INVESTIGATION INTO HEPATITIS B VIRUS PREVALENCE, RISK FACTORS AND HEALTH CARE WORKERS' AWARENESS IN KAVANGO EAST AND WEST REGIONS OF NAMIBIA

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ABSTRACT

Available data has shown that most deaths due to liver cancer and cirrhosis are primarily attributed to the complications of Hepatitis B Virus (HBV) infections, globally. Countries ought to have well-documented information on the HBV prevalence and risk factors to be able to understand and interrupt its transmission. In Namibia, data on the HBV prevalence and risk factors are scanty and older than two decades. Also, health care workers' (HCWs) awareness on the HBV prevention and control are inadequate. The purpose of this study was to investigate HBV prevalence, risk factors and health care workers' awareness on HBV prevention and control aspects in Kavango East and West (KE&W) regions. The study adopted a quantitative, cross-sectional, descriptive and analytical design. Firstly, the researcher interviewed purposively selected HCWs from the Ministry of Health (17 respondents) and private health clinicians (13 respondents) about their awareness on HBV. Next, all the pre-existing HBV laboratory results from Namibia Institute of Pathology (NIP), January-December 2013 were retrieved and analyzed. Thereafter, a population-based survey, which included 720 randomly selected subject individuals from 20 households in 36 lusters in KE&W regions, was conducted, by interviewing respondents or their caretakers. One drop of blood was drawn from each respondent and was tested for hepatitis B surface antigen, using Uni-Gold HBV rapid diagnostic kits. All the responses were analyzed using the Statistical Package for the Social Science (SPSS) software, version 24. The frequencies, cross-tabulations, logistic regression, bivariate and risk factor analysis were performed. Based on this analysis, the health care workers' awareness on HBV prevention, were found to be insufficient. The pre-existing HBV laboratory results showed HBV positivity rate of 11.8% nationally, with Kavango region showing the highest prevalence of 16.3%. The HBV prevalence survey in KE&W regions showed an overall prevalence of 7.1% for the two regions combined, but when disaggregated by region, Kavango West showed 12.3%, compared to5.0% of Kavango East. Further analysis has shown a strong association between positive results with rural residents (p=0.007), household contacts or providers of care for HBV infected person (p=0.000), sex work for money

(p=0.001) and age at first sex (p=0.002).A predictive model, based on selected variables, whether or not someone is likely to be HBV positive has been developed. The study proposed recommendations to the MoHSS and related stakeholders to develop a strategic plan to combat viral hepatitis in Namibia in general and in KE&W regions in particular.

LIST OF PUBLICATIONS WHICH CAME DIRECTLY FROM THIS STUDY

The publications below forms part of a PhD study undertaken at the University of Namibia:

1. Petrus Mhata, Louis F Small, Christian J Hunter (2017). Investigation into Health Care Worker's Awareness and Implementation of Policies for the Prevention and Control of Hepatitis B Virus Infections in Namibia. *International Science and Technology Journal of Namibia.* Vol 9: 61-67.

2. P Mhata, T W Rennie, L F Small, P M Nyarang'o, Z Chagla, C J Hunter,(2017) Distribution of hepatitis B virus infections in Namibia. *South African Medical Journal.* Vol 107(10):882-886

DECLARATION

I, Petrus Mhata, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Name of Student	**Signature**	**Date**

DEDICATION

This study is dedicated to my mother, Meme Sesilia Inimaimwe Hamukwaya, who went beyond her usual parental roles and taught me how to read and write, before I started school. She created opportunities for me and used her meagre resources until I successfully completed my high school grades. At the time of completing this study, however, she has been sick and frail, thus unable to witness fruits of her contributions.

I dedicate this scientific work to my Mom, as she opened doors and windows of opportunities for me and was the greatest facilitator and a mentor I ever had. I therefore dedicate this work to her person with gratefulness, love and compassion.

I pray that the Lord gives her the strength she needs and carry her by His Grace all the way.

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LIST OF ACRONYMS

AFP	-	Alpha-fetoprotein
AFRO	-	WHO Regional Office for Africa
AIDS	-	Acquired Immuno-deficiency Syndrome
ALT	-	Alanine aminotransferase
ANC	-	Antenatal care
anti-HBc	-	antibody to HBcAg
anti-HBe	-	antibody to HBeAg
anti-HBs	-	antibody to HBsAg
AST	-	Aspartate aminotransferase
cccDNA DR	-	covalently closed circular DNA Direct Repeats
CDC	**-**	Centers for Disease Control and Prevention
CI	-	Confidence Interval
DAPP	-	Development Aid from People to People
df	-	degree of freedom
DNA	-	Deoxyribonucleic acid
GHSS	-	Global Health Sector Strategy

FGD	-	Focus Group Discussions
GPS	-	Global Positioning System
HBsAg	-	Hepatitis B surface Antigen
HBeAg	-	Hepatitis B e Antigen
HBcAg	-	Hepatitis B core Antigen
HBV	-	Hepatitis B Virus
HBxAg	-	Hepatitis B x protein
HCC IgM	-	Hepatocellular Carcinoma Immunoglobulin M Hepatology
HCV	-	Hepatitis C Virus
HCW	-	Health Care Worker
HIV	-	Human Immuno-deficiency Virus
KE&W	-	Kavango East and West regions
MoHSS	-	Ministry of Health and Social Services
NICE	-	National Institute for Health and Clinical Excellence
NIP	-	Namibia Institute of Pathology
OR	-	Odds Ratio
PLWHA	-	People Living With HIV/AIDS

POC	-	Point Of Care
PSU	-	Primary Sampling Unit
RDT	-	Rapid Diagnostic Test
SDGs	-:	Sustainable Development Goals
SPSS	-	Statistical Package for the Social Science
TCE	-	Total Control of (AIDS) Epidemic
UNAIDS	-	Joint United Nations Programme on HIV/AIDS
UNAM	-	University of Namibia
USAID	**-**	United States Agency for International Development
WCH	-	Windhoek Central Hospital
WHA	-	World Health Assembly
WHO	-	World Health Organization

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CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1.INTRODUCTION OF THE STUDY

Hepatitis is a global public health problem that can be caused by hepatitis A, B, C, D or E viral infections (1). All five types of viral hepatitis can cause acute disease, but the majority of deaths, WHO continues, result from liver cancer and cirrhosis, which usually occur after many years of chronic Hepatitis B Virus (HBV) or Hepatitis C Virus (HCV) infections (1,2). The absolute numbers of people who are chronically infected with and related risk factors; deaths due to HBV complications; and health care provider practices in most countries have not been adequately documented (3). Similarly, data on the HBV prevalence in Namibia is scanty, and the most recent research information on this disease is older than two decades (4–6).

This study focused therefore, on determining the distribution of HBV infections in the country using pre-existing laboratory data for 2013. An assessment of health care workers' awareness on the prevention and control of HBV was also carried out in the area of study. Furthermore, the study investigated and determined how many people were carrying the HBV, as well as the risk factors associated with these infections in Kavango East and Kavango West (KE&W) regions. The study concluded by proposing recommendations to the MoHSS and health stakeholders aimed at reducing HBV transmission; through public awareness rising for health care workers and communities and improving to screening, treatment and care for people with chronic hepatitis.

1.2.BACKGROUND OF THE STUDY

Hepatitis B Virus (HBV) infections poses the greatest public health in Africa and Asia (7). Transmission from one person to the other occurs through sexual contact; from infected mother to her baby at birth; horizontal transmission, mainly during childhood, through close contact and sharing contaminated items; and through the use of contaminated equipment, including needles (8). The main clinical marker for identifying persons with acute or chronic HBV infections is the presence of Hepatitis B surface Antigen (HBsAg) in the blood (3).

Research of the last five decades contributed immensely to the development of a health policy environment in most countries by introducing effective vaccination programs to prevent hepatitis A and B (9). Meanwhile, affordable screening assays for the HBV detection and surveillance; treatment for HBV with effective antiviral medication; and improved clinical outcomes of care for people who are chronically infected with HBV has been observed (9). Despite all these positive developments, unresolved challenges that are related to access to HBV screen monitoring, care and treatment with available antiviral medications remain an issue (9). WHO recommends therefore, that countries consider developing effective national strategic plans, for the prevention of new infections, and monitoring and providing treatment for people with chronic hepatitis (10–13). Countries are urged to assess the HBV disease burden by collecting evidence-based data that is required to address socio-political, health policy, facility and community-based factors using amongst others, Bastani's Health Behavioural Framework (26), the Framework for Global Action for the Prevention and Control of HBV (1); and the New York Viral Hepatitis Strategic Plan and HBV Framework (27).

The World health Organization and partners have endorsed the 2030 Agenda for Sustainable Development Goals (SDGs) target 3.3; the framework for global action for the prevention and control of viral hepatitis; and the Global Health Sector Strategy (GHSS) 2016-2021,and urge countries, to develop national plans towards eliminating viral hepatitis, particularly Hepatitis B and C, by the year 2030 (9).

1.3.THE CONTEXTUAL SOCIO-POLITICAL ENVIRONMENT

Namibia, with a population of 2.4 million is comprised of 14 political regions, 107 constituencies and numerous localities/villages or enumeration areas (14). These political regions, are headed by the regional governors and the regional constituencies are run by regional councilors (14).

The area of study, i.e. Kavango East and Kavango West regions (See Figure 1: Administrative Map of Namibian Regions), is bordered by Angola to the North, Zambezi region and Botswana to the East, Otjozondjupa to the south; Ohangwena and Oshikoto regions to the west (15). Kavango East and Kavango West have a total of 14 constituencies, with a combined total population of about 240,000 people, of whom 71% are found in rural household villages (14). The tribal chief or "Fumus" (as they are known in Kavango regions) are the heads of traditional authorities, with senior headmen running the tribal districts and villages (14). The Ministry of Health and Social Services (MoHSS) has three levels of management, namely, the national, regional and district levels (16). The regional health directorates are subdivided into 35 health districts (each with one district state hospital), 44 state health centers and about 274 state clinics(16).

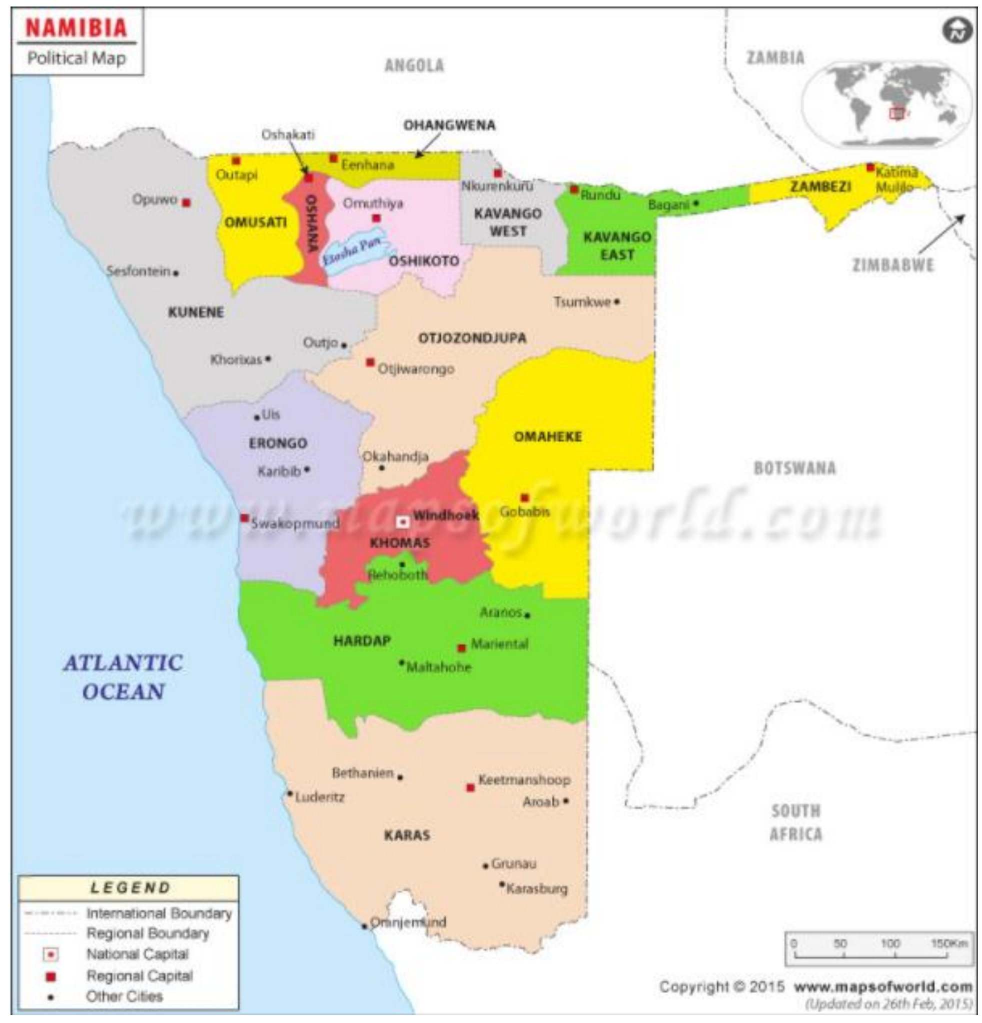


Figure 1: Administrative Map of Namibian Regions

Source: https://www.mapsofworld.com/namibia/namibia-political-map.html

In Namibia, there are around 7 (seven) main private hospitals and numerous private medical centers or clinics in the mayor towns of Khomas, Erongo, Oshana and KE&W regions. Traditional health care providers (traditional healers) are available in all the districts, but their practices are not adequately regulated. The health region is headed by the regional director, supported by the members of the regional management team, consisting of officers for the immunizations services, disease prevention and control,

treatment and follow up care. A similar structure is available at the health district level, which is headed by the district senior medical officer (16).

Kavango East and Kavango West regions have four hospitals in four health districts that include Andara, Nyangana, Nankudu and Rundu district hospitals. These hospitals provide support to 56 state clinics/health centers and about four private clinics, based in Rundu and Nkurenkuru towns. Available non-governmental service providers include the Development Aid from People to People (DAPP), under the Total Control of Epidemic (TCE) program whose primary responsibilities are to conduct HIV rapid testing and counseling in households, and refer people with positive results to public health facilities for further management (17).

The country introduced hepatitis B immunizations into the routine immunization for infants since 2009 (18) and hepatitis B birth-dose to the new-borns in 2015 (19). Furthermore, pregnant women and people living with HIV/AIDS are screened for hepatitis B during their Antenatal Care (ANC) first visits and during their anti-retroviral treatment follow-up visits, respectively (19). Meanwhile, health care workers who are exposed and are working in high-risk areas of the public hospitals and clinics receive three doses of hepatitis B vaccinations as part of disease prevention (20). The MoHSS adopted the Integrated Disease and Surveillance and Response Guideline in 2011, with the aim of detecting, reporting, investigating, monitoring, and responding to priority surveillance diseases, including HBV infections. However, data collection and reporting appears to be inadequate and consequently, the current HBV disease burden is not known.

1.4.THE PROBLEM STATEMENT

Hepatitis B Virus (HBV) infections is a global public health problem, particularly in developing countries (2). During 2015, an estimated 257 million people were living with HBV globally, which resulted in 887,000 deaths, mostly from liver cirrhosis and hepatocellular carcinoma (HCC) (2). Moreover, deaths due to HBV complications have increased over the past few years, more than deaths from HIV/AIDS and malaria (2).In Namibia, data on HBV infections is scanty, and the only available research information is more than 20 years old (4–6). Also, the current health information system (HIS) statistics on the numbers of infected people and deaths due to HBV, although limited, have shown higher rates of infections in Kavango East and West regions (21,22).There seem to be inadequacies regarding public awareness for HBV prevention and consequent shortcomings in the data collection, analysis and dissemination by the health information system (HIS) and surveillance programs in the MoHSS. This results in a silent and uninterrupted transmission, with consequent increased mortality due to HBV complications, in the country.

1.5.PURPOSE

The purpose of this study was to investigate hepatitis B virus (HBV) prevalence, risk factors and health care workers' awareness regarding the prevention and control of HBV infections in Kavango East and West regions.

1.6.OBJECTIVES

- To assess the MoHSS health care workers' (HCWs) awareness regarding the prevention and control of HBV in Namibia;
- To assess the awareness of the private clinicians and health stakeholders regarding the prevention and control of HBV in Namibia;
- To determine the distribution of HBV infections in Namibia, using the pre-existing Hepatitis B surface Antigen (HBsAg) results from the central NIP laboratory, January to December 2013;
- To estimate the prevalence of Hepatitis B Virus (HBV) infections in Kavango East and West regions; and
- To determine the risk factors associated with HBV infections in Kavango East and West regions.

1.7.SIGNIFICANCE OF THE STUDY

This study is expected to determine the HBV disease burden in Namibia, which could be regarded as baseline information considering that the only available research data is very old. The outcomes regarding the risk factors that are associated with HBV infections in Kavango East and West regions will also contribute to the new knowledge in Namibia, considering that there has not been one conducted to date in the country. Similarly, the current HCWs awareness and consequent practices regarding the prevention and control of HBV will be useful to identify and address the awareness gaps in the long run. The

beneficiaries will thus be the individual community members, the health service providers of the MoHSS; the health development partners; and the research fraternity. In summary, the quality of life for people in Namibia can be improved by learning more about HBV sero-prevalence and associated risks and gaps in Namibia in general, and in Kavango East and West regions, in particular.

This study will furthermore provide an opportunity of exploring various options for interventions offered by global initiatives, including the use of point-of care (POC) diagnostic kits. It will furthermore shed light on opportunities for the expansion of HBV vaccinations to other vulnerable groups, beyond infants and exposed health care workers. The policy- This will give an opportunity for sensitizing policy makers for the need to expand the screening, vaccination, monitoring and/or treatment of HBV carriers, as well as the follow-up care of the symptomatically ill.

1.8.PARADIGMATIC PERSPECTIVE/ASSUMPTIONS

A paradigm is described as a pattern or model that contains legitimated assumptions and a design for collecting and translating data into useful information (23). All scientific research is carried out within a specific paradigm or in a way of how the researcher views this or her research work. Therefore, every researcher should decide which paradigmatic perspective she or he will take and the nature of the selected paradigm, to be able to communicate the information in a clear and unambiguous manner (23). This research takes a positivist or realism approach, which is concerned with numerical description, causal relationship and predictions (24). It assumes that reality is objective, singular, and independent from the investigator (23). Researchers assume that

quantitative studies should be able to be replicated and generalized; and the investigation process is comprised of the following major dimensions, namely ontology, epistemology and methodology (24).

1.8.1. Ontological assumptions

Ontology is derived from two Greek words - onto, meaning 'being'; and logia, meaning 'science, study or theory'(24). Antwi and Hamza, 2016 go on to maintain that ontology covers a branch of philosophy, which involves articulating the nature and structure of the world; the form and nature of reality; and what can be known about it.

Positivistic thinkers adopt the view that scientific methods and systematic knowledge generation process with the help of quantification contributes to precision in the description and measurement of parameters as well as the relationship among them, and thereby uncovering the truth and presenting it empirically (24). Ontological assumption has therefore been chosen to quantify HBV disease burden, health care worker practices in preventing and controlling HBV and association between HBV positive individuals and certain variables.

1.8.2. Epistemological assumptions

Epistemological assumptions refer to the process which the investigators follows to know the objective reality, which is observable and measurable (24). Research work will only be considered credible and authentic if investigations are based on a sound rationale, and the research processes and the choice of a study methodology, data collection and data analysis are the appropriate ones for the study design (24). The

epistemological assumption is therefore applicable to the current study, because it seeks to follow the systematic way of justifying the rationale and following the appropriate process of data collection and analysis, in alignment with the chosen methodology.

1.8.3. Methodological assumptions

Methodological assumptions refers to the strategies that the researcher adopts to practically find out whatever he or she believes can be known through research (24). The methodological assumption translates ontological and epistemological principles into a particular research instructions, procedures and practices that show or guide the researcher how to conduct a particular research investigation (24). The researcher has chosen this assumption to ensure he follows correct methodology and a process that will make this study credible, authentic and replicable.

1.9.CONCEPTUAL FRAMEWORK

A conceptual framework refers to the mind-map of the end result, after bringing a number of related concepts together to explain, predict a certain even and give clearer understanding of the occurrence of interest (25). In essence, a conceptual framework is derived from a concept and represented schematically, as opposed to a theoretical frameworks that is derived from a theory (25). The researcher approach and methodology of conducting this research, i.e. the methodology, data collection and analysis was guided by the Framework for global action for the prevention and control of HBV (1); the Bastani's Health Behavioural Framework (26); and the New York Viral Hepatitis Strategic Plan and HBV Framework (27).

1.9.1. The WHO Framework for Global Action For the Prevention of HBV

This WHO framework approaches the HBV prevention and control in countries by focussing on the following four axes: (i) awareness raising, partnerships and resource mobilisation; (ii) Evidence-based Policy and Data for Action; (iii) Prevention of transmission; screening, care and treatment (1,28,29). Please see chapter 3 for more details.

1.9.2. Bastani's Health Behavioural Framework

This framework approaches the health status or disease being influenced by societal factors, health system and health care provider characteristics and practices; as well as by the demographic and individual characteristics (26). Please see chapter 3 and annexure F for further details.

1.9.3. New York Viral Hepatitis Strategies plan and HBV Framework

This HBV framework is comprised of five strategic directions, including Prevention; Education; Surveillance and Research; Medical Care and Treatment; and Policy and Planning (27). The details are available in chapter 3 for further details.

1.10. RESEARCH DESIGN AND METHODS

This is a quantitative study, which is comprised of two phases. The first phase covers the situational analysis on health care workers awareness regarding current HBV practices, using self-administered questionnaires; and analyzing the pre-existing HBV

laboratory results for 2013, using a checklist. The second phase is about the situational analysis regarding the HBV prevalence, using a point of care (POC) HBsAg rapid diagnostic test (RDT) kit, a checklist; and a structured interview schedule to determine risk factors, which are associated with positive HBV cases in Kavango East and West regions.

1.11. DEFINITION OF CONCEPTS

1.11.1. Investigation

The Mosby's Medical Dictionary, 2009 defines investigation as "scrutiny, exploration, investigation, examination, inquiry and research express the idea of an active effort to find out something. The dictionary continues to describe an investigation as a systematic, minute, and thorough attempt to learn the facts about something complex or hidden; which is often formal and official and an orderly attempt to obtain information (30). In the context of this study, investigation refers to searching systematically and brings out the truth about the numbers and proportions of people infected with HBV in Kavango east and west region, quantify the health care workers awareness and practices in the prevention and control of HBV; and the risk factors that could be associated with positive HBV cases in Kavango region.

1.11.2. Hepatitis

The World Health Organization, 2017 defines hepatitis as an inflammation of the liver, which can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer.

Hepatitis can be caused by certain infections, toxic substances (e.g. alcohol, certain drugs), and autoimmune diseases, but viruses are the most common cause of hepatitis in the world.There are 5 main hepatitis viruses, referred to as types A, B, C, D and E(31).

1.11.3. Hepatitis B Virus

Hepatitis B is a double-stranded circular DNA virus, of a hepadnaviridae group, which attack liver cells and has three main components, such as: i) hepatitis B surface antigen (HBsAg), which shows the presence or absence of Hepatitis B infection; ii) hepatitis B core antigen (HBcAg), which indicates that the infection has been in the body for a long time; and iii) hepatitis B e antigen (HBeAg), which shows active replication, reproduction and infectivity and can be transmitted to another person(31).

1.11.4. Prevalence Rate

Prevalence rate refers to the number of people in a population who have a disease at a given time (32). It is calculated using the number of existing cases of disease at a specified time as a numerator and the total population as the denominator. The period may be a point or a defined interval, but it is traditionally the former (i.e. a point prevalence), if unspecified (33).

1.11.5. Risk factor

A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury. Some examples of the more important

risk factors are underweight, unsafe sex, high blood pressure, tobacco and alcohol consumption, and unsafe water, sanitation and hygiene (34).

1.11.6. Disease Prevention

Prevention includes a wide range of activities that are aimed at reducing risks or threats to health. There are three categories of prevention, namely primary, secondary and tertiary. **Primary prevention** is concerned with **preventing** the onset of **disease, thus** aiming at reducing the incidence of **disease**. It involves interventions that are applied before there is any evidence of **disease** or injury. Examples include protection against the effects of a **disease** agent, e.g. vaccination against Hepatitis B disease (35).

1.11.7. Disease Control

Disease control includes interventions that aim at reducing the incidence, prevalence, morbidity or mortality of an infectious disease to a locally acceptable level (36).

1.12. ETHICAL CONSIDERATIONS

The researcher has taken into account and observed the critical ethical principles as laid down in the Belmont Report (37,38), which include the principle of respect for persons, the principle of beneficence; and the principle of justice. Please see chapter 3, section 3.5. for full details.

1.13. OUTLINE OF CHAPTERS

This thesis is comprised of six chapters. Chapter one presented the background information of the study and the approach the research has taken to conduct this research. The second chapter dealt with the review of literature, whereas chapter three looked at the methodology. Chapter four presented the findings and provided interpretation of data. Chapter five covered the discussions and chapter six concluded with the proposed recommendations. This paper has a list of references in the bibliography. The list of tables and figures follows immediately after the table of contents and other additional information, including the letters from the MoHSS for the researcher to proceed with the study, a letter from NIP to grant permission to use NIP data for HBV results, consent forms, data collection instruments, amongst, are found in the annexures A - H.

1.14. SUMMARY OF CHAPTER 1

Chapter one provides the background and introduction of the study. This includes context, the problem statement, objectives, paradigmatic assumptions and other essential aspects that are required to introduce the reader to this work. This chapter furthermore presents the conceptual basis of this research study, the significance of the study, the outline of the dissertation and the summary of the chapter.

CHAPTER 2

LITERATURE REVIEW

2.1.INTRODUCTION TO THE LITERATURE REVIEW

This chapter presents the review of literature on the historical background of viral hepatitis; virology and transmission of HBV; epidemiology and different HBV genotypes; symptomatology, diagnosis, treatment and prevention of HBV. It furthermore provides the current situation of Hepatitis B Virus (HBV) infections globally, and proposed most appropriate frameworks and reports that could best guide the methodology, study populations, key variables, data collection and data analysis procedures. These include the Bastani's Health Belief Framework (26) – also see Annex F; WHO frameworks for global action for the prevention and control of viral hepatitis (1); WHO global policy reports (28,29); and the New York Viral Hepatitis Strategic plan and HBV Framework 2010 – 2015 (27). The focus of these frameworks and reports laid the emphasis on the demographic and health care system factors and individual characteristics or variables, as related to the barriers or support systems, thus facilitating or hindering community access to essential services (see chapter three for further details).

Furthermore, this chapter presents the key outcomes and gaps of previous research and the latest updates on available options for the prevention, diagnosis, treatment and care of people infected with or affected HBV in different settings. The definitions of selected

key terms used in the thesis are presented. The review concludes by identifying the remaining gaps in the current literature and proposing ideas for future research.

2.2.SEARCH STRATEGY

The researcher conducted the internet search using Google Scholar and PubMed for the following key words: hepatitis, hepatitis B virus, transmission, prevalence, awareness, partnerships, risk factors, HBV/HIV co-infection, prevention, control, treatment, care, conceptual framework. Other words used to search the web were, amongst others, point of care, and rapid testing kits for Hepatitis B surface antigen (HBsAg). It became evident that literature on HBV prevalence in Southern Africa is rare, compared to literature on HIV/AIDS. A number of articles were then identified and abstracts screened for relevance. The most relevant and current ones were selected, and stored systematically in the Mendeley Desktop Program for easy citation and referencing.

2.3.HISTORICAL OVERVIEW OF VIRAL HEPATITIS

The word 'Hepatitis' originated from the Greek word 'hepa' which means liver, and 'itis', meaning inflammation (39). The first description of this disease, which is characterized by jaundice was recorded during the 3rd millennium BC, on the clay tablets, which were the first text books of medicine (39). Hippocrates (460-375 BC) described the clinical presentation of hepatitis as 'epidemic jaundice,' 'fulminant hepatitis', and recommended a special diet of honey and water, which is still a relevant advice today (39). Major hepatitis epidemics were reported among military personnel during 18-19th centuries in Europe and in America, which were regarded as 'jaundice of

camps’. These epidemics occurred mostly among the group of soldiers and were termed ‘syringe hepatitis (following syphilis injections) and ‘post-vaccine hepatitis’ (when outbreaks followed small pox vaccination campaigns during that time).

In 1947, Mac Callum identified two forms of hepatitis: i) epidemic hepatitis or hepatitis with a short incubation period (now known as Hepatitis A and Hepatitis E); and serum hepatitis which has a long incubation period (now known as Hepatitis B and Hepatitis C). The above developments were followed by identification of more hepatitis viruses (A-E) and by characterizing them into molecular types, functions and genes. This was finally confirmed by Saul Krugman, between 1964 and 1967. Subsequent better understanding continue to evolve, as evidenced in development of strategic preventive interventions, such as vaccinations, screening, and treatment with antiviral medications (40).

Baruch Blumberg, a geneticist, discovered hepatitis B surface antigen (HBsAg) in 1963, which is one of the critical markers of Hepatitis B infection. He noted an unusual reaction between the serum of an Australian aborigine and the poly-transfused haemophiliac patient (39). Until today, the presence of HBsAg remains the primary marker of hepatitis B infection. Alfred Prince noted in 1968, in New York Blood Centre that serum hepatitis antigen was present in people who developed a ‘post-transfusion hepatitis’ and this is how the specificity of HBsAg, which has the same identity with the Australian antigen was confirmed (39,40). This discovery led to the current basic understanding of Hepatitis B surface antigen in infected people and transmissibility from person to person, through the use of intravenous or intramuscular injections (40,41).

2.4.EPIDEMIOLOGY AND HBV GENOTYPES

Viral hepatitis (specifically Hepatitis B and C) was responsible for 1.34 million in 2015 globally, a number closer to the deaths caused by tuberculosis, but higher than the deaths caused by HIV/AIDS (2). Moreover, the number of deaths due to viral hepatitis seems to be increasing over time, in contrast with the mortality due to tuberculosis and HIV is declining. The report showed that chronic liver disease was responsible for most deaths from viral hepatitis in 2015, with 720,000 deaths due to liver cirrhosis and 470,000 due to hepatocellular carcinoma. Meanwhile, 257 million people were living with chronic Hepatitis B Virus (HBV) infection and 71 million people with chronic Hepatitis C Virus (HCV) infection (2). Between 60-80% of primary liver cancer cases worldwide are due to Hepatitis B Virus infection (42,43).

