 109(60.2%), 131(72.4%), and 140(77.3%) respondents have the knowledge that Hepatitis B can be transmitted through Tattoos, unprotected Sex, and sharing of Needles respectively while 72(39.8%), 50(27.6%) and 41(22.7%) of the respondents had no knowledge that Hepatitis B can be transmitted through Tattoos, through unprotected Sex and the sharing of needles respectively.

155(85.6%) know that Hepatitis B infection can be transmitted to one's partner while 26(14.4%) do not know about it. 125(69.1%) and 93(51.4%) respondents have the knowledge that Hepatitis B can be spread from an infected mother to an infant Hepatitis B during pregnancy and some believed can be spread by shaking hands with an infected person respectively while 56(30.9%) and 88(48.6%) have no knowledge that Hepatitis B can be spread through infected mother to infant Hepatitis B during pregnancy and spread by shaking hands with an infected person respectively. The majority of the respondents have the knowledge that Hepatitis B infection can be prevented with the vaccine against Hepatitis B 150(82.9%), prevented with exercise 107(59.1%), prevented with a balanced diet 91(50.3%), and prevented with a good hand hygiene 125(69.1%) while 31(17.1%), 74(40.9%), 90(49.7%) and 56(30.9%) has the knowledge that Hepatitis B Infection can be prevented with a vaccine, exercise, balanced diet, and good hand hygiene respectively.

154(85.1%) have the knowledge that there is a Blood Test to detect Hepatitis B infection while 27(14.9%) of the respondents have not. Knowledge-based on the Antiviral Therapy for Hepatitis B, 148(81.8%) of the participants believed that there is Antiviral Therapy for Hepatitis B while 33(18.2%) has no knowledge about it. 28(15.5%) of the respondents have no knowledge that Hepatitis B is a Risk Factor for Liver Cancer while the majority 153(84.5%) of the participants have the knowledge that Hepatitis B is a Risk Factor for Liver Cancer. 36(21%) have no knowledge that newborns must take the Hepatitis B vaccine while a larger number 143(79%) of them have the knowledge. Based on the complete set of Hepatitis vaccines that requires three injections of vaccines, 148(81.8%) participants have knowledge while 33(18.2%) do not know about it. Sequel to the knowledge of the participants on the common signs of Hepatitis B

Infection, 120(60.3%) has knowledge that Jaundice is one of the most common signs of Hepatitis B infection while 61(33.7%) do not know about it.

Table 4.2: Assessment of Knowledge towards Hepatitis B Virus

Variables	Incorrect (%)	Correct (%)
Hepatitis Is Caused by Virus	27(14.9)	154(85.1)
Brain Can Be Affected by Hepatitis B Infection	73(40.3)	108(59.7)
Kidneys Can Be Affected by Hepatitis B Infection	47(26)	134(74)
Kidneys Can Be Affected by Hepatitis B Infection	64(35.4)	117(64.6)
Hepatitis B Can Be Transmitted Through Eating with Or Sharing Food/Utensils	105(58)	76(42)
Hepatitis B Can Be Transmitted Through Contaminated Water	83(45.9)	98(54.1)
Hepatitis B Can Be Transmitted Through Sneezing and Coughing	124(68.5)	57(31.5)
Hepatitis B Can Be Transmitted Through Blood	36(19.9)	145(80.1)
Hepatitis B Can Be Transmitted Through Tattoos	72(39.8)	109(60.2)
Hepatitis B Can Be Transmitted Through Unprotected Sex	50(27.6)	131(72.4)
Hepatitis B Can Be Transmitted Through Sharing Needles	41(22.7)	140(77.3)
Hepatitis B Can Be Spread Through Infected Mother to Infant Hepatitis B During Pregnancy	56(30.9)	125(69.1)
Hepatitis B Can Be Spread by Shaking Hands with An Infected Person	88(48.6)	93(51.4)
Hepatitis B Infection Can Be Prevented with A	31(17.1)	150(82.9)

Vaccine Against Hepatitis B		
Hepatitis B Can Be Prevented with Exercise	74(40.9)	107(59.1)
Hepatitis B infection can be prevented with A balanced Diet	90(49.7)	91(50.3)
Hepatitis B can be prevented with a good hand Hygiene	56(30.9)	125(69.1)
There Is a Blood Test to Detect Hepatitis B Infection	27(14.9)	154(85.1)
There Is Antiviral Therapy for Hepatitis B	33(18.2)	148(81.8)
Hepatitis B Is a Risk Factor for Liver Cancer	28(15.5)	153(84.5)
Hepatitis B Infection Can Be Transmitted to Your Partner	26(14.4)	155(85.6)
Newborns Must Take Hepatitis B Vaccine	36(21)	143(79)
A Complete Set of Hepatitis B Vaccines Requires Three Injections of Vaccines	33(18.2)	148(81.8)
Jaundice Is One of The Most Common Signs of Hepatitis B Infection	61(33.7)	120(60.3)

Source: Field Survey, 2022

Figure 4.1 shows the level of respondents' knowledge of the Hepatitis B virus The table shows that the majority 151 (83.4%) of the participants had good knowledge about the Hepatitis B virus while 30 (16.6%) had poor knowledge.

