Assessing the Knowledge, Attitude, and Practice of Hepatitis B Virus infection in Allied Health Workers in Johannesburg

by

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DECLARATION

I, **Ledile Mokoka-Nkhobo**, declare that this research report is my own unaided work which is being submitted for the degree Master of Medicine in the branch of Internal Medicine at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signed: ……

Date: ……day of ……2019

ACKNOWLEDGEMENTS

I acknowledge the contribution and continuous support of my supervisor Prof J Mahlangu.

I acknowledge all the participants who took part in this study. I also appreciate the assistance Mr Chakauya Leonard who has tirelessly ensured that the research is completed.

DEDICATION

I dedicate this research project to my husband Dr PCM Nkhobo and our daughter Botebo Nkhobo . To my Dad Mr JJ Mokoka, my late Mom Mrs DM Mokoka, Late brothers Mr Peter and Julian Mokoka , my late sister Mapitso Mokoka I know you would be proud of me.

ABSTRACT

Background

Hepatitis B virus is a common viral disease with a high global prevalence and associated high mortality rates. The virus is transmitted by parenteral mucosal exposure to HBsAg–positive body fluids from persons who have acute or chronic HBV infection. The increase in communicable diseases worldwide has necessitated the need for adequate knowledge on the prevention and transmission of these diseases by medical personnel. The focus of this study is the knowledge, attitude and practice of Hepatitis B virus (HBV) infection, which is an easily transmittable blood-borne pathogen that poses an immense threat to health personnel occupational hazard. Even though Hepatitis B Virus infection is preventable, many healthcare workers may remain ignorant of its risks and may not practice adequate preventive measures.

Objectives

To assess the knowledge, attitude and practice of Allied health care workers on the prevention of hepatitis B virus infections at three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH).

Methods

A cross-sectional descriptive study was conducted on allied healthcare workers from the three academic teaching hospitals using a questionnaire to collect demographic information; knowledge, attitude and practice about Hepatitis B virus infection. The data was quantitatively analysed using Stata statistical package and Likert Scales to code the participants' responses.

Results

Of the 260 healthcare workers surveyed, 220 returned their completed questionnaires (85% response rate). The majority of the respondents were female (77%). The respondents included 23% Physio/ OT, 18% Technicians/technologists, 6% Speech therapists, 5% radiographers while 45% had other occupations. More

than half of the workers (59%) were between 22 and 30 years old, 30% were 13 – 45 years old, 10% were older than 45 years old while 1% of the sample did not indicate their age. Almost all workers, (97.2%) indicated that they had knowledge about hepatitis B infection. There was no difference in this opinion by gender (p-value = 0.612). The workers got to know about hepatitis mainly from formal teaching in their training (73.5%), 16% from workshop training at work and 15.1% from media. The source of information did not differ significantly by gender as all the p-values were non-significant. The results showed that there is no association between occupation and gender (p-value = 0.754) since the p-value was greater than 0.05. There was also no association between several years employed since the chi-square p-value was greater than 0.05 (p-value = 0.820). There was a significant relationship between knowledge on complications of hepatitis B infection by occupation with 84% of the other workers indicating that one of the complications is cirrhosis with other occupations having lower percentages mentioning cirrhosis and 79% of the same group of workers having the highest mention of liver cancer. The p-values for cirrhosis (.001) and liver cancer (0.000) were less than 0.05. The unvaccinated participants held low positive attitudes, with a median, mode and mean score of 1 (likely score from +4 to -4). Most of the respondents (79%) practised the right compliance with common precautions, and most of the participants (64.9%) were vaccinated. Overall respondents showed substantially superior knowledge ($p< 0.001$), safer practices and positive attitudes ($p=0.001$).

Conclusions

Hepatitis B infection is well known amongst allied health workers at the three South African hospitals, but there is reluctance towards HBV preventative measures hence it is a high risk. It is recommended that efforts should be made to increase the vaccination coverage and accessibility of the HBV vaccine at the hospitals. It is necessary to increase awareness campaign and training of AHCW on HBV transmission and preventive measures.

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AHCW	Allied Healthcare Workers
Anti-HBc	Antibody to Hepatitis B core antigen
CEO	Chief Executive Officer
CHBH	Charlotte Maxeke Johannesburg Academic Hospital
CMJAH	Chris Hani Baragwanath Hospital
DoH	Department of Health
HBV	Hepatitis B Virus
HBsAg	Hepatitis B surface antigen
HCW	Healthcare Workers
HJH	Helen Joseph Hospital
IgM	Immunoglobulin M
PEP	Post-exposure prophylaxis
PI	Principal Investigator
TV	Television

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CHAPTER ONE: LITERATURE REVIEW

1.1 Literature Review

1.1.1 Introduction

Hepatitis B virus (HBV) is a small double-shelled virus and a member of the Hepadnaviridae responsible for a variety of liver diseases. (1) HBV contains numerous antigenic components including HBsAg, hepB core antigen (HBcAg) and hepatitis B e antigen (HBeAg). (7) Humans are the only known host for HBV. (2) HBV infection is an internationally well-known challenge. It is assumed that about 240 million HBV infected people worldwide, with 600 000 annual fatalities from HBV liver-related illness. (3) The effective operationalisation of vaccination presentations in several nations has caused a substantial reduction in acute HBV incidences; however, HBV is still a critical cause of mortality and morbidity. (2)

The prevalence of HBV carriership varies from 0.1 percent and 2 percent in low prevalence areas such as United States of America, Canada, Australia, New Zealand; 3-5 present in intermediate prevalence areas such as South America, Central Asia; to 10-20% in high prevalence areas such as Sub-Saharan Africa, south-east Africa. (1, 4). HBV disease is a recognised cause of chronic and acute hepatitis infection and hepatocellular carcinoma and consequent cirrhosis. It is the reason for half of hepatocellular carcinoma (HCC). (13) The World Health Organization (WHO) has estimated that in 2002, about 600 000 people died of hepatitis B related chronic or acute liver disease. (1)

Hepatitis B surface antigen (HBsAg), previously known as hepatitis related antigen or Australia antigen is located on the virus' surface, and it can be identified in the serum of infected individuals 30-60 days following HBV infection exposure and persisting for varying phases. (8) HBsAg is non-infectious, however, what is infectious is the entire Dane particle virus. (15, 27) HBsAg is most frequently used to screen for the presence of this infection; it is the first detectable viral antigen to appear during infection. (6)

Hepatitis B core antigen (HBcAg) is the nucleocapsid protein core of HBV that is not noticeable in serum, but it can be found in a person's liver tissue with chronic or acute HBV infection. (4) Antibodies specific to the hepatitis B core antigen (anti-HBc)

can be detected in serum. Both IgM and IgG antibodies can be detected; the IgM antibody is the first antibody produced after infection with HBV, IgG antibody is generated in response to the core antigen later in the course of the infection and usually persists for life.(6)

Shortly after the appearance of the HBsAg, hepatitis B e antigen (HBeAg) will emerge habitually, the presence of HBeAg in a host's serum is related with very big rates of enhanced infectivity and viral replication. Nevertheless, there are variants of hepatitis B virus which do not yield the "e" antigen. (9) Within the natural infection cycle, the HBeAg may be eradicated, and antibodies to the "e" antigen (anti-HB e) will rise instantly. This conversion is normally related with a sudden reduction in viral reproduction. (7)

1.1.2 Hepatitis Transmission

The virus is transmitted by parenteral or mucosal exposure to HBsAg–positive body fluids from persons who have acute or chronic HBV infection. (8) The highest concentrations of virus are in blood and serous fluid, lower titres are found in other fluids such as saliva, tears, urine and semen. (21)

Hepatitis B virus is transmissible where there is no visible blood and will continue to be infectious on environmental surfaces for seven days.(5) Straight per subcutaneous inoculation of HBV by needles such as in drug use is a critical transmission mode which enters into the skin with no overt needle punctures such as lesions, burns, abrasions, or fresh skin scratches, which may also work as ports of entry. (10) Nosocomial exposure such as blood products or transfusion of blood, haemodialysis, use of needles, needle sticks, insulin pens and lancets for glucose monitoring, or other '" sharps"' wounds suffered by the clinic staff resulting in HBV transmission.(8)

Healthcare workers who are of concern are the laboratory technologist, technician, scientist and doctors who do not wear personal protective clothing whilst handling blood samples from a diverse patient population in the hospital. (9).

The spread of patients to HBsAg–positive healthcare workers has been well written. A study done in Tanzania hospital revealed an overall prevalence of chronic HBV infection among HCW in the tertiary hospital to be 7.0%. (33) Perinatal transmission from mother to infant at birth is very efficient. If the mother is positive for both HBsAg

and HBeAg, 70% to 90 % of infants will become infected in the absence of post-exposure prophylaxis. (10)

1.1.3 HBV infection in South Africa

HBV infection is widespread across the African continent posing a serious public health threat. (13) It is predicted that about 3-4 million black South Africans are chronically HBV infected. (15) The prevalence of HBV is lower in black females than males (mean ratio in some research 2.6:1.0). (11)

In non-urban areas, the chronic HBV infection is common amongst children up to the age of 5 years. (16) An additional rise is noted at school going age and during puberty. HBV vaccine was included in the National Extended Programme for Immunization (EPI) programme in South Africa from April 1995. (4) The impact of the vaccination programme has not been adequately evaluated, but anecdotal reports suggest it has reduced the incidence of HBV infection. (16)

1.1.4 HBV amongst Healthcare Workers (HCW)

HCWs possess a high occupational exposure risk to numerous blood-borne illnesses such as hepatitis C viral infections, HBV and HIV (12). Out of these diseases, HBV is both the most transmissible infection and the only vaccination preventable one. (18) In developing countries HCWs vaccination against HBV is very low and most clinics lack the adequate post exposure management structures to support the employees.

The study by Leibowitz et al., revealed that viral hepatitis is an occupational hazard of paramedical and medical personnel to receive first most important attention in American medical literature in 1949, in a serum hepatitis case of a bank worker. (21) Following this publication of several articles appeared in close succession, with seven pharmaceutical firm employees with hepatitis cases from preparing blood derivatives. (19). Similarly, Turmbull and Greiner (2009) came up with 16 hepatitis cases that took place amongst four hospitals within a period of three years. The researchers of these cases raised the issue of hazard of infection related to physical contact with blood products.

Healthcare workers (HCW) can also transmit hepatitis B infection to their patients. (13). HCW who are unaware of their vaccination status of hepatitis B poses a risk to their patients. The findings were explained in the research carried out at one

Johannesburg hospital where unvaccinated HCWs were found. (17). Although the vaccine is recommended by the South African National Department of Health (NDoH), it remains voluntary for HCW in this nation.

1.1.5 GAPS in Current Knowledge

All HCW remain at high risk of blood-borne illnesses and the well-known accidental exposure is as result of needle stick injury (NSI). (23) Sharp objects lead to exposures such as broken glass, scalpels, bodily fluids and mucosal exposures after a blood splash. (16). Whilst there have been several studies on HBV in healthcare workers in SA, none has assessed the knowledge, attitude and practice of allied healthcare workers such as physiotherapists, occupational therapists and speech therapists, towards HBV infection. Most studies have revealed the lack of knowledge of doctors and nurses regarding hepatitis B. (12, 14). It is hypothesized that this situation is not different from non-doctor and non-nurses allied healthcare workers.

1.2 Study aim and objectives

1.2.1 Aims

To assess the knowledge, attitude and practice of HBV infection among allied HCW across three academic hospitals in Johannesburg.

1.2.2 Objectives

The research objectives are:

- To determine the level of knowledge, attitude and practice of allied healthcare professionals
- To compare levels of knowledge, attitude and practice of AHW in Johannesburg with those in the literature
- To make a recommendation regarding the importance of correct preventive practice concerning HBV

1.3 Methods

1.3.1 Study Design

This is a cross-sectional descriptive, uncontrolled study. A self-administered anonymous questionnaire was used to assess the participant's knowledge, attitude and practice regarding HBV infection. The study population was drawn from allied healthcare workers from the three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH). A sample was drawn using random stratified sampling to ensure the respondents belonged to the three teaching hospitals and part of health workers.

