



Hepatitis B and C Prevalence and Prevention Awareness among Health Care Workers in Butare University Teaching Hospital

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ACRONYMS AND ABBREVIATIONS

%: percentage

mls : milliliters

HCWs: health care workers

HBV: hepatitis B virus

HCV: hepatitis C virus

ELISA: Enzyme Linked Immunofluorescence S Assays

HBs Ag: Hepatitis B surface Antigene,

HBc Ab: Hepatitis B core Antibody,

HBs Ab: Hepatitis B surface Antibody

HCV Ab: Hepatitis C Virus Antibody

BUTH: Butare University Teaching Hospital

WHO: World Health Organization

NIOSH: National Institute for Occupational Health and Safety

HIV: Human Immunodeficiency Virus

NIH: National Institute of Health

TH: Tertiary Hospital

RMH: Rwanda Military Hospital

USA: United State of America

UNICEF: United Nations Children's Fund

RDT: Rapid diagnostic test

SPSS: Software Package for Statistical Solution

DEDICATION

To the Only Almighty, Our God.

To my family.

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ABSTRACT

- I. **Background:** viral hepatitis B and C constitute a public health challenge worldwide due to morbidity and mortality they cause. Their prevalence in Rwandan general population is not known until now. Health Care Workers who are among the highly exposed groups to these infections. The seroprevalence is not known and they are not screened and vaccinated routinely. The aim of this study was to find out the prevalence, risk factors and prevention awareness of viral hepatitis B and C in CHUB as one of teaching hospital in Rwanda.
- II. **Methodology:** this was a cross sectional study done among Health Care Workers of CHUB, between October 2013 and December 2013. A pre-coded questionnaire was used to collect the information on socio-demographic characteristics, risk factors and knowledge of prevention. The RDTs were used to test serum for HBs Ag and anti-HCV ab. The SPSS version16 was used for data analysis. Descriptive and logistic regression models were used for statistical analysis.
- III. **Results:** Among 378 HCWs consented to participate in our study females were 54.5% and males were 45.5% with ratio M: F of 1:1.2. The young adults aged from 26 to35 years were dominant with 49.7% of study population. The 61.4% of participants were married and Catholic Christians were 52.9%. The main departments are similarly represented except the laboratory which was underrepresented at 0.5%. The medical doctors were12.7%, general nurses were 29.3% and cleaners were 32.8%. The prevalence of HBV was 4.5% while HCV was 1.3%.Occupational exposure was reported in 57.1% while HBV vaccination coverage was 4.5%, and only 17.6% of them complete the vaccination course. 88.1% of HCWs were aware of viral hepatitis prevention, in general. **However only 4.76% of HCWs were aware of HBC vaccine availability.**
- IV. **Conclusion:** The viral hepatitis prevalence among the HCWs and the risk exposure in workplace was high. However the HBV vaccination coverage was low and the prevention knowledge was limited. The universal HBV vaccination policies in HCWs and safer work environment have to be implemented, and workplace training on viral hepatitis prevention has to be improved.

CHAPTER . I.INTRODUCTION

I.1.INTRODUCTION TO VIRAL HEPATITIS

The viral hepatitis group includes two viruses that cause chronic viral hepatitis, the Hepatitis B and C viruses (HBV & HCV). They belong to the hepatotropic viruses group. Infections with these viruses can be acute or chronic. The complications of chronic infection include chronic liver disease and hepatocellular carcinoma. The infections are transmitted in similar ways. Transmission of hepatitis B and C viruses is due to exposure to infectious blood or other human specimens. The common ways of transmission are blood transfusion, use of contaminated sharp materials, unprotected sexual contact and vertical transmission from mother to child during childbirth. There is a vaccine to prevent HBV, but not for HCV. [1,2]

I.2.BACKGROUND

Viral hepatitis infections caused by HBV and HCV are of important health problem worldwide due to their morbidity and mortality. The prevalence varies from region to region and among different segments of single populations. [1] Two billion people worldwide have been exposed to HBV and more than 350 million have developed chronic viral hepatitis. [3] HCV infection is reported among 170 million people and mortality due to these infections and complications is 8,000-10,000 people per year in USA[1,6]. In USA, the HCV accounted for 40% of liver cirrhosis cases as well as other chronic liver diseases [5,32] and one third of cases of hepatocellular carcinoma [5,33]. HCV is a common reason for liver transplantation worldwide. [5] HCV prevalence is highest in Egypt (15-20%). [1,3,4]

Occupational exposures which health care workers (HCWs) face in their daily work (needlestick injury, exposure to blood and other biological fluids) put them at high risk of being affected by bloodborne infections, especially hepatitis B and C. These infections may lead to serious complications in an important number of cases. Approximately 30/100 beds per year were estimated as incidence of occupational injuries encountered by HCW in the hospital in USA[5]. The morbidity and mortality of HBV in HCWs due to sharp injuries are estimated 66,000 cases and 261 deaths per year, respectively. In developing countries 40-60% of HBV infections in HCWs are attributed to sharp injuries [5].

The Occupational Safety and Health Administration (OSHA) in America reported that an estimated 5.6 million people who work in the health care industry and related occupations are at risk of encountering occupational exposure to blood borne pathogens [8]. The National Institute for Occupational Health and Safety (NIOSH) reported an estimate of 600,000 to 800,000 needlestick and other percutaneous injuries in the US hospitals every year. [9] In 2000 alone, it was estimated that 16,000 cases of HCV, 66,000 cases of HBV and 1000 cases of HIV due to percutaneous injuries occurred worldwide. [10].