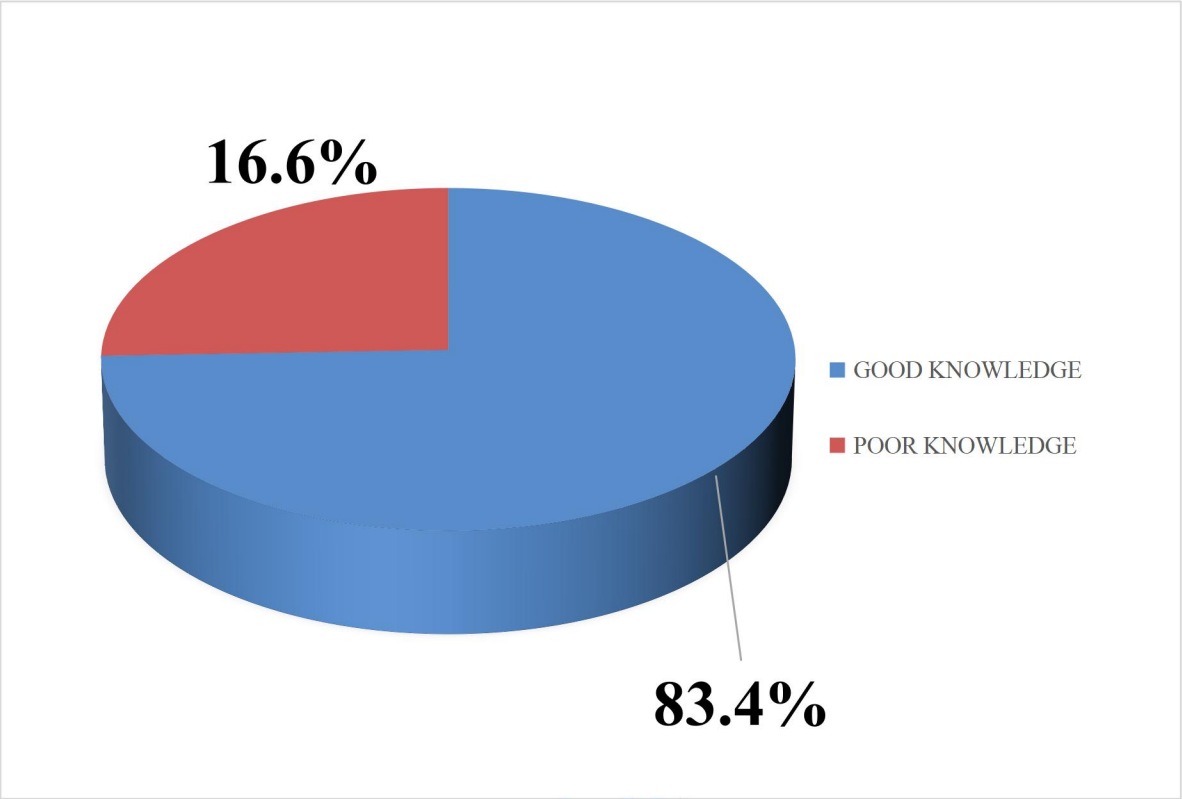

Figure 4.1: General Level of Knowledge of Respondents about Hepatitis B virus

Source: Field Survey, 2022

Respondent's Knowledge about Hepatitis B Virus Mode of Transmission

With respect to questions 14,15,16,17,18,19,20,21 and 22 of the questionnaire

Figure 4.2 shows the respondent's knowledge of the Hepatitis B virus mode of transmission. It shown that 136 (75.1%) have good knowledge and 45 (24.9) have poor knowledge about the Hepatitis B virus mode of transmission.

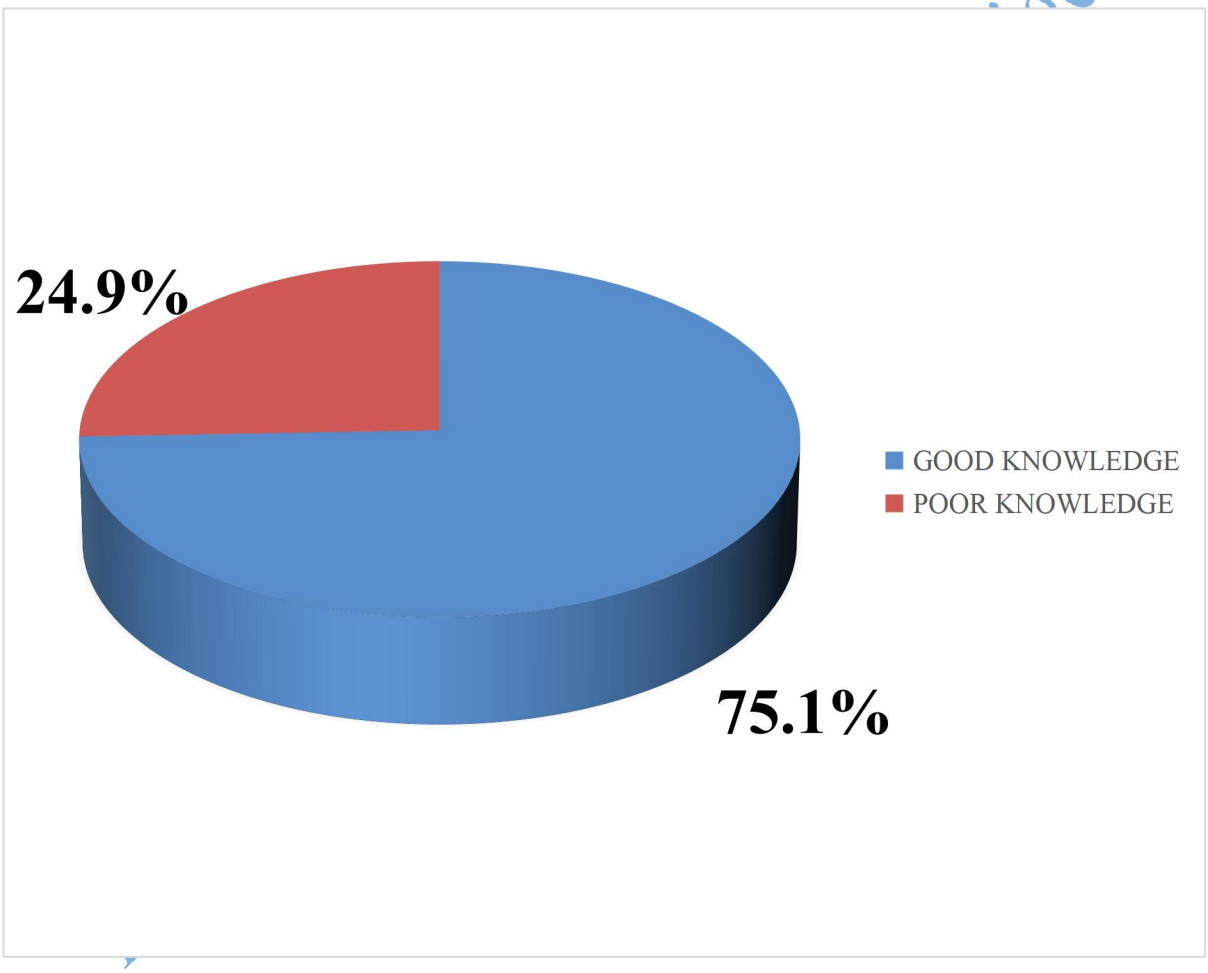

Figure 4.2: Respondent's Knowledge about Hepatitis B Virus Mode of Transmission

Source: Field Survey, 2022

Respondent's knowledge about the Prevention of Hepatitis B virus

With respect to questions 23,24,25 and 26 of the questionnaire

Figure 4.3 shows the respondent's knowledge of the preventions of Hepatitis B Virus. shown that 141 (77.0%) have good knowledge of hepatitis B virus prevention and 40 (22.1%) have poor knowledge about the prevention of hepatitis B virus.