The WHO African Region and the Western Pacific Region have the highest reported prevalence of HBV, with the highest HCV prevalence being reported from the WHO Eastern Mediterranean Region and the European Regions (7). Chronic hepatitis B disease requires long term monitoring, treatment and care and research has proven that there is a declining trend in HBV prevalence in countries that introduced HBV vaccinations during the 1990s, particularly China and India (44).

The frequency of HBV infection and patterns of transmission vary greatly throughout the world, and has been classified into the following three regions of endemicity or HBV carrier rates; namely, prevalence of more than 8% (high endemicity); prevalence of between 2-7.99% (medium endemicity); and prevalence below 2% (low endemicity)

(3,45), as shown in the global HBsAg endemicity map in Figure 2: Global HBsAg endemicity during 1957-2013. below.

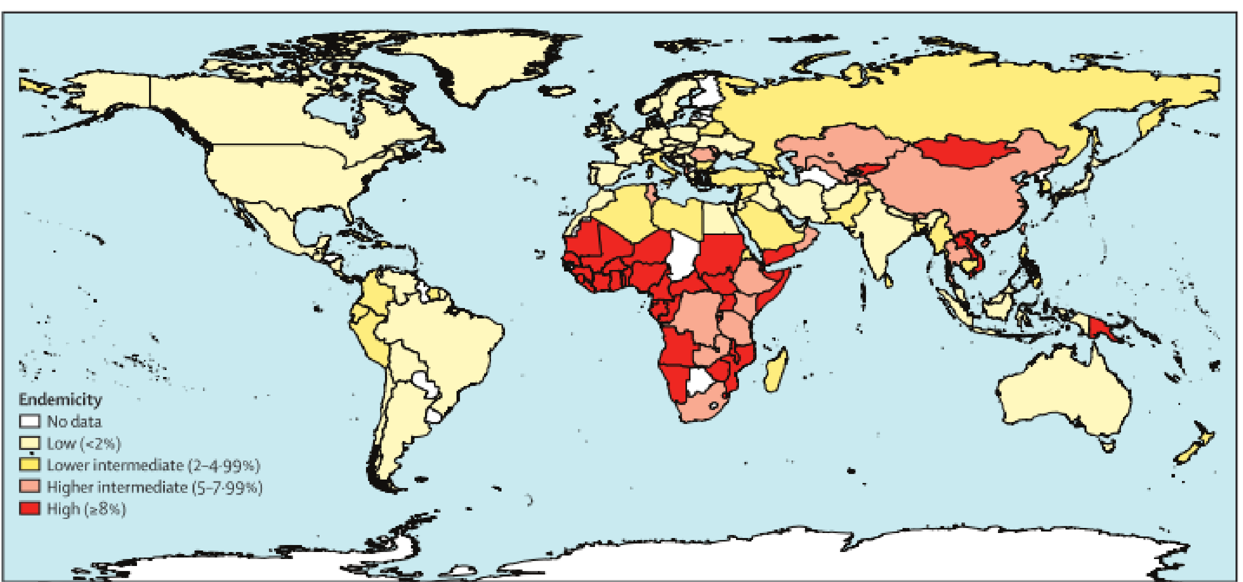


Figure 2: Global HBsAg endemicity during 1957-2013

Source: www.theLancet.com.

The clinical course HBV infections varies between individuals, and depends on a complex interaction between viral, host, environmental and other factors, including the high genetic variability of this virus, which has been categorized into different HBV genotypes and sub-genotypes (46). This categorization is based on geographical distribution, transmission routes, disease progression, responses to antiviral therapy or vaccination, and clinical outcomes, like cirrhosis or hepatocellular carcinoma. HBV (sub) genotyping resulted in some controversies due to misclassifications and incorrect interpretations of different genotyping methods. It is therefore important to ensure

accurate, holistic and dynamic classification system to avoid above mentioned pitfalls. Comparisons of HBV DNA sequencing from virus strains collected globally, that was performed by Hiroaki Okamoto and partners in 1988 revealed the existence of four genotypes A – D, which were divergent by more than 8% in the DNA sequence (41). Helene Norder and Lars Magnius (Stockholm), however, in their work on HBV genotyping in 2004 extended the genotypes i.e. from A to F as follows - genotype D was found worldwide except in the Americas; with B and C restricted to Asia; A_1 and E restricted to Africa, and F and H in the Americas (41,47) as shown in figure 2.2.

Figure 3: Genotype distribution of HBV infections

Please note that HBV sub-genotype A2, present in the most popular hepatitis B vaccines, is only prevalent in the low endemic regions of the Americas and Europe, meaning that over 99% of all HBV carriers have other HBV sub-genotypes.

It is useful to determine or show the evolution and the origins of the various HBV genotypes (A-H) and how closely they are related to the common ancestor or to each other. This is done by using a phylogenetic tree (48) to analyze the virus that has been identified as shown in figure 2.3 below. These HBV genotypes are interesting for anthropology on the one hand but epidemiologically useful for clinical reasons on the other(41,46). For instance, genotypes C, D and F are on average more pathogenic, compared to other genotypes on the one hand; whereas interferon therapy proved to be more effective in the treatment of genotypes A and B(41,46). Please see a phylogenetic tree below, adapted from De Almeida et al, 2017.

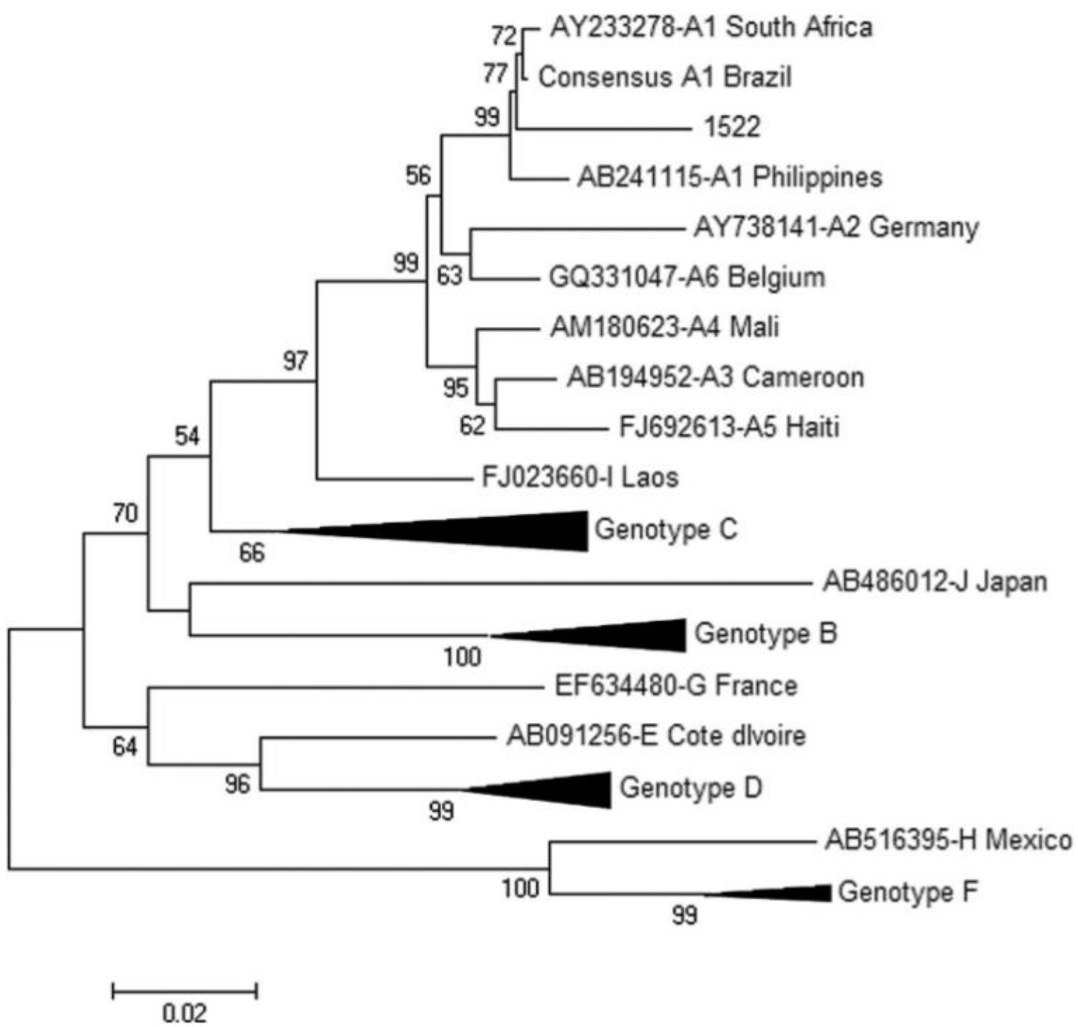


Figure 4: An example of a phylogenetic tree

2.5.HBV VIROLOGY AND TRANSMISSION

A significant advance occurred in 1970, with a discovery of the 42-47 nanometer hepatitis B virion by David Dane, who described it as a double-stranded circular DNA virus, of a hepadnaviridae group, which has three main components, such as: i) hepatitis B surface antigen (HBsAg), which shows the presence or absence of Hepatitis B infection, but unable to show for how long it has been present in the body; ii) hepatitis B

core antigen (HBcAg), which shows that the infection has been in the body for a long time; and iii) hepatitis B e antigen (HBeAg), which shows active replication, reproduction and infectivity and hence, it can be transmitted to another person as shown in **Error! Reference source not found.**. below:

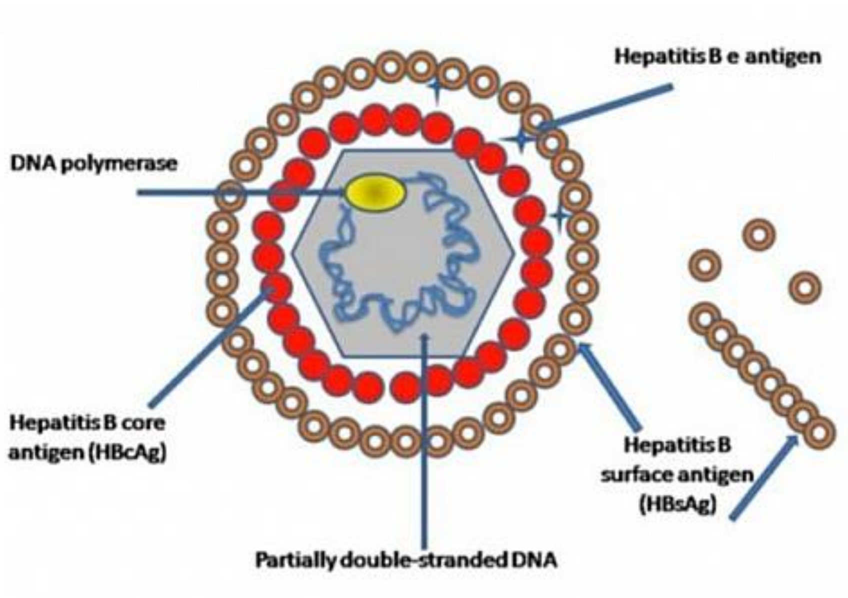


Figure 5: The Structure of the Hepatitis B Virus

(Source:http://www.jotscroll.com/forums/11/posts/87/hepatitis-b-vaccines-symptoms-transmission-causes-treatment.html)

HBV is an enveloped partially double-stranded DNA virus that belongs to the Hepadnaviridae family and is 100 times more infectious than HIV(13). HBV can be transmitted through close contacts with body fluids (blood, semen, saliva) of an infected person. In most countries, HBV transmission occurs in health care settings and hence the need for adequate attention for practicing safe injection practices, blood supplies and

procedures for health care workers at risk of exposure to viral hepatitis through unsafe blood supplies and unsafe medical injections and procedures (29). In settings with high hepatitis B prevalence, mother-to-child transmission of hepatitis B appears to be the commonest mode of transmission, together with early childhood infection among the susceptible and unvaccinated individuals (29).

The WHO asserts that the likelihood that infection becomes chronic depends on the age at which a person becomes infected and children less than 6 years of age who become infected with the hepatitis B virus are the most likely to develop chronic hepatitis infections (49). Also, 90% of neonates born to Hepatitis B "e"antigen (HBeAg) positive mothers will develop chronic hepatitis B following exposure to HBV infection during the first year of life, and 30–50% of children infected before the age of 6 years will develop chronic hepatitis infections (13,49). In adult population, however, less than 5% of otherwise healthy persons who are infected as adults will develop chronic hepatitis disease; whereas 20–30% of adults who are chronically infected will develop liver cirrhosis and/or liver cancer (49).

2.6.SYMPTOMATOLOGY AND NATURAL HISTORY OF HBV INFECTION

Hepatitis B Virus (HBV) disease is a viral infection that attacks the liver and can cause both acute and chronic disease (49). Wu et al, 2015 contents that the continuum and natural history of HBV infection varies and ranges from low viraemic immune control state during a mild acute phase to a progressive chronic hepatitis disease, with the potential for consequent complications such as cirrhosis, liver failure and hepatocellular carcinoma (HCC) (13,50).

The acute phase of the HBV disease is characterised by subclinical hepatitis, which can go unnoticed (51). About two-thirds of patients with HBV infection will present with this mild form during an acute phase, which could be associated with a prodromal period, during which the patient may present with anorexia, nausea, vomiting, low-grade fever, myalgia, fatigue, disordered gustatory acuity and smell sensations, pain in the epigastric region on the right upper quadrant (51). Acute liver failure generally occurs in about 1% of patients with acute hepatitis B. During this time, HBsAg and HBV DNA levels generally fall rapidly as liver failure develops, and these patients require careful management and monitoring. They should be referred rapidly to a tertiary medical institution, where facilities for a liver transplantation are available (51). The chronic phase ranges from an asymptomatic chronic infection to a symptomatic chronic hepatitis, to be accompanied by liver complications later in life (51).

Chronic HBV infection occurs when serum hepatitis B surface antigen (HBsAg) persists for six months or more, after acute infection with HBV (52). Patients with chronic hepatitis may become immune tolerant and thus asymptomatic, with inactive chronic infection, and without any evidence of active disease (52). But even though they are asymptomatic, they still spread the virus to the close contacts (40,51). However, those in a replicative state, may have similar complaints with those of acute hepatitis, including anorexia with mild upper quadrant pain or discomfort (52). If progressive liver disease is present, some of the following symptoms may also appear, namely, hepatic decompensation, hepatic encephalopathy, somnolence, disturbances in sleep patterns mental confusion, coma, ascites, gastro intestinal bleedings or coagulopathy (51).

There is generally a marked elevated Alanine aminotransferase (ALT) levels, in parallel with elevated alfa-fetoprotein (AFP) which is a marker for hepatocellular carcinoma (HCC), particularly among those with HBeAg-negative chronic hepatitis B carriers. Up to one third of patients with chronic HBV infection may eventually develop liver cirrhosis, end-stage liver disease, or HCC, but the ultimate determinants of outcome of chronic hepatitis B results from the viral (HBV DNA levels in the serum, HBV genotype, certain HBV mutation patterns) and host-specific factors such as the age, gender, genetic background, immune status (51). There are various phases of chronic infection (not necessarily sequential and are of variable duration) (13,50,53), such as the following:

- **The immune tolerant phase**: This phase is more common and more prolonged in who were infected perinatally or before the age of 5 years. It can persist into early adulthood and is characterized by HBeAg positivity, high levels of viral replication, normal transaminases, minimal or no hepatic necro-inflammation and no or slow progression to fibrosis. The rate of spontaneous HBeAg loss is generally low, during this phase (13,50,53).
- **The immune clearance phase (HBeAg-positive chronic hepatitis B**): This phase is characterized by HBeAg positivity, and by the levels of viral replication. There are high levels of transaminases and histology tends to show severe necro-inflammatory features with rapid progression to fibrosis. This phase generally lasts for weeks or years, and sometimes, a sustained HBeAg seroconversion could occur and the development of anti-bodies for e antigen (anti-HBe), but this usually happens in people who were infected during adulthood (13,50,53).

- **The inactive HBV carrier or latency state (immune control phase):** This phase occurs after a successful HBeAg to anti-HBe seroconversion and is characterized by very low or undetectable HBV DNA levels and normal transaminases (<2 000 IU/ml). Following an immunological control of the HBV infection, such patients have a good prognosis, and lower risk of progression to liver cirrhosis or hepatocellular carcinoma (HCC). Loss of HBsAg and seroconversion to anti-HBs generally occurs annually, at a rate of 1 to 3 percent (13,50,53).
- **The "Immune escape, with positive or negative HBeAg**: This represents a later phase in the natural history of the disease and it commonly affects 5 and 15% of individuals in the inactive HBV carrier phase usually develop HBeAg-negative chronic hepatitis B, particularly older men (13,50,53).
- **Occult HBV infection** is the term used to describe the HBV those cases where patients have cleared surface antigen but have detectable plasma HBV DNA, but serologically, they are HBsAg negative, hepatitis B surface antibody (HBsAb) positive and anti-HBc IgG positive(13,50,53).

Understanding the mechanisms that trigger the liver inflammation and their long-term impacts are useful to enhance the development of better and effective therapeutic strategies for patients with chronic HBV infections. Significant therapeutic advances has been made to initiate the treatment and the choice of therapy in accordance with immunological phase of the chronic infection and other patient factors (53–55). In some cases, some patients with HBV can be co-infected with different chronic viral infections, such as hepatitis C and HIV/AIDS, amongst others (13).

2.7.RISK FACTORS ASSOCIATED WITH HBV

Information on factors associated with HBV infections among the general population is scanty, particularly in Sub-Saharan Africa. Limited data is however available in studies that were conducted in this area, in Asia (56). A cross-sectional study was conducted by collecting information using a structured questionnaire among 329 hepatitis B confirmed patients who were admitted to LabbafiNejad's Hospital hepatitis Clinic 2012-15. SPSS version 21 statistical software was used to run frequencies, descriptive and chi-square test analysis. Results have shown stronger association of positive HBV test with male sex (59%) through routine screening. The frequency of exposure to risk factors included a history of dentist visit (62.3%), major surgery (45.5%) and hospitalization (54.7%). There were no cases HBV following a history of cosmetics and splice joint treatments, using a common blades or razors (56). A HBV serosurvey study that was conducted in Anhui province, China during 2006 among the general public were 8,875 people participated, has shown an association between HBV positive people older age, male gender, a history of surgical operations, at least one HBsAg-positive family member, non-vaccination and blood transfusion history (57). A number of studies that are available in Africa refers mainly to pregnant women, and have shown stronger association with Low HBV awareness 12.2%, history of abortions (χ^2=9.094 df1 $p<0.01$), early age (11-15 years) at first sexual encounter (χ^2 =8.185 df1 $p<0.01$) (58).

2.8.HBV/HIV AND OTHER HBVCO-INFECTIONS

About 1% of people with chronic hepatitis B infection (2.7 million people) are co-infected with HIV (49). Also, globally, the prevalence of HBV infection among HIV-infected persons stands at 7.4% and since 2015, the WHO has recommended the treatment for everyone diagnosed with HIV infection, regardless of the stage of disease and most people benefitted from antiviral medications, such as Tenofovir, which works well for both HBV and HIV (7,50,59,60).

Mobile communities as well as populations entangled in conflict-stricken areas and civil unrest poses are at high risk of all forms of viral infection, due to lack of access to clean water and sanitation, safe food and ineffective infection control measures in health care settings (29). These people will require specific attention as they may be co-infected with different viruses, such as HBV, HCV or HBV/HCV/HIV (29,50,59).

2.9.DIAGNOSIS AND TREATMENT

Diagnosis for HBV is based on laboratory confirmation as hepatitis due to other viral agents makes it difficult to make a diagnosis on clinical grounds(50). There are blood tests available to diagnose, monitor the HBV disease and distinguish acute from chronic infections (13,49). Laboratory diagnosis of HBV infection, Sonderup and WHO continue, aims at the detection of the hepatitis B surface antigen (HBsAg). Acute HBV infection is characterized by the presence of HBsAg and immunoglobulin M (IgM) and antibody to the core antigen (HBcAg) (49). During a first few days following HBV

infection, patients are also positive for hepatitis B e antigen (HBeAg), which is a marker of high levels of replication of the virus and infectivity (13,49,61).

Chronic infection occurs when there is a persistence of HBsAg for at least 6 months (with or without concurrent HBeAg) and this HBsAg persistence HBsAg is the main marker of a risk for developing chronic liver disease and liver cancer (13,49,53,55).

There is no specific treatment for acute hepatitis B and care focusses on maintaining comfort and adequate nutritional balance, including fluid replacement due to vomiting and diarrhoea. On the other hand, chronic hepatitis B infection can be treated with the most potent oral antiviral agents with a few side effects and require limited monitoring (namely, tenofovir, entecavir) to slow the progression of liver cirrhosis, reduce liver cancer and improve long term survival of patients (49).

Entecavir is off-patent, but its cost and availability vary from country to country, but in most upper-middle- and high-income countries,Tenofovir is protected by a patent until 2018. But as of February 2017, however, the cost ranged from US$400 to US$1500 (N$4,660.00 to N$17,475) for treatment for one year (49). While some middle-income countries (such as China and the Russian Federation) still face patent barriers in accessing tenofovir, generic tenofovir is affordable in most countries where it is accessible. The Global Price Reporting Mechanism (GPRM) indicates that the cost for a year of treatment ranged from US$ 48 to US$ 50 in February 2017 according to the World Health Organization (49).

The purpose for providing treatment to HBV carriers is not to cure hepatitis B infection in most case, but only suppresses the replication of the virus, thereby slowing and minimizing liver damage and it is therefore necessary for the majority of people starting hepatitis B treatment to continue this long-term treatment for life (13,49,50).Diagnosis and treatment of hepatitis B in many resource-constrained settings are limited and in 2015, it was about 9% (22 million) of the total people (257 million) who were carrying the virus knew their diagnosis, whereas only 8% (1.7 million) of those diagnosed were on treatment. Of those diagnosed, the global treatment coverage was only 8% (1.7 million). Many people are diagnosed only when they already have advanced liver disease (12,49).

The long-term complications of HBV infections, namely cirrhosis and hepatocellular carcinoma have generally poor treatment outcomes, and thus causing a large disease burden and rapid progression, due to limited treatment options. Most patients in low-income countries die from liver cancer within months of diagnosis, but in high-income countries, surgery, chemotherapy and to some extent, liver transplantation may prolong life for up to a few years (12).

2.10. HBV PREVENTION

An effective hepatitis B vaccine has been available since 1982 to prevent HBV, given to all infants as a monovalent vaccine, within 24 hours after birth, followed by three mono- or combined vaccine doses, usually given together with other routine infant vaccinations (13,49,62). HBV infection in children below five years old was about 1.3% globally, compared to 4.7% during the pre-vaccination era and this decline could be attributable

to the widespread use of hepatitis in most countries. Children who complete the HBV vaccination schedule develop protective antibody levels in more than 95% of infants, children and young adults, adequate to protect them for at least 20 years or probably for a life-time. Thus, WHO does not recommend booster vaccination for persons who have completed the 3 dose vaccination schedule (49).

WHO recommends that all children and adolescents younger than 18 years-old and not previously vaccinated, as well as those in high-risk groups, such as people who frequently require blood or blood products, dialysis patients, recipients of solid organ transplantations; people interned in prisons; persons who inject drugs; household and sexual contacts of people with chronic HBV infection; people with multiple sexual partners; and healthcare workers and others who may be exposed to blood and blood products through their work (49). Additionally; travelers who have not completed their hepatitis B vaccination series should be vaccinated before they leave for they depart to endemic areas (13,18,49). The vaccine is effective, affordable with excellent safety records (7,49).The global coverage with the third dose of hepatitis B vaccine reached 84% in 2015, but the WHO African region had lowest coverage compared to the other WHO Regions, particularly regarding the hepatitis B birth-dose (7).

In 2013, however, 97% of blood donations globally were screened and quality assured, but gaps persist in terms of safe injection practices, elimination of unnecessary and unsafe injections, safer sex practices, and public awareness regarding precautionary measures to prevent HBV transmission from social and household contacts and contaminated objects (49).

2.11. GLOBAL VIRAL HEPATITIS RESPONSE INITIATIVES

The World Health Assembly endorsed resolution (WHA 63.18) in 2010, aiming at attaining a world free of viral hepatitis by 2030 (1). This was followed, in March 2015, by the launch of the first "Guidelines for the prevention, care and treatment of persons living with chronic hepatitis B infection" by WHO (49). These guidelines target the i) promotion of simple, non-invasive diagnostic tests to assess the stage of liver disease and eligibility for treatment; ii) prioritization of treatment for those with most advanced liver disease and at greatest risk of mortality; and iii) recommendation for the preferred use of the nucleos(t)ide analogues with a high barrier to drug resistance (tenofovir and entecavir, and entecavir in children aged between 2–11 years) for first- and second-line treatment (49). Furthermore, the lifelong treatment of people with cirrhosis; regular monitoring for disease progression; toxicity of drugs and early detection of liver cancer have been recommended (49,50).

The endorsement of the 2030 Agenda for Sustainable Development (SDGs) by the United Nations General Assembly added an impetus on the fight against viral hepatitis by calling on the international community to combat viral hepatitis (28). The World Health Assembly of May 2016, adopted the first "Global Health Sector Strategy on Viral Hepatitis, 2016-2020". This strategy highlights the critical role of Universal Health Coverage and calls for the elimination of viral hepatitis as a public health threat; and the reduction of new infections and mortality by 90% and by 65%, respectively by 2030 (7). The GHSS employs five strategic directions such as strategic information; interventions;

equity; financing and innovation, to facilitate progress monitoring at global, regional and country levels between 2015 and 2030 (7).

In its Sixty-sixth session in Addis Ababa, Federal Democratic Republic of Ethiopia, in 19–23 August 2016, the WHO Regional Office for Africa (AFRO) committed itself to and urged all 47 member countries to develop five year national plans (2016-2020) with a framework for action with common goal, vision, objectives and targets, guiding principles and priority interventions and actions in order to eliminated viral hepatitis by 2030 (2). At a glance however, the WHO African region envisions a world where viral hepatitis transmission is halted and everyone living with viral hepatitis has access to safe, affordable and effective prevention, care and treatment services. The goal is to eliminate viral hepatitis as a major public health threat by 2030. This framework has the following principles: a) Country ownership, b) Effective partnerships, c) Universal Health coverage as the overarching framework, d) Integration of hepatitis services into health systems and strategies, e) Public health approach and f) Intersectoral cooperation. Moreover, this framework provides strategic directions including information for focused action (awarenes); Interventions for impact; Delivering for equity; Financing for sustainability; and Innovation for acceleration (2). The WHO Region for African reported that there were only three countries (Algeria, Mauritania and Senegal) had national viral hepatitis action plans; and a few others were still in the process of developing theirs, by 2015.

However, forty countries reported testing 100% of all blood donations for all transfusion-transmissible infections, inclusive of HIV, hepatitis B and C.

The WHO Global hepatitis report that was released in 2017has set the global and regional estimates of viral hepatitis infections and deaths during 2015, as the baseline for monitoring the progress towards the implementation of new global strategy for reducing HBV and HCV morbidity and mortality (7). It provides data related to the following strategic routes:i) strategic information, ii) interventions, iii) equity, iv) financing and v) innovation, which are the key pillars of the global health sector strategy (GHSS), aiming at monitoring progress and measuring impact of interventions for saving lives between 2015 and 2030 (7).

In supporting of countries towards achieving the global hepatitis goals within the Sustainable Development Agenda 2030, WHO and partners are advocating to countries to develop the following areas, as proposed in the Global Framework for global action (1): These include i) raising public awareness; promoting partnerships and resource mobilization; ii) formulating evidence-based policy and data for action; iii) preventing transmission; and iv) scaling up screening, care and treatment services. WHO also encourages countries to organize World Hepatitis Day on July 28 every year to increase public awareness and understanding of viral hepatitis (28,63,64).

2.12. FINDINGS FROM RECENT RESEARCH ON HBV

Data on morbidity due to viral hepatitis in Namibia is limited, and available Hepatitis B Virus (HBV) prevalence data in Namibia is older than two decades, ranging from 7.3%

to 17% (4,6,65). These include the 1983 HBV prevalence study that was conducted in a general population in Kavango region (4); a Study on a HBV carrier state among children in Ovamboland in 1984 (65); a survey on serological markers of HBV in Eastern Caprivi in 1991 (6); and HBV study among the !Kung children in Bushmanland in 1994 (5). Of the above HBV data from the previous HBV prevalence studies and in the routine outpatients and inpatients annual returns for 2009-2013, Kavango regions recorded the highest hepatitis B infections in Namibia (21,22). However, data on mortality due to viral hepatitis is limited or non-existent in the country. The absence of recent and updated HBV data may compromise the country's efforts, to initiate informed and appropriate national viral hepatitis strategy 2016-2021, and to achieve the goal of the global elimination of hepatitis B and C by 2030, as recommended by WHO (1,2).

Several studies have shown a high prevalence of HBV in HIV-positive patients and among pregnant women and recommended screening for HBsAg for all pregnant women during their first antennal visits and for all people living with HIV/AIDS during their first anti-retroviral therapy consultation (19,66,67). Data on HBV and on HBV/HIV co-infection is limited as HBV screening and treatment is only meant for the pregnant and HIV positive people only (19,20).

Neyangam, et al. 2016 developed a simulation model of the global HBV epidemic by using data regarding the natural history of hepatitis B virus, morbidity and mortality, immunization coverage, treatment and demographic factors. They found vaccination of infants and neonates to be responsible for a decline in new transmissions and have already averted 210 million new chronic hepatitis cases by 2015 and it is estimated that

1.1 million deaths will be averted by 2030 (68). Even though there is a decline in transmissions due to the current interventions, Nayangam et al, 2016 continues, this model estimates a cumulative 63 million new cases of chronic hepatitis B cases and 17 million HBV-related fatalities between 2015 and 2030, due to the ongoing transmission, particularly in settings with inadequate access to diagnosis, treatment and care of infected HBV carriers. On this basis, the model set a target of 90% reduction in new chronic HBV cases and 65% reduction in death cases, if immunization coverage for infants could be increased to 90%, and to 80% coverage with HBV birth-dose vaccination, providing the peripartum antivirals to 80% of pregnant with hepatitis B e antigen- positive results; and population-based testing and treatment at least 80% of all eligible people (68). It is believed that these strategies could avert 7.3 million deaths between 2015 and 2030, and consequently 1.5 million cases of deaths due to hepato-cellular carcinoma and to reach a target of elimination threshold for new cases by 2090 (68). These achievements will cost a total of U$7.5 billion globally, with U$3.4 billion being spent in low-income and lower-middle-income countries(68).