Data were collected on needlestick injuries from 29 health facilities in US from 2007. [11], with these data showing that occupational exposure due to percutaneous injuries was more significant in teaching hospitals than in non teaching hospitals; the most exposed workplaces were operating rooms, patients' rooms, and emergency departments. Nurses, residents and attending physicians encountered occupational exposures at the rate of 34%, 18% and 14% respectively. The risk among medical trainees was associated with long work hours and fatigue due to sleep deprivation [12,14]. A study done in HCW in a tertiary hospital in Uganda showed a prevalence of 8.1% of HBV due to occupational exposure, with needle stick injuries reported in 68.7% of cases and exposure of mucous membrane of 41.0% of cases. [3, 20]

People with acute viral hepatitis caused by HBV and HCV usually do not show clinical signs. Those infected by HBV are clinically sick in 35% of cases while 25% of those with acute HCV infection become clinically ill. However, these infections are highly transmittable, and HCWs are at high risk of contracting them and transmitting them to patients. For that reason, a decision was made by World Health Organization (WHO) and National Institute of Health (NIH) that the risk of viral hepatitis transmission to patients during physical examination has to be considered and prevented. [1].

Viral load, the volume of infected body fluid, and the frequency of exposure are determinants of the risk of acquiring blood borne pathogens from occupational exposures. The risk also depends on positivity or negativity of "HBe" antigen: it is 2% if negative and increases to 40% if the source is "HBe" antigen positive [9] Since 1982, HBV is vaccine-preventable. The HBV vaccine is safe, immunogenic, and effective [27, 28, 29]. The implementation of that vaccine in HCW is

recommended by WHO. But in developing countries, mostly in sub-Saharan Africa, routine vaccination is not yet sufficient [29]. A great proportion of HCW never receive that vaccine though they are at high risk to be infected [28]. If HCW are not vaccinated, the risk of transmission by HBV-infected blood in the case of a single needle stick injury blood ranges from 6 to 30%. [27,28]

Hepatitis C is another blood borne infection which is a major cause of human morbidity and mortality. [3] The mode of transmission is similar to those of HBV. The difference is the low rate (5%) of sexual transmission. [1,2,9] The diagnosis is due to seek for antibodies in blood against the virus. [9]

The true prevalence of HBV and HCV in Rwanda is not known but average estimated seroprevalence in the wider sub-Saharan region suggests that there is a seroprevalence > 8% of HBV [14] and 1-2.4% of HCV. [15,16,17]. Some results from a study conducted in Rwanda and Uganda show that HBsAg was found in 4.9 % women in Uganda and 2.4% in Rwanda. HBeAg was found in 33% of HBsAg-positive patients and HBV DNA was quantifiable in 71% of patients. Anti-HCV antibodies were found in 5/247 women (seroprevalence 2.0% 95%CI 0.3-3.9): 1/165 (0.6%) in Uganda and 4/82 (4.9%) in Rwanda. [18] Data from the national centre for blood transfusion has shown a prevalence of HBsAg varying between 1.9% and 3.2% among blood donors while HCV Ab is also found in blood donors at a prevalence varying between 0.76 and 3.17% [19].

The health system of Rwanda until now has not implemented a policy of universal HCW vaccination against HBV; however the system is routinely vaccinating newborns. This vaccine was introduced free of charge since 2002 for children under 1 year. [34]

In sub-Saharan Africa there are few studies on prevalence rate of hepatitis viruses in HCWs, hepatitis B vaccination status, or awareness and attitudes towards basic infection control practices like post exposure prophylaxis to needle stick injuries. If an effective infection control programme is to be implemented in our health care setting, baseline data on these matters will be needed to establish the right direction for its implementation, as prevalence of disease, and attitudes and behaviors of HCWs vary from place to place.

Hence this study was designed to describe the current situation in public health facilities in Rwanda, using the Butare University Teaching Hospital as a sample, with the hope that findings will help the infection control committees, hospital administrations, and the Ministry of Health in formulating policies on preventing viral hepatitis transmission within local health care settings.

I.3.RESEARCH QUESTION

What is the prevalence and state of knowledge about viral hepatitis amongst HCWs in Rwanda?

I.4.OBJECTIVES

I.4.1.GENERAL OBJECTIVE

To find the prevalence of Hepatitis B and C, risk factors, and to assess knowledge of hepatitis prevention among HCWs of BUTH.

I.4.2.SPECIFIC OBJECTIVES

1. To determine prevalence of HBV and HCV among HCWs in different departments of BUTH
2. To determine exposure behaviors amongst HCWs
3. To determine the correlation between exposure behavior and infection of HBV and HCV in HCWs.
4. To assess HCWs' knowledge about viral hepatitis prevention

CHAPTER. II. METHODS AND MATERIALS

II.1.Study design

This study was a descriptive, cross sectional study and was conducted between October 2013 and December 2013.

II.2.Settings

This study was conducted within Butare Teaching Hospital, located in Huye District. Its aims are mainly to be:

- A center for specialized health care. It also assumes the supervision of district hospitals.
- A center for teaching and training of medical students and postgraduates from Rwanda National University and other universities of the Eastern African Region and European Countries.
- A center for clinical research

It holds 747 personnel: 384 clinical HCWs, 78 administrative personnel, 250 Cleaners, 35 residents (data as of 16/10/2013, as given by Human Resource Unity of BUTH). It has twelve departments comprising Internal Medicine, Surgery, Gynecology &Obstetrics, Pediatrics, Otolaryngology, Ophthalmology, Radiology, Dermatology, Dentistry, Pharmacy, Physiotherapy and Laboratory.

II.3. Study population

All HCWs were eligible. They were further defined by their department of work and level of direct contact with patients.

II.3.1. Inclusion criteria

- All permanent healthcare workers currently working in BUTH who gave written informed consent.
- Postgraduate students were considered as HCWs
- All cleaners who accepted to give written consent
- Non clinical staff who accepted to give written consent

II.3.2. Exclusion criteria

- Medical and nursing students
- Whoever did not sign written consent form
- Those who were not at work during the screening period

II.4. Sample size

There are 747 HCWs in CHUB, who represent our eligible study population. We performed a power calculation to determine prevalence of HBV and HCV. Using an estimated HBV prevalence of 5%, and a margin of error of 2%, with a 95% confidence interval, we calculated, we would need to include 284 HCWs in the study. This was minor number of participants we calculated. But as we wanted to have more accurate results we accepted also other participants until we had 378 participants.