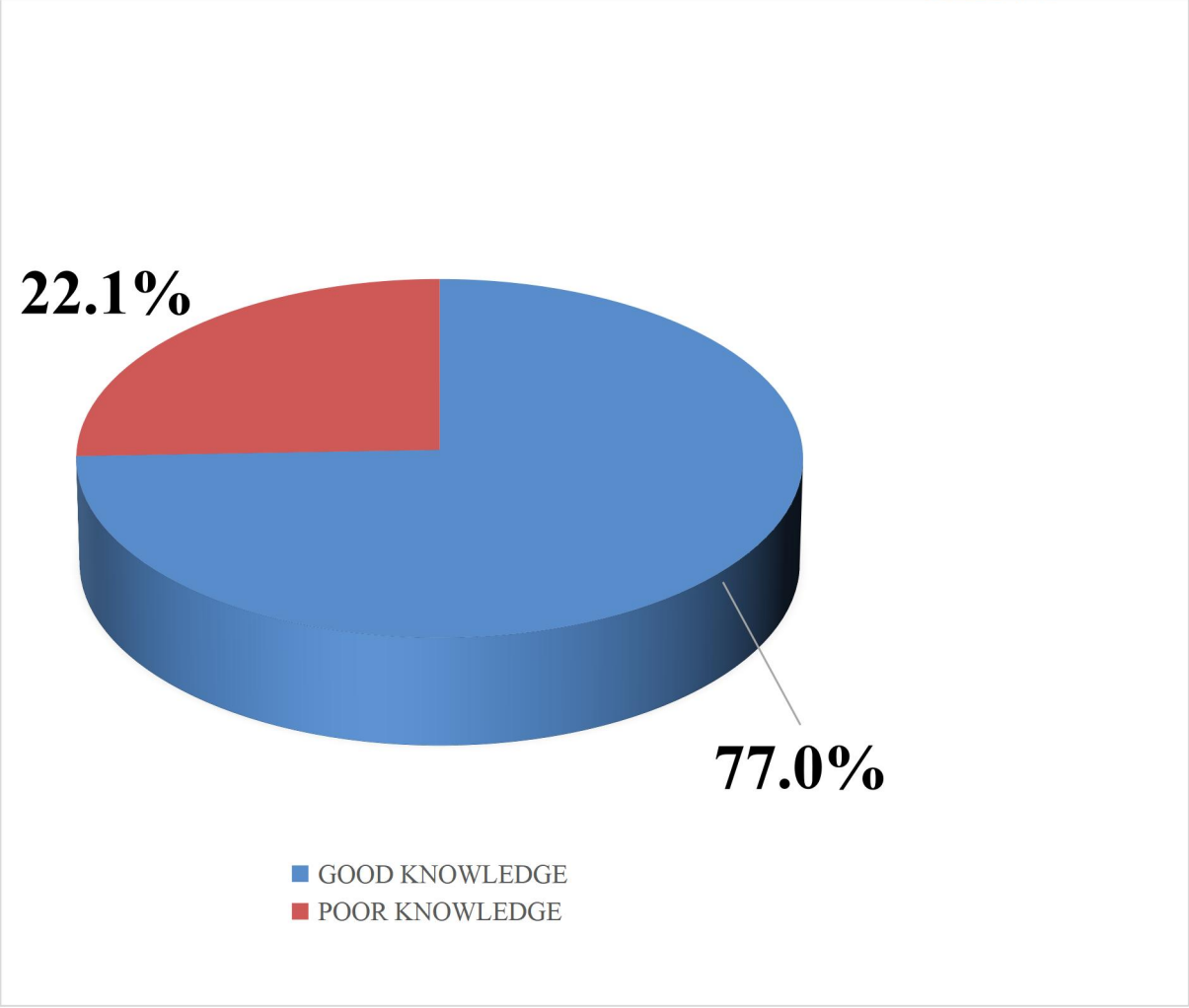

Figure 4.3: Respondent's knowledge about the Prevention of Hepatitis B virus

Source: Field Survey, 2022

Respondents' Knowledge about the Risk Factor of Hepatitis B Virus

With respect to questions 29 and 31

Figure 4.4 shows the respondent's knowledge about the risk factor for the Hepatitis B Virus. That 153 (84.5%) have good knowledge of the risk factor of Hepatitis B Virus and 28 (15.5%) have poor knowledge about the risk factor of Hepatitis B Virus.

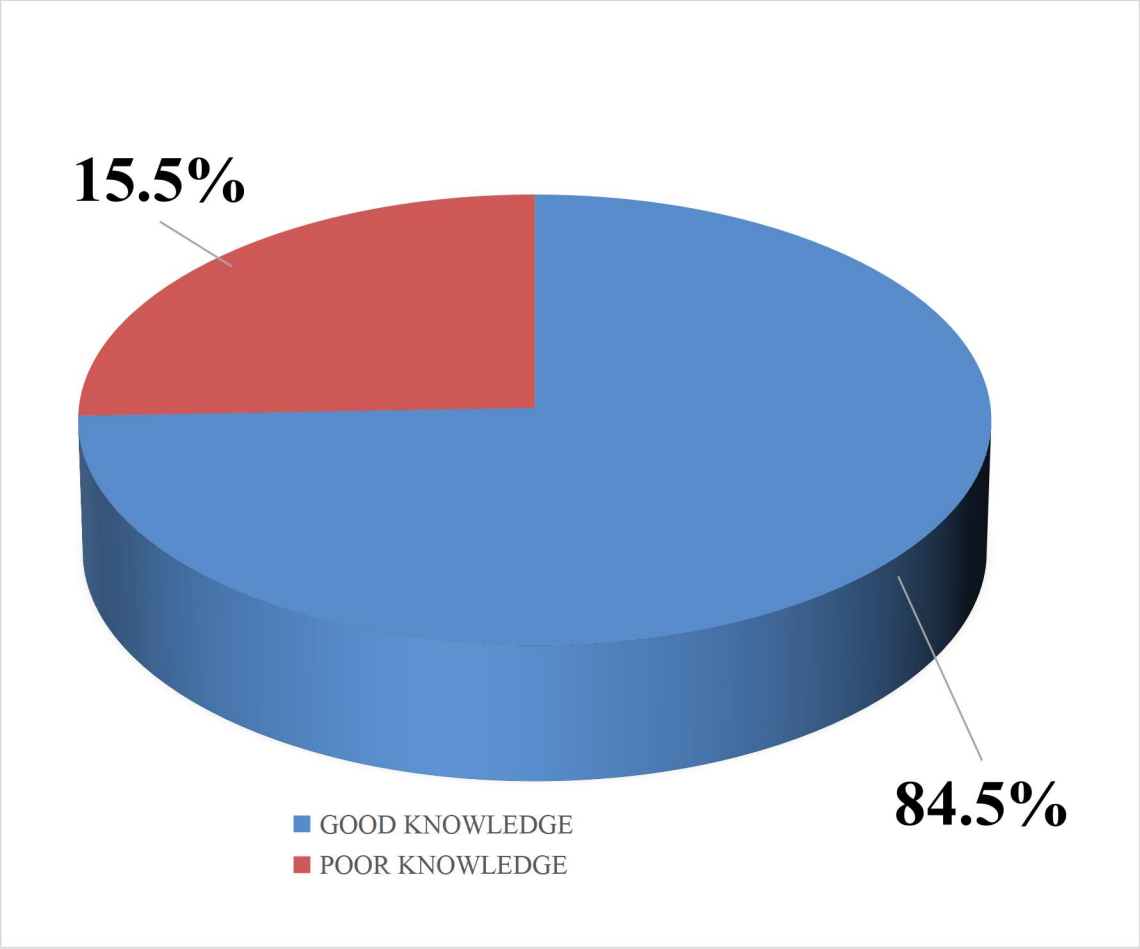

Figure 4.4: Respondents' Knowledge about the Risk Factor of Hepatitis B Virus

Source: Field Survey, 2022

Respondents' Knowledge about the Symptoms of Hepatitis B Virus

With respect to question 33 of the questionnaire

Figure 4.5 shows the respondents' knowledge about the symptoms of the Hepatitis B Virus. The majority 120 (66.3%) of the participants had good knowledge about the symptoms of the Hepatitis B Virus while 61 (33.7%) had poor knowledge.