1.3.2 Study Population

Study participants were allied healthcare workers from the three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH). A total of 250 allied HCW were enrolled for the study.

1.3.3 Eligibility Criteria

1.3.3.1 Inclusion Criteria

Allied healthcare workers (AHCW) (Physiotherapist, occupational therapist, speech therapist and laboratory technicians) in the three academic hospitals with more than a year working experience in a hospital setting and those AHCW who have given written informed consent were included in the study. The phlebotomist were excluded from the study as several studies concerning hepatitis B and phlebotomist were done.

1.3.3.2 Exclusion Criteria

Excluded from the study were the following AHCW:

- Participants with less than one-year working experience
- Phlebotomist
- Those AHCW who did not give written consent.

1.3.4 Material and Method Section

This study only started when the appropriate permissions were obtained from the hospital Heads of Units, Hospital CEOs and the Human Research Ethics Committee of the University of the Witwatersrand.

The study was a self-administered questionnaire based. The questionnaire was initially distributed to a small pilot group of 10 potential participants before use. Once optimized and corrected, it was then be distributed to all participants.

The questionnaire remained anonymous and was completed in a single sitting comprising of 30 items divided into four sections namely demographics, knowledge, attitudes and practices on HBV. The questionnaire questions were of multiple-choice formats, where respondents were asked to choose the most likely answer.

1.3.5 Data Management and Analysis

The principal investigator (PI) distributed and collected the questionnaire. The PI ensured that the data was anonymous. Quantitative data were summarised using summary statistic and presented in tabular and graphical formats. Data collection was done using the data collection tool REDCAP and was analysed with the assistance of a statistician using STATA version 13. Paired comparisons were made using a paired Student t-test. A p-value of less than 0.05 was considered statistically significant.

1.3.6 Ethical and Legal Consideration

Written informed consent was obtained from all study participants. There were no major ethical considerations for this study. Privacy and confidentiality of participants were always assured and maintained. An application to the Wits University Research Ethics Committee was submitted and approved before the commencement of the research. Permission to retrieve and utilize the data was requested and granted by Chris Hani Baragwanath Academic Hospital, Helen Joseph Hospital, and Charlotte Maxeke Johannesburg Academic Hospital management, once ethics has been approved.

1.4 Data presentation and analysis

The data collected was analysed using STATA and is presented and discussed as follows:

1.4.1 Demographic Information

The sample was made up of 221 allied healthcare workers from the three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH). The pie chart below shows the gender distribution of the workers.

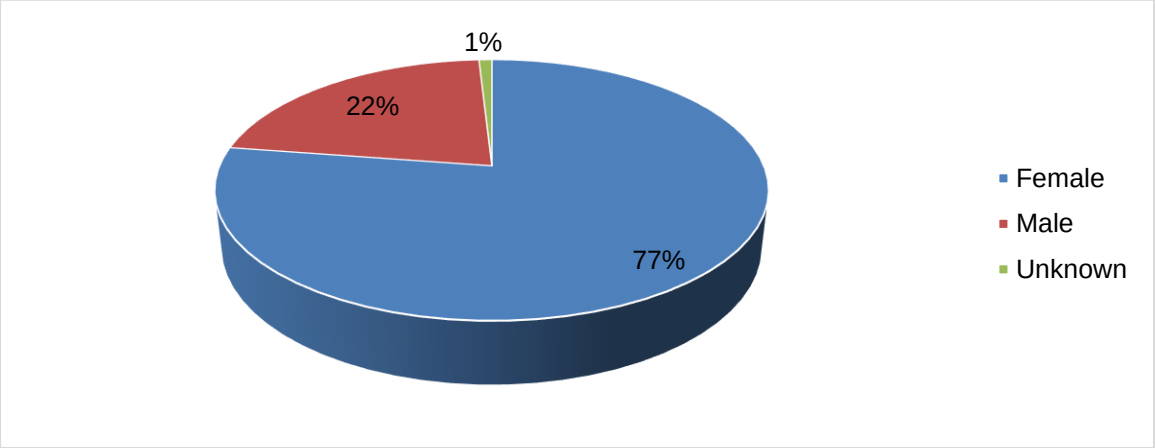

Figure 1: Gender of respondents

Most of the workers (77%) were female, 22% were male, and the other 1% did not specify their gender.

The age distribution of the workers in summarised in Figure 2.

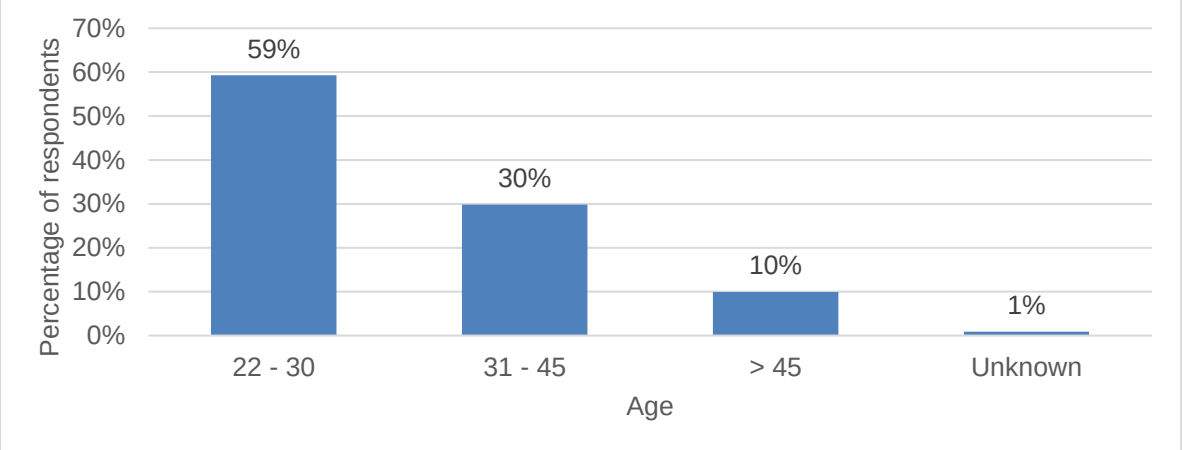

Figure 2: Age of respondents

More than half of the workers (59%) were between 22 and 30 years old, 30% were 13 – 45 years old, 10% were older than 45 years old while 1% of the sample did not indicate their age.

Figure 3 illustrates the occupation of the workers in the sample.

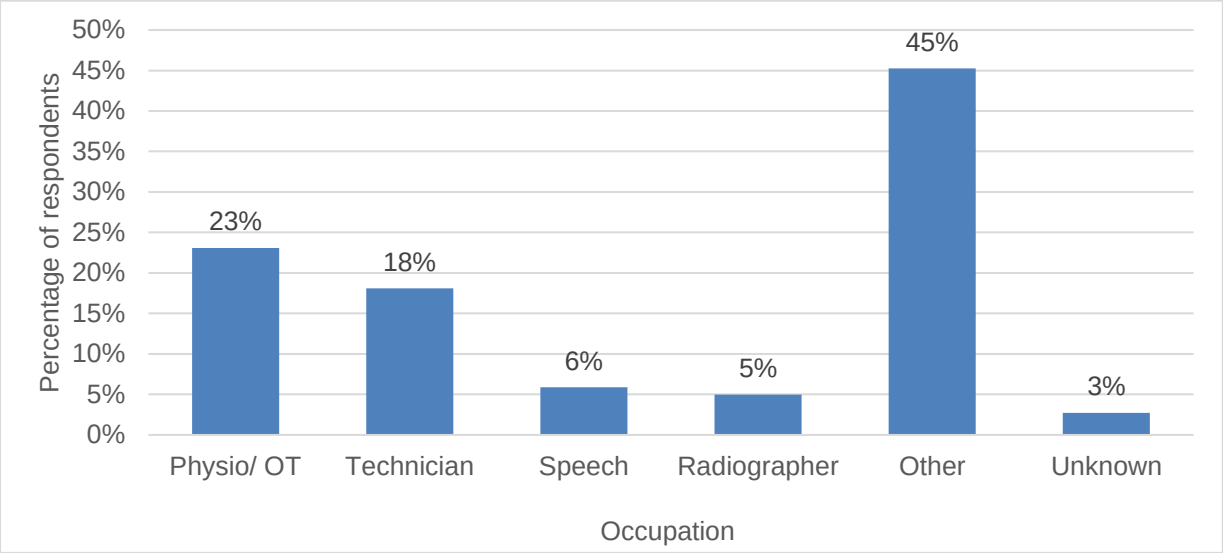

Figure 3: Occupation

It can be noted from the results that 23% of the workers were Physio/ OT, 18% Technician, 6% Speech, 5% Radiographer while 45% had other occupations. (These included the Medical Laboratory Technologists and Technicians).

The split of the file by an ethnic group is shown in Figure 4.

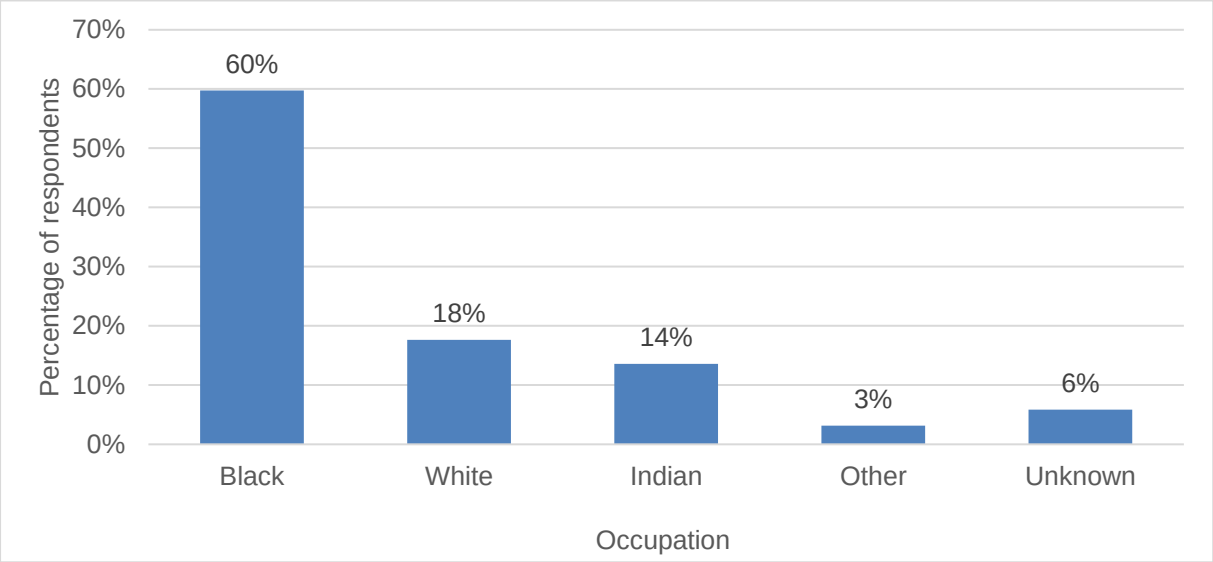

Figure 4: Ethnic group

Most of the workers (60%) were Black, 18% White, 14% Indian and 3% other. There were 6% that did not indicate their ethnic group.

The number of years that the workers had been employed is summarised in Figure 5.