II.5. Data collection

II.5.1. Participant enrollment :

All HCWs with direct contact with patients were eligible for study enrollment; but any other non-clinical HCW who signed consent was also eligible. Study personnel, including the site investigator and trained research assistants, conducted study recruitment and enrollment procedures including clear explanation of the study and signing of consent by participants.

II.5.2. Study instrument

A pre-coded and pretested semi-structured questionnaire in English or Kinyarwanda was administered by a trained study interviewer. Data on personal demographics, risk factors and

prevention knowledge was collected. Participants were de-identified to optimize confidentiality and privacy.

II.5.3 Sample collection and transportation

Using standard venesection and laboratory practices, 10 mls of venous blood was collected from the ante cubital fossa from each participant. Each sample was centrifuged within 6 hours of being collected into 8 aliquots of serum for testing at the hospital laboratory.

II.5.4. Screening for HBV and HCV using RDTs

RDTs are intended for qualitative detection of HBsAg in human serum, plasma or whole blood. In this study, 2 different rapid diagnostics kits were used; detection of HBV infection (both previous and existing) was done using HBsAg dipstick on human serum or plasma. ‘Cypress Diagnostics’ HBsAg is a rapid one step visual immune-chromatographic test for qualitative detection of HBsAg. The dipstick, patient samples, and controls were allowed to come to room temperature then the dipstick was immersed in samples for 15 seconds and the strip was laid on a flat, clean, non absorbent surface to await appearance of the coloured bands. Results were read after 10-20 minutes. However to confirm negative results a further check after the complete reaction time of 30 minutes was used.

Diagnosis of HCV infection has been done using the “Cypress Diagnostics’ anti-HCV dipstick method on human serum or plasma. “Cypress Diagnostics” anti-HCV dipstick is a rapid chromatographic immunoassay test for qualitative detection of antibodies to HCV infection. The dipstick, patient samples, and controls were allowed to come to room temperature and thereafter the dipstick was immersed in the samples for 15 seconds with the strip laid on a flat, clean, non absorbent surface until the appearance of the colored bands. Results were read after 15-20 minutes.

II.6.Data management

All data were collected using a questionnaire uploaded on personal digital assistants (PDAs). All study data were entered into Microsoft Access software. Data were double-entered to verify

accuracy of entry and data backed up daily to ensure quality control. Query programs were written into database to limit entry of incorrect data and to ensure data quality. The study coordinator and data manager had reviewed CRFs (case record form) and data queries daily for completeness and accuracy. Data analysis was at two levels-descriptives and logistic regression-using SPSSv16 software. Microsoft Word 2010 was used to prepare text and Microsoft Excel 2010 was used to make graphs.

II.7.Ethical considerations

Access to the data collected from questionnaire and laboratory tests were kept under conditions of strict confidentiality. All data collected were rendered anonymous (only marked with a code) and could therefore not directly be traced back to the person concerned. The key record identifying the participant was kept confidential and not made available, except to the Principal Investigators. Even after the publication of results, the participants' results will remain confidential.

This proposal has been presented to the Faculty of Medicine research commission and to BUTH Ethics Committee for acceptance and validation.

Participants signed the consent before they entered the study. Determining the seroprevalence of HBV and HVC- in HCW will help in prevention and advocacy for universal vaccination for medical and paraclinical personnel of health facilities in country.

For negative HBV and HCV serology participants, the result was communicated by SMS message and HBV vaccination was offered. For positive participants, post test counselling was done in person and they were followed up by clinical staff in the Internal Medicine department.

CHAPTER III.RESULTS

III.1. Socio-demographic characteristics of Butare University teaching Hospital, 2013.

Table 1. Viral hepatitis serological status of HCWs by socio-demographic category

Characteristics		HBV status		HCV status	
		Negative	Positive	Negative	Positive
<i>Age</i>	Less than 25 years	50(96.2%)	2(3.8%)	51(98.08%)	1 (1.92%)
	26 to 35 years	177(94.2%)	11(5.8%)	187(99.5%)	1(0.5%)
	36 to 45 years	100(97.1%)	3(2.9%)	102(99%)	1(1%)
	older than 45 years	34(97.1%)	1(2.9%)	33 (94.3%)	2(5.7%)
	Total	361(95.5%)	17(4.5%)	373 (98.7%)	5(1.3%)
<i>Gender</i>	Male	163(94.8%)	9(5.2%)	169(98.3%)	3(1.7%)
	Female	198(96.1%)	8(3.9%)	204(99%)	2(1%)
	Total	361(95.5%)	17(4.5%)	373(98.7%)	5(1.3%)
<i>Marital status</i>	Never married	123(93.9%)	8(6.1%)	131(100%)	0(0%)
	Married	223(96.1%)	9(3.9%)	227(97.8%)	5(2.2%)
	Living together	2(100%)	0(0%)	2(100%)	0(0%)
	Separated/divorced	4(100%)	0(0%)	4(100%)	0(0%)
	Widow/widower	9(100%)	0(0%)	9(100%)	0(0%)
	Total	361(95.5%)	17(4.5%)	373(98.7%)	5(1.3%)
<i>Religion</i>	Catholic	192(96%)	8(4%)	198(99%)	2(1%)
	Protestant	138(95.2%)	7(4.8%)	143(98.6%)	2(1.4%)
	Muslim	8(88.9%)	1(11.1%)	8(88.9%)	1(11.1%)
	SDA	18(94.7%)	1(5.3%)	19(100%)	0(0%)
	Jehovah's witness	1(100%)	0(0%)	1(100%)	0(0%)
	No religion	4(100%)	0(0%)	4(100%)	0(0%)
	Total	361(95.5%)	17(4.5%)	373(98.7%)	5(1.3%)

378 HCWs consented to participate in the study. The age of our population study ranged from 18 to 63 years with mean of 34.05 years (± 8.36 as standard deviation). The study population

consisted mostly of young adults: 49.7% of participants were in the age range from 26 to 35 years. There were 206 (54.5%) females and 172(45.5%) males, with a ratio of M: F of 1.2:1. The majority of the participants were married 232/378 (61.4%), followed by single people 131/378 (34.7%). Divorce and separation were not common in our population 2/378 (1.1%). Catholic Christians made up 200/378(52.9%) and Protestants were the next most common 145/378 (38.4%). People without religion and Jehovah's Witness were small minorities, 1.1% and 0.3% respectively.