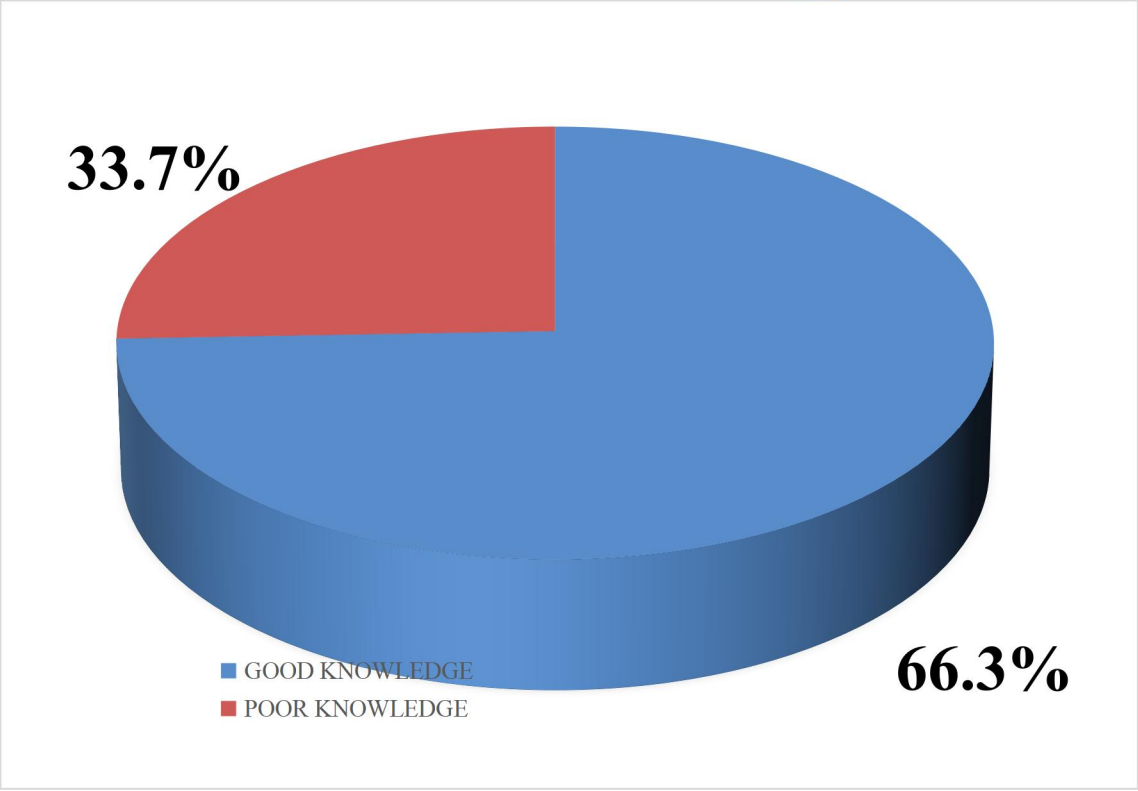

Figure 4.5: Respondents' Knowledge about the Symptoms of Hepatitis B Virus

Source: Field Survey, 2022

Respondents' Knowledge of the Availability of Vaccine

With respect to question 27,28 and 32 of the questionnaire

Figure 4.6 shows the respondents' knowledge of the availability of the Hepatitis B Virus vaccine. Shown that 165 (91.2%) have good knowledge of the availability of the Hepatitis B Virus vaccine and 16 (8.8%) have poor knowledge about the availability of the Hepatitis B Virus vaccine.

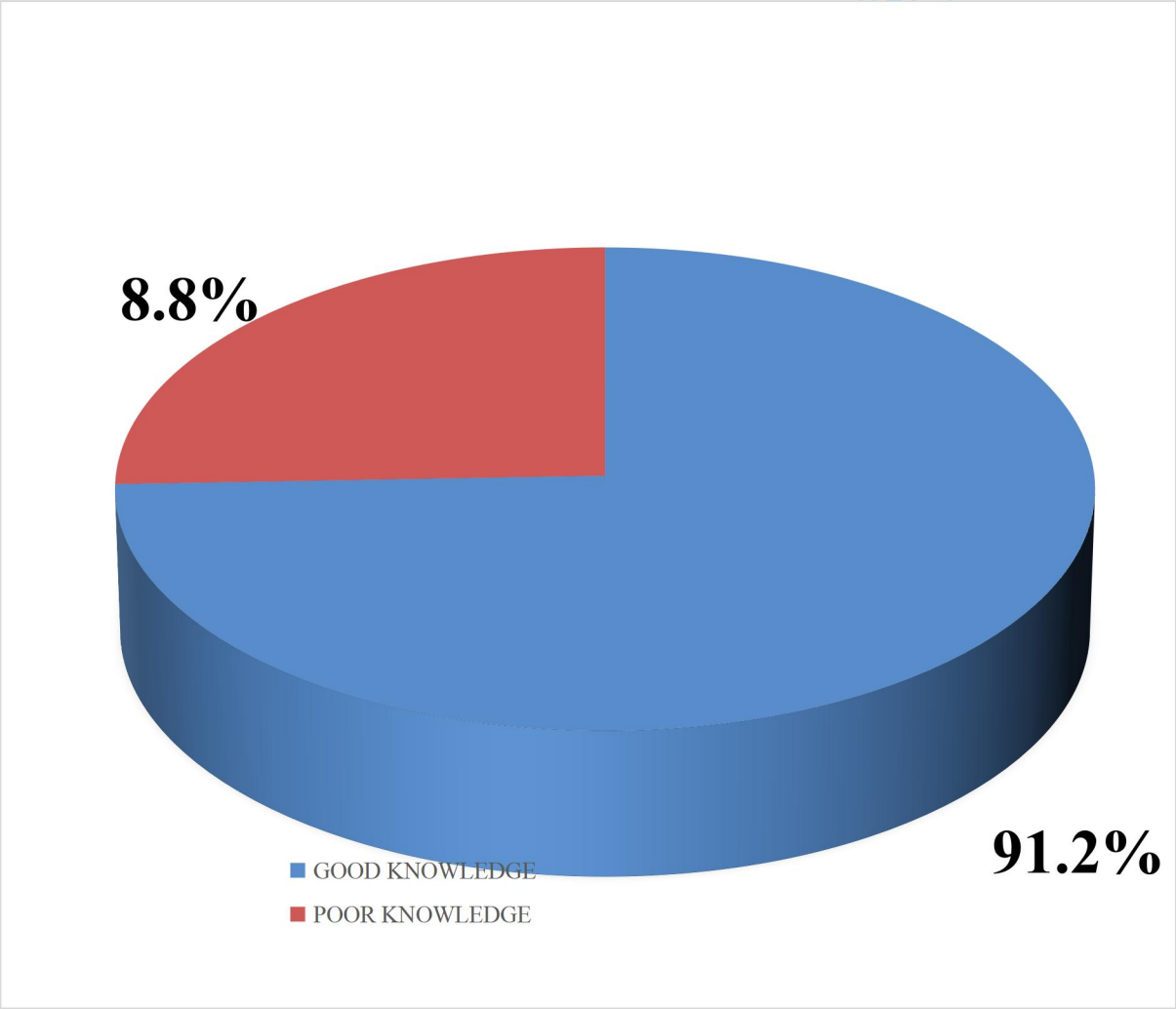

Figure 4.6: Respondents' Knowledge of the Availability of Vaccine

Source: Field Survey, 2022

4.2.2 Research Question Two:

The level of awareness Hepatitis B infections, risk factors, and sequel among Naval Personnel