2.12.1. Awareness, partnerships and financing for HBV

The global report on viral hepatitis have shown evidence that the general public, at-risk populations, health care providers and even policy makers lack necessary knowledge and awareness to prevent viral hepatitis(69). Due to the general lack of global awareness, most persons with hepatitis remain undiagnosed (43). Consequently, up to 95% of people with chronic viral hepatitis are not aware of their status and hence, do not receive appropriate care and treatment (2). This places them at greater risk of severe,

even fatal, complications from the disease and increasing the likelihood that they will spread the virus to others over many years.

Meanwhile, results from a 2007 hepatitis B knowledge survey conducted by the Centers for Disease Control and Prevention (CDC) among 196 primary-care providers in the United States of America found that 55% were unable to identify laboratory HBV markers for chronic hepatitis B virus infection (69). In a survey of 593 conducted in the US by CDC, in 2009, obstetrician/gynecologists (OBGYNs) demonstrated that 50% provided HBV-infected patients with information that is based on the opinion of a medical care provider, which in most cases was inconsistent with CDC recommendations (69). CDC consequently recommends that increasing provider awareness of viral hepatitis infections be addressed as soon as practically possible (69) to improve delivery of preventive services for viral hepatitis; improving the number of providers knowledgeable about viral hepatitis testing, care, and available treatment options. It further recommends that Primary care providers be equipped to know who to test for viral hepatitis, how to interpret test results, information needed by their patients, and recommended preventive care; managing co-factors that hasten the progression of liver disease (e.g., alcohol use), monitoring patients for signs of disease progression, timely referrals for consultation, therapy as appropriate, and inclusion of viral hepatitis in the medical and other health professional school curricula, in-service training in collaboration with medical professional societies to provide health-care professionals with continuing education.

Provider education and appropriate viral hepatitis services alone will be inadequate to prevent and control viral hepatitis. Therefore, the general public, especially the

vulnerable groups and populations such as Intravenous drug users (IDUs), HIV-infected persons, pregnant women and so on, also need to be equipped and well-informed about the prevention, care and treatment for hepatitis infections (27).

2.12.2. Evidence-based policy on HBV and Data for Action

Hepatitis B Virus (HBV) remains the biggest public health concern, particularly in Africa and Asia(1,7). The burden of Hepatitis B Virus infection is determined by calculating the number of people who tested positive for hepatitis B virus are present in a particular population at a given period in time (32).This is expressed as a prevalence rate, which is calculated by dividing the number of persons who tested positive for hepatitis B Virus (HBV) infection, by the total number of individuals that were tested for HBV at a particular point period, multiplied by 100 (32). In other words, it is expressed in percentages (per 100), but when the number of cases are very low, the prevalence can be expressed as the number of cases per 1, 000 or per 10,000 or per 100,000 of the population.

Effective interventions for the prevention and control of HBV requires ongoing monitoring, follow up and reporting, including other related local capacities and efforts (27). All these needs adequate resources to be able to detect, investigate, report and respond appropriately, in a timely fashion, to contain outbreaks (27). Research in Hepatitis B-related aspects is necessary to inform policy and the HBV prevention and control program, in order to innovate and improve response interventions for quality care and management of people who need care and treatment(27).However, in most

countries, including Namibia, the surveillance and research data that is required for policy guidance and planning is limited.

2.12.3. Prevention of HBV Transmission

The most effective way of preventing Hepatitis B Virus infection is through vaccination (12,47). However, many health providers, including some policy makers have a misconception, assuming that hepatitis B vaccinations for the infants alone are adequate to eliminate the hepatitis B disease, but that is not largely so (1-3,27). This is because unvaccinated older children and susceptible older people, who most of the times are unaware of their HBV status, will continue spreading the disease over the years (1-3,27). The incidence of acute hepatitis B and the prevalence of hepatitis B surface antigen chronic carrier rates have decreased over the years in China and in several countries, following the universal HBV vaccination programs that were introduced in the nineties (44,47,62,70). Some countries, however, are still unable to reach and provide universal hepatitis B vaccinations in hyper-endemic rural areas and this is where HBV could still be higher (13,47).Although the exact HBV prevalence is not known, most countries in the African Region has realized that viral hepatitis is an urgent public health concern and have introduced universal HBV routine immunizations for infants in since the 1990s (1,18).

2.12.4. Access to screening, Care and Treatment for HBV

In a knowledge, attitudes, and behaviors related study related to HBV screening that was conducted among 256 Vietnamese Americans in the greater Philadelphia and New

Jersey area in 2007 (71), 46.3% of the sample revealed that they had heard of HBV or knew about the availability of screening (32.6%), vaccination (35.5%), and only 7.5% were ever screened or had been vaccinated (6.3%). Based on this information, community-based and culturally appropriate interventions for these communities and health care providers were proposed, to increase screening and vaccination rates (69).

A prevalence study of HBV among health care workers (HCWs) in a tertiary hospital in Tanzania in 2015 showed that Chronic HBV infection is common (7.4%) among those that were at risk of contracting HBV (rHCW) compared to 5.6% of those HCWs considered not at risk of contracting HBV (72). The study furthermore found that 36% of the rHCWs) had a previous exposure to HBV infection. Considering the fact that one third of rHCWs were found to be susceptible and 36% of them acquired immunity against HBV through previous exposure to HBV, the study recommended pre-testing for HBsAg to be conducted to identify susceptible individuals (72). The use of the Rapid Diagnostic Test (RDT) Alere Determine HBsAg point of care (POC) kits are among the cost effective tools for screening for HBsAg in HIV-1 infected patients or pregnant women in Sub-Saharan Africa (SSA) (73–77).

2.13. SUMMARY OF CHAPTER 2

The research on viral hepatitis since discovery, and particularly in the last 50 years, contributed immensely to the development of effective vaccination, screening, monitoring, care and antiviral treatment, resulting in improved good patient clinical outcomes (9,78). The WHO Global Hepatitis Programme's Framework for Global Action, which resulted from the World Health Assembly resolution (WHA 63.18) in

2010, envisioned a world free of viral hepatitis by 2030 (1). This Framework is based, amongst others, on the public health model (79), outlines four axes for global action including (i) raising awareness, promoting partnerships and mobilizing resources; (ii) developing evidence-based policy and data for action; (iii) prevention of transmission; and (iv) increasing access to screening, care and treatment. This framework furthermore, urges countries to attain a hepatitis-free world, through country-specific strategic actions of reducing transmission of viral hepatitis; bringing down mortality and mortality; improving patient care and treatment and reducing the socio-economic impact of viral hepatitis at individual, community and population levels. The Bastani's Health Belief Framework (26); WHO global policy reports on the prevention and control of viral hepatitis(28,80); and the New York Viral Hepatitis Strategic plan and HBV Framework 2010 – 2015 (27) were among the frameworks reviewed, and which have been recommended by WHO to guide the study approaches, methodologies, data collection procedures and analysis, to ensure consistency and systematic approaches to address the objectives of study objectives (23). Despite all these positive developments, unresolved challenges remain, as some countries, such as Namibia, are yet to develop updated national policy framework and strategic plans for eliminating viral hepatitis by 2030 by increasing public awareness on viral hepatitis; increasing access to HBV screening and immunizations, development of evidence-based guidance on the monitoring of asymptomatic carriers; and the treatment and care of the clinically ill (9).

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1. INTRODUCTION

This chapter outlines and describes the research design and methods, study populations, sampling and sampling procedures, research instruments and procedures used to collect and analyze data. The pilot testing, data quality control issues, limitations and ethical considerations are also explained. The outcome of the data analysis was used as a basis for developing the recommendations for reducing HBV transmission and monitor, treat and provide follow-up care of people with chronic hepatitis in Kavango East and West regions of Namibia.

3.2. RESEARCH APPROACH AND METHODS

This study adopts a quantitative, descriptive, cross-sectional, analytical design. The quantitative design was deemed appropriate as one would have to use numbers to be able to reach the objectives of the study, namely awareness of HCWs regarding the prevention and control of HBV; the distribution of HBV in Namibia; and the prevalence and risk factors of HBV in Kavango East and West regions. It was also used to measure research outcomes objectively, using statistical ways of data analysis (23). On the other hand, the descriptive design ought to be chosen when the researcher records the information that is present in the population, without manipulating the variables (23). Furthermore, the research chose a cross-sectional study design to be able to examine

what exists in a population at a specific point in time and analytical design was chosen to determine whether or not associations exist between variables, for instance, between people who tested positive in relation to their prior close contacts with HBV infected individuals (23). The outcomes of this study formed the basis of developing the HBV prevention and control framework. This study is comprised of two phases that aim at systematically addressing all the objectives of the study. The first phase covers the first three objectives, and the second phase focussed on the fourth and fifth objectives. The two phases and the objectives are presented in detail, below.

3.1.1. Phase 1: Situational analysis regarding HCW and HBV burden

The first phase covers the first three objectives listed below:

- Objective 1: To assess the MoHSS health care workers' (HCWs) awareness regarding the prevention and control of HBV in Namibia.
- Objective 2: To assess the private clinicians and other health stakeholders' awareness regarding the prevention and control of HBV in Namibia.
- Objective 3: To determine the distribution of HBV infections in Namibia, using the pre-existing HBsAg results from the central NIP laboratory, January to December 2013.

3.2.1.1.Objective 1: To assess the MoHSS HCWs awareness regarding HBV

3.2.1.1.1.Study Population of MoHSS Health Care Workers

The study population included the senior MoHSS staff at national level, including policy makers, program officers, medical officers and nurses tasked to oversee immunizations and disease prevention and control activities in the MoHSS. In the Kavango regions, selected respondents included senior regional and district managers, as well as medical officers and nurses in charge of immunizations and disease prevention and control programs. The inclusion criteria were: Senior official at policy level, Senior Officer or program officer working in Windhoek Central Hospital (WCH) and/or at Central level; Senior Program officer for immunizations, disease prevention and control or/and Health Information System; HIV/AIDS Mentor, Medical Officer or Nurse; Duty station should be Windhoek Central level or Kavango Regional Management Team member or a member of District Coordinating Officer from Andara, Nyangana, Nankudu or Rundu district. The exclusion criteria were: HCWs from duty stations other than from the two Kavango regions, except policy makers from Central level or Windhoek Central Hospital (WCH)]; Other junior MoHSS staff who are not working at policy level or directly with immunizations, disease prevention and control, or HIV/AIDS programs.

3.2.1.1.2.Sample size and sampling method

A total of 20 Senior MoHSS were selected purposively from the offices that oversee immunizations, and those running the disease prevention and control activities in the MoHSS. These are the people who will know the key issues related to current

immunizations policy as well as the prevention and control, including treatment practices of HBV in the country.

3.2.1.1.3.Data collection instrument

A self-administered questionnaire, which was in English, was distributed. It covered the sections such as the office and position of respondent, as well as the level (central, regional or district); variables to determine awareness of HCW regarding HBV prevention and control; evidence-based policy and data use for action; HBV transmission; screening, care and treatment. Please find FormC-1 and C-2A: Consent form and Self-administered questionnaire for Senior MoHSS Staff, Program Managers, Medical Officers and Nurses.

3.2.1.1.4.Procedure for data collection

Pilot testing: The data collection instruments were initially tested in February 2014, through interviewing five MOHSS staff from the epidemiology division, central level, before the actual data collection started. The purpose of the study and the procedure to be followed was explained to the respondent before s/he completes the form. Once the respondent become fully aware of the purpose, s/he completes the consent form (see FormC-1: Consent form for the HCWs from the MoHSS and Private clinicians/health stakeholders). The researcher ensured that the staffs that participated in the pilot testing were not considered for inclusion in the sample to be interviewed during the actual data collection activity. After the pre-testing was completed, the inconsistencies in the data

collection instruments were rectified, before commencing with the actual data collection.

Actual data collection: The self-administered questionnaire was distributed to 20 respondents between February and June 2014 and the researcher went back to collect them within five working days. The researcher did not need to recruit research assistants during this phase, as the numbers of respondents involved were small – he conducted both the pre-testing and the actual data collection alone. The researcher conducted the data collection in Windhoek and in Kavango regions, between February and June 2014.

3.2.1.2.Objective 2: To assess private clinicians and stakeholders' awareness

3.2.1.2.1.Study Population for the Private HCWs and Health Stakeholders

The study population included the private doctors and other health stakeholders. ***Inclusion criteria*** were staff from: Centers for Disease Control (CDC), UNICEF, UNAIDS, NAMBTS and WHO, at central level and in Kavango East and West regions. ***Exclusion criteria:*** All the staff that are not working as private medical doctors or nurses, staff not working as health development partners, that have been listed above.

3.2.1.2.2.Sample size and sampling method (private and other stakeholders)

A total of 17 respondents were selected purposively from this study population. These are the people who will know the key issues related to immunizations and HBV prevention and control, including treatment and care for HBV in the country.

3.2.1.2.3.Data collection instruments (Private and other stakeholders)

A self-administered questionnaire, which was in English covered the sections such as the identification of the office, and position, and level (central, regional or district); Awareness of HCW regarding HBV prevention and control; Evidence-based policy and data for action; HBV Transmission; Screening, Care and Treatment. Please find FormC-1 and C-2Bfor a sample Consent forms and self-administered questionnaire for private doctors and other health care workers who are not employed by the MoHSS. Form C-3 and Form C-4 were also used as checklists to collect reported HBV infections and deaths in facilities during 2013. Data on HBV vaccination infants and health care workers were also assessed.

3.2.1.2.4.Procedure for data collection (Private and other stakeholders)

Pilot-testing was done before the actual data collection, in order to identify unclear or inconsistent questions, wording or procedures in the questionnaires. The purpose of the study and the procedure to be followed was explained to the respondent before s/he completes the form. Once the respondent become fully aware of the purpose, s/he completes the consent form (see FormC-1: Consent form for the HCWs from the MoHSS and Private clinicians/health stakeholders). The questionnaires were consequently modified to remove ambiguities or inconsistencies in the data collection instruments, before the actual data collection period. The questionnaire was distributed to 17 respondents between February and June 2014 and the researcher went back to collect them and completed them within the same period.

3.2.1.3.Objective 3: To determine the distribution of HBV in Namibia, 2013

3.2.1.3.1.Study Population for the pre-existing HBV data

The study population included all the pre-existing HBV results from the Namibia Institute of Pathology (NIP) for January to December 2013.

3.2.1.3.2.Sample and sampling method (for pre-existing HBV data)

The researcher requested the Namibia Institute of Pathology (NIP) to provide electronic data of all the pre-existing hepatitis B surface antigen (HBsAg) laboratory results that were conducted from January to December 2013 in all the NIP laboratories in the country.

3.2.1.3.3.Data collection instrument (for pre-existing HBV data)

A checklist (seeFormC-7) was used to ensure the data received was indeed for HBsAg for the period January to December 2013. This checklist contained relevant variables such as the patient registration number, name, date, age, gender, residential address, region, district, hospital unit/or department, ward or reason for testing and laboratory results. However, the names were later removed to ensure confidentiality and anonymity.

3.2.1.3.4.Procedure for data collection (for pre-existing HBV data)

After obtaining the permission from the chief executive officer to use the data, the Information and Communication Technician (ICT) proceeded to retrieve the requested

databases as per the checklist and handed these to the researcher. Data was formatted, cleaned and numerically coded, before the data analysis started.

3.2.1.3.5.Reliability and Validity of data collection instruments for HCWs

Reliable research instruments are the measures of good quality research, as they should be expected to yield the same study results if another researcher conducts a similar study in the same manner (23). Since the HCWs were few, the researcher managed to distribute all the self-administered questionnaires to the respondents, collect and check for consistency alone and standardizing his supportive and professional approach, thereby minimizing the collector bias.

Validity, on the other hand refers to the way how the empirical measure measures the variable accurately (23). During the first phase, the researcher focused on the key informants purposively, as they were the people best placed to provide accurate information on HBV, by virtue of their roles and responsibilities as policy makers, program officers, medical doctors and nurses and were expected to provide representative of what was actually the case, in as far as HCWs awareness on HBV is concerned. Similarly, the laboratory results were systematically cleaned, guided by above-mentioned checklist. The data was furthermore coded numerically, to ensure anonymity and to make it ready for analysis, using the selected statistical software.

3.2.1.3.6.Data analysis

Analysis was conducted using IBM SPSS version 24 statistical software and the frequency counts, descriptive analysis were performed to measure the health care

workers' (MoHSS staff and private clinicians/ health stakeholders) awareness in relation to availability and use of policy guidelines, morbidity and mortality data, monitoring, treatment and care of people with HBV; and what actions MoHSS ought to take to prevent further transmission.

The pre-existing HBsAg data was analyzed across the three main groups such as the pregnant women; people living with HIV/AIDS; and people who were tested on clinical suspicion. HBV data was furthermore analyzed by age and gender across the regions and districts.

3.2.2. Phase 2: Situational analysis -Prevalence and Risk factors in KE&W regions

3.2.2.1. Objective 4 and 5: To estimate HBV prevalence and risk factors, KE&W

The study populations, sample and sampling methods, the data collection instruments and data collection procedures as well as the validity and reliability of data collection procedures and data analysis were all basically done on the same respondents, and instruments were similar.

3.2.2.2. Study Population (prevalence and risk factors)

The study population includes all people from 6 months and above, who live in households of the Kavango East and Kavango West regions. The population living in institutions under a central authority such as hospitals, police barracks, and schools hostels were excluded.

3.2.2.3. Sample size and sampling method

The sample size and sampling method was determined in such a way that it could provide a reliable estimation of the population characteristics at the overall regional level. The sample size was calculated based on the simple random sampling (SRS) design. The following formula was used for this calculation.

$n_{srs} = \frac{k^2 * p * (1-p)}{E^2}$, Where n_{srs} = the required sample size under SRS design.

p = The proportion of the characteristic under study.

The order of this proportion in the population is unknown. Hence it is assumed to be 0.50 so that the sample size is maximized under the given precision.

E = the level of precision expected in the estimates measured as margin of error, which was fixed at 5% level.

K = the critical value for the 95% confidence level = 1.96. The finite population correction (fpc) is ignored since the sampling fraction (f = n/N) is quite small (<0.05).

Thus $= \frac{1.96^2 * 0.50 * (1-0.50)}{0.05^2} = 385$

This means that, under the SRS design, a sample of 385 eligible individuals are required to estimate the population proportions with a margin of error of 5%. Considering that it was only one individual subject who was supposed to be interviewed from a household, the required number of individuals is consequently the same as the number of households.

Although the expected number of sample households is 385, it may not be achieved because of non-responses such as refusals or when people were not at home at the time of the visit to the households. In order to keep the precision level as planned, the sample

size need to be raised to cover for this loss in the sample. The non-response is assumed to be about 20%, taking into consideration the testing procedures and the non-response adjusted SRS sample size will then be 482 (385/0.80) households. It should be noted, however, that this increase in sample size will only affect the precision level but not the resulting bias which comes into play due to the non-responses.

To compensate for the loss in precision due to clustering, the SRS sample size has to be raised again by the design effect (deff) which is taken as 2. The revised sample households then will be 964 (482*2). But considering the available number of point of care (POC) testing kits which were only 1000, from which about 50 kits that will be used for pilot testing, the final sample size was fixed at 940 households and individuals.

The sampling method used included the population-based cross-sectional quantitative research methodology, with a stratified three-stage sample design. The first stage was the identification of the primary sampling units (PSUs) or clusters in Kavango east and Kavango west regions. The second stage is the sampling of households within the selected PSUs; and the third stage is the selection of one eligible individual per household by simple random sampling. The area frame units are stratified by region and by area type (urban or rural), health district or constituency, within the two regions.

Three sampling frames were involved in the survey. The primary sampling units (PSU) were selected, based on the projection from the 2011 population and housing census enumeration areas, as provided by the by the Namibia Statistics Agency (NSA). The second frame was the listing of households (by the researchers) within the selected PSUs from which the sample of households are selected. This list was prepared just before the data collection period, as part of the field work. The third frame included the

names of household members which were written in pieces of papers, folded and put in a basket/container. One household member was asked to randomly pick one piece of paper and the name that was picked was the individual to be interviewed and tested for hepatitis B Virus infection. Therefore, 47 PSUs were selected as the first stage sample, as shown in the table 1 below.

Up to 47 sample PSUs were selected using probability proportional to size sampling together with the systematic sampling approach from the sampling frame of Namibia Statistics Agency (NSA). A listing operation was carried out to list the private households within each of the selected sample PSUs before the data collection started. A Global Positioning System (GPS) was used to provide the exact location and position of selected PSUs or clusters. The 20 sampled households were selected using systematic sampling approach from the list of households. Once in the household the individual to be interviewed and to be tested for hepatitis B was selected randomly, from the list of household members, as indicated earlier.

Table 1: Sampled area types, clusters and households sampled vs surveyed

Area type	Number of households in population			Sample households			Sample PSUs		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Sampled households, and PSUs by strata, in both Kavango East and West regions	12930	24707	37637	340	600	940	16	31	47
Actual Number of households and PSUs reached during the study in Kavango East and West regions.	12930	24707	37637	340	380	720	16	20	36

If by any chance, any selected cluster or PSU was found to be having no households by the research team, a replacement PSU was selected to cover the loss in sample. Replacement Cluster (PSU) was selected randomly close to the original PSU but from the same constituency as the original one. If a PSU has less than 20 households, all households found were interviewed. Covering an additional PSU for this loss will depend upon the extent of the loss in the overall sample. As a general rule, household replacements should be done as a special case where the sample drastically goes down in a particular PSU, but this should be carried out with the supervisor's permission and in overall agreement with the head of the operation. The sample was raised by 20% to cover for this type of loss and therefore, four non responses could be accepted per PSU. The field staff should be instructed to inform the supervisors about the daily progress.

But during the actual field work, the research team could only reach 720 individuals from 36 clusters, due to logistical problems.

3.2.2.4. Data Collection Instruments for the HBV prevalence and risk factors

The researcher used Bastani's Behavioural Framework (26) to include demographic data such as age, marital status, gender, area type, constituency and region in the data collection instrument (figure 8) . The awareness and risk profile such as knowledge regarding hepatitis, hepatitis contact, hepatitis care, pregnancy/lactating, alcohol, smoking, dental repairs, ear piercing, use unsafe injections, questionnaire, previous hepatitis status were also among the questions. Finally, the sexual behavioral variables including age at first sex, number of sexual partners, condom use, sex work (for money) and men who have sex with men were also part of the interview schedule. Interview Schedule for risk factors and Specimen Collection form (Form D-5) and a guide for testing a blood for HBV infection (Annexure E) in Kavango regions. These were translated into rukwangali (the local language in KE&W regions).

3.2.2.5. Procedure for data collection -population-based prevalence and risk factors

After the completion of necessary preparations, the researcher proceeded to recruit and train researchers to assist with the pre-testing and with actual data collection. A total of 31 research assistants were recruited and trained on 15 December 2016. These included mainly the Total Control of Epidemic (TCE) community HIV counsellors, volunteers, health program officers and others who are skilled in HIV testing, counselling and care;

or able to speak rukwangali language. Generally, research assistants who were selected had to meet the following requirements: Education level should be grade 10 or grade 12 mature, fit young adults 21-55 years, experienced community HIV/AIDS counsellors who are familiar with HIV/AIDS rapid testing procedures and field work, in the two Kavango regions. These would be able to communicate fluently in Rukwangali/Gciriku and English language. The research supervisors were professional staff with medical, nursing or related background.

Figure 6: Training of research assistants (Researcher in the center)

Research Assistants were trained and oriented on the purpose and the procedures to be followed during the data collection period, including the community entry, random selection of subjects that will participate, recording of the responses from the interviewee using the questionnaire (figure 6), the use of HBsAg rapid testing kits and

interpretation of results, pre-and post-test counselling and referral, under the supervision of the principal investigator and research supervisors. Research Assistants were oriented to take the specimen and conduct the testing safely, in order to minimize occupational risk. The research assistants were furthermore oriented, regarding the ethical issues, the interviewing process, testing procedures, handling, labelling, interpretation and recording of results, communicating the test results to the subject; and appropriate referral, when necessary. One research assistant assisted the team using and locating the exact positions and demarcations of sampled clusters (figure 7).

Figure 7: Research Assistants Using GPS to locate ate exact positions of sampled clusters

The afternoon of the 15/12/2016 was dedicated for the finalization of logistics for pilot testing the next morning. After the training, the research team was deployed in clusters assigned to each team of research assistants, supported by three to four supervisors, selected from the newly trained research team.

3.3. PILOT TESTING

A pilot study was conducted on 16 December 2016 in the same regions, but this was done in 3-5 population sampling units, which were not sampled to participate in the study. Pilot testing was required to 'test drive' the research instruments, point-of-care /rapid testing kits, the interview and testing procedures; identify problems with data collection tools and the other technical or logistic issues, including reliability and validity of data that is being collected (Form D-1-D-5). Identified errors and problems in the data collection tools or in logistic arrangements were corrected immediately, before the actual data collection process started.

3.4. ACTUAL DATA COLLECTIONON PREVALENCE SURVEY

The researcher and assistants administered the interview schedule (translated into rukwangali language – Form D-3 to D-4) to gather and record socio-economic, cultural, biological and behavioral characteristics from each subject. They furthermore conducted HBsAg tests were done using the HBsAg Gold Rapid Screen test card, Product card 20T, Lot: 20160709; Expiry 08th July 2018. The expiry dates for the capillary tubes was September 2017. A "Unigold" point of care (POC) HBV rapid testing kit were used

obtain whole blood from a finger prick to determine the presence or absence of hepatitis B surface antigen (HBsAg) in the specimen of sampled individuals.

A total of 31 research assistants were recruited and trained in conducting the interviews and HBsAg testing using the point of care (POC) testing kit. These were the total control of epidemic (TCE) community workers who are assigned to communities to conduct HIV testing using POC kits. Hence it was very easy for them to carry out a similar task of HBsAg testing and counseling. An instruction manual for conducting HBsAg tests were used during the training and fieldwork. People who were reactive (positive) were referred to the nearest clinic or hospital for further advice or management.

To perform a point-of- care (POC) HBsAg testing, the research assistant tore one testing strip and removes the cover (illustration provided on the package) and places it on a flat surface where the test is to be performed. S/he adds one drop of whole blood to the Sample Pad. When all the blood is absorbed into the Sample Pad, s/he immediately applies one drop of a chase Buffer to the sample Pad. S/he waits a minimum of 15 minutes to read the result. The control line should always appear for all results for the test to be valid. If it did not appear, the results were invalid and should be repeated. No Test Results is supposed to be read after 24 hours.

Since there were about 14 teams, it was expected that each team covers at least seven randomly selected individual subjects per day in about 10 days of actual data collection in the field to reach a total of 940 targeted subjects. But since the research experienced logistical challenges related to inaccessibility of some areas due to heavy sand (in

Kavango west) and refusal for the research team to enter the community by the senior traditional leader, the researchers could only reach 720 respondents.

3.5. VALIDITY AND RELIABILITY OF DATA COLLECTION INSTRUMENT

During the 2nd phase, however, the researcher used a three-stage cluster sample design stratified by urban and rural and the random selection went down through the household up to individual subject levels. This is meant to enhance representativeness of the target population in Kavango region.

3.6. DATA ANALYSIS

Analysis was conducted using IBM SPSS version 24 statistical software and the frequency counts, descriptive analysis were performed to measure HBV prevalence various, across demographic variables, individual health and behavioral profiles and current HBsAg test outcomes during this study. The SPSS software was also used to determine the HBV prevalence and risk factors and determine whether the findings were statistically significant. Also, bivariate and logistic regressions were performed. Finally, a model was developed to see which variables appears to be the most statistically significant in predicting whether or not a person is likely to be HBV positive.

3.7. MANAGEMENT OF DATA

The researcher drew up a work plan and discussed it with all the stakeholders. He furthermore developed the questionnaires, prepared the instruction manuals and trained all the research assistants, using the Research Assistants Training Guide. He furthermore

supervised the data collection process in the field, according to the work plan and ensured it was carried out meticulously. The teams conducted daily review meetings to evaluate daily progress, occupational safety, data quality including accuracy, consistency and completeness. Missing or inaccurate information was rectified on the spot or on the following day. Data quality checks were meant to reduce the non-sampling errors which may creep, in if not properly monitored and controlled.

3.9. ETHICAL CONSIDERATIONS

The researcher has taken into account and observed the critical ethical principles as laid down in the Belmont Report (37,38), as described below.

3.9.1. *The Principle of respect for persons*

All persons must be respected, and treated in such a way that their autonomy and right to have his or decisions respected; and those with faded autonomy should be protected(37,38).The Permanent Secretary of the MoHSS granted permission for this study (Annexure B) to be conducted in the two regions. In addition to this, the Chief Executive Officer (CEO) of the Namibia Institute of Pathology (NIP) laboratory gave permission (Annexure A) for the research to retrieve and use the pre-existing electronic laboratory results for Hepatitis B virus infections during 2013.Moreover, the offices of the two respective regional governors, the regional director, traditional authorities and village headmen were consulted before the commencement of the study. All the offices, agreed, and gave permission, for the study to proceed, with the exception of the senior traditional headman (the “Fumu”) for a Hambukushu tribe in Mukwe constituency,

Kavango East region, who refused. The Health Care Workers were provided a written consent by assenting to the interview (Form C-1) and sign before the interview started. The same applied to individual household respondents or their guardians, who were provided a written consent form to sign (Form D-1 and D-2), thus agreeing to both the interview and the HBsAg testing. In order to ensure anonymity and confidentiality, participant codes, rather than names were used in the data collecting forms and data tables. All the participants were informed about the purpose of this study and they gave an informed consent; the procedures were explained to them and their participation was voluntary.

3.9.2. *The Principle of beneficence*

Beneficence goes beyond respect for persons, in that it puts an obligation to the researcher tot to harm the human subject who participates, but should rather maximize his or her wellbeing (37,38). Efforts were made to make use of research assistants who know how to carry out the testing for HBV in a safe and harmless manner, so as to obtain the accurate results that will maximize the benefits and well-being of then research participant and the community at large.

3.9.3. The Principle of Justice

This principle refers to a fair treatment in the distribution of what has been deserved, such that nobody should be denied to reap benefits without good reason; or where the burden is imposed unnecessarily on him or her (37,38). The researcher sought approval from the Ethical and Research Committee of the MoHSS and from the NIP laboratory

(annexure A and B). The purpose, methods and procedures of data collection, data analysis as well as the reporting and data dissemination was explained to the Ministry and all stakeholders involved, including the assurance that all the ethical principles (autonomy, respect, anonymity, confidentiality, truthfulness, sensitivity, amongst others) will be adhered to, to avoid violation of any of those.