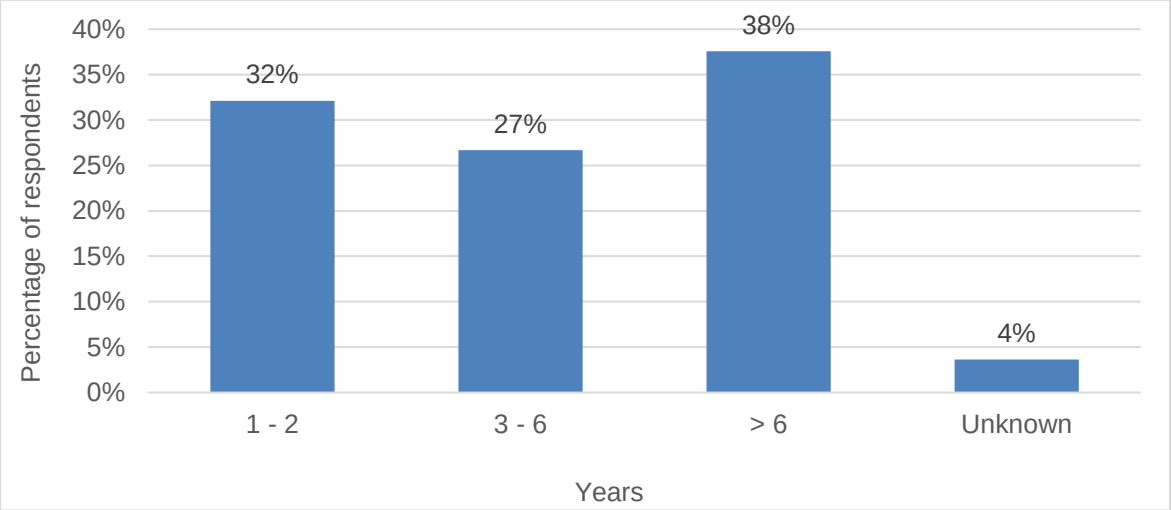

Figure 5: Number of years employed

A proportion of close 1 in 3 workers (32%) had been employed for 1 – 2 years while 27% had been employed for 3 – 6 years and 38% for more than six years.

A cross-tabulation of the occupation and number of years employed by gender is summarised below.

Table 1: Participant occupations, gender and experience

		Gender		
		Male	Female	Total
Occupation	Physio/ OT	9 (19.6%)	42 (24.9%)	51 (23.7%)
	Speech	3 (6.5%)	10 (5.9%)	13 (6%)
	Radiographer	1 (2.2%)	10 (5.9%)	11 (5.1%)
	Technician	10 (21.7%)	30 17.8%)	40 (18.6%)
	Other	23 (50%)	77 45.6%)	100(46.5%)
Number of years employed	1 - 2	15 (31.3%)	56 33.9%)	71 (33.3%)
	3 - 6	15 (31.3%)	44(26.7%)	59 (27.7%)
	> 6	18 (37.5%)	65 39.4%)	83 (39%)

The results shown in table 1 indicates that there is no association between occupation and gender (p-value = 0.754) since the p-value was greater than 0.05. There was also no association between number of years employed since the chi-square p-value was greater than 0.05 (p-value = 0.820).

The number of years employed was also assessed by occupation. The results are shown below.

Table 2: Correlation of occupation type and experience

		Occupation						P-value
		Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Number of years employed	1 - 2	23 (45.1%)	6 (46.2%)	3 (27.3%)	8 (20%)	30 31.9%)	70 33.5%)	.017
	3 - 6	20 (39%)	2 (15.4%)	3 (27.3%)	10 25%)	24 25.5%)	59(28.2%)	
	> 6	8(15.7%)	5 (38.5%)	5 (45.5%)	22(55%)	40(42.6%)	80(38.3%)	

It can be noted that 55% of technicians had been employed for more than six years compared to only 15.7% of Physio/OT workers that had more than six years' experience, 38.5% for Speech, 45.5% Radiography, 42.6% other. The results show that there is a significant association between occupation and number of years in employment since the chi-square p-value was less than 0.05 (p-value=0.017).

1.4.2 Knowledge, attitude and practice

Some questions to assess the worker's knowledge about hepatitis were posed to the workers, and the results are presented below.

Table 3: Knowledge by gender

		Gender			P-value
		Male	Female	Total	
Ever hear about hepatitis B infection	Yes	45 (95.7%)	167 (97.7%)	212 (97.2%)	.612
	No	2 (4.3%)	4 (2.3%)	6 (2.8%)	
How did you get to know about hepatitis B infection	Formal teaching in your training	36 (75%)	125 (73.1%)	161 (73.5%)	.855
	Media (TV, Magazine, social media)	8 (16.7%)	25 (14.6%)	33 (15.1%)	.819
	Workshop training at work	9 (18.8%)	26 (15.2%)	35 (16%)	.656

Almost all workers, 97.2% indicated that they have heard about hepatitis B infection. There was no difference in this opinion by gender (p-value = 0.612). The workers got to know about hepatitis mainly from formal teaching in their training (73.5%), 16% from workshop training at work and 15.1% from media. The source of information did not differ significantly by gender as all the p-values were greater than 0.05.

Table 4: Knowledge by Occupation

		Occupation						P-value
		Physio/ OT	Speech	Radiographer	Technician	Other	Total	

Ever hear about hepatitis B infection	Yes	50 (98%)	13 (100%)	10 (90.9%)	39(97.5%)	99 (99%)	211 (98.1%)	.421
	No	1 (2%)	0 (0%)	1 (9.1%)	1 (2.5%)	1 (1%)	4 (1.9%)	
How did you get to know about hepatitis B infection	Formal teaching in your training	40 (78.4%)	6 (46.2%)	9 (81.8%)	30 (75%)	73 (73%)	158(73.5%)	.194
	Media (TV, Magazine, social media)	13 (25.5%)	5 (38.5%)	2 (18.2%)	5 (12.5%)	8 (8%)	33 (15.3%)	.008
	Workshop training at work	4 (7.8%)	2 (15.4%)	0 (0%)	9 (22.5%)	20 (20%)	35 (16.3%)	.138

Media (TV, Magazine, social media) as source of information about hepatitis B infection was mainly used by workers from the Speech Occupation (38.2%) using that source of data compared to 22.5% among the Physio/OT, 18.2% Radiographer, 12.5% Technician and 8% Other occupations (p-value = 0.008 < 0.05), There were no significant differences for formal teaching in their training (p-value = 0.194) and workshop training at work (p-value = 0.138) as sources of information about hepatitis B.

Table 5: Which Disease spread quickly from person to person by gender

	Gender			P-value
	Male	Female	Total	
HIV	22 (45.8%)	69 (40.4%)	91 (41.6%)	.511
Hepatitis A virus	4 (8.3%)	20 (11.7%)	24 (11%)	.610
Hepatitis B virus	26 (54.2%)	118 (69%)	144 (65.8%)	.060

There was no association between knowledge on the disease spread quickly from person to person by gender since all p-values were greater than 0.05.

Table 6: Which Disease spread easily from person to person by Occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
HIV	18 (35.3%)	3 (23.1%)	4 (36.4%)	17 (42.5%)	46 (46%)	88 (40.9%)	.465
Hepatitis A virus	9 (17.6%)	1 (7.7%)	1 (9.1%)	1 (2.5%)	12 (12%)	24 (11.2%)	.243
Hepatitis B virus	38 (74.5%)	11 (84.6%)	6 (54.5%)	28 (70%)	59 (59%)	142 (66%)	.149

There was also no association between knowledge on the disease spread easily from person to person by occupation since all p-values were greater than 0.05.

Table 7: How do you think hepatitis B is spread (Gender comparison)

	Gender			P-value
	Male	Female	Total	
Needle stick injury only	33 (68.8%)	131 (76.6%)	164 (74.9%)	.265
Touching blood of infected person with hepatitis B	37 (77.1%)	135 (78.9%)	172 (78.5%)	.843
Sexually only	28 (58.3%)	119 (69.6%)	147 (67.1%)	.165
Sputum and other body fluids	32 (66.7%)	143 (83.6%)	175 (79.9%)	.014
Touching surfaces of dried bloods of person infected of hepatitis B	30 (62.5%)	118 (69%)	148 (67.6%)	.390

The results show that significantly more female workers indicated that hepatitis B is spread through Sputum and other body fluids (83.6%) compared to 66.7% among male workers. This was significant since the p-value was 0.014 < 0.05.

Table 8: How is hepatitis B infection spread? (comparing different professionals)

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Needle stick injury only	33 (64.7%)	7 (53.8%)	8 (72.7%)	34 (85%)	78 (78%)	160 (74.4%)	.076
Touching blood of infected person with hepatitis B	36 (70.6%)	9 (69.2%)	9 (81.8%)	33 (82.5%)	81 (81%)	168 (78.1%)	.506
Sexually only	33 (64.7%)	7 (53.8%)	6 (54.5%)	28 (70%)	69 (69%)	143 (66.5%)	.696
Sputum and other body fluids	48 (94.1%)	11 (84.6%)	7 (63.6%)	30 (75%)	75 (75%)	171 (79.5%)	.035
Touching surfaces of dried bloods of person infected of HBV	31 (60.8%)	7 (53.8%)	6 (54.5%)	30 (75%)	70 (70%)	144 (67%)	.374

The results show that significantly more workers from Physio/ OT indicated that hepatitis B is spread through Sputum and other body fluids (94.1%) compared to the other workers. This was significant since the p-value was 0.035 < 0.05.

Table 9: Complications of hepatitis B infection (gender comparison)

	Gender			P-value
	Male	Female	Total	
Liver failure	45 (93.8%)	165 (96.5%)	210 (95.9%)	.415
Cirrhosis	37 (77.1%)	121 (70.8%)	158 (72.1%)	.468
Liver cancer	33 (68.8%)	108 (63.2%)	141 (64.4%)	.501

The result shows that there was no association between knowledge complications of hepatitis B infection by gender since all p-values were greater than 0.05.

Table 10: Complications of hepatitis B infection by Occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Liver failure	50 (98%)	13 (100%)	11 (100%)	37 (92.5%)	96 (96%)	207 (96.3%)	.560
Cirrhosis	30 (58.8%)	9 (69.2%)	4 (36.4%)	28 (70%)	84 (84%)	155 (72.1%)	.001
Liver cancer	23 (45.1%)	8 (61.5%)	3 (27.3%)	25 (62.5%)	79 (79%)	138 (64.2%)	.000

There was a significant relationship between knowledge on complications of hepatitis B infection by Occupation with 84% of the other worker indicating that one of the complications is cirrhosis with other occupations having lower percentages mentioning cirrhosis and 79% of the same group of workers having the highest mention of liver cancer. The p-values for Cirrhosis (.001) and Liver cancer (0.000) were less than 0.05.

Table 11: Known host of hepatitis B Virus (gender comparison)

	Gender			P-value
	Male	Female	Total	
Mosquitos	0 (0%)	3 (1.8%)	3 (1.4%)	1.000
Human only	34 (70.8%)	132 (77.2%)	166 (75.8%)	.445
Pigs	1 (2.1%)	3 (1.8%)	4 (1.8%)	1.000
Sheep	0 (0%)	2 (1.2%)	2 (0.9%)	1.000
Human and mosquitos	12 (25%)	31 (18.1%)	43 (19.6%)	.307

There was no association between opinion on a Known host of hepatitis B Virus and gender since all p-values being greater than 0.05.

Table 12: Known host of hepatitis B Virus by occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Mosquitos	2 (3.9%)	0 (0%)	0 (0%)	1 (2.5%)	0 (0%)	3 (1.4%)	.346
Human only	35 (68.6%)	6 (46.2%)	5 (45.5%)	34 (85%)	83 (83%)	163 (75.8%)	.001
Pigs	2 (3.9%)	0 (0%)	1 (9.1%)	1 (2.5%)	0 (0%)	4 (1.9%)	.161
Sheep	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (2%)	2 (0.9%)	.677
Human and mosquitos	13 (25.5%)	6 (46.2%)	5 (45.5%)	3 (7.5%)	15 (15%)	42 (19.5%)	.002

There was a significant relationship between the opinion that humans only are the known host of hepatitis B Virus by occupation (p-value = 0.001) and also that Human and mosquitos are the Known host of hepatitis B Virus by profession (p-value = 0.002).

Table 13: Transmission by gender

	Gender			P-value
	Male	Female	Total	
Do you think hepatitis B infection is common in South Africa	40 (83.3%)	147 (86.5%)	187 (85.8%)	.640
Mother to Child transmission	34 (75.6%)	119 (78.8%)	153 (78.1%)	.683
Intravenous drug use	37 (84.1%)	133 (86.4%)	170 (85.9%)	.806
Blood transfusion & blood products	41 (89.1%)	153 (95%)	194 (93.7%)	.169
Haemodialysis	29 (67.4%)	102 (71.3%)	131 (70.4%)	.704
Needle sticks injury	45 (95.7%)	157 (97.5%)	202 (97.1%)	.619
Sexually	31 (72.1%)	112 (74.2%)	143 (73.7%)	.845

No association was realised between opinion on the transmission of hepatitis B Virus and gender since all p-values were greater than 0.05.