Table 4.3 revealed that based on the respondent's awareness of the Government provision of free HB vaccination for infants in Nigeria, 111(61.3%) are aware while 70(38.7%) are not aware. The majority 108(59.7%) of the respondents are not aware of the Hepatitis B Status of their Family members while few 73(40.3%) of the respondents are aware of their family status about Hepatitis B. 101(55.8%) participants know about their Hepatitis status while 80(44.2%) are not aware of their Hepatitis status. Higher 133(73.5%) respondents are not aware if they had received a complete Hepatitis B Vaccination while 48(26.5%) are aware. Based on the question If You Received Vaccination, You Do Not Need a Screening Test 118(65.2%) are not aware while 63(34.8%) are aware. 146(80.7%) know whether hepatitis B infection remains for the rest of their life while 35(19.3%) are unaware whether hepatitis B infection remains for the rest of their life. 133(73.5%) are aware that they are immune, infected with HBV, Or at Risk while 48(26.5%) are aware. Overall, the respondents had poor awareness of the Hepatitis B virus

Table 4.3: Respondents' Awareness of Hepatitis B

Variables	Not Aware	Aware
Government Provides Free HB Vaccination for Infants in Nigeria	70(38.7)	111(61.3)
I Know the Status of My Family Member's Hepatitis B	108(59.7)	73(40.3)
I Know My Status of Hepatitis B	80(44.2)	101(55.8)
I Have Complete Hepatitis B Vaccination	133(73.5)	48(26.5)
If You Received Vaccination, You Do Not Need a Screening Test	118(65.2)	63(34.8)
All The Individuals Infected with HBV Remain Infected for The Test of Their Life	35(19.3)	146(80.7)
Do You Know If You Are Immune, Infected with HBV, Or at Risk?	133(73.5)	48(26.5)

Source: Field Survey, 2022

Figure 4.7 shows the respondents' level of awareness about the Hepatitis B Virus among Naval Personnel. Shows that 59 (32.6%) of the participants had good awareness about the symptoms of the Hepatitis B Virus while majority 122 (67.4%) had poor awareness.

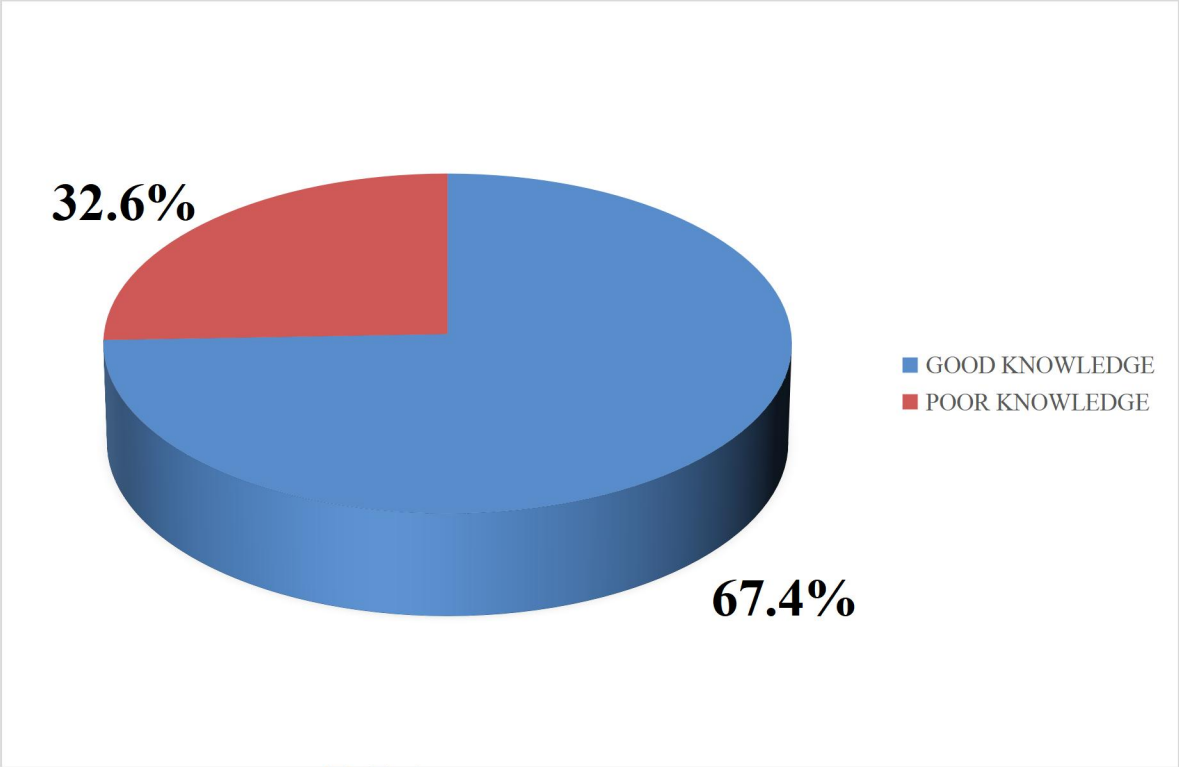

Figure 4.7: Respondents' Level of Awareness among Naval Personnel

Source: Field Survey, 2022

4.3 Discussion of Findings

Exposure to Hepatitis B infections resulted in health problems for the individual, professionals, and the public. Findings from this study establish the necessity for sensitization campaigns to address reported misconstructions. However, findings in this study are similar to what has been found in other studies associated with knowledge and awareness of hepatitis B transmission and prevention but this study to the best of my knowledge remains one of the first conducted among Naval personnel. The result of this study makes known that most Naval personnel have acceptable knowledge of HBV causes (85.1%), risk factors (84.5%), and effects on the body organ such as the Kidney (74%) and Brian (59.7%) and an appreciable knowledge about the HBV mode of transmission and prevention. Evaluating the individual's knowledge remains a useful step to assess the degree to which an individual or community is in a position to assume a risk-free disease behavior for this disease. Based on this statement, the study participants had considerable knowledge of Hepatitis B[1].

The lack of previous vaccination 138(76.2%) to protect against hepatitis B, which is of concern, particularly because this population is considered high risk was reported in this study. The finding here is a bit higher than the 40.3% of police trainees vaccinated against hepatitis B viral infection reported in a study conducted among total police trainees but lower than the vaccination status of 87.8% study done at Muhammad medical college Mirpurkhas 29.3% was reported among medical students, 35% was reported in civil hospital of 60 laboratory technicians[3,4]. According to the World Health Organization, persons within endemic areas of the world should be vaccinated against hepatitis B. To address hepatitis B and work towards World Health Organization goals of viral hepatitis eradication which include a reduction in the incidence of hepatitis B infections and their associated mortality by 2030, comprehensive public

health efforts should work to continue to support education, screening, and vaccination at the community level (by 90% and 65% respectively)[2].