Young HCWs in the age range from 26 to 35 years were highly affected by HBV (5.85%) while positive HCV serology was uncommon, but appeared fairly equally distributed among the whole range of ages. The number of male HCWs with a positive test for either hepatitis B or C was slight higher than females with 12/172 (6.97%) for males and 10/206(4.85%) for females. Positive HBV serology was found in both married and unmarried HCWs; 9/232(3.9%) and 8/131(6.1%) respectively. HCV positivity was seen only in married HCWs. Religious preference was not clearly associated with either HBV or HCV serological status.

Table.2.Viral hepatitis serological status of HCWs by occupation and department

		HBV status		HCV status	
		Negative	Positive	Negative	Positive
Cadre	General nurse	106(95.5)	5(4.5)	111(100)	0(0)
	Midwife	16(100)	0(0)	16(100)	0(0)
	Double trained nurse	3(75)	1(25)	4(100)	0(0)
	Specialized nurse	6(100)	0(0)	6(100)	0(0)
	Intern doctor	9(81.8)	2(18.2)	11(100)	0(0)
	General doctor	20(95.2)	1(4.8)	21(100)	0(0)
	Specialized doctor	9(90)	1(10)	10(100)	0(0)
	Lab technologist	1(100)	0(0)	1(100)	0(0)
	Lab technician	1(100)	0(0)	1(100)	0(0)
	Other	190(96.4)	7(3.6)	192(97.5)	5(2.5)
		361(95.5%)	17(4.5%)	373(98.7)	5(1.3)
Department	Internal Medicine	48(98)	1(2)	49(100)	0(0)
	Pediatrics	45(93.8%)	3(6.2)	48(100)	0(0)
	Surgery	52(96.3)	2(3.7)	54(100)	0(0)
	Obst/Gynecology	28(93.3)	2(6.7)	30(100)	0(0)
	Administration	53(96.4%)	2(3.6)	53(96.4)	2(3.6)
	Other	135(95.1%)	7(4.9)	139(97.9)	3(2.1)
		361	17	373	5
	95.5%	4.5%	98.7%	1.3%	

The number of general nurses was 111/378 (29.3%). Medical doctors were 48/378(12.7%).

Administration, Surgery, Internal Medicine and Pediatrics departments represented 55/378(14.6%), 54/378(14.3%), 49/378(13.0%) and 48/378(12.7%) respectively. A significant proportion of our population was working in “other departments” (including cleaning department, pharmacies, anesthesia,..) 142/378 (37.57%).

The department with high HBV positivity is Gynecology & Obstetrics followed by Pediatrics, 6.67% and 6.25% respectively, while administration had high HCV positivity at 3.64% (but still only 2 total positive cases). Intern doctors had the highest rate of HBV positivity with 18.2% then General Physicians at 4.8% and nurses at 4.5%. HCV was seen only in Administrative staff and “other” HCWs.

III.2. Risk factors to viral hepatitis among HCWs of Butare University Teaching Hospital.

Table 3. Baseline risk factors of HBV/HCV infection among HCW at CHUB, 2013

		HBV status			HCV status		
		Negative	Positive	P-value	Negative	Positive	P-value
<i>History of blood transfusion</i>	No	348	16	0.481	359	5	1
		95.60%	4.40%		98.60%	1.40%	
	Yes	13	1		14	0	
		92.86%	7.14%		100%	0%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>Prior prescribed IV medication</i>	No	153	9	0.456	160	2	1
		94.44%	5.56%		98.77%	1.23%	
	Yes	208	8		213	3	
		96.30%	3.70%		98.61%	1.39%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>Prior surgery</i>	No	162	6	0.468	166	2	1
		96.43%	3.57%		98.80%	1.20%	
	Yes	199	11		207	3	
		94.76%	5.24%		98.60%	1.40%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>Prior dental procedure</i>	No	168	11	0.213	178	1	0.375
		93.86%	6.14%		99.44%	0.56%	
	Yes	193	6		195	4	
		97%	3%		98%	2%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	

<i>History of ear/nose piercing</i>	No	286	16		298	4	
		94.70%	5.30%		98.70%	1.30%	
	Yes	75	1	0.214	75	1	1
		98.70%	1.30%		98.70%	1.30%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>History of tatoos</i>	No	358	17		370	5	
		95.50%	4.50%		98.70%	1.30%	
	Yes	3	0	1	3	0	1
		100%	0%		100%	0%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>History of surgery done by traditional purposes</i>	No	316	14		325	5	
		95.80%	4.20%		98.48%	1.52%	
	Yes	45	3	0.463	48	0	1
		93.75%	6.25%		100%	0%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>History of Having sex intercourse</i>	No	39	1		40	0	
		97.50%	2.50%		100%	0%	
	Yes	322	16	1	333	5	1
		95.30%	4.70%		98.52%	1.48%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	
<i>History of work accident in Health Facility</i>	No	158	4		160	2	
		97.50%	2.50%		98.77%	1.23%	
	Yes	203	13	0.133	213	3	1
		94%	6%		98.60%	1.40%	
	Total	361	17		373	5	
		95.50%	4.50%		98.70%	1.30%	

14/378 (3.7%) had previously received blood transfusion and 12/14 were transfused once, while 216/378(57.1%) had received intravenous medications. Surgical past history, in general, was reported by 210/378 (55.6%).