Table 14: Transmission by occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Do you think hepatitis B infection is common in South Africa	47 (94%)	12 (92.3%)	8 (72.7%)	36 (90%)	80 (80%)	183 (85.5%)	.094
MTCT	32 (68.1%)	8 (72.7%)	7 (70%)	32 (88.9%)	71 (79.8%)	150 (77.7%)	.212
IVDU	42 (89.4%)	11 (91.7%)	6 (60%)	31 (88.6%)	76 (84.4%)	166 (85.6%)	.162

Blood transfusion & blood products	46 (92%)	12 (92.3%)	8 (72.7%)	37 (100%)	88 (94.6%)	191 (93.6%)	.027
Haemodialysis	29 (60.4%)	6 (54.5%)	5 (55.6%)	22 (73.3%)	66 (77.6%)	128 (69.9%)	.149
Needle sticks injury	50 (98%)	11 (91.7%)	11 (100%)	36 (100%)	91 (95.8%)	199 (97.1%)	.498
Sexually	34 (72.3%)	10 (83.3%)	4 (44.4%)	26 (78.8%)	67 (74.4%)	141 (73.8%)	.280

	Gender			P-value
	Male	Female	Total	
Do you know about vaccination of hepatitis B Virus?	47 (97.9%)	164 (97%)	211 (97.2%)	1.000

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Do you know about vaccination of hepatitis B Virus?	50 (98.0%)	13 (100%)	10 (90.9%)	40 (100%)	94 (95.9%)	207 (97.2%)	.430

There was a significant relationship between the opinion that hepatitis B is transmitted via Blood transfusion & blood products and occupation (p-value = 0.027). Most of the workers (97.2%) knew about the vaccination of hepatitis B Virus, and there was no significant difference in knowledge by gender (p-value = 1.000). There was also no significant difference in the knowledge about vaccination of hepatitis B Virus by occupation (p-value = .430).

The tables below summarise all the results showing the statistical analysis for the study:

Table 15: How the workers got to know about Hepatitis B vaccination by gender

	Gender	P-value

	Male	Female	Total	
University	36 (75%)	124 (72.5%)	160 (73.1%)	.854
Media (TV. Magazine or social media)	3 (6.3%)	8 (4.7%)	11 (5%)	.709
Friend	0 (0%)	5 (2.9%)	5 (2.3%)	.588
Workshop training at work	12 (25%)	43 (25.1%)	55 (25.1%)	1.000

Table 16: How the workers got to know about Hepatitis B vaccination by occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiogr-apher	Technic-ian	Other	Total	
University	51 (100%)	10 (76.9%)	7 (63.6%)	21 (52.5%)	68 (68%)	157 (73%)	.000
Media (TV. Magazine or social media)	0 (0%)	1 (7.7%)	1 (9.1%)	5 (12.5%)	4 (4%)	11 (5.1%)	.090
Friend	0 (0%)	2 (15.4%)	1 (9.1%)	1 (2.5%)	1 (1%)	5 (2.3%)	.007
Workshop training at work	2 (3.9%)	2 (15.4%)	2 (18.2%)	17 (42.5%)	31 (31%)	54 (25.1%)	.000

Table 17: Attitude and Practice by Gender

		Gender			P-value
		Male	Female	Total	
Have you been vaccinated for hepatitis B	Yes	45 (93.8%)	167 (98.2%)	212 (97.2%)	.122
	No	3 (6.3%)	3 (1.8%)	6 (2.8%)	
How many doses of hepatitis B Vaccine did you get?	1	6 (14%)	25 (15%)	31 (14.8%)	.528
	2	8 (18.6%)	40 (24%)	48 (22.9%)	
	3	28 (65.1%)	91 (54.5%)	119 (56.7%)	
	4	1 (2.3%)	11 (6.6%)	12 (5.7%)	
When last did you check	6 months ago	11 (22.9%)	29 (17.2%)	40 (18.4%)	.055

your immunity against Hepatitis B infection	1 Year ago	13 (27.1%)	57 (33.7%)	70 (32.3%)	
	2 years ago	23 (47.9%)	59 (34.9%)	82 (37.8%)	
	Never checked	1 (2.1%)	24 (14.2%)	25 (11.5%)	
Have you ever participated in a health education programme related to Hepatitis B at work?	Yes	20 (41.7%)	36 (21.1%)	56 (25.6%)	.008
	No	28 (58.3%)	135 (78.9%)	163 (74.4%)	
Do you think healthcare workers can transmit Hepatitis B Infection to patients?	Yes	40 (83.3%)	139 (82.7%)	179 (82.9%)	1.000
	No	8 (16.7%)	29 (17.3%)	37 (17.1%)	
Do you adhere to universal precautions when helping patients?	Sometimes	12 (25.5%)	33 (20.5%)	45 (21.6%)	.546
	All the time	35 (74.5%)	128 (79.5%)	163 (78.4%)	
Are you aware of post-exposure prophylaxis for Hepatitis B infection?	No	30 (62.5%)	102 (60.4%)	132 (60.8%)	.868
	Yes	18 (37.5%)	67 (39.6%)	85 (39.2%)	
How concerned are you about exposure to hepatitis B	Sometimes	17 (35.4%)	67 (39.6%)	84 (38.7%)	.617
	Never	3 (6.3%)	19 (11.2%)	22 (10.1%)	
	Often	10 (20.8%)	32 (18.9%)	42 (19.4%)	
	All the time	18 (37.5%)	51 (30.2%)	69 (31.8%)	

Table 18: Attitude and Practice by Occupation

		Occupation						P-value
		Physio/ OT	**Speech**	**Radiographer**	**Technician**	**Other**	**Total**	
Have you been vaccinated for hepatitis B	Yes	50 (100%)	13 (100%)	11 (100%)	39 (97.5%)	95 (95%)	208 (97.2%)	.417
	No	0 (0%)	0 (0%)	0 (0%)	1 (2.5%)	5 (5%)	6 (2.8%)	
How many doses of Vaccine did you get?	1	10 (19.6%)	4 (30.8%)	2 (18.2%)	6 (15.8%)	9 (9.7%)	31 (15%)	.270
	2	11 (21.6%)	1 (7.7%)	4 (36.4%)	11 (28.9%)	20 (21.5%)	47 (22.8%)	
	3	27	8 (61.5%)	3 (27.3%)	20 (52.6%)	58 (62.4%)	116 (56.3%)	

		(52.9%)						
	4	3 (5.9%)	0 (0%)	2 (18.2%)	1 (2.6%)	6 (6.5%)	12 (5.8%)	
When last did you check your immunity against Hepatitis B infection	6 months ago	10 (19.6%)	5 (38.5%)	2 (18.2%)	4 (10%)	17 (17.3%)	38 (17.8%)	.000
	1 Year ago	8 (15.7%)	1 (7.7%)	1 (9.1%)	14 (35%)	45 (45.9%)	69 (32.4%)	
	2 years ago	20 (39.2%)	4 (30.8%)	5 (45.5%)	19 (47.5%)	34 (34.7%)	82 (38.5%)	
	Never checked	13 (25.5%)	3 (23.1%)	3 (27.3%)	3 (7.5%)	2 (2%)	24 (11.3%)	
Have you ever participated in a health education programme related to Hepatitis B at work?	Yes	8 (15.7%)	3 (23.1%)	1 (9.1%)	14 (35%)	27 (27%)	53 (24.7%)	.180
	No	43 (84.3%)	10 (76.9%)	10 (90.9%)	26 (65%)	73 (73%)	162 (75.3%)	
Do you think healthcare workers can transmit Hepatitis B Infection to patients?	Yes	47 (92.2%)	11 (84.6%)	7 (63.6%)	29 (74.4%)	84 (85.7%)	178 (84%)	.066
	No	4 (7.8%)	2 (15.4%)	4 (36.4%)	10 (25.6%)	14 (14.3%)	34 (16%)	
Do you adhere to universal precautions when helping patients?	Sometime	14 (27.5%)	6 (46.2%)	8 (72.7%)	1 (2.8%)	16 (17%)	45 (22%)	.000
	All the time	37 (72.5%)	7 (53.8%)	3 (27.3%)	35 (97.2%)	78 (83%)	160 (78%)	
Are you aware of post-exposure prophylaxis for Hepatitis B infection?	No	42 (82.4%)	7 (53.8%)	9 (81.8%)	22 (55%)	51 (52%)	131 (61.5%)	.003
	Yes	9 (17.6%)	6 (46.2%)	2 (18.2%)	18 (45%)	47 (48%)	82 (38.5%)	
How	Sometime	25	7 (53.8%)	8 (72.7%)	11 (27.5%)	32 (32.3%)	83 (38.8%)	.000

concerned are you about exposure to hepatitis B		(49%)						
	Never	12 (23.5%)	2 (15.4%)	0 (0%)	2 (5%)	6 (6.1%)	22 (10.3%)	
	Often	7 (13.7%)	4 (30.8%)	3 (27.3%)	6 (15%)	22 (22.2%)	42 (19.6%)	
	All the time	7 (13.7%)	0 (0%)	0 (0%)	21 (52.5%)	39 (39.4%)	67 (31.3%)	

1.4.3Discussion

The primary objective of this study was to assess the knowledge, attitude and practice of hepatitis B virus infection in Allied Healthcare Workers in Johannesburg. The sample was made up 210 participants from AHCW from the three teaching hospital of the University of the Witwatersrand, namely CMJAH, CHBAH and HJH. Out of 250 AHCW approached, none declined participation but 21 did not return their questionnaire, and 12 were examined from the analysis because of the non-completeness. Most of the participants were females (77.8%) compared to (22%) of males. More than half of the participants were aged between 22-33 years, and most of them were blacks.

All HCW have a high risk of blood-borne illnesses with the most known accidental exposure being the needle stick injury (NSI). Too much exposure lead to sharp objects such as broken glasses and scalpels, including mucosal exposures after bodily fluids or blood splash (11). Whilst there have been several studies on HBV in healthcare workers in SA, none has assessed the knowledge, attitude and practice of Allied Healthcare Workers such as physiotherapists, occupational therapists and speech therapists, towards HBV infection. Most studies have revealed the lack of knowledge of doctors and nurses regarding hepatitis B. (12, 14). It is hypothesised that this situation is not different from non-doctor and non-nurses allied healthcare workers. Almost all of the participants (97.2%) indicated that they have heard about HBV infection. These findings are similar to the findings of the study done in Nigeria Tertiary hospital in 2015 (26) where they found 96% of their participants knew about HBV infection.

The results did not show any difference in gender or occupation. The results of the study showed that most of the AHCW got information about HBV mainly from their formal undergraduate training (73.5%) compared with (16%) from occupation-related workshops. The above results concur with the findings of the study done by Khan and Ross (14) in KZN where 80% of their participants thought that HBV immunization plan at their clinic was neither accessible nor well organized. According to WHO HBV is one of the leading causes of death with approximately two million people dying annually from HCC and complications of cirrhosis secondary to HBV infection. (24).

Hospitals need to do more to improve all HCW including AHCW awareness about HBV infection. It is assumed that there are presently 3-4 million South African blacks who have chronic HBV infection. The HBV prevalence is less in black females than males. (mean ratio in some researches 2.6:1.0). (11). The high HBV infection is prevalent in South Africa where people in excess of 75% adults have serological evidence of past hepatitis carrier rates and exposure of between 10-25%. HCW and AHCW are thus at risk and susceptible to this preventable illness. (14)

The study also found that 65.8 % of the participants thought that HBV is spread more readily from person to person, while 41.6% of the respondents wrongly thought that HIV was transmitted easily than HBV. These findings are worse compared to the results of a study done in Bloemfontein. (31) The results also showed that the physiotherapist and the occupational therapists had a better understanding of how hepatitis B is spread compared to radiographers. The results show that significantly more Physio/OT indicated that hepatitis B is spread through sputum and other body fluids (94.1%) compared to radiographers 63.6%. Radiographers also scored low when comparing their knowledge of possible complications of hepatitis only 27.3% of them believing hepatitis B can cause liver cancer compared to a speech therapist (61.5%) and physiotherapist (45.1%). Only 72.7% of radiographers thought that HBV is common in RSA, compared to 94% of physios, 62.3 % of speech and 90% of technicians. From the results, it was clear that there is a gap in knowledge, attitude and practice towards HBV when comparing radiographers with other AHCW. It is therefore crucial that this department is sensitized and educated about the risk of HBV infection among HCW.