3.10. APPROPRIAT GLOBAL FRAMEWORKS FOR COMBATING HBV

This WHO framework approaches the HBV prevention and control in countries by focussing on the following four axes: (i) awareness raising, partnerships and resource mobilisation; (ii) Evidence-based Policy and Data for Action; (iii) Prevention of transmission; screening, care and treatment (1). Please see chapter three for more details.

3.10.1. New York Viral Hepatitis Strategies plan and HBV Framework

This HBV framework is comprised of five strategic directions, including Prevention; Education; Surveillance and Research; Medical Care and Treatment; and Policy and Planning (27), see Annexure H.

3.10.2. Bastani's Health Behavioural Framework

This framework approaches the health status or disease being influenced by societal factors, health system and health care provider characteristics and practices; as well as by the demographic and individual characteristics (1,7). The researcher applied and

adapted Bastani's Health Behavioural framework (see figure 8 on page68 below), to guide the development of the data collection instruments for this study.

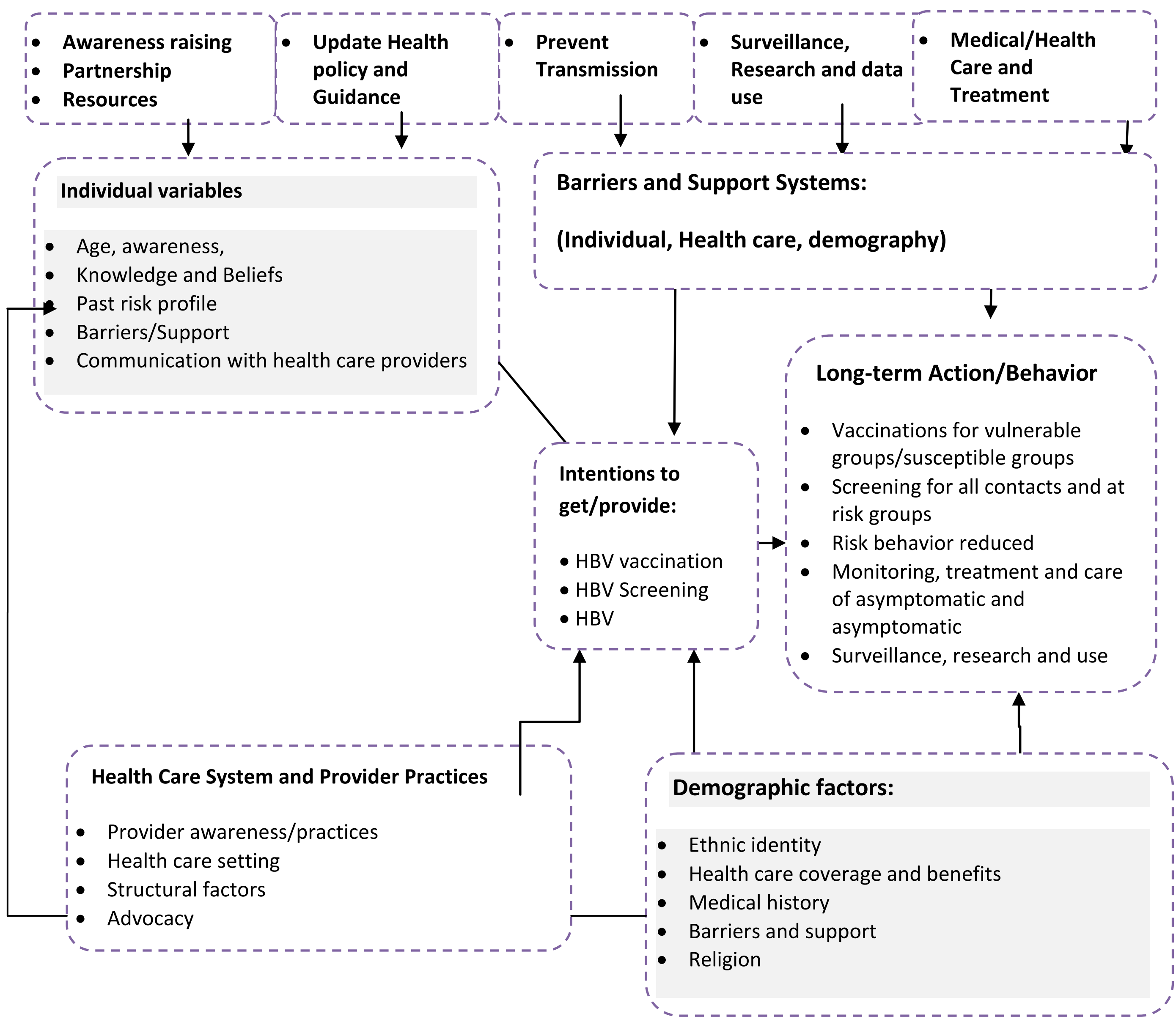


Figure 8: Health Behavioral Framework for the prevention of HBV in Namibia

(Adapted from Bastani's Health Behavior Framework, Bastani et al, 2014)

3.10.3. The WHO Frameworks for Action for the Prevention of HBV

This WHO framework approaches the HBV prevention and control in countries by focussing on the following four axes: (i) awareness raising, partnerships and resource mobilisation; (ii) Evidence-based Policy and Data for Action; (iii) Prevention of transmission; screening, care and treatment (1,28,29). Please see chapter 3 for more details.

3.11. SUMMARY OF CHAPTER 3

This chapter explained the quantitative research methodology that is based on positivism, which seeks to offer scientific explanations within the contextual environments of the health care system and demographic factors, as well as individual variables. Based on this design, the study designs, study populations, data collection tools and procedures were explained for each phase. The issues of clearance of the study from the authorities, pilot testing, consent to of research participants to participate, anonymity, timeline, validity and reliability, limitations were presented. Finally, the methods of data analysis were also explained.

CHAPTER 4

RESULTS

4.1.INTRODUCTION

This chapter provides the key findings of the study, which will be used as a basis for developing recommendations for reducing HBV transmission in Kavango the East and West regions of Namibia.

4.2.PRESENTATION OF RESULTS

The presentation of the results is based on the two phases of the study. The first phase, which is the situational analysis, provides information about the HCW's awareness on HBV prevention and control in the study area. The distribution of HBV in Namibia, using pre-existing HBV results from central NIP laboratory for 2013 is also presented, using mainly tables and graphs. Finally, the results of the second phase on demographic characteristics, HBV awareness, risk profile and outcomes of the test results of the respondents who were tested during this field study will be presented. The frequencies, descriptive and bivariate tables, cross-tabulations and logistic regression analysis are presented.

4.2.1. HBV Awareness among the HCWs of the MoHSS

4.2.1.1. Information on respondents

A total of 17 health care workers (HCWs) were interviewed from 20 purposively sampled MoHSS staff, i.e.85.0% response rate. Eleven responses out of seventeen (64.7%) were from National level, whereas 35.3% were from Kavango region. National level officials were included to get more policy-related information from different offices and divisions at the central level and to supplement and verify the responses that were obtained from the Kavango regions.

4.2.1.2. Awareness, Partnership and Resource-related issues

With regard to the awareness of health care workers regarding the national guiding documents that are focusing *exclusively on the prevention & control of viral hepatitis*, 15 out of 17 MOHSS respondents (88.2%) indicated that there were none. Respondents, however, indicated that MoHSS has national guiding documents that integrate HBV prevention and control with other conditions or diseases, such as antenatal care (ANC), HIV/AIDS, occupational injury, rape, sexual assault and clinical suspicion for HBV. Respondents maintain that the national guiding documents where HBV prevention and control has been integrated with other diseases in Namibia include the Anti-retroviral therapy (ART) Guidelines, 2014; Infection Control/Post-exposure-Prophylaxis (PEP) Guidelines (2010); the Integrated Disease Surveillance and Response (IDSR) guidelines (2011); and the National Standard Treatment Guidelines (2010) are among the most important documents available.

4.2.1.3. Evidence-based policy and data for action

As to which office, division or unit in the MoHSS has been designated to coordinate or carry viral hepatitis-related activities in the country, respondents provided diverse responses. They cited infection control/quality assurance office (8 out of 17, i.e. 47.1%); Disease Surveillance office (7 out of 17 or 41.2%); Directorate Special Programs (1 out of 17 respondents, 5.9%); and Occupational Health offices (1 out of 17 respondents or 5.9%) as designated offices for coordinating Viral Hepatitis activities in the MoHSS. As to how often feedback on burden of viral hepatitis was provided to policy makers and service providers, 12 out of 17 (70.6%) respondents indicated that it was done rarely or never; whereas 2 out of 17 (11.8%) indicated that it was conducted 1-2 times over the past year. All respondents (17 out of 17 respondents, 100%) revealed that the MoHSS has neither a strategic plan for raising public awareness, nor a national research agenda for the prevention and control of viral hepatitis in Namibia.

4.2.1.4. Prevention of Transmission

Up to 76.5% (13 out of 17 respondents) revealed that there is no national policy targeting transmission of viral hepatitis among the general public, apart from routine immunizations for infants and exposed health care workers in the MoHSS. They furthermore indicated that available national guiding documents for routine HBV screening and vaccination was only targeting pregnant women and patients who are HIV/AIDS positive. HBV testing might only be ordered for a health care worker, after accidental needle prick/injury on duty. Community members will only be tested for HBV, if they are pregnant or if they are HIV positive or after s/he was a raped or

sexually assaulted. Although the health care workers are routinely provided with 3-doses HBV vaccination, they are not routinely screened for HBV to determine if they were not already infected, before taking the vaccination.

The quality assurance respondents furthermore, reported that health workers who completed their three doses of the HBV vaccination schedule during 2011 and 2012 were 63% and 80%, respectively(19,20). However, the respondent from the Family Health Division of the MoHSS maintained that the immunization coverage for HBV-containing vaccine to infants was 85%, during 2013 nationally and 81% in the Kavango region(16).

4.2.1.5. Screening, Care and Treatment of chronic HBV

Up to 76.5% (13 out of 17 respondents) revealed that all donated blood units are screened for HBV before blood transfusion has been carried out in Namibia. Similarly, 76.5% (13 out of 17 respondents) revealed that MoHSS does not have a national clinical HBV management protocol in Namibia, to provide guidance to medical officers and nurses on how to manage HBV cases. All the confirmed HBV cases were generally referred to the medical specialists. As to whether MoHSS has established the goal of elimination of HBV in Namibia, 9 respondents (52.9%) indicated that they were not aware, and seven (41.2%) maintained that the country did not establish such a goal as yet. Of the 17 MOHSS Staff that were asked to list the four priority actions that MoHSS need to take to urgently reduce HBV transmission of viral hepatitis in Namibia, as follows:

- Ten out of seventeen (58.8%) cited inadequate public awareness among health care workers and communities;
- Three out of seventeen (17.6%) mentioned limited access to HBV monitoring, treatment and care for people whose HIV status is negative or unknown;
- Two out of seventeen (11.8%) reported inadequate national guiding documents including absence of treatment protocols;
- Two out of seventeen (11.8%) cited absence or limited routine, surveillance and operational research data, which is required for evidence-based planning.

4.2.2. HBV awareness among private clinicians and stakeholders

A total of 13 health care workers were interviewed from 17 purposively sampled health care workers (private and developmental partners), with a response rate of 76.5%. Eleven out of thirteen health stakeholders (84.6%), which included mainly the private doctors and development partners, were based in the capital (Windhoek), with only two out of thirteen (15.4%) based in Kavango region.

4.2.2.1.Key issues identified from HCWs responses (MoHSS and Private)

Available national guiding documents on viral hepatitis require that only the following to be screened for HBV, namely:

- Pregnant women, people living with HIV/AIDS, rape or victims of sexual assault and for health workers after needle prick or injury during medical procedures.
- Household contacts and other vulnerable groups, such as prisoners, the homeless and people who inject drugs have not been accommodated.

- HBV vaccination is limited to infants at birth (birth-dose within 24 hours of birth); 6, 10 and 14 weeks; and also for health workers working in high risk areas in hospitals and clinics.
- HIV negative persons who are positive for HBV would not be considered for the monitoring, care and treatment for HBV, according to the current practice.

4.2.2.2.Areas that need immediate action

The responses from the private stakeholders concurred entirely with those from their MoHSS counterparts. The health stakeholders cited inadequate public awareness (8 out of 13, 61.5%); inadequate treatment/management protocols (3 out of 13, 23.1%), and high cost of diagnostic equipment, monitoring and medication (1 out 13, 7.7%), as the priority challenges that MoHSS need to address immediately.

4.2.3. Distribution of HBV in Namibia using pre-existing laboratory data

4.2.3.1.Demographic information from pre-existing laboratory data on HBV

A total of 77,238 electronic Hepatitis B surface antigen (HBsAg) results, for the period January- December 2013 were retrieved from the central laboratory of Namibia Institute of Pathology during the study period in 2015/2016. The mean age for this sample was 31.4 years, of whom 25.9% were male, 72.3% females and 1.9% missing. These results were from all the 34 district laboratories and represented all the regions and health districts of the country. HBsAg data from private laboratories are not included in this analysis.

4.2.3.2. The distribution of Hepatitis B Virus in Namibia (phase 1)

Of the total 77,238 test HBV results retrieved from NIP during 2013, Kavango region showed the highest number of positive results (*n*=2 027, 16.3%), followed by Ohangwena (*n*=1 535, 11.2%), Khomas (n=1 533, 9.0%) and Omusati region (*n*=820, 16.1%).See distribution by region below in table 2 .below.

Table 2: Distribution of HBV by region, pre-existing laboratory data, 2013

Region	Total tested	Total reactive	Percent
Kavango	12,469	2027	16.3%
Omusati	5,093	820	16.1%
Oshikoto	4149	554	13.4%
Oshana	6003	778.0	13.0%
Kunene	1388	168	12.1%
Zambezi	3430	391	11.4%
Ohangwena	13713	1535	11.2%
Otjozondjupa	3136	341	10.9%
Karas	1596	149	9.3%
Omaheke	1949	178	9.1%
Hardap	1694	154	9.1%
Khomas	17106	1533	9.0%
Erongo	5512	459	8.3%
Namibia	77,238	9087	11.8%

Kavango, Ohangwena and Khomas also had the highest number of HBV-positive results in the age group 15 - 34 years. Of the total 9 087 positive HBV test results, 5 391 (59.3%) were for females, 3 519 (38.7%) for males, with 177 results (1.9%) whose gender was missing, please see figure9below, (n=9087 positive results).

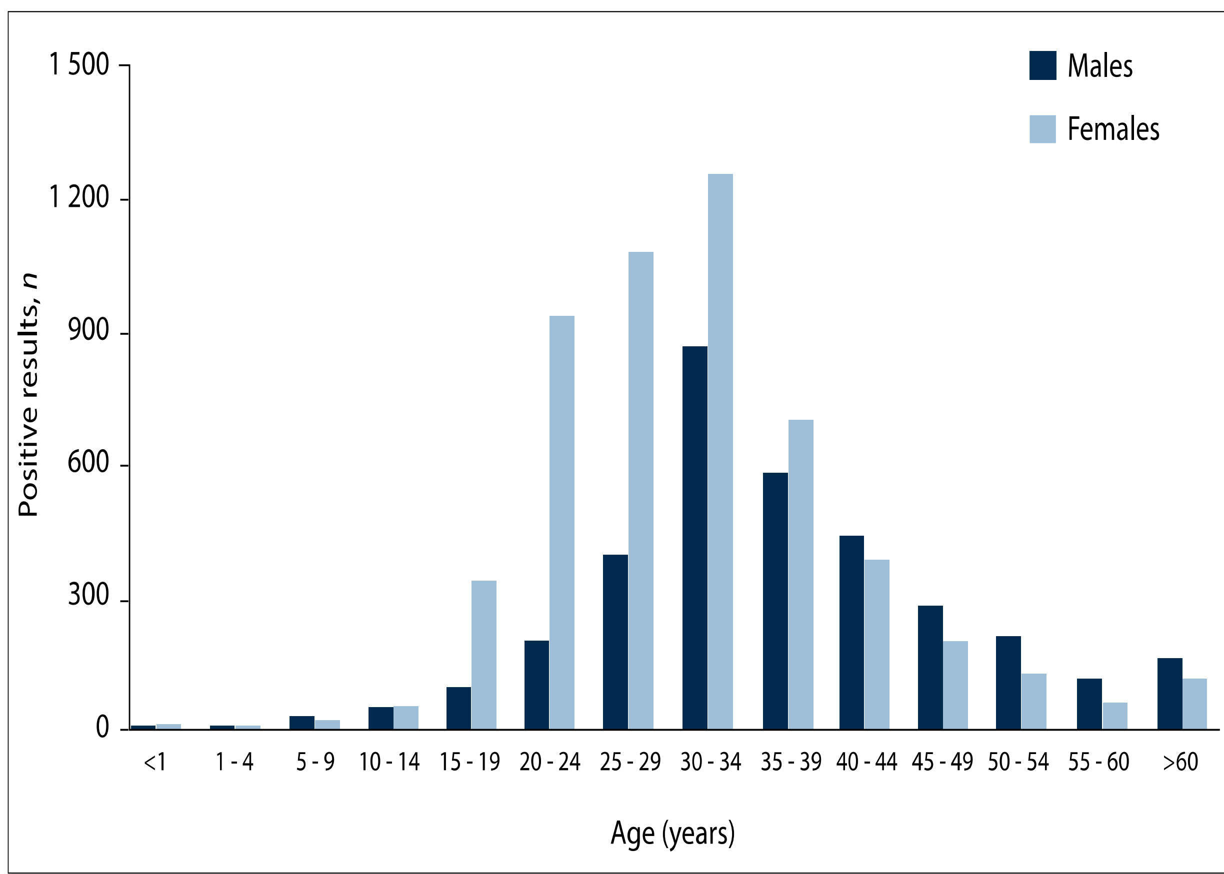


Figure 9: HBV Results by Age and Sex, from Namibia Institute of Pathology, 2013

About 246 out of 9 087of the positive results (2.7%), were children aged 0 - 14 years, with the sexes equally affected. Females were the most affected, with over twice as many positive results than males, peaking in the age group 30 - 34 years. From the age of 40 years, however, the number of positive HBV test results for males exceeded that for females (1 238 positive results for males vs. 948 for females). Further analysis of the

HBV screening results for routine ANC clients and for people living with HIV/AIDS as well as those tested on clinical suspicion for hepatitis B or unknown reasons on the laboratory request form are presented in table 3 below.

Table 3: Reasons for taking HBV test in state health facilities, Namibia, 2013

Reason for testing	Total tested for HBV	Total Positive	Percent
ANC screening	11,390	836	7.3%
HIV/AIDS screening	13,456	1,819	13.5%
Tested on clinical grounds	52,392	6,432	12.3%
Total	**77,238**	**9,087**	**11.8%**

Routine screening for HBV of pregnant women during ANC visits was found to be systematically conducted only in two regions, Ohangwena, with 415 (10.1%) positive out of 4 096 test results, and Khomas, with 350 (5.6%) positive out of 6 235 test results. Data on HBV screening of pregnant women from the remaining 11 regions were incomplete or missing. A total of 836 (7.3%) of 11 390 (positive plus negative) HBV results retrieved for pregnant women were positive. For patients with HIV/AIDS (i.e. co-infected with HBV and HIV/AIDS), the figure was 1 819 (13.6%) out of 13 456 results retrieved.

Omusati region recorded the highest positivity rate of 17.0% (HIV/HBV co-infection). Rates of HBV/HIV co-infection were also high in Oshikoto (15.3%), Kavango (14.4%), Kunene (14.1%), Oshana (13.5%) and Ohangwena (13%). With the exception of Karas (6.1%), all the regions had HIV/HBV co-infection rates >10%. The HBV positivity rate

for individuals tested on clinical grounds or for other reasons was 12.3% (6 432 positive out of a total of 52 392 tests in this category (see details in table 4 on the following page).

Table 4: HBV results among pregnant, HIV positive and symptomatic people, 2013

Region	Pregnant women, *n* positive results/*N* positive + negative results (%)	HIV-positive patients, *n* positive results/*N* positive + negative results (%)	Other (tested on clinical grounds or for unknown reasons), *n* positive results/ *N* positive + negative results (%)	Total, *n* positive results/*N* positive + negative results (%)
Kavango	1/13 (7.7%) †	428/2 971 (14.4%)	1 598/9 485 (16.8%)†	2 027/12 469 (16.3%)†
Omusati	48/705 (6.8%) †	425/2 501 (17.0%)	347/1 887 (18.4%)	820/5 093 (16.1%)
Oshikoto	0/15 (0.0%) †	30/196 (15.3%) †	524/3 938 (13.3%)†	554/4 149 (13.4%)†
Oshana	4/47 (8.5%) †	37/275 (13.5%) †	737/5 681 (13.0%)†	778/6 003 (13.0%)†
Kunene	‡	98/694 (14.1%)	70/694 (10.1%)†	168/1 388 (12.1%)†
Zambezi	1/14 (7.1%) †	‡	390/3 416 (11.4%)†	391/3 430 (11.4%)†
Ohangwena	415/4 096 (10.1%)	257/1 974 (13.0%)	863/7 643 (11.3%)	1535/13 713 (11.2%)
Otjozondjupa	‡	114/1 056 (10.8%)	227/2 080 (10.9%)†	341/3 136 (10.9%)†
Karas	‡	26/427 (6.1%) †	123/1 169 (10.5%)†	149/1596 (9.3%)†
Omaheke	‡	60/480 (12.5%) †	118/1 469 (8.0%)†	178/1 949 (9.1%)†
Hardap	‡	‡	154/1 694 (9.0%)†	154/1 694 (9.1%)†
Khomas	350/6 235 (5.6%)	301/2 539 (11.9%)	882/8 332 (10.6%)	1533/17 106 (9.0%)
Erongo	17/265 (6.4%) †	43/343 (12.5%) †	399/4 904 (8.1%)†	459/5 512 (8.3%)†
Namibia	836/11 390† (7.3%) †	1 819/13 456† (13.5%) †	6 432/52 392 (12.3%)†	9087/77 238 (11.8%)†

HBV = hepatitis B virus.
†Includes results with missing information, or inaccurate information captured on the laboratory request form that could have led to overestimation of positive results.
‡No HBV screening done/no test results found.

Data from the annual returns of the MoHSS Health Information System (inpatients and outpatients) showed a notification or reporting of a total of 501 suspected or confirmed hepatitis B virus cases only (figure 10, n=501), during January - December 2013 nationally. On the contrary, 77,238 test results were retrieved from the NIP laboratory database, of which 9,087 were positive (figure 9, n=9027), during the same reporting period (January-December 2013).

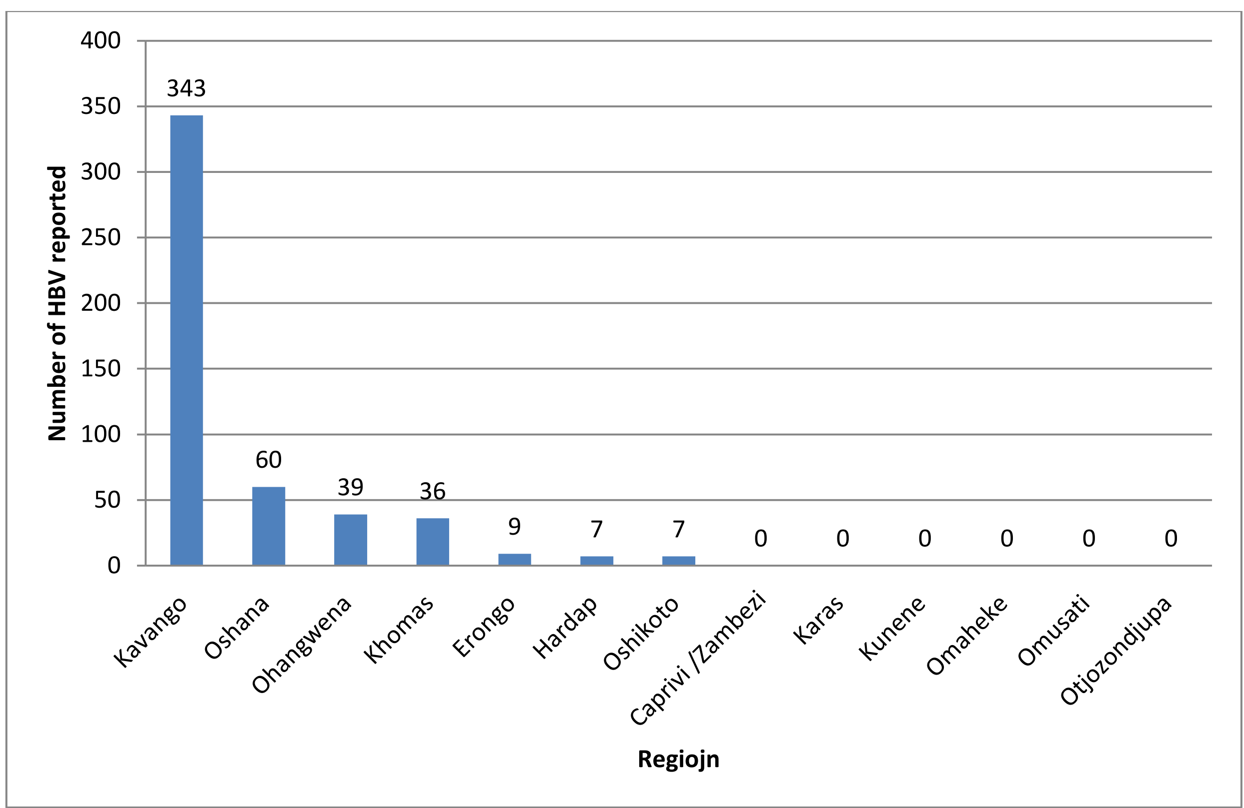


Figure 10: HBV cases reported by the MoHSS by region, (MoHSS HIS, 2013)

Death cases due to hepatitis, liver cancer or other liver diseases are not adequately captured by the health information system of the MoHSS. The latter appear to be weak, resulting in under-reporting cases of HBV and other viral hepatitis cases in the country.

PHASE 2: SITUATIONAL ANALYSIS ON HBV PREVALENCE AND RISK FACTORSIN (KE&W) REGIONS.

4.2.4. HBV prevalence and risk factors in the KE&W regions

4.2.4.1.Demographic information of the respondents

A total of 720 subject individuals or their caretakers from 36 primary sampling units were interviewed, and the respondents tested for Hepatitis B surface antigen (HBsAg). The mean age of the respondents were 26.9 years (range 8 months to 96 years), with a standard deviation (SD) of 17.9. A total of 262 (36.4%) were males, compared to 458 (63.6%) females. Up to 99.7% of the respondents were born in these two regions (Kavango east and Kavango west), and 94.4% were permanent residents there. Rundu, Nyangana and Nankudu health districts comprised 65.3%, 19.6% and 15.1% of the respondents, respectively.

Up to 67.9% of the respondents were single; 26.5% were married or living together; and 5.6% divorced, separated or widowed. Rukwangali speaking people comprised 60.7% of all the respondents, followed by RuGciricu/Rumayo, with 26.3%. The remaining language groups such as Thimbukushu, Silozi, Oshiwambo and others represented 3.3%, 0.3%, 0.6% and 8.9% respectively. Young children, including school learners and students constituted 41.2% of the total respondents. About 3.5% were self-employed; 4.3% government employees; and 5.3% pensioners. Most respondents belong to the Roman Catholic denomination (63.2%), followed by the Lutheran (9.6%) and Anglican with 8.3%. HBV Prevalence in relation to selected demographic variables.

A total of 51 out of 720 people tested were positive for HBsAg, translating in a hepatitis B prevalence of 7.1% for both regions combined. When disaggregated by region, Kavango west shows a higher prevalence of 12.3% (23 positive out of 187 tested), compared to 5.0% (26 out of 518 tested) in Kavango East. Of the total 51 respondents who tested positive, 70% are from rural areas. Also, 34 (66.7%) of the respondents who were found positive were females but this difference is not statistically significant (p=762). The most HBV positive cases were found between 10-39 years, and none was found to be HBV positive below the age of 5 years (see figure 11 and table 5 below).

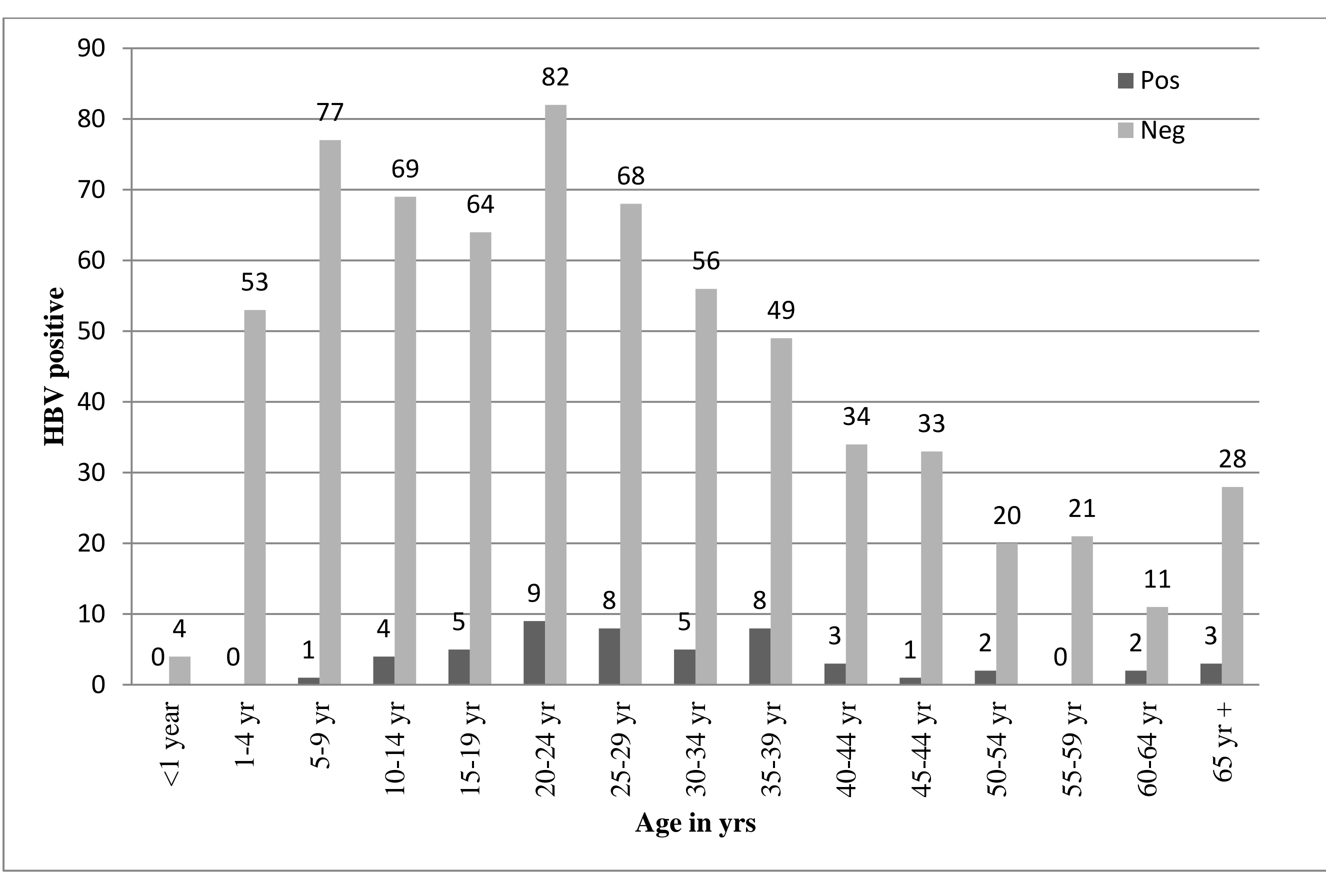


Figure 11: Distribution of positive HBV respondents by age, KE&W regions, 2016

The highest prevalence was observed in the 20-39 years age-groups. Both the OR and the p-value show a weak association between high HBV prevalence and age as shown in table 5 below.