78/378(20%) had ear and nose piercings while tattoos were not common, seen in only 3/378 (0.3%). 199/378 (52.6%) had undergone dental procedures.

Male Circumcision was reported by 118/172(68.6%). And 11/118(9.3%) had this procedure outside of health facility. 48/378 (12.7%) had underwent surgical traditional procedures. A major concern was that 216/378 (57.1%) HCWs had experienced accidents which could expose them to viral hepatitis infection.

Table 3 shows also a high rate of occupational accidents amongst those who were HBV positive 14/17(76.5%). It is the same for HCV positivity: 60% of HCWs who were HCV positive were amongst those who had encountered an accidental exposure. The occupational exposure, accordingly to the job category was as follows: general nurses and midwives 87/135 (64.4%), Anaesthetist technicians 10/11(90%), cleaner staff 54/124 (43.6%), medical doctors (intern/GPs/specialized) 26/42(61.9%).

Table 3 shows that some risk factors have impact on viral hepatitis seropositivity and others do not. For example, it is showed that blood transfusion; surgical procedures, traditional surgical procedures, sexual intercourse, and history of accident in workplace were more common among HCW with HBV seropositivity compared to those who were seronegative. But there is no significant statistical difference between 2 groups, for every risk factor, because the p value was not less than 0.05.

This is also the case for HCV: a history of intravenous medications, dental procedures, surgery, sex intercourse and workplace accidents were more common in HCWs with positive HCV serology, but p values were always >0.05, and thus not of significant statistical difference.

Table.4. Viral hepatitis prevalence by protective factors in Butare University Teaching Hospital, 2013.

		HBV status		P-Value	HCV status		P-Value
		Negative	Positive		Negative	Positive	
<i>HBV Vaccination</i>	No	346 95.84%	15 4.16%	0.174	Not Applicable		
	Yes	15 88.20%	2 11.80%				
		361	17				
	Total	95.50%	4.50%				
<i>Use of condom in last 12 months</i>							
	no sex	139(96.5%)	5(3.5)		144(100)	0(0%)	
	sex with condom	83(93.3)	6(6.7)	0.487	87(97.7)	2(2.3)	0.209
	sex without condom	139(95.9)	6(4.1)		142(97.9)	3(2.1)	
		361(95.5)	17(4.5)		373(98.7)	5(1.3)	

We found only 17/378 (4.5%) of HCWs in our study had had HBV vaccination, and only 3 of them had completed a whole course. Specialized doctors are vaccinated at a rate of 23.8%, intern doctors 18%, specialized nurses 16.7%, and general nurses 3.6%.

Sexual intercourse during the last 12 months was reported by 234/378 (61.9%) and 89/234 (38%) had always used a condom during sex intercourse. Only 16/132 (12.2%) of unmarried HCW reported not using a condom during sex intercourse.

There was high HBV prevalence amongst those HCW who were vaccinated (11.8%), although the p value was not statistically significant (p=0.174).

III.3. HBV and HCV prevalence rate among HCWs.

22/378 (5.8%) tested positive for either HBV or HCV. HBV and HCV positivity was 4.5% and 1.3% respectively. These results were obtained using rapid tests: Ag HBs and anti HCV-ab. We

did not test anti HBc-ab which would enable estimation of the whole total of HCWs who had encountered viral hepatitis.

III.4. Awareness of prevention of HBV and HCV

Out of 378 participants, 333 HCWs (88.10%) at CHUB knew that HBV and HCV were preventable infections. The use of physical protective measures (like gloves, masks, boots, glasses...) is widely known, in 75.66% of HCWs. HBV vaccination was known about by only 11% of HCWs. 4.76% of HCWs know about all classes of preventive measures. Vaccination of HBV was not known. This vaccine is not commonly or routinely given to adults in general nor to HCWs in particular.

CHAPTER. IV. DISCUSSION

IV.1. Prevalence

HBV and HCV are major problems in developing countries. They are a particular challenge in health professionals as they are the one of exposed groups and also pose a significant risk of transmitting the virus to others.

In our study we found a combined prevalence of 5.8% for HBV and HCV, 4.5% for HBV, and 1.3 % for HCV.

The prevalence is not well known in Rwandan general population. Some data from National Center of Blood Transfusion showed that among blood donors HBV prevalence was ranging from 1.9% to 3.2% (1.5% in 2012) while the HCV prevalence was ranging from 0.76% to 3.17% (2.9% in 2012). [19] The HBV positivity was a higher among HCWs compared to blood donors and lower HCV positivity among HCWs compared to blood donors. This higher prevalence of HBV amongst HCWs compared to blood donors might be due to importance of repeated exposure that HCWs are always facing. The HBV infection risk in HCWs is 4 fold higher as compared to general adult population.[29,30] In contrast, we realized that HCV prevalence amongst HCWs were lower than that found among blood donors. This appears surprising. But the blood donors would encounter this infection through other ways which are not documented in our study: like use of infected bloody materials, traditional surgical procedures etc. This high proportion of HCV amongst blood donors, although they do not represent here the Rwandan general population, should suggest the greater occupational exposure the HCWs may be unknowingly facing.

HBV positivity was high among the HCWs aged 25 to 35 years. This might be to lack precaution when they are managing the human specimens and lack of work experience. But also this is the age of active sexuality which might have an additive effect on the risk of transmission.

Viral hepatitis B and C was higher among males (6.97%) than females (4.85%). The rate of occupational exposure was quite similar. This might be due to Rwandan culture which allows the men to have more sex partners. However there was not a statistically significant difference, $p=0.35(>0.05)$ HBV positivity was higher among unmarried (6.1%) rather than among married (3.9%). It should be not only associated to occupational exposure, but probably to sex behavior like having multiple sex partners. Actually the unmarried or unattached people should be free to allow themselves to enjoy the sexual activity. This is

similar to the studies of Christy Nkiru Ezegebudo et al. in Nigeria[38] and Sharif O. et al. in USA[39].