As far as workshop training about HBV at work, the technicians scored much better than all the AHCW, with 42.5% of technicians having received some training at work compared to less than 20% of the other AHCW. The results of this survey also indicated that only 27.3 % of the radiographers received three doses of the HBV vaccine, compared to an average of 563% of the other AHCW. The results also revealed that there is lack of work-related workshops or education as far as HBV is concerned with most of the participants (90.9% radiographers, 84.3% physio, 76.9% of speech therapist indicated that they have NOT participated in any health-related programme related to HBV.

The findings also suggest that the lab technicians adhere better to universal precautions when helping patients and handling samples compared to the rest of the AHCW (Comparing 97.2 % of technicians to 27.3 % of the radiographers). This study showed that 16%, 18% and 60%, of the respondents, had received one dose, two doses, and complete three doses of HBV vaccine respectively. The findings that only 16% of the respondents had received only one dose of the HBV vaccine is almost similar to the results of the study that was done in Southwestern Nigeria. (26)

This study found 16% of participants having received only one dose is significantly lower than the findings of 40.6% from the study conducted in Egypt. (35). Vaccination is an important measure in preventing HBV infection in HCW. In our study 60% of the participants indicated that they received three doses of HBV vaccine, there is an improvement compared to the outcome of the study done in Johannesburg by Vardas et al. (22) which reflected that only 30.6% HCW were HBV immune.

1.5 Conclusions

Hepatitis B infection is well known amongst allied workers at the three South African hospitals, but there is reluctance towards HBV preventative measures. It is recommended that efforts should be made to increase the vaccination coverage and accessibility of the HBV vaccine at the hospitals. It is necessary to increase awareness campaigns and training of allied healthcare workers on Hepatitis B virus transmission and preventive measures.

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CHAPTER 2: SUBMISSABLE ARTICLE

Title

Assessing the Knowledge, Attitude, and Practice of Hepatitis B Virus infection in Allied Health Workers in Johannesburg

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Conflict of Interest: Nil

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Abstract:

Background:

The increase in communicable diseases worldwide has necessitated the need for adequate knowledge on the prevention and transmission of these diseases by medical personnel. The focus in this study is the knowledge, attitude and practice of Hepatitis B virus (HBV) infection, which is a simply transmittable blood-borne pathogen, is the very simply spread blood-borne pathogen that poses an immense threat to health personnel occupational hazard. Even though Hepatitis B Virus infection is preventable, many healthcare workers remain ignorant of its risks and the adequate preventive measures.

Objectives:

To assess the extent to which allied health workers are knowledgeable including their attitude and practices regarding prevention of hepatitis B virus infections, at three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH).

Methods:

A cross-sectional descriptive study was conducted on a sample made up of 221 allied healthcare workers from the three academic teaching hospitals using a questionnaire to collect demographic information; knowledge, attitude and practice pertaining to Hepatitis B virus infection (n=221).

Results:

Almost all workers, 97.2% indicated that they have heard about hepatitis B infection. There was no difference in this opinion by gender (p-value = 0.612). The workers got to know about hepatitis mainly from formal teaching in their training (73.5%), 16% from workshop training at work and 15.1% from media. The source of information did not differ significantly by gender as all the p-values were greater than 0.05. The results showed that there is no association between occupation and gender (p-value = 0.754) since the p-value was greater than 0.05.

Conclusions:

Hepatitis B infection is well known amongst allied workers at the three South African hospitals, but there is reluctance towards HBV preventative measures. It is recommended that efforts should be made to increase the vaccination coverage and accessibility of the HBV vaccine at the hospitals. It is necessary to increase awareness campaigns and training of allied healthcare workers on Hepatitis B virus transmission and preventive measures.

Keywords: Hepatitis B virus infection, healthcare workers

Introduction

Hepatitis B virus (HBV) is a small double-shelled virus and a member of the Hepadnavidae responsible for a variety of liver diseases. (1) HBV comprises of many antigenic parts that include HBsAg, hepB core antigen (HBcAg) and hepatitis B e antigen (HBeAg). Human beings are popularly known as active HBV hosts. (2) HBV infection is a worldwide public challenge. It is assumed there are about 240 million HBV infected people worldwide, with 600 000 annual fatalities as a result of HBV associated liver illness. (3) The effective operationalization of vaccination plans in numerous nations has led to substantial reduction in acute HBV incidences; however, HBV remains a critical cause of mortality and morbidity. (2)

The prevalence of HBV carriers varies from 0.1 present and 2 present in low prevalence areas, (USA, Canada, Australia, New Zealand), 3-5 present in intermediate prevalence areas (South America, Central Asia,), to 10-20% in high prevalence areas (Sub Saharan Africa, south-east Africa). (1, 4) HBV disease is a well-known cause of chronic and acute hepatitis and cirrhosis. It remains the main cause for half of hepatocellular carcinoma (HCC). The World Health Organization (WHO) assumed that people in excess of 600.000 people die globally of hepatitis B – related chronic and acute illnesses. (1)

Hepatitis B surface antigen (HBsAg), formerly called Australia antigen or hepatitis associated antigen is found on the surface of the virus, it can be identified in serum 30-60 days after exposure to HBV and persists for variable periods. HBsAg is not infectious. Only the complete (Dane particle) virus is infectious. (HBsAg) is most frequently used to screen for the presence of this infection, it is the first detectable viral antigen to appear during infection. (6)

Hepatitis B core antigen (HBcAg) is the nucleocapsid protein core of HBV. HBcAg is not detectable in serum, but it can be detected in liver tissue of persons with acute or chronic HBV infection. Antibodies specific to the hepatitis B core antigen (anti-HBc) can be detected in serum. Both IgM and IgG antibodies can be detected; the IgM antibody is the first antibody produced after infection with HBV, IgG antibody is produced in response to the core antigen later in the course of the infection and usually persists for life.(6)

Shortly after the appearance of the HBsAg, hepatitis B e antigen (HBeAg) will appear. Traditionally, the presence of HBeAg in a host's serum is associated with much higher rates of viral replication and enhanced infectivity. However, there are variants of hepatitis B virus do not produce the "e" antigen. During the natural course of an infection, the HBeAg may be cleared, and antibodies to the "e" antigen (anti-HB e) will arise immediately afterwards. This conversion is usually associated with a dramatic decline in viral replication, (7)

Aims

The aim of the study is to assess the knowledge, attitude and practice of hepatitis b virus infection transmission and preventive measures amongst allied health workers at three academic teaching hospitals of the University of the Witwatersrand, namely Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Helen Joseph Hospital (HJH), and Chris Hani Baragwanath Hospital (CHBH).

Material and Methods

1. **Study population**

   This is a cross-sectional descriptive study of the sampled population of 250 allied health workers employed at the three teaching hospitals for the University of Witwatersrand in Johannesburg.

2. **Data Collection**

   The self-administered questionnaire consisting closed questions with Likert scaled answers is distributed amongst the random stratified selected allied healthcare workers. The data collected is analysed statistically using Stata software to bring a conclusion to this study.

3. **Statistical analysis**

   Chi-square is used to test for correlation and existence of association amongst the variables. P-value of more than 0.05 is considered significant.

Results

Two hundred and twenty-one (88.5%) of the 250 questionnaires were returned. It was noted from the results that 23% of the workers were Physio/ OT, 18% Technician, 6% Speech, 5% Radiographer while 45% had other occupations. Most of the workers (77%) were female, 22% were male, and the other 1% did not specify their gender. More than half of the workers (59%) were between 22 and 30 years old, 30% were 13 – 45 years old, 10% were older than 45 years old while 1% of the sample did not indicate their age.

Almost all workers, 97.2% indicated that they have heard about hepatitis B infection. There was no difference in this opinion by gender (p-value = 0.612). The workers got to know about hepatitis mainly from formal teaching in their training (73.5%), 16% from workshop training at work and 15.1% from media. The source of information did not differ significantly by gender as all the p-values were greater than 0.05. The results showed that there is no association between occupation and gender (p-value = 0.754) since the p-value was greater than 0.05.

There was also no association between association between a number of years employed since the chi-square p-value was greater than 0.05 (p-value = 0.820). There was a significant relationship between knowledge on complications of hepatitis B infection by Occupation with 84% of the other worker indicating that one of the complications is cirrhosis with other occupations having lower percentages mentioning cirrhosis and 79% of the same group of workers having the highest mention of liver cancer. The p-values for Cirrhosis (.001) and Liver cancer (0.000) were less than 0.05. The unvaccinated participants held fairly low positive attitudes, with a median, mode and mean score of 1 (likely score from +4 to -4). Most of the respondents (79%) practised the right compliance with common precautions, and most of the participants (64.9%) were vaccinated. Overall respondents showed substantially superior knowledge ($p< 0.001$), safer practices and positive attitudes ($p=0.001$).

Discussion

The primary objective of this study was to assess the knowledge, attitude and practice of hepatitis B virus infection in Allied Healthcare Workers in Johannesburg. The sample was made up 210 participants from AHCW from the three teaching hospital of the University of the Witwatersrand, namely CMJAH, CHBAH and HJH. Out of 250 AHCW approached, none declined participation but 21 did not return their questionnaire, and 12 were examined from the analysis because of the non-completeness. Most of the participants were females (77.8%) compared to (22%) of males. More than half of the participants were aged between 22-33 years, and most of them were blacks.

All HCW have a high risk of blood-borne illnesses with the most known accidental exposure being the needle stick injury (NSI). Too much exposure lead to sharp objects such as broken glasses and scalpels, including mucosal exposures after bodily fluids or blood splash (11). Whilst there have been several studies on HBV in healthcare workers in SA, none has assessed the knowledge, attitude and practice of Allied Healthcare Workers such as physiotherapists, occupational therapists and speech therapists, towards HBV infection. Most studies have revealed the lack of knowledge of doctors and nurses regarding hepatitis B. (12, 14). It is hypothesized that this situation is not different from non-doctor and non-nurses allied healthcare workers. Almost all of the participants (97.2%) indicated that they have heard about HBV infection. These findings are similar to the findings of the study done in Nigeria Tertiary hospital in 2015 (26) where they found 96% of their participants knew about HBV infection.

The results did not show any difference in gender or occupation. The results of the study showed that most of the AHCW got information about HBV mainly from their formal undergraduate training (73.5%) compared with (16%) from occupation-related workshops. The above results concur with the findings of the study done by Khan and Ross (14) in KZN where 80% of their participants thought that HBV immunization plan at their clinic was neither accessible nor well organized. According to WHO HBV is one of the leading causes of death with approximately two million people dying annually from HCC and complications of cirrhosis secondary to HBV infection. (24).

Hospitals need to do more to improve all HCW including AHCW awareness about HBV infection. It is assumed that there are presently 3-4 million South African blacks who have chronic HBV infection. The HBV prevalence is less in black females than males. (mean ratio in some researches 2.6:1.0). (11). The high HBV infection is prevalent in South Africa where people in excess of 75% adults have serological evidence of past hepatitis carrier rates and exposure of between 10-25%. HCW and AHCW are thus at risk and susceptible to this preventable illness. (14)

The study also found that 65.8 % of the participants thought that HBV is spread more readily from person to person, while 41.6% of the respondents wrongly thought that HIV was transmitted easily than HBV. These findings are worse compared to the results of a study done in Bloemfontein. (31) The results also showed that the physiotherapist and the occupational therapists had a better understanding of how hepatitis B is spread compared to radiographers. The results show that significantly more Physio/OT indicated that hepatitis B is spread through sputum and other body fluids (94.1%) compared to radiographers 63.6%. Radiographers also scored low when comparing their knowledge of possible complications of hepatitis only 27.3% of them believing hepatitis B can cause liver cancer compared to a speech therapist (61.5%) and physiotherapist (45.1%). Only 72.7% of radiographers thought that HBV is common in RSA, compared to 94% of physios, 62.3 % of speech and 90% of technicians. From the results, it was clear that there is a gap in knowledge, attitude and practice towards HBV when comparing radiographers with other AHCW. It is therefore crucial that this department is sensitized and educated about the risk of HBV infection among HCW.