Table 5: Age-distribution of respondents during HBV Survey KE&W region, 2016

Variable	**Hepatitis B Status**		**Odd Ratio**	**95% CI**		**P. Value**
	Hepatitis Positive (%) n=51	**Hepatitis Negative (%) =669**		**Lower**	**Upper**	
Age in years						
<1 year	0 (0.0)	4 (0.6)	Reference			
1-4	0 (0.0%)	53 (7.9)	0.854	0.0	-	1.00
05-9	1 (2.0)	77 (11.5)	0.0	0.0	-	0.999
10-14	4 (7.8)	69 (10.3)	0.0	0.0	-	0.999
15-19	5 (9.8)	64 (9.6)	0.0	0.0	-	0.999
20-24	9 (17.6)	82 (12.3)	0.0	0.0	-	0.999
25-29	8 (15.7)	68 (10.2)	0.0	0.0	-	0.999
30-34	5 (9.8)	56 (8.4)	0.0	0.0	-	0.999
35-39	8 (15.7)	49 (7.3)	0.0	0.0	-	0.999
40-44	3 (5.9)	34 (5.1)	0.0	0.0	-	0.999
45-44	1 (2.0)	33 (4.9)	0.0	0.0	-	0.999
50-54	2 (3.9)	20 (3.0)	0.0	0.0	-	0.999
55-59	0 (0.00)	21 (3.1)	0.634	0.0	-	1
60-64	2 (3.9)	11 (1.6)	0	0.0	-	0.999
65+	3 (5.9)	28 (4.2)	0	0.0	-	0.999

In summary, the area type is strongly associated with high HBV prevalence in KE&W region, but in contrary, this study did not find the difference of the prevalence in specific age-groups (p=0.139) and gender (p=653) statistically significant (see table 6. below).

Table 6: Demographic characteristics of respondents, HBV survey KE&W region, 2016

Variable	Degree of freedom	P-Value
Age in Years	14	0.139
Gender (Male/Female)	1	0.653
Marital Status (married/single/separated	2	0.14
Area Type (urban or rural)	1	0.008
District	2	0.014

Most of the divorced, separated or widowed respondents who were tested were more likely to be HBV positive (OR 3.335, p=0.05), compared to the single or married respondents. There is a strong association between HBV positive respondents and Area-type, i.e. whether or not they are urban or rural residents and being positive (p=0.008). There is no association between HBV positivity and the age, language, religion, level of education, job type, monthly income, and occupation, this study did not find any positive association with HBV infections.

4.2.4.2.HBV prevalence in relation to awareness and risk profile

Out of the 720 respondents who were tested and found to be positive for HBV, it was only 61 (8.3%) who knew their HBV status before. This means that more than 90% were not aware of their HBV status (p-value 0.000). Furthermore, about 450 out of 720 (62.6%) did not know what hepatitis was. Respondents who claimed to know, provided a local name for

hepatitis as "uverawehuli", literary meaning "disease of the liver" and 18.0% confirmed that they have been providing care to HBV infected persons in their households, whereas 19.0% argued that they lived with close relatives who were infected with hepatitis B in their households ($p<0.000$) – see table 7 below.

Table 7: Awareness and Risk profile for HBV in HBV study KE&W regions, 2016

Variable	**Degree of freedom (df)**	**Pearson Chi-Square test (P-Value)**
Know Hepatitis	1	0.008
Being a Hepatitis B Contact	2	0.000
History of a Dental repair	2	0.794
Aware of own previous HBV status	2	0.000
Relationship with infected parent/guardian, sibling, spouse	6	0.000
HIV status	2	0.021
Alcohol	1	0.143
Smoking (Self)	1	0.625
Smoking (Family)	1	0.067
Ear piercing	1	0.087

Up to 76% of the respondents did not know how Hepatitis B was transmitted from one person to the other and did not perceive themselves to be at risk. Of the few percentages that knew their own HBV status, they reported to have learned about this during ART care, ANC visits, HBV screening for blood donation or when they became sick. Up to 87.9% of the respondents (all ages) have not been immunized against HBV. Of the 68 under-fives who were part of the sample, 47 (70%) of their medical records indicated that they were up to date with their childhood HBV vaccinations, which they received from government health facilities. Up to 46 out of the total 720 tested (6.4%) were HIV positive according to their personal medical records, and 15.2% of those are also co-infected with hepatitis B (p-value<0.026).

This study did not find any strong association between hepatitis B virus (HBV) infection with dental repairs, smoking, smoking, alcohol and ear piercing. But the association between HBV infections and awareness of own status, relationship with infected guardian, parent or grand-child are very strong and significant, as shown in table 7.

4.2.4.3.HBV prevalence in relation to sexual behavior

There seems to be a strong association between sex work, age at first sex, condom use and number of sex partners, as shown in table 8. Individuals with one or more partners were more likely to be HBV positive, compared to those without a sexual partner (p-value<0.024) statistically significant. This study did not come across a man who admitted to being a man who has sex with men, and thus no association of this variable with HBV infection.

Table 8: Association with regard to sexual behavior using Odds Ratio and p-value

Variable	Hepatitis B Status		Odd Ratio	95% Confidence Interval		p-value
	Hepatitis Positive (%)	Hepatitis Negative (%)		Lower	Upper	
Age First Sex						
Less than 10 years	0(0.0)	31(4.6)	*Reference*			
10-14 years	3(5.9)	39(5.8)	37047667	0	.	0.998
15-19 years	38(74.5)	317(47.4)	0.212	0.014	3.245	0.265
20 years or above	5(9.8)	80(12.0)	0.131	0.011	1.549	0.107
No Response	5(9.8)	202(30.2)	0.226	0.016	3.098	0.265
Sex Partners						
None	12(23.5)	283(42.3)	*Reference*			
One	34(66.7)	321(48.0)	0.649	0.166	2.543	0.535
More than one	5(9.8)	65(9.7)	0.619	0.211	1.815	0.382
Condom Use						
Yes	18(35.3)	190(28.4)	*Reference*			
No	25(49.3)	244(36.5)	1.517	0.306	7.531	0.61
Other	8(15.7)	235(35.1)	1.803	0.406	8.011	0.438
Sex Work (i.e. sex for money)						
Yes	2(3.9)	6(0.9)	*Reference*			
No	44(86.3)	452(67.6)	0.103	0.005	2.371	0.156
Others	5(9.8)	211(31.5)	0.882	0.071	10.949	0.922

Table 9: Predictive values using p-values in relation to sexual behavior

Variable	df	Pearson Chi-Square test (P-Value)
Age at first sex	4	0.002
Number sex partners	2	0.024
Condom use	2	0.018
Sex work (i.e. sex for money)	2	0.001

4.3. BINARY LOGISTIC REGRESSION

This section deals with the identification of the variables that are most contributing to correct prediction that one is most likely to be HBV positive. The researcher has used the logistic regression, which assisted in developing a formula of defining if one is likely or not to be HBV positive, looking to certain variables. This model was put together, by using all the variables that were seen earlier in this chapter, in order to determine the variable that shows the greatest association to someone being HBV positive. This will be the predictive model that will help in predicting whether or not one is likely to be HBV positive or not, based on selected variables. These variables include:

(i) demographic variables, such as the marital status, area type, district, and age;

(ii) awareness and risk profile for respondents from Kavango regions prevalence survey such as HBV contacts, know own HBV status, relationship with infected family member/close contact and

(iii) sexual behaviors, such as age at first sex, sex work, condom use and number of sexual partners.

Our hypothesis predicts 0 positive cases of HBV and after feeding the SPSS statistical program with the variables mentioned above, an estimated 92% of negative results was generated (i.e. 720 total sample – 51 positive results from this study = 669. Thus 669/720*100 = 92.9% prediction value of negative results. Logistic regression uses odds ratios (OR) as a measure of the relationship between the outcome variable and the predictor variable. The odds of the outcome increase, (i.e. OR greater than 1), when the value of the independent variable is increased by 1 unit. Meanwhile, the odds of the outcome decreases (i.e. OR less than 1) when the value of the independent variable decreased by 1 unit as shown in table 5 and table 8 earlier. The Odds Ratio, which is Exponent (B) in the table, where >1 shows increased risk; <1 shows decreased risk and closer than 0 is protective or not much difference. There is a strong association between HBV positive respondents and Area-type, i.e. whether or not they are urban or rural residents and being positive (p=0.008). There is no strong association between high HBV prevalence and age (0.139) or gender (p=653).

4.4. ASSOCIATION ANALYSIS

This study has found a strong association between rural residence with being HBV positive (OR 2.476, p=0.007). Also, there was no significant difference between demographic variables of age (p=0.999), gender (p=762) and other variables such as the occupation, religion or educational status (p>0.10). However, divorced, separated or widowed people were found to be more likely (OR 3.335) to be HBV positive compared

to married or single people ($p=0.050$). Although this study has shown odds ratio of knowing HBV risks, knowing what HBV is all about, being a contact of HBV positive person, and/or being aware of own previous HBV status is more likely (OR 2.35), these have been shown to be statistically insignificant ($p>0.01$). Behavioural characteristics such as alcohol use, smoking, earpiercing, dental repairs, age at first sex, sex work (for money), condom use have also been shown to be statistically insignificant ($p>0.1$).

4.5. SUMMARY OF CHAPTER 4

This chapter presented the results of the study. The situational analysis has identified gaps regarding the health provider practices, adequacy or availability of the national guiding documents and the high level of HBV transmission in the health facilities in the northern regions. The priority challenges that need urgent attention by the MoHSS have been identified by the respondents as follows: inadequate awareness about HBV disease burden and capacity to prevent and control it; absence of adequate and updated guiding documents; limited or absence of management/treatment protocols; and inadequate recording and dissemination of HBV data to guide action. The study has furthermore shown that HBV prevalence is very high, particularly in Kavango west (12.5%). The prevalence is higher in rural areas compared to urban areas. Also, age appears to have an effect on the prevalence rate, increasing by age. The odds ratios have been calculated and the logistic regression model developed.

CHAPTER 5

DISCUSSION OF RESULTS

5.1.INTRODUCTION TO THE DISCUSSION ON OF RESULTS

The purpose of this study was to investigate hepatitis B virus (HBV) prevalence, risk factors and health care workers' awareness regarding the prevention and control of HBV infections in KE&W regions. This chapter provides in-depth discussions of the study results and compares these with what others have done or found on this subject. The discussions will also provide plausible explanations to observations made. Discussions will be on the results of (i) HCWs awareness on the prevention of HBV within the MoHSS; (ii) HCWs awareness on the prevention of HBV among private doctors and other health stakeholders; (iii) the distribution of HBV in Namibia, following analysis of pre-existing electronic HBV laboratory results for January – December 2013 in Namibia, and (iv) the results of the HBV survey in KE&W regions. Finally, the study limitations as well as the ethical considerations will be discussed and conclusions drawn regarding their appropriateness.

5.2.DISCUSSION ON HCWS AWARENESS AND HBV DISTRIBUTION

Up to 88.2% of the health care workers of the MoHSS who were interviewed indicated that Namibia did not have a written national strategy or plan that focuses exclusively on the prevention & control of viral hepatitis in the country. This implies that the level of awareness on HBV prevention might be low, among the policy makers and program

officers in Namibia. These results confirms WHO's findings of the 2010 assessment of member states, which revealed that 29 out of 47participating Member States (62.7%) reported the absence of written national strategy or plans focusing exclusively or primarily on viral hepatitis in their countries(28). WHO recommends Member States to increase public awareness and develop such national plans and strategies, the immunizations, Antenatal care (ANC) and HIV/AIDS prevention and control plans(18–20). The HCWs who were interviewed have revealed that it was not clear which office/unit in the MoHSS is designated to coordinate viral hepatitis-related activities. This results in the MoHSS HIS and surveillance programs, as well as the HCWs alike not knowing each other's mandate and roles regarding the collection, analysis and dissemination of HBV morbidity and mortality data in the country. The Combating of viral hepatitis, including HBV has been negated by both the national governments and global organizations, until when it was targeted recently under the global health sectors strategy (GHSS) and the SDGs.

Moreover, MoHSS has neither a strategic plan for raising public awareness, nor national research agenda for viral hepatitis in Namibia. For this reason, HBV data has not been adequately reported, captured or disseminated by the routine or in the surveillance system, nor at the directorate special programs. This is similar to various countries that did not develop their national viral hepatitis plans yet according to the WHO global policy report on viral hepatitis(28). And the most important thing to do now is for the country to develop a national action plan/strategy as soon as possible.

With regard to the prevention of HBV transmission, the quality assurance respondents reported that health workers who completed their three doses of the HBV vaccination

schedule during 2011 and 2012 were 63% and 80%, respectively. This shows that health care providers might not be adequately aware of the benefits and schedules of HBV vaccination and the consequences of not taking it as per schedule. HCWs are furthermore not screened to see if they are already carrying the HBV virus, before taking HBV vaccinations, according to the respondents. On the other hand, the immunization coverage for infants was 85% nationally, during 2013, according to the respondents from the Family Health Division of the MoHSS. Introduction of hepatitis B containing vaccinations in national childhood vaccination schedules in India, China and other countries, contributed significantly to reduced HBV transmission in those countries(13,44,47,62,70,81,82) and the country need to take this up as "a best practice."

Although most respondents maintain that all donated blood units (100%) are screened for HBV before blood transfusions, they confirmed that the MoHSS does not have a policy of plan to prevent HBV transmission amongst household contacts of the people infected with HBV, prisoners, the homeless and people who inject drugs. This is a matter of concern as these household contacts and other vulnerable groups need to be screened and eventually vaccinated if they are not yet infected or if they were never vaccinated before (13,50,83,84).With regard to the screening, monitoring and treatment, there are no HBV management protocol in Namibia to provide guidance to medical officers and nurses, and all the respondents indicated that all confirmed HBV cases are generally referred to the medical specialists. This indicates an urgent need for the MoHSS to consider developing treatment and management protocols, in addition to the current general treatment manual, Integrated Disease Surveillance and Response

Guidelines (IDSR), and other HIV/AIDS guidelines (7,85,86). This situation is similar in other countries of similar resource constrained settings.

The responses from private clinicians and other health stakeholders concurred with the MoHSS HCWS accounts and cited the following inadequate public awareness; lack of treatment/management protocols; high cost of diagnostic equipment, procedures and medication This concurs with the WHO reports (87), which maintains that the cost for tenofovir, for instance, for one year of treatment ranged from US$ 48 to US$ 50 (or N$559.00 to N$582.50) at an exchange rate of 1U$-N$11.65. in February 2017 (49). These costs may not be affordable in resource-constrained settings (28,88,89). This could be the reason why most countries are using the current selective approach of excluding the HIV negative people to benefit from the screening and treatment for chronic hepatitis B infections and leave out the monitoring, treatment and care of pregnant women, once they have been diagnosed during ANC visits.

This study confirms the suspicions of the MoHSS that HBV prevalence is higher in those regions, compared to other regions. The 16.3% positivity rate makes Kavango regions to be hyperendemic for HBV. These could be the clusters of highest concentration and HBV transmission is therefore located in the northern regions, particularly in those regions bordering Angola and Zambia, and cross-border transmission could not be underestimated. The results from this study are generally similar with earlier findings in studies conducted in the early 1980's. This means the transmission has not been interrupted adequately and much more need to be done to combat the spread of HBV infections in the equally affected regions of northern Namibia, and elsewhere.

The researcher noted with concern the missing or inaccurate information that was captured on the laboratory request form. This could have led to overestimation of positive results in the group of the HBV results on those tested on clinical grounds. It is interesting to note though that in the age group 15 - 39 years (i.e. 72.9%, 6 625 out of the total 9 087 positive results), the females were the most affected, with over twice as many positive results than males, peaking in the age group 30 - 34 years. From the age of 40 years, however, the number of positive HBV test results for males exceeded that for females (1 238 positive results for males v. 948 for females). This info consider, when devising awareness raising and health education messages for HBV prevention and control.

Reporting and notification of new and chronic HBV cases, recording, monitoring and providing treatment for patients with liver fibrosis or liver cancer, including deaths due to hepatitis-related conditions is not adequately captured in the MoHSS health information system. This is the reason why the MoHSS could only capture a total of 501 cases of hepatitis B Virus infection during January - December 2013 nationally, compared to 77 238 test results retrieved from the NIP laboratory database, of which 9 087 were positive, during the same reporting period. Data quality is a matter of concern in Namibia and in most countries of the developing world.

5.3.HBV PREVALENCE AND RISK FACTORS IN KE&W REGIONS

With regard to the population-based HBV prevalence and risk factors survey in Kavango East and Kavango West, this study has shown a prevalence rate of 7.1% for Kavango east and west regions, combined, with 5.0% and 12.3% HBV prevalence for Kavango East and Kavango west, respectively, when disaggregated by region. These rates concurs with estimations by Schweitzer et al, 2015, who maintains that most countries in Africa are higher-intermediate endemicity, i.e. HBV prevalence of 5–7·99%, or highly endemicity, with HBV prevalence of ≥8%. Also, the earlier studies by Joubert et al, 1985 and others found similar results (4–6), showing a little decline in HBV transmission, if anything, at all from the current situation in these two regions.

One important finding from this study is that 70.6% of the respondents are from rural compared to urban areas. In summary, the more rural the district, constituency or region is, the more likely are the people to be HBV positive. A study in Kenya and others in Sub-Saharan countries as pointed out by Ngaira et al. 2016 reported similar findings, with geographical variations (58). However, this is in contrast of study results amongst pregnant women in Ethiopia, where most HBV positive cases were from urban areas, compared to rural areas (90). However, the reason for higher HBV rates in rural areas in these studies could not be established and need further investigations.

The fact that only 61 (8.3%) knew their HBV status and more than 90% were not aware of their status until they were tested during this survey, concurs with the WHO report of 2015, that only 9% (22 million) of the people who are infected knew their diagnosis. Of those who knew they are carrying the virus, the report goes on, only 8% were on

treatment. Many people are diagnosed only when they already have advanced liver disease (12,49). This is the situation that needs urgent attention. It is not surprising that between 10 and 20% of the people infected with HBV according to this study have close household contacts and have been providing care and support for people with liver diseases in their households. However, they were not aware how to protect themselves from getting/contracting the liver disease (uverawehuli") from the sick relatives. HBV and HIV co-infection was observed among 15.2% of those interviewed and tested (p-value<0.026), suggesting a well-established association between these two conditions and hence the need to combat them jointly, as recommended by the SDGs and GHSS (7,91).It will be helpful for the MoHSS to discuss these key issues further, in order to explore and address the drivers of HBV transmission in Namibia, based on available evidence.

5.4.STUDY LIMITATIONS

The limitations during the first phase were that the number of the HCWs who were interviewed regarding HBV awareness was small. It would have been better if the researcher has considered using a qualitative approach technique, such as the focus group discussions (FGD) to gather more in-depth information. Meanwhile, the study used total test results rather than total individuals tested. This might have contributed to a degree of double counting, but efforts were made to minimize this problem during the data cleaning process. Also, there appears to be under-reporting or misreporting due to possible inaccuracies in labeling the laboratory investigation form in terms of where the specimen originated,(e.g. ANC, ART, outpatient department (OPD) or other hospital

department); and ambiguities about which office or division was mandated to collect and handle HBV data in 2013.This study was just a cross-section study for one year (2013), and it was not possible to show a trend over time, to see if there is an increase or a decline over the years. Also, there are numerous missing variables for age and gender.

As for the HBV prevalence and risk factors survey, sampling was done initially for one Kavango region before it was split into two regions. Attempts have been made to cater for both regions in the analysis of results, where possible. The survey planned to sample a total of 940 subject individuals from 47 primary sampling units (PSU) or clusters, but only 720 respondents were reached in 36 PSUs/clusters, translating into a response rate of 76.6%. The reasons for not reaching the 11 targeted clusters are two-fold. The tribal authority of the Hambukushu tribe refused the survey to be conducted in six sampled PSUs under his jurisdiction. This was in spite of the permission that was granted by the MoHSS, and the facilitation by both the regional director of Health and the district management of Andara health district. The remaining five clusters were in remote rural areas, and were inaccessible with the limited numbers and type of vehicles that were available, due to the nature of the terrain and deep sand that requires a very strong 4 x 4 vehicle. Data quality issues were minimized as the researcher went through each questionnaire at the end of each day to double check the completeness, consistency and legibility, at the time of submission by the research assistants.

Cluster sampling for the PSUs has a limitation as individuals from the same cluster tend to be similar to one another, than people from different clusters. The expected precision level under PSU clustering might have been compromised. But since this geographical area has a homogenous population and the clusters are roughly the same, this sampling

method seem to be the most relevant and appropriate, given the total number of interviews, costs and the desired accuracy. The sampling errors could however be measured since probability sampling methods has been adhered to. The following statistical measures are available to inform about the sampling errors, standard errors of the estimates, relative standard of the estimates, 95% confidence intervals and the design effect (deff) - at least for the selected important variables and indicators. Andara health district in Mukwe constituency (Kavango east), did not participate, and therefore five sampled clusters were not covered, due to refusal by the senior traditional leader.

5.5.SUMMARY OF CHAPTER 5

This chapter presented the interpretation the observations made during the study and compared these with the findings of earlier research works. It sought to point out the possible explanations, gaps and new evidence that need to be considered by decision makers. The gaps regarding the health provider practices, adequacy or availability of the national guiding documents and the intense HBV transmission in the KE&W and the border regions with Angola have been elaborated on. The priority challenges that need urgent attention by the MoHSS have been discussed, in particular, the inadequate awareness about HBV disease burden and capacity to manage it; absence of adequate and updated national guiding documents on HBV; limited or absence of HBV management/treatment protocols; and inadequate recording and dissemination of HBV data to guide action. The predictors and factors that can be associated with HBV and its statistical significance as shown through the odds ratios, univariate, bivariate and

logistic regression model that was developed. The chapter concluded with a brief discussion on the significance and the limitations of this study.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1.INTRODUCTION

The purpose of this chapter is to review the process and outcomes of this study and to point out significant findings. The guiding frameworks for global action for the prevention and control of HBV are emphasized and the limitations, as well as the unique contribution are highlighted in this chapter. The conclusions and recommendations have been presented, based on the stated objectives of this study.

Objective 1: To assess the MoHSS health care workers' (HCWs) awareness regarding the prevention and control of HBV at National and Kavango regional level

6.2.1. Conclusions for objective 1

The MoHSS does not have the national guidelines on viral hepatitis, and hence HCWs were not aware of some of the current practices focusing exclusively combating HBV. Data collection, analysis and disseminations were not adequately done, because it was not clear which office was handling HBV data on HBV infections and deaths, during 2013. The researcher therefore concluded that the majority of HCWs are not aware of the current practices and guidelines on HBV prevention control; screening for HBV is

only limited to pregnant women on the one hand; and the HIV/AIDS positive and the symptomatically ill; seems to be the only one receiving treatment for this disease.

6.2.2. Recommendations for objective 1

There is a need for the MoHSS to:

- Intensify awareness raising and to commemorate the World Hepatitis Day, 28 July annually, in addition to routine sensitization sessions for all HCWs.
- Develop national HBV prevention and control strategy/guideline for the country
- Strengthen collection, analysis and use of routine Health Information and surveillance data in a well-coordinated manner, for improved HBV prevention and control in Namibia.
- Expand access of HBV vaccination, screening, treatment and care beyond the current beneficiaries – i.e. infants and HCW (vaccination); pregnant women (HBV screening); monitoring, treatment and care (for people living with HIV/AIDS).
- Reconsider disallowing people who are HIV negative but HBV positive to receive HBV treatment and care.

Objective 2: To assess the private clinicians and other health stakeholders' awareness regarding the prevention and control of HBV at National and Kavango regional level, in Namibia

6.2.3. Conclusions for objective 2

Private clinicians and other health stakeholders cited inadequate public awareness; inadequate documentation of HBV data; lack of treatment protocols; and limited access to medical care, due to high cost of diagnostic tests, monitoring and medication. Furthermore, the researcher concluded that there is no public awareness agenda that involves both state and private health care workers to promptly detect, investigate, report/notify, monitor and effectively prevent, control and coordinate the reporting of viral hepatitis, particularly HBV in Namibia. Viral hepatitis is under-reported in the country.

6.3.1. Recommendations for objective 2

MoHSS need to:

- Strengthen public awareness for both the health care providers, and the communities, starting with the policy makers and HCWs).
- Strengthen collection of routine Health Information and surveillance data from private facilities, if possible.
- Expand the HBV vaccination to older age-groups, as per WHO recommendations

Objective 3: To determine the distribution of HBV infections in Namibia, using pre-existing electronic HBsAg results from the central NIP laboratory, January-December 2013.

6.4.1. Conclusions for objective 3

HBV infections are higher in Kavango regions and in the rest of the northern regions along the Namibia-Angolan border. Screening for HBV amongst the pregnant women was only done systematically in Ohangwena and Khomas regions during 2013. There are numerous missing or inaccurate information on the laboratory request forms, which results in under-reporting of cases from most regions. The researcher therefore concluded that:

- HBV is highly endemic in northern regions, especially in Kavango regions.
- HBV infections affected young children of 0-15 years (2.7% of 9087) with over 72% infections among the 15-39 year old age-group, particularly women.
- Women were the most affected, with over twice as many positives as their male counterparts. Males are most affected only after the age of 40 years.

6.4.2. Recommendations

MoHSS need to:

- Strengthen the capacity of the HIS, surveillance system and laboratory networks to improve data quality and data management
- Conduct targeted awareness raising meetings to address the groups in most affected regions.

- Consider building laboratory capacity to be able to perform required tests for Hep A, B, C to E in the country
- Acquiring and implement affordable rapid testing kits to be performed in health facilities and in the rural settings.

Objective 4 and 5: To estimate the HBV prevalence and risk factors in KE&W

6.5.1. Conclusions for objectives 4 and 5

HBV prevalence was 7.1% for Kavango East and West regions combined, with 5.0% and 12.3% HBV prevalence for Kavango East and Kavango West, respectively, when disaggregated by region. The analysis of selected variables that were used in this study has furthermore, shown that:

- KE&W regions falls between the higher-intermediate endemicity (5–7·9%) and higher endemicity (≥8%) areas for HBV transmission in Namibia.
- The rural areas are the most affected, with Nankudu health district showing 15.6%, compared to Rundu health district, which showed 6.0% (p-value<0.001).The reason for higher HBV rates in rural areas are related to early age at first sex, living or caring with HBV infected relative – spouse, sibling or parent, amongst others.
- Only 8.4% of those tested during this study, had prior knowledge of their HBV status. But, they did not generally know how this disease spreads and how it could be prevented.

- HBV and HIV co-infection was 15.2%, (p-value<0.026), suggesting a well-established association between these two viral infections.

6.5.2. Recommendations

There is a need for the MoHSS and relevant stakeholders to:

- Increase public awareness and advocacy for HBV prevention in Namibia in general, and in the KE&W regions, in particular.
- Provide funding for combating HBV alongside HIV and expand HBV screening, vaccination, treatment and care to other vulnerable population groups, as opposed to limiting access to screening, treatment to the people living with HIV/AIDS (PLHWA).
- Consider the acquisition of affordable rapid diagnostic testing (RDT) kits for HBV, and to expand early and voluntary testing as is done with HIV RDT testing in the country.
- Include HBV in the regular sentinel testing for HIV/AIDS for pregnant women and in the Namibia demographic health survey, alongside HIV/AIDS surveillance.
- Consider using the predictive model that was developed during this study, to predict if someone is, or identify which areas are likely to have clusters of HBV infections in Kavango East and West region or elsewhere.

6.5.3. Unique Contribution to scientific knowledge

Considering the fact that HBV is one of the most important but neglected silent killers in the world, and bearing in mind that available HBV data of the recent annual returns of the MoHSS in Namibia appears limited and scanty, the researcher filled the gap by providing current HBV data for country. The researcher produced two publications: (1) distribution of HBV in Namibia; and (2) awareness of HCW on the prevention of HBV in Namibia. This study used all the variables that have strong association with HBV and developed a model for predicting the likelihood of someone being HBV positive, when applying them. This study has provided the most recent data on the HBV prevalence in Kavango regions, and made recommendations for the MoHSS and partners to develop strategic plan for the interruption of HBV and eventual elimination of viral hepatitis in Namibia, as per WHO recommendations.

REFERENCES

1. World Health Organization. Prevention & Control of Viral Hepatitis Infection: Framework for Global Action [Internet]. Geneve; 2012 [cited 2017 Jun 23]. Available from: http://apps.who.int/iris/bitstream/10665/130012/1/WHO_HSE_PED_HIP_GHP_2012.1_eng.pdf?ua=1&ua=1

2. WHO/AFRO B. Prevention, Care and Treatment of Viral Hepatitis in The African Region: Framework for Action, 2016 – 2020 Report of the Secretariat. Rep Secr RC66,. 2016;14 June 20(June):19–23.