Similar studies have shown higher viral hepatitis prevalence among HCWs in different Asian and African developing countries like in Pakistan where prevalence was 8% of combined HBV, HCV and coinfection of HBV/HCV (Javed SARWAR et al, 2008) [2], in Uganda where the prevalence was 8.1% of HBV infection (Adallah K. et al., 2010) [20] and Niger where the prevalence was 14.5% (Gerard PELLISSIER et al, 2009). [28] In contrast, the viral hepatitis studies conducted in developed countries have shown lower prevalences than that we found. One of those studies was conducted in Syria where the prevalence was 2.8% for HBV (Yacoub R. et al., 2010). [23]

The higher prevalence in developing countries is related to high prevalence of viral hepatitis in the general population. The HCWs, as instruments of health system, interact with patients in their daily work and therefore have an increased exposure to viral hepatitis [29]. In developing countries, professional risk is the cause of 40-60% of HBV infection among HCWs while it contributes to less than 10% in developed countries thanks to vaccination coverage [30].

We share the same impression with Abdhahah K. et al. [20] that the high HBV prevalence is due to lack of policy of routine immunization of HCW. But also the policy of routine vaccination has to be established, implemented and monitored. For reducing HCV prevalence, HCW education on infection control has to be strengthened. Indeed, the HCV is not vaccine preventable.^(1,2) Therefore other preventive safety measures have to be put in place and to refresh HCWs memory of HCV transmission and prevention.

The viral hepatitis prevalence among HCW in our study was lower than those found in neighboring countries. This is due to multiple factors. The policy to reduce HIV infection can have an impact on reduction of viral hepatitis transmission. This is shown by prevalence of HIV in Rwanda (2.9%) [37] compared to 7.2% in Uganda [37], to 5.6% in Kenya [36,37] and to 3.1% Nigeria [37]. Indeed, infection of both viral hepatitis and HIV use the same ways of transmission: blood contact and sexual intercourse.[1] The hygienic measures are strictly monitored by the Ministry of Health. Different cultural norms and beliefs might have an impact

on that difference between prevalences: like traditional surgical procedures, sexual behaviors, and cosmetic surgical procedure (tattoos).

IV.2. Risk factors and HBV vaccination

Overall, 57.1% of HCWs reported having encountered the occupational accident in workplace. The occupational exposure rate in our study was higher in anaesthesists (90%), general nurses and midwives (64.4%), medical doctors (62%) and cleaner staff (43.6%). These data are not different from those found in study conducted in Pakistan where the nurses were at high risk of viral hepatitis infection [30]. In Iran, the exposure rate was mostly high in cleaner staff (78%) and the nurses (63%). [24] This might be due that the nurses are the first to be in close contact with patients and stay longtime with them. Other probability is also the low knowledge on viral hepatitis prevention. It should also be the consequence of reflection of exposure.

The HBV vaccination coverage was 4.5%. Among 17 HCWs who were vaccinated, only 3 of them (17.6%) received a complete vaccination course. 12/17 (70.6%) were males, 9/17(52.9%) were doctors (Intern/GP/specialized). This low vaccination coverage is due to a lack of national policy on HCWs HBV vaccination. But also the level of HBV vaccine knowledge or income would have an impact of HBV vaccination. This is similar to vaccination coverage of Uganda where it was 6.2% [20]. Also this discordant situation was seen in Nigeria [22] where 53.7% of HCW had had needle stick injury versus 22.4% of vaccination coverage. In Cameroon, the HBV vaccination coverage was 12.3%. [27] The study conducted in hospitals in Niger showed the occupational exposure to blood to be 46.9% but the vaccination rate was 7.2%. [28]

This is very different from that of Pakistan where 86% of HCWs are completely vaccinated.[21] The study of Yacoub R.et al conducted in tertiary hospitals in Syria showed the similar results for exposure (76.6%) but different vaccination coverage (76.6%). [23] Hadadi A. et all. in Tehran, Iran, found that occupational exposure was 43.4% and HBV vaccination was 85.9% among HCW.⁽²⁴⁾ In USA and France, the countries with a low HBV prevalence lower than <2% of HBV, HBV vaccination programmes for HCWs were initiated in the early 1980s, and vaccination of HCWs was mandatory in most of western European countries.[35] Occupational

exposure to viral hepatitis infection is common among HCW in both developing and industrialized countries. But the vaccination coverage was not similar!

In our country, there was not policy or formal framework to routinely immunize HCW. It might be the level of priority to vaccinate HCWs. The effort was put towards the vaccination of children under 5 years in hopes of achieving the millennium goals. The report of UNICEF mentioned that in 2012, the HBV vaccination coverage in children was 98% in Rwanda [37]. Indeed, the vaccine combining 5 vaccines (including HBV vaccine) started to be used since 2002 [34]. The country is now among the first to reduce child morbidity and mortality. [37] Another issue is the cost of screening and vaccines. The level of education and information concerning the viral hepatitis infection might also partially explain the low vaccination rate, as otherwise awareness of vaccination against this infection and prognosis would mobilize any HCW to afford the cost of this vaccine. This is shared within developing countries. We should ask who must pay the cost of vaccination between HCW and government or other private employer. The industrialized countries have financial and political will, possible reasons of high vaccination coverage. Indeed most of those countries recommended immunization against HBV at the beginning of career in healthcare workplace [29, 30] but there is no official policy or guidelines established and implemented in Rwanda.

We recommend also HBV vaccine availability at district hospital level. This will help the accessible vaccine to HCW and the population in general. The reduction of price also is needed for affordable vaccination.

IV.3. Knowledge of viral hepatitis prevention

In our study, 88.10% of HCW knew that HBV and HCV are preventable infections. 75.66% of HCWs knew physical protective measures. HB vaccination was known in 11% of HCWs. 45/378 (11.9%) of HCWs who did not know that viral hepatitis are preventable, most of them are cleaner staff 25/45(55.6%). Viral hepatitis prevention awareness depends on level of education. This is shown by this high proportion of cleaners among other HCWs who did not know the existence of viral hepatitis prevention. But they are usually in contact with patients or the infectious materials and human specimens in their work.