As far as workshop training about HBV at work, the technicians scored much better than all the AHCW, with 42.5% of technicians having received some training at work compared to less than 20% of the other AHCW. The results of this survey also indicated that only 27.3 % of the radiographers received three doses of the HBV vaccine, compared to an average of 563% of the other AHCW. The results also revealed that there is lack of work-related workshops or education as far as HBV is concerned with most of the participants (90.9% radiographers, 84.3% physio, 76.9% of speech therapist indicated that they have NOT participated in any health-related programme related to HBV.

The findings also suggest that the lab technicians adhere better to universal precautions when helping patients and handling samples compared to the rest of the AHCW (Comparing 97.2 % of technicians to 27.3 % of the radiographers). This study showed that 16%, 18% and 60%, of the respondents, had received one dose, two doses, and complete three doses of HBV vaccine respectively. The findings that only 16% of the respondents had received only one dose of the HBV vaccine is almost similar to the results of the study that was done in Southwestern Nigeria. (26)

This study found 16% of participants having received only one dose is significantly lower than the findings of 40.6% from the study conducted in Egypt. (35). Vaccination is an important measure in preventing HBV infection in HCW. In our study 60% of the participants indicated that they received three doses of HBV vaccine, there is an improvement compared to the outcome of the study done in Johannesburg by Vardas et al. (22) which reflected that only 30.6% HCW were HBV immune.

Conclusions

AHCW in our institution is at high risk of HBV infection, because of their very low awareness of the availability and accessibility of the PEP against HBV. The Department of Radiography needs to be given special attention concerning their low-performance score in general when compared to the rest of the AHCW.

Way Forward

Despite the limitations of this study, our findings add value in epidemiological information to the paucity of data that exists for HBV infection transmission and preventive measures amongst healthcare workers in South Africa. Strategies that might help will include regular workshops at work, focusing on the risk and the preventative measures for HBV infection.

Future similar studies from multiple centers in South Africa, with a more significant sample size, can be conducted to either support or refute the findings of this study.

Acknowledgement

Nil

Disclosure statement

The authors have no conflict of interest to declare

Tables and graphs

Demographic Information

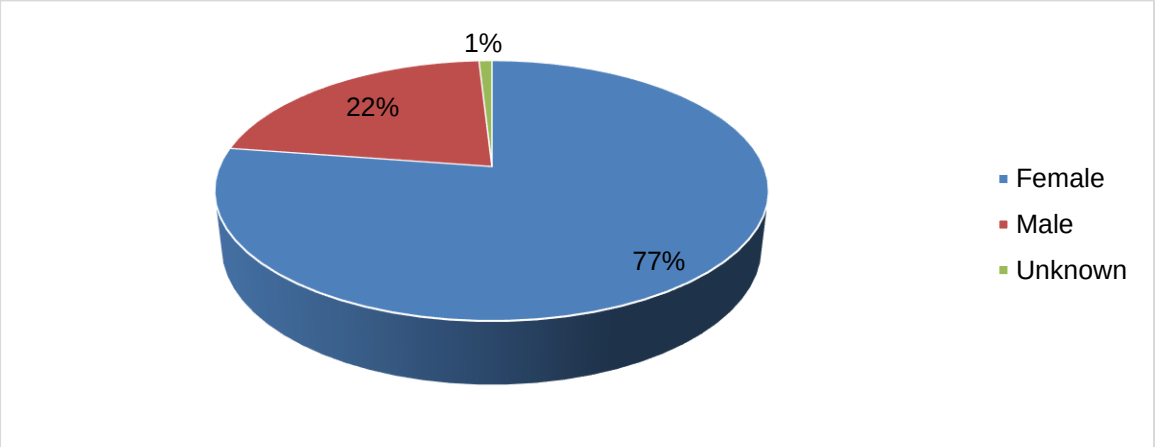

Figure 6: Gender of respondents

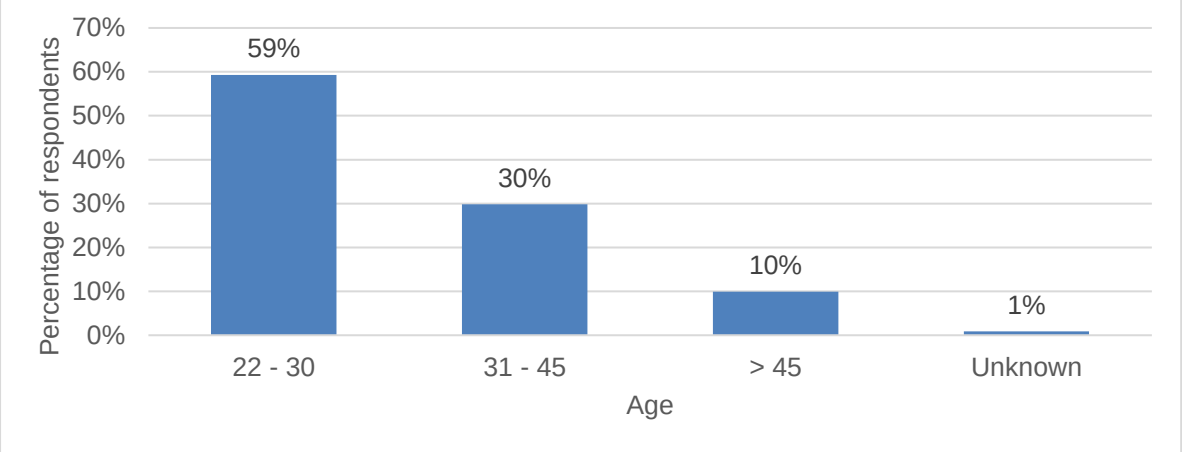

Figure 7: Age of respondents

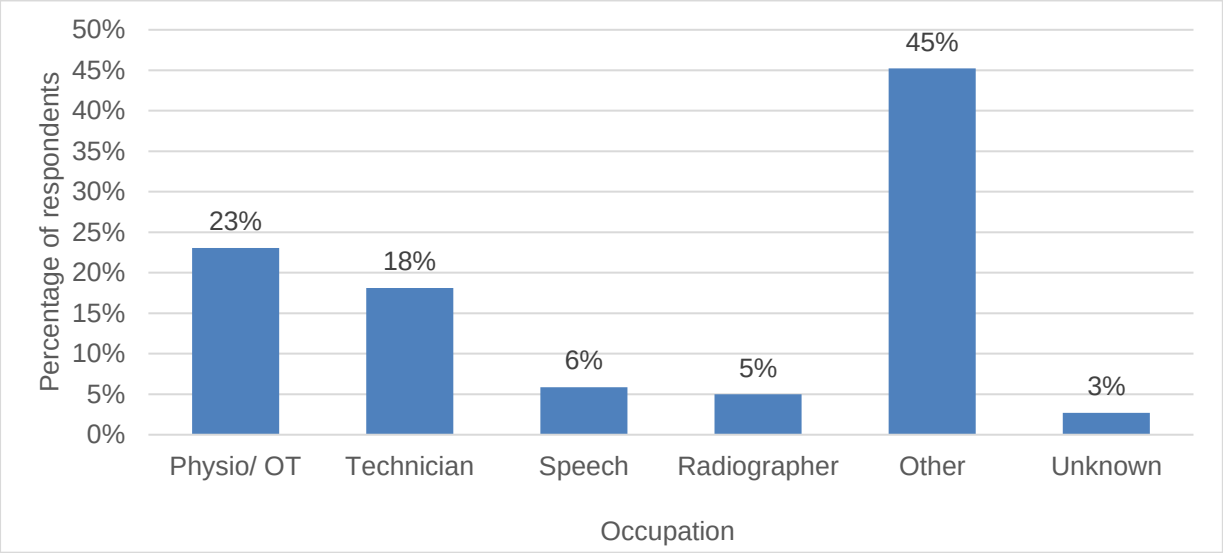

Figure 8: Occupation

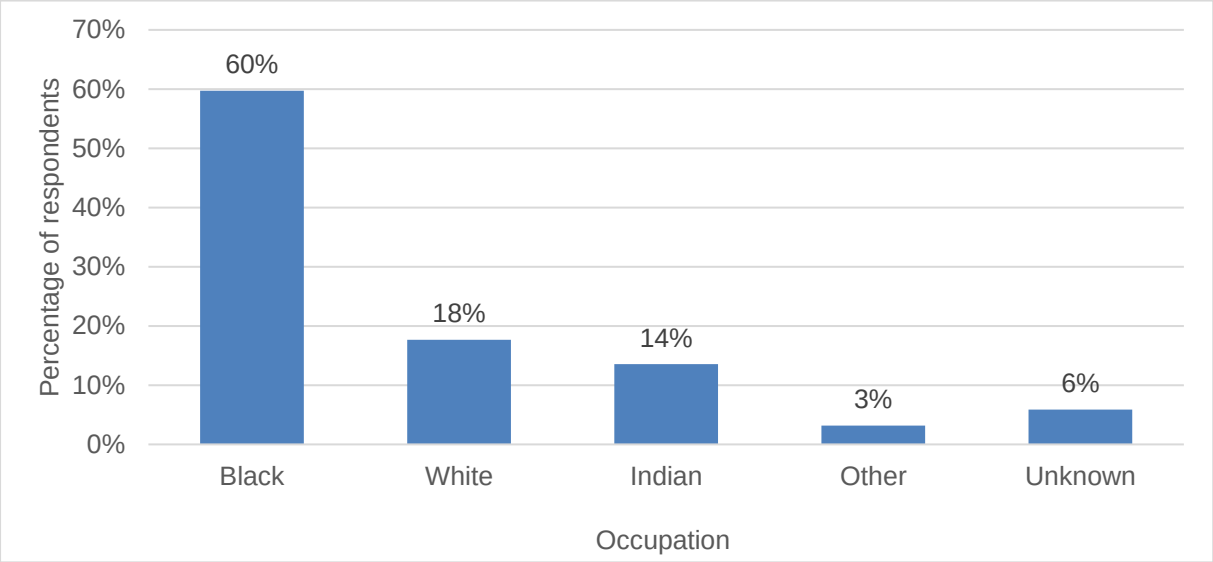

Figure 9: Ethnic group

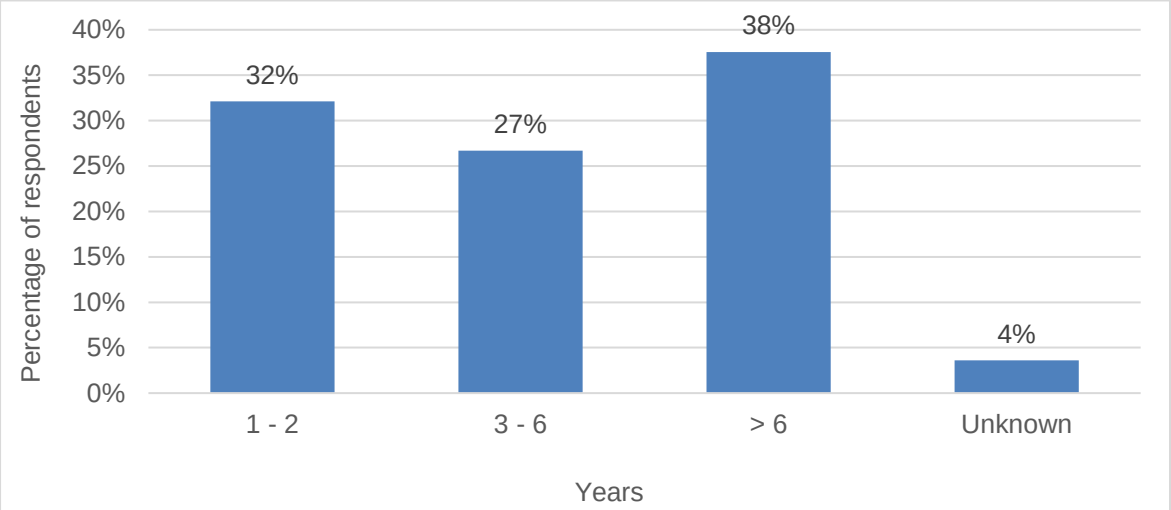

Figure 10: Number of years employed

Table 19: Occupation and Number of years Employed by gender

		Gender			P-value
		Male	Female	Total	
Occupation	Physio/ OT	9 (19.6%)	42 (24.9%)	51 (23.7%)	.754
	Speech	3 (6.5%)	10 (5.9%)	13 (6%)	
	Radiographer	1 (2.2%)	10 (5.9%)	11 (5.1%)	
	Technician	10 (21.7%)	30 (17.8%)	40 (18.6%)	
	Other	23 (50%)	77 (45.6%)	100 (46.5%)	
Number of years employed	1 - 2	15 (31.3%)	56 (33.9%)	71 (33.3%)	.820
	3 - 6	15 (31.3%)	44 (26.7%)	59 (27.7%)	
	> 6	18 (37.5%)	65 (39.4%)	83 (39%)	