3. Ott JJ, Stevens GA, Groeger J, Wiersma ST. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. Vaccine [Internet]. 2012 Mar 9 [cited 2017 Jun 16];30(12):2212–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22273662

4. Joubert JJ, Prozesky OW, Lourens JG, van Straten AM, Theron JW, Swanevelder C, et al. Prevalence of hepatitis virus and some arbovirus infections in Kavango, northern SWA/Namibia. S Afr Med J [Internet]. 1985 Mar 30 [cited 2017 Jul 9];67(13):500–2. Available from: http://www.ncbi.nlm.nih.gov/pubmed/3983734

5. Aspinall S, Joubert JJ, Evans AC, Josephs S, Steele AD, Lecatsas G. Prevalence of hepatitis B in !Kung (San) children from Bushmanland, Namibia. Ann Trop Paediatr [Internet]. 1994 Jan 13 [cited 2017 Jul 9];14(2):163–7. Available from: https://www.tandfonline.com/doi/full/10.1080/02724936.1994.11747711

6. Joubert JJ, van der Merwe CA, Lourens JH, Lecatsas G, Siegrühn C. Serological markers of hepatitis b virus and certain other viruses in the population of eastern caprivi, Namibia. Trans R Soc Trop Med Hyg [Internet]. 1991 Jan [cited 2017 Jul 9];85(1):101–3. Available from: https://academic.oup.com/trstmh/article-lookup/doi/10.1016/0035-9203(91)90176-Y

7. World Health Organization. Global hepatitis report, 2017. 2017th ed. Geneva; 2017.

8. Kilonzo K. A comparative Study of Prevalence Of Hepatitis B Among HIV Positive And HIV Negative Pregnant Women In Kenyatta National Hospital, Nairobi, Kenya - A Dissertation Submitted as Part of Fulfilment for The Award

Of the Degree Of Master Of Medicine in Obstetr. 2010 [cited 2017 Jun 16];60. Available from: http://obsgyn.uonbi.ac.ke/sites/default/files/chs/medschool/obsgyn/Dr Margaret Kilonzo.pdf

9. Locarnini S, Hatzakis A, Chen D-S, Lok A. Strategies to control hepatitis B: Public policy, epidemiology, vaccine and drugs. J Hepatol [Internet]. 2015 Apr 1 [cited 2017 Jun 25];62(1):S76–86. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0168827815000495

10. Terrault NA, Bzowej NH, Chang K-M, Hwang JP, Jonas MM, Murad MH. AASLD guidelines for treatment of chronic hepatitis B. Hepatology [Internet]. 2016 Jan [cited 2017 Oct 14];63(1):261–83. Available from: http://doi.wiley.com/10.1002/hep.28156

11. WHO. Guidelines on Hepatitis B and C Testing. 2017. 1-170 p.

12. Guidelines for the Prevention Care and Treatment of Persons with Chronic ... - World Health Organization - Google Books [Internet]. 2015 [cited 2017 Jun 23]. Available from: https://books.google.com.na/books?hl=en&lr=&id=slk0DgAAQBAJ&oi=fnd&pg=PR9&dq=hepatitis+B+control+and+prevention+framework&ots=_J9e-srQ4T&sig=uIl2YFUNHZdrhbUd2tyehIrkadk&redir_esc=y#v=onepage&q&f=false

13. Sonderup MW, Botha JF, van der Merwe SW, Song E, Kassianides C, Newton KA, et al. South African guideline for the management of chronic hepatitis B:

2013 [Internet]. Vol. 103, SAMJ: South African Medical Journal. Cape Town: Medical Association of South Africa; 2013 [cited 2017 Jun 16]. 335-349 p. Available from: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-95742013000500026

14. Namibia Statistics Agency. 2011 Population and Housing Census Report. Book. Windhoek; 2011.

15. Namibia-regions-map.jpg (800×836) [Internet]. [cited 2017 Jul 12]. Available from: http://namibiaconsulate.co.za/wp-content/uploads/2015/03/namibia-regions-map.jpg

16. MoHSS. Namibia Demographic and Health Survey, 2013. 2013.

17. Development Aid from People to Peaple (DAPP). Home-Based HIV Counselling and Testing (HBHCT) in Namibia: Report on evaluation of a Pilot Project. Windhoek; 2013. p. 26.

18. EPI Unit in Family Health Division. Intoduction Plan for Pentavalent Vaccine in Namibia. Windhoek; 2008.

19. MoHSS. National Guidelines for Antiretroviral Therapy 4th Edition. 2014;(January):1–108.

20. MoHSS. National Guidelines on Post-Exposure Prophylaxix rophylaxis for HIV, HBV and Tetanus: After workplace exposures and Sexual Assault. 2010 editi. Windhoek: Ministry of Health and Social Services; 2010.

21. MoHSS. Analysed Viral_Hep_Inpatient 2009-2013. Windhoek: Epidemiology Division; 2013.

22. MoHSS. Analysed HepB_OPD Namibia 2009-2013. Windhoek: Epidemiology Division; 2013.

23. De Vos A S, Strydom, H, Fouche C B DC. Research at Grassroots. Fourth Edi. Pretoria: Van Schaik Publishers; 2011. 545 p.

24. Antwi SK, Hamza K. Qualitative and Quantitative Research Paradigms in Business Research : A Philosophical Reflection Qualitative and Quantitative Research Paradigms in Business. Eur J Bus Manag. 2015;7(3):217–25.

25. Imenda S. Is there a conceptual difference between theoretical and conceptual frameworks? J Soc Sci. 2014;38(2):185–95.

26. Maxwell AE, Bastani R, Glenn BA, Taylor VM, Nguyen TT, Stewart SL, et al. Developing Theoretically Based and Culturally Appropriate Interventions to Promote Hepatitis B Testing in 4 Asian American Populations, 2006–2011. Prev Chronic Dis [Internet]. 2014 May 1 [cited 2017 Oct 22];11:130245. Available from: http://www.cdc.gov/pcd/issues/2014/13_0245.htm

27. New York State Department of Health. Background and Rationale for the Viral Hepatitis Strategic Plan: Framework for Hepatitis B. 2010;2–5. Available from: https://www.health.ny.gov/diseases/communicable/hepatitis/strategic/background_rationale_hepatitis_c.htm

28. World Health Organization. Global policy report on the prevention and control of

viral hepatitis in WHO Member States. Report [Internet]. 2010 [cited 2017 Jun 25]; Available from: www.who.int/about/licensing/copyright_form/en/index.html

29. World Health Organization. Global Health Sector Strategy On Viral Hepatitis 2016–2021 Towards Ending Viral Hepatitis. 2016;56.

30. Mosby's Medical Dictionary, 9th edition. © 2009 E. Anicteric hepatitis | definition of anicteric hepatitis by Medical dictionary [Internet]. Elsevier. 2009 [cited 2017 Sep 16]. Available from: http://medical-dictionary.thefreedictionary.com/anicteric+hepatitis

31. World Health Organization. WHO | What is hepatitis? WHO [Internet]. 2017 [cited 2017 Oct 22]; Available from: http://www.who.int/features/qa/76/en/

32. Dictionary FM. Prevalence | definition of prevalence by Medical dictionary [Internet]. [cited 2017 Aug 9]. Available from: http://medical-dictionary.thefreedictionary.com/prevalence

33. WHO | Risk factors. WHO [Internet]. 2014 [cited 2017 Sep 20]; Available from: http://www.who.int/topics/risk_factors/en/

34. Primary, secondary and tertiary prevention | Institute for Work & Health [Internet]. [cited 2017 Sep 20]. Available from: https://www.iwh.on.ca/wrmb/primary-secondary-and-tertiary-prevention

35. WHO | Control, elimination, eradication and re-emergence of infectious diseases: getting the message right. WHO [Internet]. 2011 [cited 2017 Sep 20]; Available from: http://www.who.int/bulletin/volumes/84/2/editorial10206html/en/

36. Reverso Dictionary. program framework definition | English dictionary for learners | Reverso [Internet]. [cited 2017 Sep 20]. Available from: http://dictionary.reverso.net/english-cobuild/program framework

37. The National Commission of The Protection of Human subjects. The Belmont Report: Ethical Principles and Guidelines for the protection of Human Subjects of Research. Washington, D. C.; 1978.

38. MoHSS. Principles of research ethics. 2016;(August). Available from: http://dissertation.laerd.com/principles-of-research-ethics.php#fifth

39. Trepo C. A brief history of hepatitis milestones. Liver Int. 2014;34(SUPPL1):29–37.

40. Trépo C, Chan HLY, Lok A. Hepatitis B virus infection. Lancet [Internet]. 2014 Dec [cited 2017 Jun 25];384(9959):2053–63. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0140673614602208

41. Gerlich WH, Bogdanova A, Skrastina D, Zajakina A, Bruvere R, Ose V, et al. Medical Virology of Hepatitis B: how it began and where we are now. Virol J [Internet]. 2013 Jul 20 [cited 2017 Jun 21];10(1):239. Available from: http://virologyj.biomedcentral.com/articles/10.1186/1743-422X-10-239

42. Liver Cancer and Hepatitis B - Hep [Internet]. [cited 2017 Sep 17]. Available from: https://www.hepmag.com/basics/hepatitis-b-basics/liver-cancer-hepatitis-b

43. Scottish Exhibition and Conference Centre (SECC) Glasgow UK. Building Momentum, Building the case: World Hepatitis Summit Meeting Report. 2015;1–

72.

44. Liang X, Bi S, Yang W, Wang L, Cui G, Cui F, et al. Reprint of: Epidemiological serosurvey of Hepatitis B in China—Declining HBV prevalence due to Hepatitis B vaccination. Vaccine [Internet]. 2013 Dec [cited 2017 Jul 9];31:J21–8. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0264410X13010967

45. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Articles Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. Lancet, Publ online [Internet]. 2015 [cited 2017 Jun 16];www.theLan. Available from: http://www.thelancet.com/pb/assets/raw/Lancet/pdfs/S014067361561412X.pdf

46. Pourkarim MR, Amini-Bavil-Olyaee S, Kurbanov F, Van Ranst M, Tacke F. Molecular identification of hepatitis B virus genotypes/subgenotypes: revised classification hurdles and updated resolutions. World J Gastroenterol [Internet]. 2014 Jun 21 [cited 2017 Sep 2];20(23):7152–68. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24966586

47. Zampino R, Boemio A, Sagnelli C, Alessio L, Adinolfi LE, Sagnelli E, et al. Hepatitis B virus burden in developing countries. World J Gastroenterol [Internet]. 2015 Nov 14 [cited 2017 Jul 9];21(42):11941–53. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26576083

48. Almeida RW de, Mello FC do A, Menegoy IV, Santo MP do E, Ginuíno CF, Sousa PSF de, et al. Detection and molecular characterisation of a diagnosis escape variant associated with occult hepatitis B virus in Brazil. Mem Inst

Oswaldo Cruz [Internet]. 2017 Jul [cited 2018 Feb 17];112(7):485–91. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0074-02762017000700485&lng=en&tlng=en

49. World Health Organization. WHO | Hepatitis B Fact Sheet [Internet]. WHO. World Health Organization; 2017 [cited 2017 Sep 17]. Available from: http://www.who.int/mediacentre/factsheets/fs204/en/

50. World Health Organization. Guidelines for the Prevention, Care and Treatment of Persons with Chronic Hepatitis B Infection. Who [Internet]. 2015;(March):166. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26225396

51. Liang TJ. Hepatitis B: the virus and disease. Hepatology [Internet]. 2009 May [cited 2017 Aug 22];49(5 Suppl):S13-21. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19399811

52. Hyams KC. Risks of chronicity following acute hepatitis B virus infection: a review. Clin Infect Dis [Internet]. 1995 Apr [cited 2017 Jun 16];20(4):992–1000. Available from: http://www.ncbi.nlm.nih.gov/pubmed/7795104

53. McMahon BJ. The natural history of chronic hepatitis B virus infection. Hepatology [Internet]. 2009 May 1 [cited 2017 Jun 25];49(S5):S45–55. Available from: http://doi.wiley.com/10.1002/hep.22898

54. Wu J-F, Chang M-H. Natural history of chronic hepatitis B virus infection from infancy to adult life - the mechanism of inflammation triggering and long-term impacts. J Biomed Sci [Internet]. 2015 Oct 20 [cited 2017 Sep 16];22:92.

Available from: http://www.ncbi.nlm.nih.gov/pubmed/26487087

55. McMahon BJ, Bulkow LR, Singleton RJ, Williams J, Snowball M, Homan C, et al. Elimination of hepatocellular carcinoma and acute hepatitis B in children 25 years after a hepatitis B newborn and catch-up immunization program. Hepatology [Internet]. 2011 Sep 2 [cited 2017 Jul 9];54(3):801–7. Available from: http://doi.wiley.com/10.1002/hep.24442

56. Abolghasemi S, Sali S, Kiani P. Assessment of Risk Factors in Patients with Chronic Hepatitis B Referred to Dr . Labbafi Nejad ' s Hospital Hepatitis Clinic 2012-2014. Nov Biomed Orig. 2017;1:37–42.

57. Li X, Zheng Y, Liau A, Cai B, Ye D, Huang F, et al. Hepatitis B virus infections and risk factors among the general population in Anhui Province, China: An epidemiological study. BMC Public Health. 2012;12(1).

58. Ngaira JAM, Kimotho J, Mirigi I, Osman S, Ng'ang'a Z, Lwembe R, et al. Prevalence, awareness and risk factors associated with Hepatitis B infection among pregnant women attending the antenatal clinic at Mbagathi District Hospital in Nairobi, Kenya. Pan Afr Med J. 2016;24:1–7.

59. Franzeck FC, Ngwale R, Msongole B, Hamisi M, Abdul O, Henning L, et al. Viral Hepatitis and Rapid Diagnostic Test Based Screening for HBsAg in HIV-infected Patients in Rural Tanzania. Verhasselt B, editor. PLoS One [Internet]. 2013 Mar 1 [cited 2017 Jun 16];8(3):e58468. Available from: http://dx.plos.org/10.1371/journal.pone.0058468

60. Cynthia Tamandjou, Francina Kaindjee-Tjituka, Laura Brandt, Mark Cotton, Etienne Nel, Wolfgang Preiser MA. A cross-sectional study of hepatitis b virus infection in hiv-infected children in windhoek, Namibia. 2017;2(Suppl 2):47–9.

61. Sonderup M, Spearman W. HIV/HBV and HIV/HCV Co-infection in Sub-Saharan Africa: Transmission, Disease Outcomes, and Treatment Options | World Gastroenterology Organisation [Internet]. [cited 2017 Jun 16]. Available from: http://www.worldgastroenterology.org/publications/e-wgn/e-wgn-expert-point-of-view-articles-collection/hiv-hbv-and-hiv-hcv-co-infection-in-sub-saharan-africa

62. Shen LP, Zhang Y, Wang F, Zhang S, Yang JY, Fang KX, et al. Epidemiological changes in hepatitis B prevalence in an entire population after 20 years of the universal HBV vaccination programme. Epidemiol Infect [Internet]. 2011 Aug 15 [cited 2017 Jul 9];139(8):1159–65. Available from: http://www.journals.cambridge.org/abstract_S0950268810002827

63. Wiktor S. Implementation of the WHO Global Hepatitis Framework. WHO. 2012;(June).

64. Manamela J, Prabdial-Sing N. Establishing a framework for better data collection and surveillance of Hepatitis in South Africa. 2013;

65. Botha JF, Dusheiko GM, Ritchie MJJ, Mouton HWK, Kew MC. Hepatitis B Carrier State in Black children in Ovamboand: Role of Parinatal and horizontal transmission. Lancet [Internet]. 1984 Jun [cited 2017 Jul 9];323(8388):1210–2. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0140673684916945

66. Diale Q, R Pattinson, R Chokoe, L Masenyetse SM. Antenatal screening for hepatitis B virus in HIV-infected and uninfected pregnant women in the Tshwane district of South Africa. SAMJ South African Med J. 2016;106(1):4.

67. Ahmed SD, Cuevas LE, Brabin BJ, Kazembe P, Broadhead R, Verhoeff FH, et al. Seroprevalence of hepatitis B and C and HIV in Malawian pregnant women. J Infect [Internet]. 1998 Nov 7 [cited 2017 Jun 16];37(3):248–51. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0163445398919831

68. Nayagam S, Thursz M, Sicuri E, Conteh L, Wiktor S, Low-Beer D, et al. Requirements for global elimination of hepatitis B: a modelling study. Lancet Infect Dis [Internet]. 2016 Dec [cited 2017 Oct 14];16(12):1399–408. Available from: http://linkinghub.elsevier.com/retrieve/pii/S1473309916302043

69. US Department of Health and Human Services. Combating the Silent Epidemic of Viral Hepatitis: Action Plan for the Prevention, Care & and Treatment of Viral Hepatitis [Internet]. 2010 [cited 2017 Jun 16]. Available from: https://www.hhs.gov/ash/initiatives/hepatitis/actionplan_viralhepatitis2011.pdf

70. Tsebe K V, Burnett RJ, Hlungwani NP, Sibara MM, Venter PA, Mphahlele MJ. The first five years of universal hepatitis B vaccination in South Africa: evidence for elimination of HBsAg carriage in under 5-year-olds. Vaccine [Internet]. 2001 Jul [cited 2017 Jun 23];19(28–29):3919–26. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0264410X01001207

71. Maxwell AE, Stewart SL, Glenn BA, Wong WK, Yasui Y, Chang LC, et al. Theoretically informed correlates of hepatitis B knowledge among four Asian

groups: the health behavior framework. Asian Pac J Cancer Prev [Internet]. 2012 [cited 2017 Jun 16];13(4):1687–92. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22799389

72. Mueller A, Stoetter L, Kalluvya S, Stich A, Majinge C, Weissbrich B, et al. Prevalence of hepatitis B virus infection among health care workers in a tertiary hospital in Tanzania. BMC Infect Dis [Internet]. 2015 Dec 23 [cited 2017 Sep 16];15(1):386. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26399765

73. Anaedobe CG, Fowotade A, Omoruyi CE, Bakare RA. Prevalence, sociodemographic features and risk factors of Hepatitis B virus infection among pregnant women in Southwestern Nigeria. Pan Afr Med J [Internet]. 2015 [cited 2017 Jun 16];20:406. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26301010

74. El-Hamad I, Pezzoli MC, Chiari E, Scarcella C, Vassallo F, Puoti M, et al. Point-of-Care Screening, Prevalence, and Risk Factors for Hepatitis B Infection Among 3,728 Mainly Undocumented Migrants From Non-EU Countries in Northern Italy. J Travel Med [Internet]. 2015 Mar 1 [cited 2017 Jun 16];22(2):78–86. Available from: https://academic.oup.com/jtm/article-lookup/doi/10.1111/jtm.12176

75. Njai HF, Shimakawa Y, Sanneh B, Ferguson L, Ndow G, Mendy M, et al. Validation of rapid point-of-care (POC) tests for detection of hepatitis B surface antigen in field and laboratory settings in the Gambia, Western Africa. J Clin Microbiol [Internet]. 2015 Apr 1 [cited 2017 Jun 26];53(4):1156–63. Available

from: http://www.ncbi.nlm.nih.gov/pubmed/25631805

76. Shivkumar S, Peeling R, Jafari Y, Joseph L, Pai NP. Rapid Point-of-Care First-Line Screening Tests for Hepatitis B Infection: A Meta-Analysis of Diagnostic Accuracy (1980–2010). Am J Gastroenterol [Internet]. 2012 Sep 29 [cited 2017 Jun 16];107(9):1306–13. Available from: http://www.nature.com/doifinder/10.1038/ajg.2012.141

77. Place of Point-of-Care Tests (POCTs) in hepatitis B screening strategy What is The Place Of POCT In The Hepatitis B Screening Strategy? Hepatitis B in France. 2016 [cited 2017 Jun 16]; Available from: https://www.has-sante.fr/portail/upload/docs/application/pdf/2017-05/dir76/synthese_place_of_point-of-care_tests_pocts_in_hepatitis_b_screening_strategy.pdf

78. Timothy M. Block, Haitao Guo, and Ju-Tao Guo M. Molecular virology of hepatitis B virus for clinicians. 2008;11(4):1–21.

79. Kelly MP, Stewart E, Morgan A, Killoran A, Fischer A, Threlfall A, et al. A conceptual framework for public health: NICE’s emerging approach. Public Health [Internet]. 2009 Jan [cited 2017 Jun 23];123(1):e14–20. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0033350608002795

80. WHO | Hepatitis monitoring and evaluation framework in 5 minutes. WHO [Internet]. 2016 [cited 2017 Jun 16]; Available from: http://www.who.int/hepatitis/news-events/hep-m_e-framework-video/en/

81. Yonghao G, Jin X, Jun L, Pumei D, Ying Y, Xiuhong F, et al. An epidemiological serosurvey of hepatitis B virus shows evidence of declining prevalence due to hepatitis B vaccination in central China. Int J Infect Dis [Internet]. 2015;40:75–80. Available from: http://dx.doi.org/10.1016/j.ijid.2015.10.002

82. Bastani R, Glenn BA, Taylor VM, Chen MS, Nguyen TT, Stewart SL, et al. Integrating theory into community interventions to reduce liver cancer disparities: The Health Behavior Framework. Prev Med (Baltim) [Internet]. 2010 [cited 2017 Sep 19];50(1–2):63–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19716379

83. Services USD of H and H. Action Plan for the Prevention, Care, and Treatment of Viral Hepatitis Update 2014-2016. 2014;1–100. Available from: http://aids.gov/pdf/viral-hepatitis-action-plan.pdf%5Cnpapers3://publication/uuid/923E097E-CE4F-478D-AC3A-F40E626D78AB

84. Martinson FEA, Weigle KA, Royce RA, Weber DJ, Suchindran CM, Lemon SM. Risk Factors for Horizontal Transmission of Hepatitis B Virus in a Rural District in Ghana. Am J Epidemiol [Internet]. [cited 2017 Jun 16];147(5). Available from: https://oup.silverchair-cdn.com/oup/backfile/Content_public/Journal/aje/147/5/10.1093/oxfordjournals.aje.a009474/2/147-5-478.pdf?Expires=1497731799&Signature=ENWAT-6Dr-a3~dEbhEFTibffXHJPeYmkBOsPURrUzJv0lJR8Z~iOpXguZSq0BqO8LE99hS1

ykoZSzMghPSTFlmzJe5pkCmmJDht-cOWoFg8YIUtfQlLIiJvJuwFIQioNTXSpbNakittFmtwVC6xyyWL1Cwg7hEgqJvfjuqsFQATIUqt0EA~cyG2lj5S27F5EJL91TakGabij8QHwN6YxVM5agdE9tcpkXpftx1AGgCRdVsCgE~BQ4FZhnxKKXK3H8TnNTBkRB0o7IFEhaPDYByoJJeqL-SrbHqYspupdAxFu2OTzLlfCvGv~oxfXfQPkq1UDKpyj72Tla77qYesFhQ__&Key-Pair-Id=APKAIUCZBIA4LVPAVW3Q

85. Regional Action Plan for the Implementation of the Global Strategy for Viral Hepatitis 2017-2021 Draft for consultation (2) WHO Regional Office for the Eastern Mediterranean. [cited 2017 Jun 16]; Available from: http://www.emro.who.int/images/stories/hepatitis/hepatitis_action_plan_2017_2021_for_consulation.pdf?ua=1

86. The Lancet Global Health. The hidden threat of hepatitis B. Lancet Glob Heal [Internet]. 2016 Aug [cited 2017 Jun 16];4(8):e502. Available from: http://linkinghub.elsevier.com/retrieve/pii/S2214109X16301449

87. Day FL, Link E, Thursky K, Rischin D. Current hepatitis B screening practices and clinical experience of reactivation in patients undergoing chemotherapy for solid tumors: a nationwide survey of medical oncologists. J Oncol Pract [Internet]. 2011 May [cited 2017 Jun 23];7(3):141–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21886492

88. Easterbrook P, Sands A, Harmanci H. Challenges and Priorities in the Management of HIV/HBV and HIV/HCV Coinfection in Resource-Limited

Settings. Semin Liver Dis [Internet]. 2012 May 3 [cited 2017 Jun 25];32(2):147–57. Available from: http://www.thieme-connect.de/DOI/DOI?10.1055/s-0032-1316476

89. Lemoine M, Nayagam S, Thursz M. Viral hepatitis in resource-limited countries and access to antiviral therapies: current and future challenges. Future Virol [Internet]. 2013 Apr [cited 2017 Jun 25];8(4):371–80. Available from: http://www.futuremedicine.com/doi/10.2217/fvl.13.11

90. Desalegn Z, Mihret A, Beyene HB, Yilma M, Seid Y, Tamiru W, et al. Survey of Hepatitis B virus infection and risk factors among pregnant women at public hospitals in Ethiopia. Int J Biomed Res. 2016;7(7):450–6.

91. World Health Organization. From MDGs to SDGs: A new era for global public health 2016-2030. 2016;2.

ANNEXURES

ANNEXURE A: PERMISSION LETTER FROM NIP

14 February 2014

Enquiries: Boniface Makumbi

Mr P Mhata
PO Box 21187
Windhoek
Namibia

RE Investigation into Hepatitis B Virus Prevalence and Risk Factors in Kavango Region to Develop a Prevention and Control Program Framework for Namibia

The above mentioned research was reviewed by the Research Committee of NIP and was thus approved.

Sincerely

Mr Harold T. Kaura
Acting Chief Executive Officer

NAMIBIA INSTITUTE OF PATHOLOGY (NIP) LTD
CHIEF EXECUTIVE OFFICER
2014 -02- 14
PO Box 277 WINDHOEK, NAMIBIA
Tel. 061-2954200
Fax. 061-255566

Directors: M. Kapere- (Chairperson); A. Ndishishi; K. Von Wenzel - Obholzer; T. Mberirua; M.K. Jankie; D. Shuuluka; H. Muyoba; H.T. Kaura (Acting CEO)

ANNEXURE B: PERMISSION LETTER FROM MOHSS

9-0/0001

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198	Ministerial Building	Tel: (061) 203 2560
Windhoek	Harvey Street	Fax: (061) 222558
Namibia	Windhoek	E-mail: tkakili@yahoo.com
Enquiries: Ms. T. Kakili	Ref: 17/3/3	Date: 11 November 2013

OFFICE OF THE PERMANENT SECRETARY

Mr Petrus Mhata
P.O. Box 21187
Windhoek

Dear Mr Mhata

Re: Hepatitis B virus (HBV) prevalence and risk factors in Kavango region, 2013-2014.

1. Reference is made to your application to conduct the above-mentioned study.

2. The proposal has been evaluated and found to have merit.

3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**

3.1 The data to be collected must only be used for the completion of your Doctoral degree in in Public Health;
3.2 No other data should be collected other than the data stated in the proposal;
3.3 A quarterly report to be submitted to the Ministry's Research Unit;
3.4 Preliminary findings to be submitted upon completion of the study;
3.5 Final report to be submitted upon completion of the study;
3.6 Separate permission should be sought from the Ministry for the publication of the findings.

Yours sincerely,

15 NOV 2013

MR. ANDREW NDISHISHI
PERMANENT SECRETARY

" Health for All "

ANNEXURE C: DATA COLLECTION INSTRUMENTS FOR HCWS

FORM C-1: CONSENT FORMS FOR HEALTH CARE WORKERS

Instruction: This is a CONSENT FORM FOR the HCWs from the MOHSS, Namibia Institute of Pathology, state and private clinicians, and other stakeholders to participate in the Hepatitis B virus (HBV) prevalence study in Namibia, 2014-2016

Dear Colleague,

You have been selected purposively to participate in the **first phase** of the Hepatitis B Virus (HBV) study currently being conducted in Namibia. HBV is an asymptomatic and highly infectious disease. The people who are infected are generally not aware of their infection. Most health workers and communities in Namibia do not have sufficient information on the magnitude, control measures and the risk factors associated with the spread of this disease in Namibia. It therefore continues, uninterruptedly, to spread among household and immediate contacts of the infected people. The purpose of this studyis to collect, analyse and document information on HBV Control and Develop a Hepatitis B Virus Prevention and Control Program Framework for Namibia.

The study is comprised of two phases. **The first phase** aims at collecting information on confirmed viral Hepatitis from the National Institute of Pathology (NIP) and from Pathcare laboratories. The HBV and HBV/HIV co-infection data, and information on

current control strategies/plans, will be obtained from purposively selected Senior Staff, Program Officers in the MOHSS; State and Private Medical Officers and from stakeholders, including the Health Development Partners. ***You are only required to participate in this first phase.***

The 2nd phase aims at investigating and determining the sero-logical prevalence and risk factors associated with HBV in Kavango region, later this year. Take not that you are not be required to participate in this phase.

Please take time to complete the attached questionnaire (for phase 1), ***within three days of receipt***. The information you provide will be kept confidential and will only be used for the purpose of this study. Your contribution will lead to the improved prevention, care and management of Hepatitis B in Namibia. If the answer to a question is not immediately available, please make every effort to find the information and submit it, along with all supporting information, to Petrus Mhata, email address mhatapita@gmail.com or mhatap@who.int and/or reach him at ***0811 2283 7 8/0811474123***.