An essential public health prevention strategy should work towards directly addressing these targets, including improving vaccination coverage within this region. This involves working to make the vaccine more accessible, available in places of convenience, and affordable. The hepatitis B vaccination recommendations among the military and other endemic communities should promote vaccination against hepatitis B for all individuals residing in the country and work towards universal vaccination coverage. Additionally, birth dose vaccination administration within the first 24 hours of birth should be administered universally to prevent transmission from happening from mother to child. Implementing a hepatitis B birth dose alone can prevent up to 90% of mother-to-child transmission of hepatitis B[3,4].

Based on participant responses, there is a significant knowledge gap in terms of hepatitis B-related misconceptions, routes of hepatitis B transmission, and what body parts are impacted by hepatitis B. Many individuals (59.7% and 74%) reported that the brain and kidneys are affected by a hepatitis B infection. In a study reported in coastal Eastern India and among Cambodian Americans, in which 78% had heard about the disease earlier. In this study, there is still a lack of medical knowledge among the naval personnel regarding modes of transmission of hepatitis B virus infection and prevention. Knowledge about transmission through Blood (80.1%)[8,9], Tattoos (60.2%), Unprotected Sex (72.4%), and Infected Mother to Infant Hepatitis B During Pregnancy (69.1%) among the naval personnel was fairly good. However, knowledge of the mode of transmission through Eating with Or Sharing Food/Utensils (42%), Sneezing and Coughing (31.5%), contaminated water (45.9), and shaking hands with an infected person is low as almost the majority answered it falsely. A study conducted revealed dissimilar findings[5].

Additionally, many correctly reported that hepatitis B could be transmitted through blood (80.1%) however, there were significant misconceptions regarding casual contact transmission which has been reported within the literature in another study[11,12]. Within this study, 45.9%, 51.4%, 58%, and 68.5% falsely reported hepatitis B is spread by contaminated water, shaking hands with someone infected, eating with or sharing food/utensils, and sneezing/coughing. While the blood transmission, tattoos, unprotected sex, through infected mother to infant Hepatitis B during pregnancy, and unclean needles were reported correctly by most participants, there is still a misconception related to casual contact. A similar type of study was performed on dental students, majority knew that transmission of HBV results from exposure to contaminated blood (88%), needle stick injury (95%), and unsafe sex (92%)[6].

Participants were asked if hepatitis B can be prevented with exercise, and almost half (40.9%) falsely reported that it could. Similarly, almost 51% reported that a balanced diet can also prevent hepatitis B infection. This shows that the majority of this population still has wrong knowledge about the Hepatitis method of prevention. However, a higher percentage of the participant acknowledged that Hepatitis B could be prevented by good hand hygiene (69.1%) and vaccine (82.9%) which reveal their good knowledge about Hepatitis prevention through a vaccine. This is similar to and even higher than 57.77% of respondents who acknowledged that Hepatitis B can be prevented through the HBV vaccine[7]. This is also close to in line with the study, who reported that most of the participants examined in their study had substantial knowledge that HBV vaccines can help in preventing hepatitis B[8]. These results agree with the findings of a study from Gujarat, India; where the majority of the medical students had correct knowledge of the mode of prevention[15]. Individuals must be readily aware of the most effective mode of hepatitis B prevention through the three-dose hepatitis B vaccination. In addition,

sensitization should also work to improve vaccination knowledge, from the study, only 81.8% were aware that the hepatitis B vaccine was taken in three doses to ensure full protection against the virus[9].

Naval personnel were also assessed for knowledge regarding clinical symptoms and signs of hepatitis B virus infection. Among total participants, 60.3% told Jaundice is one of the most common signs of Hepatitis B infection. A study conducted in AIIMS Mangalagiri revealed that the clinical features of acute hepatitis B infection were not well understood by the majority of the students. Three- fourth of students (72.7%) knew that it can cause jaundice. However, their knowledge about other clinical manifestations such as fever (42.4%), loss of appetite (25.8%), and nausea and vomiting (28.0%) is poor. The knowledge about these viruses, transmission and preventive measures was low among police trainees[10].

Lack of awareness of the general public about HBV remains one of the major causes of the rapid spread of these infections in developing countries. In this study, 61.3% which is more than half of the participants were aware of the fact that government provides free HB vaccination for infants in Nigeria against the 38.7% that are unaware. This result is similar to the 53.8% participant reported, where an assessment of HBV knowledge and awareness was conducted among the Sudanese population in Khartoum State. More than half (59.7%) of the participants were reported to be not aware of their hepatitis B status while almost half (44.2%) are not aware of their personal Hepatitis B status[11].

Almost three-quarters (73.5%) are not aware whether they had completed Hepatitis B Vaccination with 73.5% of participants unvaccinated, which remains the most frightening event. 65.2% claim that someone has received a vaccination and doesn't need a screening test. This is similar to the findings reported where 50.3%, 49.2%, 37.1%, 12.2%, and 48.7% were reported

for HB family member status, personal HB status, if the individual is immune against HB, completion of HB vaccination, and ones received vaccination doesn't need a screening test respectively. However, an individual could remain a carrier without transmitting the infection. It was reported that carriers of HBV are mostly the transmitter of the virus due to the unawareness of their health status. Hence, based on this fact, having a larger percentage of the participant which remains unaware of their HBV status could result automatically in a threat by which this infection could be spread so easily. Less than 26% of the participant have received HBV vaccines, which is of great concern towards eliminating this lethal scourge. Most of the studies carried out within Nigeria show that although people are aware of Hepatitis B, the level of vaccine intake is still very poor, which is in line with the study[12].

This study shows that there was no significant association between awareness and knowledge (p=0.740). The odds of participants that had good knowledge are 1.1 times more likely to have good awareness. Findings from this study will help raise awareness and motivation for a vaccination drive among future budding naval personnel against HBV infection. The naval personnel including the individual should also be focused on avoiding infection and seeking immediate medical care in case of accidental exposure to infected blood and other body fluids. Authenticated knowledge about any contagious disease will help decrease the spread of that disease[13]. Overall, it is clear that there is a lack of information on hepatitis B among the naval personnel. The World Health Organization and leading medical bodies recognize the global burden of hepatitis B and have called for the elimination of hepatitis B by 2030[14]. With 60 million estimated hepatitis B infections in Africa, public health efforts must be specific to address barriers within the military population, which has communities that are disproportionately affected by hepatitis B[15]

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Chapter Five

Conclusion

5.1 Summary of Findings

This study has been done in relation to military people, namely naval personnel. The general population of the naval staff was found to have a good degree of knowledge. However, there is little information available regarding the population of naval personnel's HBV vaccination status.

This study assesses the knowledge and awareness of Hepatitis B virus among Naval personnel at the Nigerian Navy barracks, Ojo. Lagos. A cross sectional study was conducted among Naval personnel at the Nigerian Navy barracks, Ojo, Lagos. Information about socio demographic characteristics, basic knowledge about hepatitis B viruses, its modes of transmission, prevention, symptoms and signs and also complications, Hepatitis B vaccination were also assessed from all these police trainees. The data were collected, tabulated, and statistically analyzed using SPSS 25. A total of 183 Naval personnel at the Nigerian Navy barracks, Ojo were surveyed, 83.4% has a good knowledge of Hepatitis B Virus, 75.1% has good knowledge of Hepatitis B Virus Mode of Transmission, 77.0% has good knowledge about the prevention of hepatitis B virus, 84.5% has a good knowledge of the risk factor for Hepatitis B Virus, 66.3% has good knowledge about the Symptoms of Hepatitis B Virus, 91.2% has a good knowledge of the availability of Vaccine while almost 70% of them has poor awareness of Hepatitis B Virus. In conclusion, although, the naval personnel had more knowledge of causes, risk factors, signs and symptoms, and prevention of the disease.