Table 20: Number of years employed and Occupation

		Occupation						P-value
		Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Number of years employed	1 - 2	23 (45.1%)	6 (46.2%)	3 (27.3%)	8 (20%)	30 (31.9%)	70 (33.5%)	.017
	3 - 6	20 (39.2%)	2 (15.4%)	3 (27.3%)	10 (25%)	24 (25.5%)	59 (28.2%)	
	> 6	8 (15.7%)	5 (38.5%)	5 (45.5%)	22 (55%)	40 (42.6%)	80 (38.3%)	

Knowledge

Table 21: Assessing Knowledge of HBV (gender comparison)

		Gender			P-value
		Male	Female	Total	
Ever hear about hepatitis B infection	Yes	45 (95.7%)	167 (97.7%)	212 (97.2%)	.612
	No	2 (4.3%)	4 (2.3%)	6 (2.8%)	
How did you get to know about hepatitis B infection	Formal teaching in your training	36 (75%)	125 (73.1%)	161 (73.5%)	.855
	Media (TV, Magazine, social media)	8 (16.7%)	25 (14.6%)	33 (15.1%)	.819
	Workshop training at work	9 (18.8%)	26 (15.2%)	35 (16%)	.656

Table 22: Assessing Knowledge of HBV (Occupation comparison)

		Occupation						P-value
		Physio/ OT	**Speech**	**Radiographer**	**Technician**	**Other**	**Total**	
Ever hear about hepatitis B infection	Yes	**50 (98%)**	**13 (100%)**	**10 (90.9%)**	**39 (97.5%)**	**99 (99%)**	**211 (98.1%)**	.421
	No	**1 (2%)**	**0 (0%)**	**1 (9.1%)**	**1 (2.5%)**	**1 (1%)**	**4 (1.9%)**	
How did you get to know about hepatitis B infection	Formal teaching in your training	**40 (78.4%)**	**6 (46.2%)**	**9 (81.8%)**	**30 (75%)**	**73 (73%)**	**158 (73.5%)**	.194
	Media (TV, Magazine, social media)	**13 (25.5%)**	**5 (38.5%)**	**2 (18.2%)**	**5 (12.5%)**	**8 (8%)**	**33 (15.3%)**	.008
	Workshop training at work	**4 (7.8%)**	**2 (15.4%)**	**0 (0%)**	**9 (22.5%)**	**20 (20%)**	**35 (16.3%)**	.138

Table 23: Which Disease spread easily from person to person by gender

	Gender			P-value
	Male	Female	Total	
HIV	22 (45.8%)	69 (40.4%)	91 (41.6%)	.511
Hepatitis A virus	4 (8.3%)	20 (11.7%)	24 (11%)	.610
Hepatitis B virus	26 (54.2%)	118 (69%)	144 (65.8%)	.060

Table 24: Which Disease spread easily from person to person (Occupation Comparison?)

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
HIV	18 (35.3%)	3 (23.1%)	4 (36.4%)	17 (42.5%)	46 (46%)	88 (40.9%)	.465
Hepatitis A virus	9 (17.6%)	1 (7.7%)	1 (9.1%)	1 (2.5%)	12 (12%)	24 (11.2%)	.243
Hepatitis B virus	38 (74.5%)	11 (84.6%)	6 (54.5%)	28 (70%)	59 (59%)	142 (66%)	.149

Table 25: How is hepatitis B infection spread? (gender comparison)

	Gender			P-value
	Male	Female	Total	
Needle stick injury only	33 (68.8%)	131 (76.6%)	164 (74.9%)	.265
Touching blood of infected person with hepatitis B	37 (77.1%)	135 (78.9%)	172 (78.5%)	.843
Sexually only	28 (58.3%)	119 (69.6%)	147 (67.1%)	.165
Sputum and other body fluids	32 (66.7%)	143 (83.6%)	175 (79.9%)	.014
Touching surfaces of dried bloods of person infected of hepatitis B	30 (62.5%)	118 (69%)	148 (67.6%)	.390

Table 26: How would you get hepatitis B in your occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Needle stick injury only	33 (64.7%)	7 (53.8%)	8 (72.7%)	34 (85%)	78 (78%)	160 (74.4%)	.076
Touching blood of infected person with hepatitis B	36 (70.6%)	9 (69.2%)	9 (81.8%)	33 (82.5%)	81 (81%)	168 (78.1%)	.506
Sexually only	33 (64.7%)	7 (53.8%)	6 (54.5%)	28 (70%)	69 (69%)	143 (66.5%)	.696
Sputum and other body fluids	48 (94.1%)	11 (84.6%)	7 (63.6%)	30 (75%)	75 (75%)	171 (79.5%)	.035
Touching surfaces of dried bloods of person infected of hepatitis B	31 (60.8%)	7 (53.8%)	6 (54.5%)	30 (75%)	70 (70%)	144 (67%)	.374

Table 27: Complications of hepatitis B infection (gender comparison)

	Gender			P-value
	Male	Female	Total	
Liver failure	45 (93.8%)	165 (96.5%)	210 (95.9%)	.415
Cirrhosis	37 (77.1%)	121 (70.8%)	158 (72.1%)	.468
Liver cancer	33 (68.8%)	108 (63.2%)	141 (64.4%)	.501

Table 28: Complications of hepatitis B infection by Occupation

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Liver failure	50 (98%)	13 (100%)	11 (100%)	37 (92.5%)	96 (96%)	207 (96.3%)	.560
Cirrhosis	30 (58.8%)	9 (69.2%)	4 (36.4%)	28 (70%)	84 (84%)	155 (72.1%)	.001

Liver cancer	23 (45.1%)	8 (61.5%)	3 (27.3%)	25 (62.5%)	79 (79%)	138 (64.2%)	.000

Table 29: Known host of hepatitis B Virus (gender comparison)

	Gender			P-value
	Male	Female	Total	
Mosquitos	0 (0%)	3 (1.8%)	3 (1.4%)	1.000
Human only	34 (70.8%)	132 (77.2%)	166 (75.8%)	.445
Pigs	1 (2.1%)	3 (1.8%)	4 (1.8%)	1.000
Sheep	0 (0%)	2 (1.2%)	2 (0.9%)	1.000
Human and mosquitos	12 (25%)	31 (18.1%)	43 (19.6%)	.307

Table 30: Known host of hepatitis B Virus (occupation comparison)

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Mosquitos	2 (3.9%)	0 (0%)	0 (0%)	1 (2.5%)	0 (0%)	3 (1.4%)	.346
Human only	35 (68.6%)	6 (46.2%)	5 (45.5%)	34 (85%)	83 (83%)	163 (75.8%)	.001
Pigs	2 (3.9%)	0 (0%)	1 (9.1%)	1 (2.5%)	0 (0%)	4 (1.9%)	.161
Sheep	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (2%)	2 (0.9%)	.677
Human and mosquitos	13 (25.5%)	6 (46.2%)	5 (45.5%)	3 (7.5%)	15 (15%)	42 (19.5%)	.002

Table 31: Transmission of HBV (gender comparison)

	Gender			P-value
	Male	Female	Total	
Do you think hepatitis B infection is common in South Africa	40 (83.3%)	147 (86.5%)	187 (85.8%)	.640
Mother to Child transmission	34 (75.6%)	119 (78.8%)	153 (78.1%)	.683
Intravenous drug use	37 (84.1%)	133 (86.4%)	170 (85.9%)	.806
Blood transfusion & blood products	41 (89.1%)	153 (95%)	194 (93.7%)	.169
Haemodialysis	29 (67.4%)	102 (71.3%)	131 (70.4%)	.704
Needle sticks injury	45 (95.7%)	157 (97.5%)	202 (97.1%)	.619
Sexually	31 (72.1%)	112 (74.2%)	143 (73.7%)	.845

Table 32: Transmission of HBV (occupation comparison)

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Do you think hepatitis B infection is common in South Africa	47 (94%)	12 (92.3%)	8 (72.7%)	36 (90%)	80 (80%)	183 (85.5%)	.094
Mother to Child transmission	32 (68.1%)	8 (72.7%)	7 (70%)	32 (88.9%)	71 (79.8%)	150 (77.7%)	.212
Intravenous drug use	42 (89.4%)	11 (91.7%)	6 (60%)	31 (88.6%)	76 (84.4%)	166 (85.6%)	.162
Blood transfusion & blood products	46 (92%)	12 (92.3%)	8 (72.7%)	37 (100%)	88 (94.6%)	191 (93.6%)	.027
Haemodialysis	29 (60.4%)	6 (54.5%)	5 (55.6%)	22 (73.3%)	66 (77.6%)	128 (69.9%)	.149
Needle sticks injury	50 (98%)	11 (91.7%)	11 (100%)	36 (100%)	91 (95.8%)	199 (97.1%)	.498
Sexually	34 (72.3%)	10 (83.3%)	4 (44.4%)	26 (78.8%)	67 (74.4%)	141 (73.8%)	.280

Table 33: How the workers got to know about Hepatitis B vaccination (gender comparison)

	Gender			P-value
	Male	Female	Total	
University	36 (75%)	124 (72.5%)	160 (73.1%)	.854
Media (TV. Magazine or social media)	3 (6.3%)	8 (4.7%)	11 (5%)	.709
Friend	0 (0%)	5 (2.9%)	5 (2.3%)	.588
Workshop training at work	12 (25%)	43 (25.1%)	55 (25.1%)	1.000

Table 34: How the workers got to know about Hepatitis B vaccination (occupation comparison)

	Occupation						P-value
	Physio/ OT	Speech	Radiographer	Technician	Other	Total	
University	51 (100%)	10 (76.9%)	7 (63.6%)	21 (52.5%)	68 (68%)	157 (73%)	.000
Media (TV. Magazine or social media)	0 (0%)	1 (7.7%)	1 (9.1%)	5 (12.5%)	4 (4%)	11 (5.1%)	.090
Friend	0 (0%)	2 (15.4%)	1 (9.1%)	1 (2.5%)	1 (1%)	5 (2.3%)	.007
Workshop training at work	2 (3.9%)	2 (15.4%)	2 (18.2%)	17 (42.5%)	31 (31%)	54 (25.1%)	.000

Table 35: Assessing Attitude and Practice towards HBV (Gender comparison)

		Gender			P-value
		Male	Female	Total	
Have you been vaccinated for hepatitis B	Yes	45 (93.8%)	167 (98.2%)	212 (97.2%)	.122
	No	3 (6.3%)	3 (1.8%)	6 (2.8%)	
How many doses of hepatitis B Vaccine did you get?	1	6 (14%)	25 (15%)	31 (14.8%)	.528
	2	8 (18.6%)	40 (24%)	48 (22.9%)	
	3	28 (65.1%)	91 (54.5%)	119 (56.7%)	
	4	1 (2.3%)	11 (6.6%)	12 (5.7%)	
When last did you check your immunity against Hepatitis B infection	6 months ago	11 (22.9%)	29 (17.2%)	40 (18.4%)	.055
	1 Year ago	13 (27.1%)	57 (33.7%)	70 (32.3%)	
	2 years ago	23 (47.9%)	59 (34.9%)	82 (37.8%)	
	Never checked	1 (2.1%)	24 (14.2%)	25 (11.5%)	
Have you ever participated in a health education programme related to Hepatitis B at work?	Yes	20 (41.7%)	36 (21.1%)	56 (25.6%)	.008
	No	28 (58.3%)	135 (78.9%)	163 (74.4%)	
Do you think healthcare workers can transmit Hepatitis B Infection to patients?	Yes	40 (83.3%)	139 (82.7%)	179 (82.9%)	1.000
	No	8 (16.7%)	29 (17.3%)	37 (17.1%)	
Do you adhere to universal precautions when helping patients?	Sometimes	12 (25.5%)	33 (20.5%)	45 (21.6%)	.546
	All the time	35 (74.5%)	128 (79.5%)	163 (78.4%)	
Are you aware of post-exposure prophylaxis for Hepatitis B infection?	No	30 (62.5%)	102 (60.4%)	132 (60.8%)	.868
	Yes	18 (37.5%)	67 (39.6%)	85 (39.2%)	
How concerned are you about exposure to hepatitis B	Sometimes	17 (35.4%)	67 (39.6%)	84 (38.7%)	.617
	Never	3 (6.3%)	19 (11.2%)	22 (10.1%)	
	Often	10 (20.8%)	32 (18.9%)	42 (19.4%)	
	All the time	18 (37.5%)	51 (30.2%)	69 (31.8%)	