This low percentage of HCWs who are aware of HBV vaccination is one of major explanations of low vaccination coverage. It may be due to lack of HBV education of HCWs at work. HBV vaccine is also new. Although it was available and recommended by WHO in 1981, [29,30] it was available in Rwanda in 2002.[34] Further, the vaccine is not available at all levels of health facilities in Rwanda; it is only available at the national level of vaccination. This may be other explanation of low awareness of the HBV vaccine and may partially explain the low vaccination coverage in HCWs. This is contrast to other developing countries. Emmanuel Chidiebere Okwara et al.(Nigeria) and Swati Tripathi et al.(India) reported awareness of HBV vaccine in 92.9% and 78.4% HCW respectively.[26,31] The difference should be due to viral hepatitis education and probably different economical status which is between the countries countries.

The difference on awareness of the HBV vaccine has to be narrowed by increasing knowledge within the CHUB staff. We recommend strengthening the training in infection control in general and particularly bloodborne infections. HCWs have to be trained on viral hepatitis transmission and prevention. The prevention and infection control department in collaboration with the Ask Rwanda limited (private company, in charge of cleaning) have to train the cleaner staff on bloodborne infection control. The CHUB has to sign a contract with the private cleaning company whose workers are HBV vaccinated and trained on bloodborne infection control and viral hepatitis.

CHAPTER V. CONCLUSIONS AND RECOMMENDATIONS

V.1. Areas of uncertainty and weakness of the study

To our knowledge, this is the first study on the epidemiology of viral hepatitis among HCWs in our setting. However, we recognize some limitations.

First, our study did not cover the all levels of health facilities we studied only one tertiary hospital. We know that from the primary level of health facilities (health centers) to tertiary hospitals (teaching hospitals) the HCWs are not a homogeneous population. They are different from each other in terms of level of knowledge, the level of occupational exposure, the equipment they use for infection prevention and control, etc. And even within our population, some departments were underrepresented so that we are not fairly able to conclude for some variables. For example laboratory workers were represented only by 1 lab technician and 1 technologist. From these two facts, the data we found could not be generalized to all HCWs in Rwanda. But if the data are like that in the teaching hospital, probably the situations are poorer in district hospitals as well as in health centers. We suggest the future studies should consider the above mentioned facts.

Second, the reliability of the data may be limited. Except for the laboratory tests we performed, other information, most of which was not easily verifiable, was self-reported by participants. However, since our participants were assured of the confidentiality of their responses, we hope or we are more certain that the information they provided was accurate.

Third, the recall bias can have an important impact on the data as questions were concerning past events which may have happened a long time ago. The study is also cross sectional and does not allow us to determine causation. For example, we cannot conclude exactly that being vaccinated for HBV is the effect of HBV knowledge.

Fourth, it is not easy to conclude the particularity of viral hepatitis among HCW when we do not have the prevalence in general population for comparison. As an estimate, we used the data from National Center of Blood Transfusion as representing whole Rwandan population.

Last, we did not perform the confirmatory tests (ELISA) as well as other tests which could help to know the number of HCW who were in contact with HBV (anti-HBVC ab). This was due to

financial and time constraints. We suggest future studies to analyze this meaningful information and financial support from different partners interested in prevention and infection control as well as those interested in research.

V.2. CONCLUSIONS AND RECOMMENDATIONS

The HCWs are serving the suffering patients. Unfortunately, when they are neither well immunized nor well trained on safety measures, they can be infected by diseases from the patients they are serving and vice versa. The results we found in this study showed that the prevalence among the HCWs was important. They are at risk to contract the HBV and HCV due to low vaccination coverage, high rate of occupation exposure, and low knowledge in prevention measures. We make the following recommendations:

To Ministry of Health:

- i. To establish a policy of universal screening and vaccination of HCWs at the onset of their work in a healthcare setting
- ii. To provide HBV vaccination at different levels of health facilities, at least at district hospitals
- iii. To assure the affordable costs of vaccination for HCWs as well as for general population
- iv. To conduct the study on prevalence in the Rwandan general population

To School of Medicine/ Research department

- i. To provide, in collaboration with Ministry of Health, vaccination to medical students before they start clinical practice
- ii. To motivate and support the undergraduate and postgraduate students to do the research on viral hepatitis in Health Facilities.

To CHUB and other Health Facilities

- i. To establish the regular trainings of HCWs on blood borne infection control and viral hepatitis in particular.
- ii. To establish and to supervise implementation of the guidelines on blood borne infection
- iii. To educate the general population through various media on viral hepatitis infection.
- iv. To conduct different research on viral hepatitis among HCWs and patients.

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APPENDICES

INFORMED CONSENT FORM

Study on “HBV and HCV prevalence and prevention awareness within HCW of Butare University Teaching Hospital”

My name is Dr Pascal BIHIZIMANA. We are conducting a study in which we want to determine the prevalence of viral hepatitis B (HBV) and C (HCV) in health care workers (HCWs) in Butare Teaching Hospital(BUTH) .The purpose of this study is to find out what is the prevalence of HBV and HCV and how is the awareness among the HCWs of this hospital because most of time those HCWs are exposed to contract this infection. You, as HCW of BUTH, are asked to participate in this study. If you agree that you participate, this must be documented by a signed and dated written informed consent form. The Research and Ethic committee of BUTH and Faculty of Medicine approved this study.

Participation in this study is completely voluntary and you may refuse participate.

Background

Several studies show that HCWs are among groups of people more exposed to viral infections, hepatitis B and C. These 2 viral hepatitis are preventable by vaccination or carefulness during daily professional life. And this trough contact with biological fluids. The vaccination of hepatitis B within HCWs is not systematic. The prevalence of HBV and HCV in our country is not known in whole population as well as in HCWs. This study will help us to know the prevalence, awareness and risk factors to exposure for doing advocacy for HBV vaccination and improve knowledge of HCWs in prevention of risk factors.