The results show that the navy personnel have a low level of knowledge of HBV. Misconceptions are also common, including the idea that sneezing, coughing, and sharing utensils might spread the disease. The results show that the navy personnel had little knowledge of HBV. There was

little evidence of the general population's knowledge level among the navy personnel. As a starting point for culturally appropriate public health interventions aimed at boosting hepatitis B knowledge and awareness, screening, and vaccination efforts among military personnel, these results added significant information to the currently scant literature documenting the current knowledge level and awareness on hepatitis B treatment, prevention, and symptoms within this community.

5.2 Conclusion

According to objective one, it can be concluded from this study that the navy troops in the chosen barracks have a solid understanding of hepatitis B. However, the navy personnel knew more about the disease's causes, risk factors, symptoms, and prevention. The respondents' knowledge of the Hepatitis B vaccine is incredibly limited. Given the critical low level of awareness, it is urgently necessary for the government, public health professionals, and other stakeholders to increase awareness, especially among Naval personnel, in order to lessen the burden of this infection and further contribute to reducing the incidence of disease. To control all facets of knowledge, awareness, attitude, and practice about HBV, broad health education campaigns on the mechanism of transmission and prevention should be stressed.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made:

1. More investigation is required to comprehend some of the potential obstacles to testing and immunization access in this situation.

2. There is a critical need in the community under study for more funding and assistance to address public health level sensitization for hepatitis B awareness and testing.
3. It should be investigated whether social media and networking strategies may be used to spread important information about HBV infection from healthcare authorities.
4. All personnel on board and onshore should receive special attention during public awareness workshops.
5. Misconceptions should also be addressed in campaigns.

5.4 Contribution to Knowledge

To the already existing literature describing the current state of understanding on hepatitis B treatment, prevention, and symptoms within the examined community, this study had made a significant contribution. Additionally, it can act as a springboard for the development of culturally appropriate public health initiatives targeted at raising hepatitis B awareness among military personnel through screening, immunization, and education.

5.5 Suggested Area for Further Research

In contrast to the limited information in the literature, more research on Hepatitis infection should be conducted among military people.

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Appendix I

Informed Consent

Title of Study

Evaluating The Knowledge and Awareness Of Hepatitis B Among Naval Personnel: A Case Study Of The Nigerian Navy Barracks Ojo Lagos, Nigeria.

Principal Investigator
Tinuola Sarah, Ajai
Public Health Department, Leadcity University
Leadcity University, Toll Gate, Ibadan,
+2348038945656
seraajai@gmail.com

Purpose of Study

My name is Tinuola Sarah Ajai, a master of public health student at the faculty of public health, Lead City University, Ibadan. I am conducting a study on the "Evaluating the knowledge and awareness of Hepatitis B among Naval personnel: a case study of the Nigerian Navy Barracks Ojo Lagos, Nigeria.

I am interested in understanding the level of knowledge of Hepatitis B among Naval personnel of Nigerian Navy. I equally want to know the level of awareness of Hepatitis B Infection among the Naval Personnel. I will greatly appreciate your participation in my study. Your insight will assist me understand their knowledge and awareness of Hepatitis B virus.

Research Procedure

If you agree to be in this study, you will be asked to answer questions about yourself as well as questions about the Evaluating the knowledge and awareness of Hepatitis B among Naval

personnel. These questions will be asked using a structured questionnaire. To fill the questionnaire will take about 5 to 10 minutes of your time.

Risks and Benefits

There is minimum or no risks if you take part in this study. There are also no incentives but the information you provide will help you improve on your health and that of your loved ones.

Compensation

There is no monetary compensation or incentive for this study. Participation is voluntary.

Confidentiality

Like it is stated above, your comments will be anonymous. Every effort will be made by the researcher to preserve your confidentiality. Only the research team will have access to the answered questionnaires. Confidentiality and privacy will be maintained by keeping all materials under lock and key. Your name will not be recorded.

Contact Information

If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the Institutional Review Board at

Voluntary Participation

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the

researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

Consent

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Questionnaire

Public Health Department, Lead City University

Lead City University, Toll Gate, Ibadan,

Dear Respondent,

I am a student of the above university. I am presently conducting research on **"Evaluating the knowledge and awareness of Hepatitis B among Naval personnel: a case study of the Nigerian Navy Barracks Ojo Lagos, Nigeria".** Please, kindly assist in answering the questionnaires before you. You are expected to give your honest and sincere views on the questions by ticking the options. Best assured that all information given here shall be treated with absolute confidentially and shall be used for the purpose of this study only.

Thanks for your anticipated cooperation.

Introduction: Please tick ( ) were appropriate.

SECTIONA: Respondent Socio-demographic Profile

1. Age (a) **14-37** ( ) (b) **38-57**( ) (c) **58-67** ( ) (d) 68+ ( )
2. **Educational attainment** (a) **Primary school**( ) (b) B.Sc ( ) (c)**M.Sc** ( )
3. **House hold monthly income** (a) **Low (1-10000)** ( ) (b) **Middle (10,001-20,000)** ( ) (c) **High (>20,000)** ( )
4. **Previous HBV Vaccine** (a) **No** ( ) (b) **Yes** ( )
5. **Family HBV Exposure** (a) **No** ( ) (b) **Yes** ( ) (c) **I don't know ( )**
6. **History of surgery** (a) **No** ( ) (b) **Yes** ( )
7. **History of blood transfusion** (a) **No** ( ) (b) **Yes** ( )

8. **History of blood donation** (a) **No** ( ) (b) **Yes** ( )

9. **HBsAg** (a) **Negative** ( ) (b) Positive ( )

SECTION B:Table 2: Respondents Knowledge about Hepatitis B

s/n	Variables	Yes	No	DON'T KNOW
10.	Hepatitis caused by virus			
11.	Brain can be affected by Hepatitis B infection			
12.	Kidneys can be affected by Hepatitis B infection			
13.	Heart can be affected by Hepatitis B infection			
14.	Hepatitis B can be transmitted through eating with or sharing food/utensils			
15.	Hepatitis B can be transmitted through contaminated water			
16.	Hepatitis B can be transmitted through sneezing or coughing			
17.	Hepatitis B can be transmitted through blood			
18.	Hepatitis B can be transmitted through tattoos			
19.	Hepatitis B can be transmitted through unprotected sex			
20.	Hepatitis B can be transmitted through sharing needles			
21.	Hepatitis B can be spread through infected mother to infant hepatitis B			
22.	Hepatitis B can be spread by shaking hands with an infected person			
23.	Hepatitis B infection can be prevented with a vaccine against hepatitis B			
24.	Hepatitis B infection can be prevented with exercise			
25.	Hepatitis B infection can be prevented with a balanced diet			
26.	Hepatitis B infection can be prevented with good hand hygiene			
27.	There is a blood test to detect Hepatitis B infection			
28.	There is antiviral therapy for hepatitis B			
29.	**Hepatitis B is a risk factor for liver cancer**			
30.	Hepatitis B infection can be transmitted to your partner			
31.	Newborns must take Hepatitis B vaccine			
32.	A complete set of Hepatitis B vaccine requires three injections of vaccines			
33.	Jaundice is one of the most common signs of Hepatitis B infection			

SECTION C: Respondents Awareness about Hepatitis B

s/n	Variables	Yes	No	Do not know
34.	Government provides free HB vaccination for infants in Sudan			
35.	I know the status of my family members Hepatitis B			
36.	I know my status Hepatitis B			
37.	I have complete Hepatitis B vaccination			
38.	If you received vaccination, you do not need a screening test			
39.	All the individuals infected with HBV remain infected for the rest of			
40.	Do you know if you are immune, infected with HBV, or at risk?			