Table 36: Assessing Attitude and Practice towards HBV (Occupation comparison)

		Occupation						P-value
		Physio/ OT	Speech	Radiographer	Technician	Other	Total	
Have you been vaccinated for hepatitis B	Yes	50 (100%)	13 (100%)	11 (100%)	39 (97.5%)	95 (95%)	208 (97.2%)	.417
	No	0 (0%)	0 (0%)	0 (0%)	1 (2.5%)	5 (5%)	6 (2.8%)	
How many doses of hepatitis B Vaccine did you get?	1	10 (19.6%)	4 (30.8%)	2 (18.2%)	6 (15.8%)	9 (9.7%)	31 (15%)	.270
	2	11 (21.6%)	1 (7.7%)	4 (36.4%)	11 (28.9%)	20 (21.5%)	47 (22.8%)	
	3	27 (52.9%)	8 (61.5%)	3 (27.3%)	20 (52.6%)	58 (62.4%)	116 (56.3%)	
	4	3 (5.9%)	0 (0%)	2 (18.2%)	1 (2.6%)	6 (6.5%)	12 (5.8%)	
When last did you check your immunity against Hepatitis B infection	6 months ago	10 (19.6%)	5 (38.5%)	2 (18.2%)	4 (10%)	17 (17.3%)	38 (17.8%)	.000
	1 Year ago	8 (15.7%)	1 (7.7%)	1 (9.1%)	14 (35%)	45 (45.9%)	69 (32.4%)	
	2 years ago	20 (39.2%)	4 (30.8%)	5 (45.5%)	19 (47.5%)	34 (34.7%)	82 (38.5%)	
	Never checked	13 (25.5%)	3 (23.1%)	3 (27.3%)	3 (7.5%)	2 (2%)	24 (11.3%)	
Have you ever participated in a health education programme related to Hepatitis B at work?	Yes	8 (15.7%)	3 (23.1%)	1 (9.1%)	14 (35%)	27 (27%)	53 (24.7%)	.180
	No	43 (84.3%)	10 (76.9%)	10 (90.9%)	26 (65%)	73 (73%)	162 (75.3%)	
Do you think healthcare workers can transmit Hepatitis B Infection to patients?	Yes	47 (92.2%)	11 (84.6%)	7 (63.6%)	29 (74.4%)	84 (85.7%)	178 (84%)	.066
	No	4 (7.8%)	2 (15.4%)	4 (36.4%)	10 (25.6%)	14 (14.3%)	34 (16%)	
Do you adhere to universal precautions when helping patients?	Sometimes	14 (27.5%)	6 (46.2%)	8 (72.7%)	1 (2.8%)	16 (17%)	45 (22%)	.000
	All the time	37 (72.5%)	7 (53.8%)	3 (27.3%)	35 (97.2%)	78 (83%)	160 (78%)	
Are you aware of post-exposure prophylaxis for Hepatitis B infection?	No	42 (82.4%)	7 (53.8%)	9 (81.8%)	22 (55%)	51 (52%)	131 (61.5%)	.003
	Yes	9 (17.6%)	6 (46.2%)	2 (18.2%)	18 (45%)	47 (48%)	82 (38.5%)	
How concerned are you about exposure to hepatitis B	Sometimes	25 (49%)	7 (53.8%)	8 (72.7%)	11 (27.5%)	32 (32.3%)	83 (38.8%)	.000
	Never	12 (23.5%)	2 (15.4%)	0 (0%)	2 (5%)	6 (6.1%)	22 (10.3%)	
	Often	7 (13.7%)	4 (30.8%)	3 (27.3%)	6 (15%)	22 (22.2%)	42 (19.6%)	
	All the time	7 (13.7%)	0 (0%)	0 (0%)	21 (52.5%)	39 (39.4%)	67 (31.3%)	

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APPENDICES

APPENDICE 1: QUESTIONNAIRE

QUESTIONNAIRE

{Please indicate your selection by an (X)}

DEMOGRAPHIC DATA

Gender: Male ☐ Female ☐

Age: 22-30 ☐ 31-45 ☐ >45 ☐

Occupation: physio/OT ☐ Dietician ☐ speech ☐

Radiographer ☐ Technician ☐ other ☐

Ethnic group: black ☐ white ☐ Indian ☐

Other ☐

A number of years employed:

1-2 ☐ 3-6 ☐ > 6 ☐

Knowledge

1. Have you ever heard about hepatitis B infection?

(Please indicate with{x} yes or no)

No ☐ Yes ☐

2. If yes, how did you know about it?

a. Formal teaching in varsity ☐

b. Media (TV, Magazine, social media ☐

c. Workshop training at work ☐

3. **Which of the following is spread easily from person to person?**

a. HIV ☐

b. Hepatitis A virus ☐

c. Hepatitis B virus ☐

1. **How do you think hepatitis B is spread?**

a. Needlestick injury only ☐

b. Touching blood of an infected person with hepatitis B ☐

c. Sexually only ☐

d. Sputum and other body fluids ☐

e. Touching surfaces of dried blood of a person infected of hepatitis B ☐

F. all of the above ☐

5. Can hepatitis B CAUSE?

(Please indicate with {X} your selection)

a. Liver failure ☐
b. Cirrhosis ☐
c. Liver cancer ☐
d. All of the above ☐

6. Which of the following are known a host of hepatitis B Virus?

A. mosquitos ☐

b. Human only ☐

c. Pigs ☐

d. Sheep ☐

E. human and mosquitos ☐

1. **Do you think hepatitis B infection is common in South Africa?**

NO ☐

Yes ☐

Transmission.

(Please indicate with {X} yes or no)

8. Can Hepatitis B virus be transmitted by the following routes?

a) Mother to Child transmission:	No	☐	Yes	☐
b) Intravenous drug use	No	☐	Yes	☐
C) Blood transfusion & blood products:	No	☐	Yes	☐
d) Haemodialysis	No	☐	Yes	☐
e) Needle sticks injury	No	☐	Yes	☐
f) Sexually	No	☐	Yes	☐

Vaccination

(Please indicate with {X} yes or no

1. **1. Do you know about the vaccination of hepatitis B Virus?**

   a. No ☐ Yes ☐

2. If yes how did you know about it?

(Please indicate with {X} your selection)

a. University ☐
b. Media (TV. Magazine or social media) ☐
c. Friend ☐
d. Workshop training at work ☐

ATTITUDE AND PRACTICE

1. Have you been vaccinated for hepatitis B?

(Please indicate with {X} yes or no)

a. No ☐ b. Yes ☐

2. If yes, how many doses of hepatitis B Vaccine did you get?

a. 2 ☐
b. 4 ☐
c. 1 ☐
d. 3 ☐

3. When last did you check your immunity against Hepatitis B infection?

a. 2 years ago ☐

b. Never checked ☐
c. six months ago ☐
d. one year ago ☐

3. Have you ever participated in a health education programme related to Hepatitis B at work?

a. Yes ☐
b. No ☐

1. **Do you think healthcare workers can transmit Hepatitis B Infection to patients**?
   a. Yes ☐
   b. No ☐

2. **Do you adhere to universal precautions when helping patients or handling samples and specimen?**
   a. sometimes ☐
   b. all the time ☐

3. **Are you aware of post-exposure prophylaxis for Hepatitis B infection?**

(*Please indicate with {X} yes or no)*

a. No ☐
b. Yes ☐

6. How concerned are you about exposure to hepatitis B

(Please indicate with {X} your selection)

a. sometimes ☐

B. never ☐

C often ☐

c. All the time ☐

APPENDIX 2: ETHICAL APPROVAL LETTER

R14/49 Dr Ledile Mokoka-Nkhobo

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160790

NAME: (Principal Investigator)	Dr Ledile Mokoka-Nkhobo
DEPARTMENT:	Internal Medicine Charlotte Maxeke Johannesburg Academic Hospital Chris Hani Baragwanath Academic Hospital Helen Joseph Hospital
PROJECT TITLE:	Assessing the Knowledge, Attitude, and Practice of Hepatitis B Virus Infection in Allied Health Workers in Johannesburg
DATE CONSIDERED:	29/07/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Johnny Mahlangu
APPROVED BY:	Professor A Dhai, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	14/12/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in July and will therefore be due in the month of July each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX 3: APPROVAL LETTER FROM CHARLOTTE MAXEKE ACADEMIC HOSPITAL CEO

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

Enquiries:
Mr. J. Maepa
Office of the Clinical Director
Tell: (011) 488-3365
Email:johannes.maepa@gauteng.gov.za
28 June 2016

Dear Dr Ledile Mokoka –Nkhobo

STUDY TITLE: Assessing knowledge, Attitude and Practice of hepatitis B virus infection in Allied Health Workers in Johannesburg.

Permission to conduct the above mentioned study is provisionally approved. Your study can only commence once Ethics approval is obtained. Please forward a copy of your ethics clearance certificate as soon as the study is approved by the Ethics committee for the CEO's to give you the final approval to conduct the study.

Supported/~~not supported~~

Dr. M.I. Mofokeng
Clinical Director
DATE: 28/6/2016

Approved/not approved

Ms G. Bogoshi
Chief Executive Officer
Date: 29-06-2016

APPENDIX 4: APPROVAL LETTER FROM CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL MANAGEMENT

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE
CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 27 May 2016

TITLE OF PROJECT: Assessing the knowledge, attitude, and practice of hepatitis B virus infection in allied health workers in Johannesburg

UNIVERSITY: Witwatersrand

Principal Investigator: L Mokoka-Nkhobo

Department: Pathology

Supervisor (If relevant): J Mahlangu

Permission Head Department (where research conducted): Not yet

Date of start of proposed study: May 2016
Date of completion of data collection: Dec 2018

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Hospital. The CEO /management of Chris Hani Baragwanath Hospital is accordingly informed and the study is subject to:-

- Permission having been granted by the Human Research Ethics Committee of the University of the Witwatersrand.
- the Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- the MAC will be informed of any serious adverse events as soon as they occur
- permission is granted for the duration of the Ethics Committee approval.

.....
Recommended
(On behalf of the MAC)
Date: 27 May 2016

.....
Approved/Not Approved
Hospital Management
Date: 31/05/16

APPENDIX 5: APPROVAL LETTER FROM HELEN JOSEPH HOSPITAL

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Helen Joseph Hospital
Enquiries: Dr. M.Mukansi
Research Committee - Chairperson
Tell: 011 489 0306/1087
Fax: 011 489 1038
Email: murimisi.mukansi@wits.ac.za

To whom it may concern

Date: 29 June 2016

SUBJECT: **HELEN JOSEPH HOSPITAL RESEARCH COMMITTEE**
Protocol Title: Assessing the knowledge, Attitude, and Practice of Hepatitis B Virus infection in Allied Health Workers in Johannesburg.
Protocol Ref No: Not applicable
Ethics Clearance: Pending
Investigator: Ledile Mokoka - Nkhbo
Department: Internal Medicine

Committee Recommendations
Committee approval is provisional the committee awaiting ethical clearance from University of Witwatersrand HREC.

Thank you in anticipation

Dr. M. Mukansi
Chairperson of the HJH Ethics and Research Committee