Can we proceed? ☐ Yes ☐ No Your signature and date here: ___________

FORM C-2: SELF-ADMINISTEREDQUESTIONNAIRE FOR MOHSS HWCS

(*For program managers: Epidemiology, Family Health, DSP and medical officers)*

Participant Code:	☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Date interview/form received:	--- /-- /---- (dd/mm/yyyy
Date interview/form returned/collected/completed: ***(To be collected preferably within three working days)***	--- /-- /---- (dd/mm/yyyy ***(preferably within three working days from date received)***
Name of interviewer/investigator:	First Name: Petrus Last Name: Mhata Tel number: 0811 2283 78/ 0811 4741 23
Name of office/division of interviewee/participant:	☐1-(Dep PS, Director PHC, Director DSP, DDs) ☐2-Prog Officer – please tick as applicable…..(EpidSurv/HIS, DSP, FH) ☐3-Medical Officer☐4-Nurse (in charge) specify: _________ ☐ 4-Other, Specify: ______________________________
Name of Region of interviewee/participant:	☐1-Kavango ☐2-Khomas ☐3-Not Applicable (if working at national level)

Name of District of interviewee/participant:	☐1-Andara ☐2-Nyangana ☐3-Nankudu ☐4-Rundu ☐5-Not Applicable (if working at national level)
Name(s) and position of Participant	First Name: ________________________ Last Name: _________________________ Position: ___________________________ Tel number: ________

FORM C-2. CONTINUED …A SELF ADMINISTERED QUESTIONNAIRE FOR MOHSS HWCS

(For program managers: Epidemiology, Family Health, DSP and medical officers)

A. AWARENESS-RAISING, PARTNERSHIPS AND RESOURCE MOBILIZATION

Question	Response
Thank you for agreeing to participate in this study…	
STRATEGY AND GUIDING DOCUMENTS	
1. Does the MOHSS have a written national strategy or guiding document that focuses exclusively on the prevention & control of viral hepatitis?	☐ 1 –Yes ☐ 2- No ☐ 99- Do not know
2. If yes, to question 1, record the names and dates of policy exclusively for prevention/control of viral hepatitis:	
3. Does the MOHSS have a written national strategy or guiding document where Hepatitis B prevention/ control is integrated with other diseases (e.g. hepatitis	☐ 1 –Yes ☐ 2- No ☐ 99- Do not know

B combined with HIV, or with sexually transmitted infections)?	
4. If yes, to question 3, record the names and dates of policies integrating HBV with HIV/other STI.	____ ____
5. Does the MOHSS have a written national Hepatitis B Virus screening or vaccination guiding document, which targets certain populations/risk groups in the country?	☐ 1 –Yes ☐ 2- No ☐ 99- Do not know
6. If yes, to question 5, please tick the populations/risk groups that are targeted by that HBV prevention/control strategy/policy?	☐ 1- Health-care workers (including waste handlers) ☐ 2- People living with HIV ☐ 3- Pregnant women ☐ 4- People who inject drugs ☐ 5- Prisoners ☐ 6-The homeless ☐ 7- Others, please explain: ____________________
7. If yes to question 5, please list the documents guiding the screening/vaccinating of these risk groups mentioned in question 6 above.	____
8. Does the MOHSS have Hepatitis B policy/strategy that addresses the following components?	Please tick what applies

8.1 Raising awareness for health workers and communities	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.2.Surveillance for viral hepatitis	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.3. Vaccinations against Hepatitis B	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.4. Prevention of transmission in health-care settings	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.5. Prevention of transmission from mother to child	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.6. Prevention of transmission from chronic carrier to household and sexual contacts	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.7. Prevention of transmission via injecting drug use	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.7.Treatment and care of people with HBV	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.8. Treatment and care of HBV co-infection with HIV	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
8.9. Other, please specify __________	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
9. If yes, to any question 8.1-8.9 above, record the names and dates of that/those policy document(s), addressing surveillance, vaccinations, PMTCT, ART, etc.	____
10. Do you know of any relevant research reports/ publications, consultants'/local experts' reports or management protocols that are used	☐ 1 -Yes ☐ 2 –No

in the prevention and control of Hepatitis B Virus (HBV) in Namibia?	
11. If yes to question 10, please list title of reports and management protocols, dates and authors.	Please write the titles, dates and authors below:
	☐ 1 –Published HBV Research Reports/Management protocols:____
	☐ 2 – Unpublished HBV Consultant's reports/research reports/management protocols: ____

B. EVIDENCE-BASED POLICY AND DATA FOR ACTION	
12. Does the Health Information System of the MOHSS in Namibia, report the following types of viral hepatitis infections routinely? Tick all the boxes that apply.	Tick all the boxes that apply ☐ 1 –Hepatitis A ☐ 2 –Hepatitis B ☐ 3 –Hepatitis C ☐ 4 –Hepatitis D ☐ 5 –Hepatitis E ☐ 6 –None of the above ☐ 99 –Don't know
13. Is there designated divisions/units in the MOHSS that is responsible for coordinating or carrying out viral hepatitis-related activities at national, regional and district levels?	☐ 1 –Yes ☐ 2 –No ☐ 99 –Don't know
14. If yes to question 13 state the name(s) of unit(s) coordinating viral hepatitis prevention/control.	
15. State the main functions of unit(s) designated to coordinate prevention/control viral hepatitis at your level.	Please tick the level that applies to you ☐ 1 – Main Functions: ____
For HIS, Surveillance Officers and DSP/ART Officers 16. Are the tables 16.1 by sex and place by HIS/Surveillance officer?	Please provide remarks after completing the tables 16.1-16.5 ☐ 1-Yes ☐ 2-No ☐3-Data missing

17. How often does this unit Q14 above) provide feedback/document analysed HBV data to policy makers/service providers/stakeholders?	☐ 1-+2 times/year ☐ 2-rarely ☐ 3 –Never
18. If feedback is provided – was copy of the latest feedback report observed/presented?	1-Yes 2-No
19. To what extent is the collected HBV data used for action/planning?	Please explain: ____
20. Is there a designated division/unit in the MOHSS that is responsible for coordinating or carrying out HBV and HBV/HIV co-infection activities at your level?	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
21. If yes to question 20 state the name(s) of the unit(s) responsible for coordinating HBV/HIV co-infection	Names of Units/divisions: ____ ____
22. Please state the main functions of the units responsible for HBV/HIV co-infection at your level?	Please tick the level that applies to you ☐ 1 – Main Functions: ____________________________________

23. How often does/do the unit(s)/division(s) named in question 21 above, document analysed HBVHIV co-infection data, or provide feedback to the policy makers, service providers and stakeholders?	☐ 1-+2 times/year ☐ 2-rarely ☐ 3 –Never
24. If regular documentation or feedback is provided – was a copy presented/observed by the interviewer	1-Yes 2-No Please record below:____
25. To what extent is the collected HBV/HIV co-infection data used for action/planning?	Please explain: ____ ____
26. Are data tables 26.1-26.2 filled in completely (at the end of the Questionnaire)?	Please provide remarks after completing the tables 26.1-26.2 1-Yes 2-No 3-Data missing
For All	
27. Does the MOHSS have a national public health research agenda for viral hepatitis?	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
28. If yes, please provide priority research topics for viral hepatitis in the MOHSS?	Please list priority research topics below ☐ 1 –Topic____ ☐ 2 –Topic____ ☐ 3 –Topic____

29. Does the MOHSS have a national policy /strategy that specifically targets mother-to-child transmission of hepatitis B?	1 -Yes 2 –No 99 –Don't know
30. If yes, please tick if that policy calls for any of these activities	
	☐ 1-All pregnant women are screened for hepatitis B
	☐ 2-All pregnant women found to have hepatitis B are counselled
	☐ 3-Health-care providers follow up with all pregnant women found to have hepatitis B during pregnancy for the purpose of encouraging them to give birth at H facilities
	☐ 4-Upon delivery, all infants born to women with hepatitis B receive hepatitis B immunoglobulin
	☐ 5-All infants receive the first dose of hepatitis B vaccine within 24 hours of birth, irrespective the mother's Hepatitis B status
	☐ 6-All infants receive the three doses of Pentavalent (including hepatitis B vaccine) within 12 months of birth.
31. Please provide evidence by recording the name and date of the reference document/guideline mentioned in Q29-30 above.	Please record in this space: ____ ____ ____
32. Does the MOHSS have	Yes 2-No 3-Do not know

a national policy /strategy that targets transmission of hepatitis B among the general public?	
33. If yes, please provide title, date and a copy of policy preventing HBV transmission general public.	
34. For EPI Program/Family Health Officers Only Please provide copy of Pentavalent3 coverage data and (drop-out rates) by district within the first year of life during 2013.	
35. For Infection Control Officer Please provide Number of HWs who started the Hepatitis B vaccination schedule and the numbers who completed it (2013.	
36. For Medical Officers/Cancer Association Please complete tables 36.1-36.6 end of questionnaire	

C. SCREENING, CARE OF CHRONIC HBV AND TREATMENT	
For Medical Officers 37. Are all donated blood units and blood products nationwide screened for hepatitis B?	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
For Medical Officers 38. If yes, please explain more, if you can – specifically on how the window period is taken care of?	Please explain:
For Medical Officers 39. Does the MOHSS have national clinical guidelines/management protocols for the Treatment of Hepatitis B?	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
For Medical Officers 40. If yes, please indicate the title and date of publication.	
For Medical Officers 41. Where do the health professionals in Namibia obtain their	☐ 1 -Schools for health professionals (pre-service education) ☐ 2 -On-the-job training ☐ 3 -Postgraduate training ☐ 4 –Self-reading

skills and competencies required to effectively prevent, control, treat and care for the people living with Hepatitis B?	☐ 99 -Do not know
For Medical Officers 42. Of the following medications for treating Hepatitis B, which ones are on the national essential medicines list and subsidized by the government?	Please tick all the boxes that apply ☐ 1 - Interferon alpha education) ☐ 2 - Pegylated interferon ☐ 3 - Lamivudine (Epivir-HBV, Zeffix or Heptodin) ☐ 4 Adefovirdipivoxil (Hepsera) ☐ 5 Entecavir (Baraclude) ☐ 6 Telbivudine (Tyzeka, Sebivo) ☐ 7 Tenofovir (Viread) ☐ 8-Do not know
43. Did the MOHSS establish the goal of eliminating hepatitis B in Namibia?	☐ 1 –Yes ☐ 2 –No ☐ 99 –Don’t know
44. If yes, please explain that goal a bit further	
D. AREAS THAT MAY NEED FURTHER STRENGTHENING AND SUPPORT	
45. Do you think that the current MOHSS practice with regard to the prevention and	☐ 1- Yes ☐ 2- No ☐ 9- Don’t know

control of HBV infections, including the management and care of people living with chronic hepatitis B is on course with expected national and international standards for HBV control?	
46. In your view, what are the four key critical challenges for the effective interruption of HBV in Namibia? (please list from most important to least important)	Priority challenges for HBV prevention/control/care ☐ 1-challenge ____________________ ☐ 2-challenge____________________ ☐ 3-challenge____________________ ☐ 4-challenge____________________
47. In your opinion, what are the four priority actions that the MOHSS should take to reduce HBV transmission in Namibia? (list from most important to least important)	Priority actions needed -HBV prevention/control/care ☐ 1-Action____________________ ☐ 2-Action____________________ ☐ 3-Action____________________ ☐ 4-Action____________________

48. Please list up to four priority areas of support, if any, in which the MOHSS might need assistance from the health partners to interrupt the transmission of HBV in Namibia.	Priority areas of support for the MOH/country for HBV prevention/control/care ☐ 1-support in____ ☐ 2- support in____ ☐ 3- support in ____ ☐ 4- support in ____
49. Which development partners/NGOs and stakeholders, in your view, might be willing to provide technical and financial support in the prevention and control of HBV in Namibia.	
	☐ 1-Vaccine Companies e.g. GSK ☐ 2-UNAIDS ☐ 3-USAID
	☐ 4-Namibia Institute of Pathology ☐ 5-Pathcare ☐ 6-WHO
	☐ 7-UNICEF ☐ 8-CDC ☐ 9-I-TECH
	☐ 10-Cancer Association of Namibia ☐ 11-Global Fund ☐ 12-Project Hope
	☐ 13-Namibia Blood Transfusion Services
	☐ 14-Others, Specify1: _______________________________________
Any other comment?	Any other comment:

E. PREVENTION OF TRANSMISSION

Thanks for your time and invaluable contribution.

The remaining set of questions below will ONLY be completed by:

- ***Health Information System Officer (Form C-3)***

FORM C-3: REPORTED HBV INFECTIONS-HIS/SURVEILLANCE 2013

Region: __________________ District:_______________ Health Facility: ___________

Suspected Viral Hepatitis	Date (dd/mm/ yyyy)	Age-group yrs (<1; 5-9; 10-14; 15-19, etc	Gender M/F		Lab results Hep A (Pos/Neg)	Lab results Hep B (Pos/Neg)	Lab results Hep C (Pos/Neg)	Lab results Hep E (Pos/Neg)	# on treatment for Chronic HBV	Deaths
			M	F						
Total										

Please do the same for all the 34 health districts (or 13 regions)

FORM C-4: DEATHS DUE TO HBV COMPLICATIONS 2013

Region: __________________ District:_______________ Health Facility: ___________

Deaths due to Hep B complications	Date (dd/mm/yyyy)	Age-group yrs (<1; 5-9; 10-14; 15-19, etc	Gender M/F		Death due to liver cirrhosis/fibrosis	Death due to liver cancer	Death due to other liver conditions	Remarks
			M	F				
Total								

Please do the same for all the 34 health districts (or 13 regions)

FORM C-5: SELF-ADMINISTERED QUESTIONNAIREFOR PRIVATE CLINICIANS AND OTHER HCWS

(for NIP, private mo's and nurses; and other stakeholders/health partners on HBV study in namibia (situational analysis -phase 1) 2014-2016

IDENTIFICATION

Participant Code:	□□□□□□□□□□□□□□□□□□
Date interview/form received:	--- /-- /---- (dd/mm/yyyy
Date interview/form returned/collected/completed: ***(To be collected preferably within three working days)***	--- /-- /---- (dd/mm/yyyy ***(preferably within three working days from date received)***
Name of interviewer/investigator:	First Name: Petrus Last Name: Mhata Tel number: 0811 2283 78/ 0811 4741 23

Name of office/division of interviewee/participant:	☐1-Cancer Association of Namibia ☐2-Centers for Disease Control ☐3-Global Fund ☐4-Pharmaceutical company GSK/Roche/SPasteur ☐5-I-TECH ☐6- Namibia Blood Transfusion Serv ☐7-NIP ☐8-Pathcare ☐9-Project Hope ☐10-Private clinician ☐11-UNAIDS ☐12-USAID ☐13-UNICEF ☐14-WHO ☐ 15-Other, Specify: ___________________
Name of Region of interviewee/participant:	☐1-Kavango ☐2-Not Applicable (if working in Windhoek)
Name of District of interviewee/participant:	☐1-Andara ☐2-Nyangana ☐3-Nankudu ☐4-Rundu ☐5-Not Applicable (if working in Windhoek)
Name(s) and position of Participant	First Name: _______________________ Last Name: ________________________ Position: _________________ Tel number: _______

QUESTION	RESPONSE
A. AWARENESS-RAISING, PARTNERSHIPS AND RESOURCE MOBILIZATION	
1. Is Hepatitis B Virus (HBV) infection a major health problem in Namibia?	☐ 1- Yes ☐ 2- No ☐ 9- Don't know
2. If Yes to question 1, what do you see as the main reasons for the further spread of Hepatitis B Virus (HBV) in the country?	Main reasons for HBV spread ☐ 1-reason ____________________ ☐ 2-reason ____________________ ☐ 3-reason____________________ ☐ 4-reason____________________
3. Do you know of any relevant studies/publications/ reports or management protocols on Hepatitis B in Namibia or elsewhere, which are useful to the prevention and control of HBV in the country.	☐ 1 –Yes ☐ 2 –No
4. If yes to question 3, ***please list titles, dates and authors in the column on the right.***	***Please write the titles, dates and authors below***
	☐1 –Research reports (published or unpublished): ____________________

	☐2 – Consultant's reports: ____
	☐3 – Interviews with local HBV experts & stakeholders:________________________ __________________________
	☐4 – Others, Specify: ____
5. How does your Entity/Agency/Unit contribute to the prevention and control of hepatitis B virus (HBV) in Namibia?	Please explain: ____
B. EVIDENCE-BASED POLICY AND DATA FOR ACTION	
6. Does your agency receive regular analysed data and information from the MOHSS that includes Hepatitis B Virus (HBV) for Namibia?	☐ 1-Yes ☐ 2-No ☐ 3- Not Applicable ☐ 99 –Don't know
7. If yes, to Q6 is a copy of analysed HBV feedback data that was received from the MOH available?	☐1-Yes ☐2-No
7.1. Evidence available of how data was used for action and planning?	☐1-Yes ☐2-No
8. Do you receive regular analysed HBV/HIV co-infection data from MOH?	☐ 1-Yes ☐ 2-No

9. If yes to Q8, is a copy of analysed HBV/HIV co-infection data from the MOH available?	☐-Yes ☐ 2-No
9.1. If yes, to Q8 is there evidence available of how data was used for action/planning?	☐-Yes ☐ 2-No
10. Please explain and provide a copy of relevant HBV related data that you have (which can be used for the purpose of this study)	
For NIP and Pathcare laboratories only 11. Were ***questions 27-32 and tables 16.1-16.5*** completely answered?	☐-Yes ☐2-No ☐3-Not applicable
C. PREVENTION OF TRANSMISSION	
12. Please explain briefly, the current prevention and control interventions used by the MOHSS and stakeholders to reduce HBV transmission among the Namibian population?	Please explain briefly:
13. Which components should, in your view, be included in the	1. 2. 3.

policy/strategy that is designed to prevent ***mother-to-child transmission*** of Hepatitis B Virus in Namibia?	
14. In your view, what are the components for reducing HBV ***transmission among the general population***, which the MOHSS should consider for inclusion in the Hepatitis B prevention and control policy/strategy for Namibia?	1. 2. 3. 4.
D. SCREENING, CARE AND TREATMENT FOR HBV	
15. In your view, do you think all donated blood units and blood products Nationwide that have been screened for Hepatitis B Virus in Namibia, are safe?	☐ 1 -Yes ☐ 2 –No ☐ 99 –Don't know
16. If yes, please explain, if you can (specifically on how the window period is taken care of?)	
17. ***For medical staff***: Where do you or your staff obtain skills competen-cies required to effectively prevent, care or treat people with HBV?	☐ 1 -Schools for health professionals (pre-service education) ☐ 2 -On-the-job training ☐ 3 -Postgraduate training, Self-reading ☐ 4 -Other, specify____

18. ***For medical staff only***: Which medications are generally being used by private clinicians for treating hepatitis B in Namibia?	***Please tick all the boxes that apply*** ☐ 1 - Interferon alpha education ☐ 2 -Pegylated interferon ☐ 3 - Lamivudine (Epivir-HBV, Zeffix or Heptodin) ☐ 4 Adefovirdipivoxil (Hepsera) ☐ 5 Entecavir (Baraclude) ☐ 6 Telbivudine (Tyzeka, Sebivo) ☐ 7 Tenofovir (Viread) ☐ 8 -Other, specify_________________________
19. ***For medical staff only***: What are your views on the cost-effectives of monitoring and treatment of HBV with available medications, compared to non-monitoring and non-treatment?	***Please comment:***
E. **AREAS THAT MAY NEED FURTHER STRENGTHENING AND SUPPORT**	
20. Please indicate ***up to four priority areas of support***, if any, in which the health sector (state and private clinicians) might need assistance from the health stakeholders (development partners, pharmaceutical companies, etc) to reduce the transmission of Hepatitis B in Namibia?	

21. ***For medical staff only***: Do you think that the current practice by most private and state clinicians with regard to the prevention and control of HBV infections, including the management and care of people living with chronic hepatitis B is in line with expected national and international standards for HBV control?	☐ 1- Yes ☐ 2- No ☐ 99- Don't know
22. If yes, please explain	
23. In your view, what are the four key critical challenges to the effective prevention and control of HBV in Namibia? (***please list from most important to least important)***	***Priority challenges for HBV prevention/control/care*** ☐ 1-challenge ______________________ ☐ 2-challenge______________________ ☐ 3-challenge______________________ ☐ 4-challenge______________________
24. In your opinion, what are the four priority actions that the MOHSS should take to reduce the morbidity and mortality due to Hepatitis B in Namibia? (***please list from most important to least)***	***Priority actions needed -HBV prevention/control/care*** ☐ 1-Action______________________ ☐ 2-Action______________________ ☐ 3-Action______________________ ☐ 4-Action ______________________

25. Please state development partners/NGOs and stakeholders that, in your view, might have an interest in providing technical and financial support in reducing the transmission of HBV in Namibia.	
	☐ 1-Vaccine Companies
	☐ 2-UNAIDS
	☐ 3-USAID
	☐ 4-Namibia Institute of Pathology (NIP)
	☐ 5-Pathcare
	☐ 6-WHO
	☐ 7-UNICEF
	☐ 8-CDC
	☐ 9-I-TECH
	☐ 10-Cancer Association of Namibia
	☐ 11-Global Fund
	☐ 12-Project Hope
	☐ 13-Namibia Blood Transfusion Services
	☐ 14-Others, Specify1: ___________________________
26. Any other comment?	Any other comment:____

Thank you for your time and contribution.

FORM C-6: SELF ADMINISTERED QUESTIONNIRE AND CHECKLIST FOR NIP

These Sections are to be completed by:

- ***Namibia Institute of Pathology Laboratories(Q27-29)***
- ***Medical Officer/Hepatologist/Cancer Association of Namibia (Tables 36.3-36.5)***

For NIP and Pathcare Laboratories Only	
27. For which viral hepatitis does NIP/Pathcare perform the tests locally (in Namibia)?	***Please tick the applicable viral hepatitis for which tests are performed locally by NIP*** ☐1-Hepatitis A ☐2-Hepatitis B ☐3-Hepatitis C ☐4-Hepatitis D ☐5-Hepatitis E ☐5-Not applicable
28. Please tick the Hepatitis B serological tests that are performed by NIP/Pathcare locally.	☐1-Hepatitis B surface antigen (HBsAg ☐2-Hepatitis B surface antibody (anti-HBs): ☐3-Total hepatitis B core antibody (anti-HBc) ☐4-IgM antibody to hepatitis B core antigen (IgM anti-HBc) ☐5-Hepatitis e antigen ☐6-Others, Specify______________________________
29. Please provide remarks, on the tests that are not done locally by NIP/PathcareLaboratories.	

FORM C-7: NIP HBV LABORATORY RESULTS/REASON FOR TESTING, 2013

Region: __________________District:_______________ Health Facility: ___________

Date (dd/mm/yyyy)	Names	Age in months/ Years	Gender	ANC/ARV/Other (Reason for testing/screening)	Laboratory outcome (Result) Pos/Neg

Please do the same for all the 34 health districts (or 13 regions)

ANNEXURE D: CONSENT AND DATA COLLECTION TOOLS - HBV PREVALENCE SURVEY IN KE&W REGIONS

FORM D-1: INFORMED CONSENT FORM FOR PARENTS/GUARDIANS

Obtaining informed consent for the interview

Instruction to the interviewer: ***read this consent form aloud and clearly to the respondent.***

Good morning/good afternoon. My name is [name of the interviewer]. I am representing [the Ministry of Health]. The Ministry of Health and their partners are working together on preventing and controlling Hepatitis B Virus that affects the liver. The Ministry of Health would like to know what is happening in the general population in order to be able to improve and plan the delivery of services to our people. The Ministry is getting this information by asking people in their homes some questions. I am here to ask you some questions. Some of these questions will be about your personal life. I am aware that some of the questions are sensitive, but all the information you give me will be kept strictly confidential. Participation in this survey is voluntary. You can refuse to answer all or some of the questions, but the Ministry of Health would appreciate your help in answering all the questions. It is important for you to know that your participation will not affect your ability to use health facilities or any other services. We are hoping that you will participate since your participation and views are highly valued and important. At this time, do you want to ask me anything about the survey? May I begin asking you the questions now?

[Instruction to the interviewer: wait for the answer and make sure you do not rush the respondent to answer. If the respondent is not answering, gently ask the question again until you get an answer.]

I have been informed about this survey and understand its purpose and objectives. I understand the details, have been informed about the requirements and hereby agree to participate in the survey.

Signature of respondent_ ________________________ Date_ ________________

Signature of interviewer__________________________ Date_ ________________

FORM D-2: INFORMED CONSENT FOR HBV TESTING

Instruction to the interviewer: ***the person taking the specimen should seek this consent after the interview. If this is a different person from the interviewer, he or she should start also by greeting and introducing himself or herself to the respondent. If it is the same person, he or she should go straight to the consent form and read it aloud and clearly to the respondent. For children (younger than 18 years), the parent or the guardian must first be asked for consent. Only if the parent or guardian agrees will the child be asked to consent to the test*.**

As part of this survey, we want to know how many people have the Hepatitis B virus that causes liver diseases including liver cancer. We are asking people in the region to give a limited amount of blood with a finger prick and/or find out whether there is HBV infection or not. HBV infection affects the liver and the disease does not show symptoms until it reaches an advanced stage. We will do this in a completely safe way. All the materials we use are new, sterile and clean. We will advise you on your HBV status and discuss further options. Information from this survey will be shared with the MoHSS, but no names or identification of any person will be used anywhere in the report or otherwise made public. If the results are positive, you will be advised on how to reduce further transmission and how to protect yourself and your close contacts against hepatitis B.

The choice is yours, but the Ministry of Health would appreciate your participation in this survey. At this moment, do you want to ask me anything about the survey? Do you agree to be tested?

Instruction to the interviewer: ***wait for the answer and make sure you do not rush the respondent to answer. If the respondent is not answering, gently ask the question again until you get an answer.***

I have been informed about this survey and understand its purpose and objectives. I understand the details, have been informed about the requirements and hereby agree to be tested for hepatitis B.

Signature of respondent_ ________________________ Date_ ________________

Signature of person drawing blood________________ Date_ ________________

(For children younger than 18 years), the parent or guardian should also sign)

Signature of parent or guardian__________________ Date_ ________________

FORM D-3 (RUKWANGALI VERSION OF THE QUESTIONNAIRE): EPULISIRO LYEGUSO HONDE ZEKONAKONO UVERA WEHULI (HBV)

Erondorokomupurageli:

Mugusihondegakonakugwanaepulisiroelikonyimazepuragero.

Nsenekapisinyoveoruganaepuragero,

tamekanokumororanokulitumburanyamogekomupuragerwa. Nseneasinyove o

ruganaepuragero,

vyukilirakoforomaeziozzireseremupuragerwakuzigururukayipozimuzuvikire.

Gwanaepulisirolyovakuronakombingazovanonawokonhizonomvhuramurongonaha

mbondatu [18].

Simwesekonakonoeli, tuna hara kudivaasivantu vangapi vakara nokambumburu

koHepatitis B aka akaretesa pouverawehuli yimotupunokankelizehuli.

Yipoyitutompokeeyi, osekunakupuravantumomudingonoko-sirongo(region)

vagavehondezonsesutupumoruperokugusanonsongakonyarayipotuzikonakonensen

ekambumburumokoHBVndimwato. HBV kambumburu a karwanesaehuli,

akomkapi aka

lilkidayilikidisodogorouverawasikipontambozonenezondigukuhakura.Egusohonde

elitatu li ruganamoruperoruwapwahanamalimbikonkenye.

Yiruganesoyetunayinyeyoyipeayoyakuhuka.

Konyimazekonakonohondenatukupukururayitundwamoyogentaninatuzogeramom

unenekuhamenayitundwamo.Mauzeragekonakonoelingatugagavakominstelizouka

ngukinyemadinagovahamenimekonakonoelikapingavagaruganesamokugavayitund wamoyorupenkenye.

If the results are positive, you will be advised on how to reduce further transmission and how to protect yourself and your close contacts against hepatitis B

Etokorolyanyamweni, nyeMinistelizoukangukingaziyihaferansenemulihameseramekonakonoeli.Poruveze orumunakaranomapuromuna hara kupurangekuhamenaekonakonoeli? Munayitamburatumugusehonde?

Erondorokmupurageli: Ndindiraelimbururo, wahagenderesamulimburuli a kupeelimbururo. Nsenekapianalimburura, rugururaepurodogoro o gwaneelimbururo.

Nina gwanamapukururokuhamenaepurageroeli, sitambosalyonetokomenolyalyo.Nayinyeyazuvhikirenge, natamburavakonakonengekouverawehuli (Hepatitis B).

Esainolyomugavihonde……………………………….Mazuva……………

Esainolyomugusihonde………………………………Mazuva………………

(Nsenemugavihondegokonhizonomvhura 18 mukurona/mkareliponage a saine)

Esainolyomukurona/mutakamesi

Esainolyomukurona/mkarelipo………………………………………Mazuva……

FORM D-4: FOROMA ZEPULISIRO LYOVAKURONA NDI VATEKULI (CONSENT FOR INTERVIEW)

<u>KUGWANA EPULISIRO LYOYIPURAGERA(INTERVIEW) KOVAKURONA NDI VATEKULI</u>

Erondoro<u>komupurageli</u>:

Zigurukakureseramupurakeniforomaeziyipozimuzuvikire.

Ngurangurazongwa/sitengukososiwa.Amenyame [Edina lyomupurageli].Amemukarelipoministelizoukanguki.Ministelizoukangukinovakwatesikovazokwakuruganenakumweyipovakandanenokutakamesauverawehuli (Hepatitis B). Ministelizoukangukikwa hara mauzerakuhamenaeyiyinakuhorokamompongasanomudimayipozituremafanekono marongikidoyimotupuhenanokuwapukururamarongikidoganareyipoasizigaveutekunouhakuwokusikiliramo. Mauzerakugagwanamoruperokupurageravantumomambogawo.Yiyonawizireniya mu pure mapuro.Mapurogamwenagahamenakonkaramwenyozeni.Nayidivaasimapurogamwegehoramoyipoasitanimuhuguvaresaasimalimbururogeningagahorama. Ehamenomoyipurageraeyikapisilyomusininiko.Kuvhuramunyokekulimbururamapurogamwendinagenye, nyeministelizouhakunaziyimupandwiramokulimbururamapuronagenye. Mulyounenekukonekaasielihameserolyenimoyipurageraeyikapingali mu

kandanamokuruganesayipangerondikugwanamutekunkenyegouhaku. Tuna huguvaraasinomulihameseramomorwamulyosiliunenensemuyiruganangoso. Posiruwoesi, walyepoyilieyimuna hara kupurangekombingazoyipuragera?Kuvhuratupunitamekekumupuragera?

[Erondorokomupurageli: Gavaruvezerokugwanenakomupuragerwayipo a limburure. Nsenekapi a kulimburura, rugururakupuraepuromoruperoruwadogoro o gwaneelimbururo].

Nina gwanamapukururokuhamenaepurageroeli, sitambosalyonetokomenolyalyo.

Nayinyeyazuvhikirenge, natamburanilihameseremoyipurageraeyi.

Esainolyomupuragerwa……………………………Mazuva……………

Esainolyomupurageli…………………… Mazuva………

In case you need more information about the survey, you may contact the person(s) listed below:

Petrus Mhata (Cell: 0811228378) Dr Chinweze (cell ……………) Dr Ndifon Cell ……… Dr Banda??? Dr ……. Nankudu and Mr Kareyi and Ms Ida Mendai Cell ………………..