Bio-data

A. Personal Data

Full name: Tinuola Sarah, Ajai

Address: Nigeria Navy College of Health Sciences Offa.

E-mail Address: seraajai@gmail.com

Phone no: 08038945656.

Date of birth: 30th of April, 1979

Place of birth: Jos, Plateau State

Nationality: Nigeria

Marital Status: Single

Name of Next of Kin: Ajai Bemjamin

Address of Next of Kin:Nigeria Navy College of Health Sciences Offa.

B. Educational Background

Educational Institutions Attended with Dates and Qualification:

West African Senior School Certificate

Ifako ijaye, Lagos 2004

National Diploma, Environmental Health Technology 2010

Kwara State College of Health Technology, Offa, kwara State

Higher National Diploma, Environmental Health Technology 2012

Kwara State College of Health Technology, Offa, kwara State

Post Graduate Diploma in Environmental Health Management 2015

Ladoke Akintola University of Technology, Ogbomoso

Masters of Environmental Health Management 2017

Ladoke Akintola University of Technology, Ogbomoso.

Masters of Public Health *2021- current*

Lead City University, Ibadan, Oyo State.

C. **Work Experience**

Nigeria Navy College of Health Sciences Offa, Kwara State 2003 – Till Date

Role: Environmental health officer

D. Awards and Fellowships: NIL

E. Professional Membership: Environmental Health Officer Registration Council of Nigeria

Registered Environmental Health Officer [EHO/8805]

F. F. Publications: NIL

G. Major Conferences Attended: NIL

H. Referees

Mr Isiaq Aliyu
Deputy Provost Academic, College of Health Technology offa, Kwara State.
Isiakaliyu2020@yahoo.com
+234 (0) 8065921515

Capt. Ayodele Ogunniyi Olowolagba
Commandant Nigeria Navy College of Health Sciences Offa, kwara State.
ogunomobate@yahoo.com
Kwara-State.
+234 (0) 8033157951

_____ _____

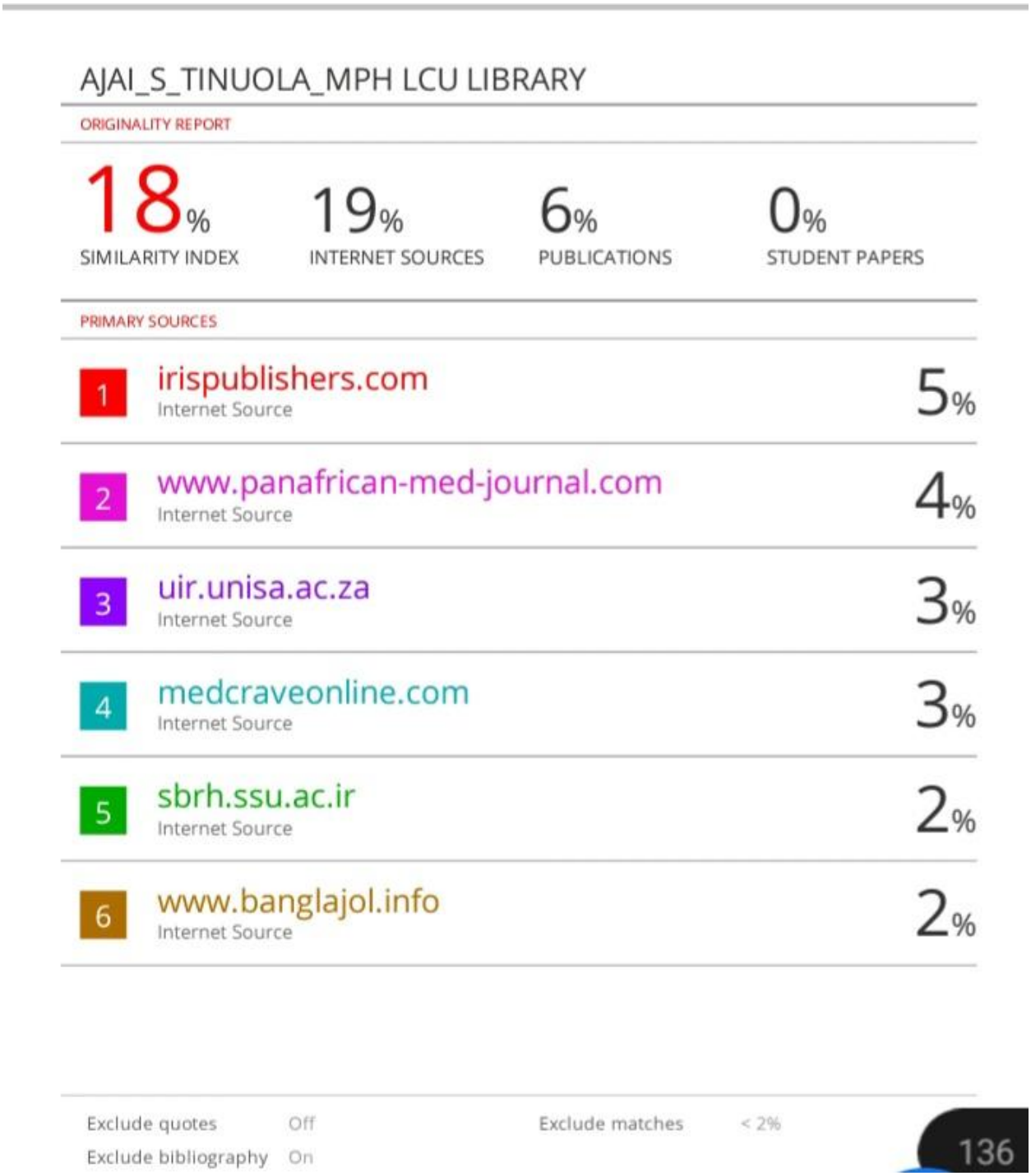
Signature Date

The University Compliance Certification

This is to certify that this thesis was written by Tinuola Sarah, AJAI, with the Matriculation Number LCU/PG/002072 in the Department of Public Health, Faculty of Applied and Health Sciences, Lead City University, Ibadan is full compliance with the approved University format.

_____ _____

Signature Date



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