FORM D-5: INTERVIEW SCHEDULE FOR RESPONDENTS/ GUARDIANS/ IN KE&W REGIONS/FOROMA ZEPULISIRO LYOVAKURONA NDI VATEKULI

<table>
<tr><td>A. IDENTIFICATION

Respondent Code:

(pre-coded)</td><td>□□□□ - □□□□- □□□□ - □□□□□□□□ - □□□

……… - ……….. - ……..…… - …………………… - ………

Region H District-Constituency-Cluster No--participant</td></tr>
<tr><td>Date of interview:</td><td>--- /-- /---- (dd/mm/yyyy)</td></tr>
<tr><td>Name of interviewer:</td><td>First Name: ______________________

Last Name: ________________________

Position: _____________Cell. No: ____________</td></tr>
<tr><td colspan="2">Begin the process:

1. Explain the survey process and select the respondent randomly as agreed in the training

2. Thank the selected respondent for agreeing to participate in the interview and to be tested</td></tr>
<tr><td>Consent to Hepatitis B (HBV) interviewobtained?</td><td>☐1-Yes ☐ 2-No

If no, do not proceed, find another</td></tr>
</table>

	participant within household…
Consent to Hepatitis B (HBV) testing obtained?	☐1-Yes ☐ 2-No If no, do not proceed, find another participant within household ….
Are you a visitor or permanent resident in this region?	☐1-Permanent resident ☐ 2-Visitor/temporary resident (stayed less than 6 months in this region)

B. DATA ON RESIDENCE

Follow the following steps to complete the form:

1. *Request the health passport for the person to be interviewed – it will be necessary to use during interview*
2. *Interview and blood testing should be done privately not in the presence of all household occupants (except in the case of babies and young children who need the presence of a guardian.*
3. *You should complete the form without asking the interviewee, where you see the asterisk (*)*
4. *Complete the * Observe or record*
5. *Please take note that the "you" in the questionnaire/interview schedule refers to the respondent. E.g. if the selected person is a baby/child who is unable to communicate, the "you" in this case is not the mother, but the baby/child (i.e. the respondent).*

*Status of residential area.	☐1-Urban ☐2-Rural
*Name of Health District	(please tick √)

	☐1-Andara ☐2-Nyangana ☐3-Nankudu ☐4-Rundu
*Number and Name of thePrimary Sampling Unit (PSU)/ Enumeration Area	Number of the PSU________________ Write village name/Erf Number/Street Name: ________________ ____ ________________
Name of **Nearest clinic/health centre**	Name of clinic/health centre: _____________________
Country/ region and place where you were born Sirongo/mukunda, nevegalyehampurukiro	☐1-(Name of) Country ________________ ☐2- (Name of) region________________ ☐3-Place of birth___________________
Nationality Muhoko	Write Nationality here:
Name of region of current residence Mukundandisitoporwaokomunakarangesi?	Please tick √ ☐1-Kavango East ☐2- Kavango west ☐3- Other, Namibian regions ☐2- Other, outside Namibia

Name of Constituency of current residence Mukunda-hogwererogweni	Kavango East: ☐1- Mashare☐2- Mukwe ☐3- Ndiyona ☐4- Ndongalinena☐5- Rundu Rural ☐6- Rundu urban Kavango west: ☐7- Kapako☐8- Mankumpi ☐9- Mpungu ☐10- Musese☐11- Ncamangoro ☐12- Ncuncuni ☐13- Nkurenkuru ☐14- Tondoro
Since when did you **become a resident of thi** Kutundasiruwomusinkemwakaramomukunda	Date/Year: ----/----/---- *(Obtain response f* *interviewee)*
C. **DEMOGRAPHIC DATA**	
1. Date of birth? ***Mo mvuranezuvamusinkevamuhampuruka?***	-- /-- /---- (dd/mm/yyyy) ☐1-Age in years:____ or months (if baby)
2. Gender	☐1-Male ☐2-Female
3. Marital status: Are you currently/***NOW*** married/living with a partner? ***Mwakwara?***	☐1-Yes ☐2-No ☐3-Divorced/Separated/widow

4. Home language Erakamusinkeomuuyungakembo?	☐1-Rukwangal ☐2-Thimbukushu ☐3-Rugciriku/R ☐4-Oshiwambo ☐5-Silozi ☐6-Others, specify_____
5. To which denomination/religion do you belong? KoNgerekamusinkemwahamena?	☐1-Lutheran ☐2-Roman Catholic ☐3-Seven Days Adventist ☐4-Anglican ☐5-Other, Specify____________________________ __
6. What is your highest educational level? Kwadimba sure dogoropontambomusinke?	☐1-No School/Never attended school ☐2-primary education (Grade1-7); ☐3-secondary education (grade 8-12) ☐4-tertiary education (University/college/polytechnic)
7. What is your occupation/ what kind of paid work do you do? Yinkeomurugana?	☐1- baby/young child ☐2-learner/student/adolescent ☐3-unemployed youth/adult ☐4-self-employed youth/adult ☐5-government/company employee ☐6-Pensioner (above 60y) ☐7-Other, not fitting any of the above, specify______________

8. Is that a temporary/ seasonal or permanent job?	☐1-permanent ☐2-temporary/seasonal ☐3-other, specify
9. How much is your income per month in Namibian Dollars? Nzambizeniyingapikokwedi?	☐1-less than N$500 ☐2-N$501-999 ☐3-N$1000-4999 ☐4-N$5000-9999 ☐5-10,000-19999 ☐6-N$20,000 and above
D. **AWARENESS AND RISK PROFILE**	
10. Do you know what hepatitis B Virus infection is? Mwadivaasi Hepatitis B (uverawehuli) yinke?	☐1-Yes ☐2-No ***If no, please go to question 12***
11. If yes to question 10, please explain the signs and symptoms of Hepatitis B infection Tutanterenikonyeasingapiomunodivaasimuntukunakara no uverawehuli?	***Please tick any of the following – as appropriate:*** ☐1-Jaundice (Yellow eyes/hands ☐2-Distended abdomen ☐3-Dark Urine ☐4-Did not mentioned any of the above ☐5-Nota Applicable/NA

12. Do you have any family member or close contact/neighbor/co-employee or patient with history of Hepatitis B or any other liver disease? Kweligekorondimundamboogugakara no uverawehuli?	☐1-Yes ☐2-No ☐3-Don't know ***If no, please go to question 14***
13. If yes to question 12, how are you related to him/ her? Ngapiomulitumbura?	☐1-parent or grandparent ☐2- Sibling/brother or sister ☐3- Biological/adopted Child ☐4- Spouse/sexual partner ☐5-Neighbour/schoolmate/work colleague ☐6- Don't know/Not related
14. Do you think you and your household contacts are at risk of getting hepatitis B infection? Ngoso one kugazaraasiwalyemosipongamunakarmukw atekouverawehuli?	☐1-Yes ☐2-No ☐3-Don't know/Not sure
15. Can you please explain how hepatitis B spread from one person to the other? 16. Kuvura mu tutantereasingapi omuaulihanaoguuverawehuli?	***Please tick as appropriate based on the response.*** Hepatitis B spread through the following ways: ☐1-Infected mother spreads it to her baby at birth

	☐2-When children/people with open cuts and sores come in direct contacts toys, hand kerchiefs, toothbrushes etc, infected with hepatitis, particularly during early childhood. ☐4-Sexual transmission – oral, vaginal and anal, with infected person ☐5-Through the use of contaminated needles, nail cutters, hair clippers, razors or other sharps ☐7-Don't know/No response/Other……………………………
17. Did you (the respondent), ever receive hepatitis B vaccination? Vamunarevendwatintiro zo uverawehuli?	☐1-Yes ☐2-No ☐3-Don't know ***If no or do not know, proceed to question 20***
18. ***For children below the age of five years***, which vaccinations did you receive ***at birth*** Ogumunonagagwanavendwatintiro at birth?	***Please verify with immunisation card/history if available, and tick as appropriate*** ***NB: Only at Birth***: ☐1- HepB birth-dose vaccination was given with BCG and OPV at birth (history health passport) ☐2- **No**HepB birth-dose vaccination given at birth (history or health passport)

	☐3 – Do not know/No vaccination given at birth (history or health passport)/
19. ***For both children and adults:*** Did you receive all the three doses of pentavalent/Hepatitis B vaccinations? Rungapivamutuntura? (please tick as appropriate)?	***Please verify with immunisation card/history if available, and tick as appropriate*** ☐1- Yes – the child/respondent is up-to-date with all three hepatitis B vaccination doses (history or health passport) ☐2- No – child/respondent is Not up-to-date with at least three hepatitis B vaccination doses (history/ health passport) ☐3- Do not know (no information by history or on health passport)
20. If yes to question 18, ***WHERE & WHY*** did s/he receive these hepB vaccination? Kupimwayizuvireyokuhamenavendwatintiro zo uverawehuli?	***Please tick as appropriate:*** ☐1-Routine childhood immunizations Ministry of He ☐2-Routine childhood EPI Private ☐3-At work as part of work requirements ☐4-A family member was diagnosed as having HBV ☐5-Others, specify _________________
21. What is your/(the respondent) Hepatitis B status (before today's test?	☐1 Hepatitis B ***Positive*** (recall or health passport)

Ngosokupimunahamene no uverawehuli – muna diva asiwalyempamwe no uverawehulimunakarandikwato?	☐2-Hepatitis B ***Negative*** (recall/ health passport) ☐3- Respondent Don't know
22. ***If respondent was already Hep B positive before today***: Since when have you been hepatitis B positive?	☐1-one to twelve months ago (please state month an ☐2-one to five years ago (please state the year-------- ☐3-six to ten years ago (please state the year---------- ☐3-more than ten years ago (please state the year-----
23. If you are hepatitis B positive, what was the reason for taking a hepatitis B test at that time? Morwasinkevamukonakonine?	☐1-Screening for blood donation; ☐2-Routine HIV/AIDS care ☐3-Routine test pregnancy tests/antenatal care visits ☐4-Due to sickness/illness ☐5-One/more household contact hepatitis B positive ☐6-Other, specify: _______________________
24. If Hepatitis B positive, was any medical or health advise provided by health care workers? Vamupangerenokumupa "medical treatment" kombinga zo uvera ?	***Please verify with the card:*** ☐1- Yes ☐2-No ☐3-Do not remember

25. If yes to question 24, please explain the medical or health advice provided.	***Please record the Medical or health advice below:*** ☐1-Avoid alcohol/tobacco ☐2-avoid self-medication ☐3-avoid salty/fatty foods ☐4- prevent transmission sexual/or close contacts ☐5-Other, specify________________________
26. What is your HIV status? Vamukonakonako HIV	***Please verify with the card:*** ☐1-HIV positive (recall or health passport) ☐2- HIV negative (recall/ health passport) ☐3- Don't know
If respondent is a Male or below 15 years, please proceed to question 34	
Questions 26-35 for females 15 -49 years only!	
27. Are you ***pregnant or is your baby less than 12 months***? Nezimomunakara or having small baby	☐1-Yes Pregnant ☐2-Have baby less than 12 months (<1year) ☐3-Not pregnant/My baby is older than 12 months/<1year ☐4-Was never pregnant ***If you were never pregnant and not currently pregnant, please proceed to question 35.***

28. Have you ever been tested for Hepatitis B infection ***during your last pregnancy***? Vamukonakonakouverawehuli	☐1-Yes ☐2-No ☐3-Don't know
29. If yes to question 27, what were your HBV ***results during pregnancy***?,Yitundamoyekonakonayinke?	☐1-Hepatitis B positive (recall or card) ☐2- Hepatitis B negative (recall/card) ☐3- Don't know
30. If the Hepatitis B test results were positive (***question 28) during pregnancy***, was any medical or health advice provided to you, your close contacts, and relatives? Yinkevamupukurulirekokombinga zo uverawehuli	☐1-Yes ☐2-No ☐3-Don't know
31. If yes to Question 29, please explain medical or health advice provided to you, your close contacts, and relatives?	***Please record the Medical or health advice b*** ***Please record the Medical or health advice b*** ☐1-Avoid alcohol/tobacco ☐2-avoid self-medication ☐3-avoid salty/fatty foods ☐4- prevent transmission sexual and other cl ☐5-Other, specify______________________

32. If the Hepatitis B test results were positive (***<u>question 27) during pregnancy</u>***, what medical or health care/advice was provided to you and to your baby? Yinkevamupukurulirekokombinga zo uverawehuli	☐1- Hepatitis B birth-dose provided (history and health passport) ☐2- Hepatitis B Immunoglobulin to the baby at birth (history and health passport) ☐3-Health Education regarding food, alcohol, self-medication ☐4-Other, specify……………………
33. Have you been screened for HIV during your last pregnancy? Vamukonakonako HIV	☐1-Yes ☐2-No ☐3-Don't know
34. What was your HIV result during your last pregnancy? Yitundamongapi	***Please verify with the card:*** ☐1-HIV positive (recall or health passport) ☐2- HIV negative (recall/ health passport) ☐3- Don't know/No response
35. If the HIV test results were positive (***<u>question 33) during pregnancy</u>***, what medical or health advice was provided to you, your baby and close contacts? Yinkevamupukurulirekokombinga zo uverawehuli	***Please verify with the card:*** ☐1-Mother to continue ART as per prescription ☐2-Baby to receive treatment/Nevirapine, breast-feeding, etc

	☐3-Health Education – General health advice on safe sex practices ☐4- Health Educ - Not to take alcohol, No to smoking or taking medication not prescribed by the doctor ☐5-Other, specify: ☐6-No Health education or other measures provided to prevent further spread
Questions 35- onwards - for both sexes and all ages	
36. Did you ever provide care or had a person with ***confirmed Hepatitis B infection*** in your household/or in your health facility? Mwakere no muveliwehulimembondimosipangeroogumwatakame sere?	☐1-Yes ☐2-No ☐3-Don't know
37. If yes to questions 35, explain the health advice provided or measures taken to prevent further ***transmission of Hep B from infected person*** to close contacts (household/partner, etc)? Yinkemwaruganenemokukandurapoasiyahalihanagura?	Please tick any appropriate box below: ☐1-Health Education – avoid direct contact with body fluids of infected person; ☐2- Health Educ - Not to take alcohol, No to smoking or taking medication

	not prescribed by the doctor ☐3- Health Education that all household (HH) members should be were tested for HepB infections ☐4-Vaccination -All Household members vaccinated against hep A and hepatiB ☐5-None of the above ☐6-No Response/Don't know/Other, specify: ____________________
38. Do you consume alcohol? One kunwayikorwesa	☐1-Yes ☐2-No
39. If yes, how many pints/drinking glasses per week? Nonkindangapi, ndimakendegangapimosiwike	☐1-< 5 per week ☐2-more than 5 ☐3-No response
40. Do you smoke tobacco/ cigarrettes? Kukokamakanya/usarute?	☐1-Yes ☐2-No
41. Do your family member/close contact smoke tobacco/ cigarrettes? Kukokamakanya/usarute?	☐1-Yes ☐2-No
42. If yes to question 39 or 40, how many cigarettes, on average, does each of the smokers use/smoke per day? Yisaruteyingapi no siwike?	☐1-< 5 cigarettes per day per day per smoker ☐2->5 cigarettes per day per smoker

43. How many dental extractions or repairs did you have in the past 5 years? One kuzazavakamudurendivakamupangemazego	☐1-None ☐2-less than three times ☐2-more than three times
44. How many times did you share injection for intravenous drugs with others, during the past 12 months? Kuligaveranovendwapokulivendwanepangwe?	☐1-None ☐2-one time or more than once
45. Did you have ear piercing or body tattoos? Matwigenivagatomona?	☐1-Yes ☐2-No
46. ***<u>If yes to question 42-44</u>***, please explain which measures were taken to prevent blood transmissible infections during these procedures? Yinkeomuruganapoasimwahakwata honed opoomuyininkeyi?	☐1- Clean and sterile equipment are generally being used ☐2-I am not sure about cleanliness of the equipments used for tattoos, eye-piercing, barbershops, etc ☐3-Equipment/Instruments used for ear piercing, body-tattoing, hair-cut etc, are generally unhygenic and dirty ☐5-Other, specify: ________________
E. SEXUAL BEHAVIOR	
47. How old were you when you had your first sexual intercourse? Nomvurangapimwakereopomwarerendimwakereno muntuponyama?	☐1-<10 years ☐2-10-14 years ☐3-15-19 years

	☐4->20 years ☐5-No response/too young/Not started
48. How many sexual partners did you have in the past 12 months? Nomvuramurongonambalidinakapita, vakadi/vagaravangapimwarerenawo?	☐1-None ☐2-one ☐3-more than one
49. Did you use a condom in your last sexual encounter? Mwaruganeserenokondom	☐1-Yes ☐2-No ☐3-NA
50. Did you ever have sex with sex a worker? Mwakaranareponyamanosikumbu?	☐1-Yes ☐2-No
51. **For men only**: Did you ever have sex with another man? Wakaranareponyama no mugaramukweni?	☐1-Yes ☐2-No
52. Any other comments/remarks about Hepatitis B infections? Poyilinkenyeeyimunaharakughuyungahenayokuha menauverawehuli?	

ANNEX …. - HBSAG TESTING	**To be completed after completion of the interview**
Pre-test counselling	
52. NB. Code Number of the specimen should be the same as the identification Number of the questionnaire, i.e. ______	☐☐☐☐ - ☐☐☐☐- ☐☐☐☐ - ☐☐☐☐☐ - ☐☐☐ ……… - ..……….. - ..…….…… - ………… - ……… Region H District Constituency- Cluster No -- particip
53. Previous HBV test result (HBsAg)	☐1-Positive ☐ 2-Negative ☐ 3-Unknown Date and Year:
54. Today's/Current HBV test result (HBsAg)	☐1-Positive; ☐ 2-Negative ☐ 3-Indeterminat --- /-- /---- (dd/mm/yyyy time: ……h….
Date/time current results recorded	
Post-test counselling and advise given by:	
Final remarks by counsellor/interviewer, including referral for health advice:	

ANNEXURE E: GUIDE FOR RAPID HBV DIAGNOSTIC TESTING

Quick Reference Card

To order please contact:

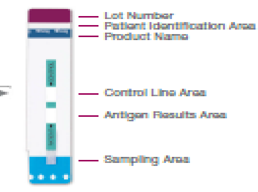
For technical assistance please contact:

Product	Kit size	Product code
Alere Determine™ HBsAg	100 Tests	7D2543
Chase Buffer	100 Tests	7D2243
EDTA-Capillary Tubes	100 Tubes	7D2222

Before you begin:

- Please read the Package Insert in its entirety, prior to use.
- Gather materials you will need.
- Cover your work space with a clean, disposable absorbent workspace cover.
- Put on your disposable gloves.
- All components must be brought to room temperature (between 15-30°C) prior to testing.

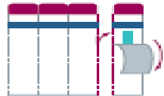
Product Information



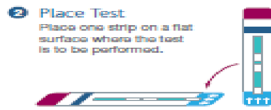
Refer to the Package Insert for complete instructions.

Test Procedure

1 Prepare Test
Tear one strip from the right and remove cover.

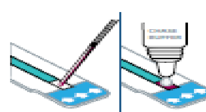


2 Place Test
Place one strip on a flat surface where the test is to be performed.

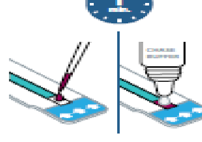


3 Add Sample

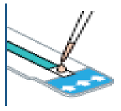
Fingerstick Whole Blood
Add 50 µL of whole blood to the Sample Pad. When all the blood is absorbed into the Sample Pad, immediately apply one drop of Chase Buffer to the Sample Pad.



Venipuncture Whole Blood
Add 50 µL of whole blood (precision pipette) to the Sample Pad. Wait 1 minute and add one drop of Chase Buffer.



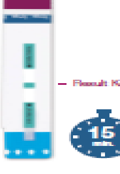
Serum/Plasma
Add 50 µL of serum or plasma (precision pipette) to Sample Pad.



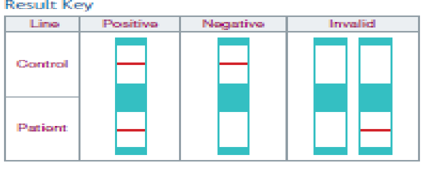
4 Read Results
Wait a minimum of 15 minutes (up to 24 hours) to read the result.

Do not read Test Results after 24 hours.

The control line should appear for all results. If it does not appear, the results are invalid and should be repeated.



Result Key



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ANNEXURE F:BASTANI'S HEALTH BEHAVIOURAL FRAMEWORK

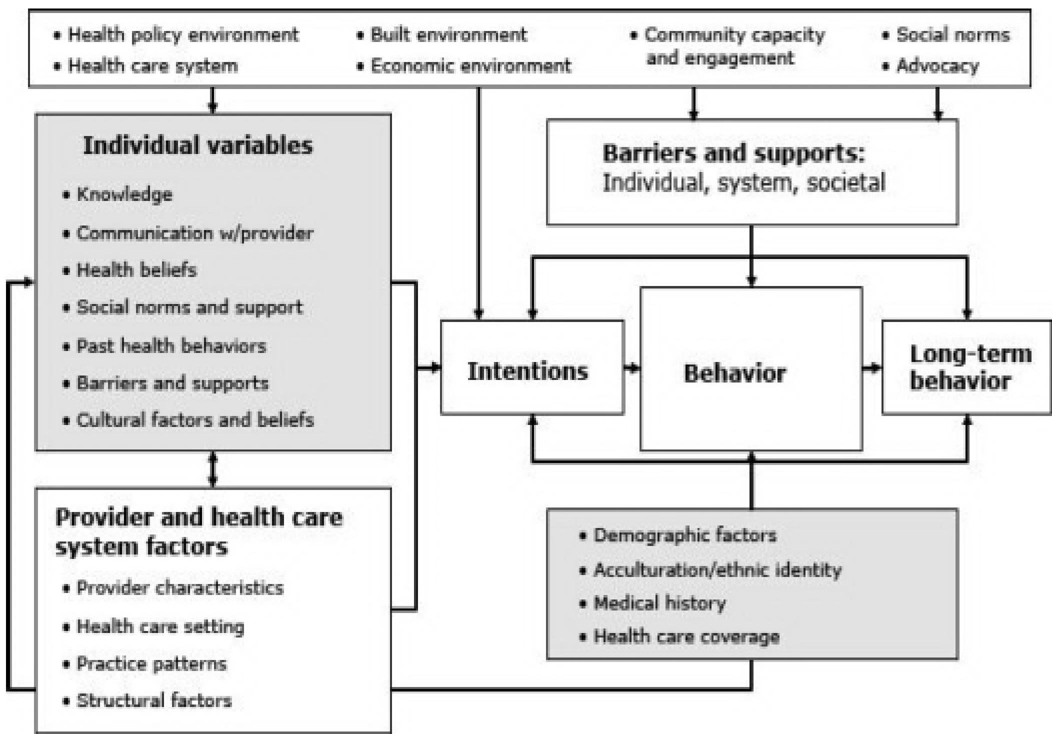
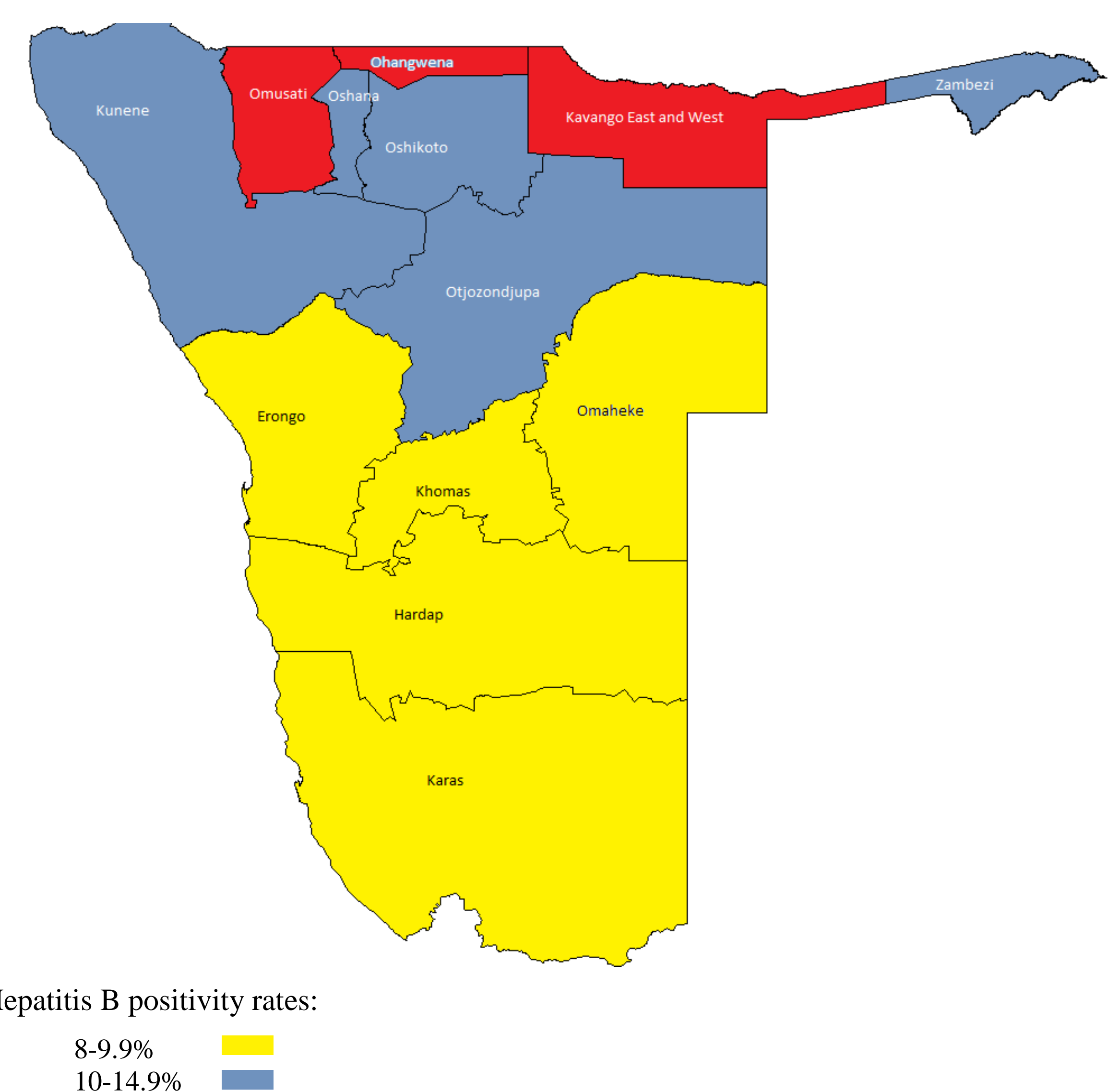


Figure. Health Behavior Framework. Reprinted with permission from Bastani R, Glenn BA, Taylor VM, Chen MS, Nguyen TT, Stewart SL, Maxwell AE. Integrating theory into community interventions to reduce liver cancer disparities: The Health Behavior Framework. Prev Med 2010, 50(1-2):63-67. [A text description of this figure is also available.]

ANNEXURE G: BURDEN OF HBV INFECTIONS IN NAMIBIAN REGIONS 2013



Hepatitis B positivity rates:

8-9.9%
10-14.9%
15-16.3%

ANNEXURE H: NEW YORK STRATEGIC PLAN/FRAMEWORK FOR VIRAL HEPATITIS, 2016-2020

New York State Viral Hepatitis Strategic Plan Framework, 2016–2020

Mission: The Mission of the Viral Hepatitis Strategic Plan is to outline a coordinated, comprehensive and systematic approach that will decrease the incidence and reduce the morbidity and mortality of viral hepatitis.

Vision: The Vision is to eliminate new hepatitis A, B and C infections and improve the quality of life for individuals living with chronic hepatitis B and C.

Prevention	Education	Surveillance and Research	Medical Care and Treatment	Policy and Planning
Goal: Prevent the acquisition and transmission of viral hepatitis from the perinatal period through adulthood.	Goal: Build knowledge and awareness of viral hepatitis prevention, transmission, care and treatment.	Goal: Determine accurate population-based measures of burden of disease for use in conjunction with research findings on effective interventions for prevention, care and treatment to guide decision making.	Goal: Develop and maintain an infrastructure to provide the highest quality of viral hepatitis care and treatment.	Goal: Foster an effective policy and planning environment at the local, state and national levels.
1.1 Promote and expand the use of effective risk reduction interventions and strategies, especially in areas where these interventions are currently not accessible. 1.2 Promote universal hepatitis A and B vaccination for all children and vulnerable adults and youth. 1.3 Increase the number of people who know their hepatitis B and C status. 1.4 Integrate viral hepatitis counseling, screening, vaccination and referral services into existing service delivery systems. 1.5 Ensure assessment of and timely referral to substance use, mental health and comprehensive sexual health-related services. 1.6 Strengthen the foundation for substance use prevention and treatment. 1.7 Emphasize the importance of sanitary conditions and personal hygiene among persons at greater risk for hepatitis A infection. 1.8 Maintain adequate infection control practices in health care and other settings to reduce risk of hepatitis B and C transmission.	2.1 Increase the knowledge of viral hepatitis among the general public. 2.2 Eliminate stigma related to viral hepatitis through the development of effective educational interventions. 2.3 Increase the knowledge of viral hepatitis prevention, transmission, care and treatment among infected and affected persons. 2.4 Improve and expand the knowledge of viral hepatitis prevention, screening, testing and treatment among health and human service providers. 2.5 Increase the awareness, understanding of and adherence to proper infection control practices in health care and other occupational settings to prevent disease transmission. 2.6 Ensure access to culturally-sensitive and linguistically appropriate viral hepatitis educational messages. 2.7 Promote a healthy lifestyle among persons newly diagnosed or living with hepatitis B and C.	3.1 Encourage adequate resources for state and local viral hepatitis surveillance activities. 3.2 Improve capacity for complete and accurate viral hepatitis reporting among laboratories and providers. 3.3 Strengthen the infrastructure needed to perform epidemiologic investigations and respond to community and health care-associated transmissions. 3.4 Use surveillance data to inform recommendations for viral hepatitis programs. 3.5 Develop, evaluate and implement evidence-based interventions for viral hepatitis prevention. 3.6 Conduct research to advance viral hepatitis prevention, care and treatment.	4.1 Ensure provider access to current guidelines, regulations and best practices for viral hepatitis prevention, diagnosis, care and treatment. 4.2 Integrate viral hepatitis services into primary care settings. 4.3 Expand the number of providers trained to effectively treat viral hepatitis. 4.4 Assure timely and appropriate access to viral hepatitis post-exposure prophylaxis, diagnosis, care and treatment. 4.5 Implement effective strategies to ensure all infants are protected against hepatitis B transmission. 4.6 Establish a referral network for hepatitis B and C diagnosis, care and treatment. 4.7 Address the complex needs associated with viral hepatitis through coordination of care. 4.8 Ensure timely access to sexual health, substance use and mental health-related services.	5.1 Maintain an adequate statutory and regulatory environment that maximizes the effectiveness of viral hepatitis programs. 5.2 Improve access to treatment for persons infected with viral hepatitis. 5.3 Strengthen the capacity of statewide systems to support viral hepatitis-related goals. 5.4 Ensure an inclusive approach to policy development and program planning. 5.5 Develop viral hepatitis-related policies using the best evidence available (qualitative and quantitative). 5.6 Provide policy makers with information on the impact of challenges and unmet needs related to viral hepatitis. 5.7 Reduce viral hepatitis-related stigma, discrimination, health disparities and cultural barriers.

Source: https://www.health.ny.gov/publications/1806.pdf

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