Procedures

We will need to know about your address (health facility) your position, your knowledge on viral hepatitis infection, your eventual history of risk exposure and your eventual serological status.

We will take venous blood sample to perform firstly rapid test for both HBV and HCV, and you will receive the results from the counsellor.

Your records will be handled as confidentially as possible. All records will be coded and kept confidentially so that only I, your doctor and ethic committee have access to them. All the information we need and investigations we want to perform would be done systematically for other HCWs of this institution who will accept to participate in this study like you. You will have right to know your serological test result and receiving pre and post test counseling.

Benefits

This information will help in planning for advocacy for prevention by HBV vaccination and strengthen measures to prevent HCV in HCW of our health facilities as well as in general population. If you have understood and are willing to take part in this study, then kindly sign below. you have the right to decide to participate or to withdraw at any point in this study without jeopardy to your medical care.

Risks

If you accept to participate in this study the sample of blood will be taken using needle. From that needle you should have mild pain at site of puncture. But this will take some minute and will be spontaneously resolved.

Participant:

Full name:.....

Date of Birth:.....

Signature:..... Date:.....

The person who conducted the informed consent discussion:

Full name:.....

Signature:..... Date:.....

Informed consent in Kinyarwanda

Ubushakashatsi ku “Ndwara y’umwijima iterwa na virusi B na C: ingano yayo, n’ubumenyi bwayo mu bakozi bo ku bitaro bya kaminuza by’i Butare”.

Nitwa Muganga BIHIZIMANA Pascal. Turimo dukora ubushakashatsi aho tugamije kumenya ingano yuburwayi bw’umwijima uterwa n’udukoko twitwa virus B na Virus C mu bakozi b’ibitaro bya kaminuza by’i Butare. Ikigamijwe muri ububushakashatsi ni ukumenya ingano y’ubwo burwayi bufata umwijima, n’ubumenyi ku byerekeranyi n’uko bwandura n’uko bwakwirindwa kubera ko kenshi na kenshi abo bakozi baba bahura n’ingorane z’uko bakwandura iyo ndwara. Niyo mpamvu tugutumiriye, wowe nk’umukozi wo muri bitaro, kugira uruhare muri ubu bushakashatsi. Niba wemeye kubugiramo uruhare, turagusaba kugira uko ubigaragaza ushyira umukono n’italiki ku rupapuro rubihamya. Abagize akanama gashinzwe ubushakashatsi n’agashinzwe kugenzura ko ubushakashatsi bukorwa mu mucyo(Ethic committee) b’ibitaro bya kaminuza by’i butare n’ab’ishami ry’ubuvuzi bemeye ko ubu bushakashatsi bukorwa. Kugira uruhare muri ubu bushakashatsi ni uburenganzira busesuye, ushobora no kwanga kubugiramo uruhare.

Impamvu y’ubu bushakashatsi

Ubuubushakashatsi bwinshi bwerekanye ko abakozi bo kwa muganga bari mu matsinda y’abantu bafite ingorane nyinshi zo kuba bakwandura indwara y’umwijima iterwa n’udukoko virusi B na virusi C. Izo ndwara uko ari 2 zishobora kwirindwa hakoreshejwe urukingo cyangwa hakoreshejwe ubwitonzi busabwa mu kazi bakora. Umuntu rero akaba yazandura mu gihe agize aho ahurira n’amaraso cy’andi matembabuzi. Gukingirwa indwara y’umwijima iterwa n’agakoko virusi B ntibiri rusange mu bakozi bo kwa muganga kugeza ubu. Ikindi kandi ntawe uzi uko iyi ndwara imeze mu batuye igihugu cyacu muri n’abakora kwa muganga by’umwihariko. Ubu bushakashatsi rero buzadufashakumenya uko iyi ndwara ihagaze, turebe ubumenyi abakozi bo kwa muganga bayifiteho, n’ingorane bahura nazo zatuma bayandura, bityo bidufashe kubona imibare ifatika twaheraho dukora ubuvugizi bw’uko habaho ikingira ku rihoraho kandi rusange ku bakozi bose bo kwa muganga, no kubongerera ubumenyi bw’uko baja brinda.

Uko bigenda

Dukeneye kumenya aho ubarizwa, icyo ushinze, ubumenyi bwawe ku byerekeye inwara y’umwijima iterwa na virusi, kuba hari aho waba waragize ingorane zatuma wandura iyo ndwara no kumenya niba waba warigeze uyirwara.

Nyuma turazafata amaraso yo mu mutsikugira ngo dukore ikizami cy’amaraso kiboneka ku buryo bwihuse. Dupimamo virusi B na C, nyuma tuzazipime noneho dukoresheje ubundi buryo bwitwa ELISA.

Amakuru yose akwereye azabikwa mu ibanga rikomeye. ayo makuru azabikwa hakoreshejwe ijambo ry’ibanga(code) no mu ibanga rikomeye ku buryo jye gusa umuganga ukuvura n’abashinzwe gukurikirana niba ubushakashatsi bukorwa neza(ethic committee) ari twe twemerewe kugera kuri ayo makuru. Amakuru tugukeneyeho n’ibizamini twifuza kugukorerwa bizakorerwa n’abandi bakozi bose bo muri iki kigo bemera kugira uruhare muri ubu bushakashatsi nkawe. Ufite uburenganzira bwo kumeya ibyavuye mu bizamini byagukorewe, kandi uzahabwa ubujyanama mbere yo gufatirwa ibizamini n’igihe cyo gufata ubisubizo.

Umusaruro dutegereje muri ubu bushakashatsi

Amakuru tuzakura muri ubu bushakashatsi buzadufasha gutegura ubuvugizi ku byerekeranye no guha urukingo rwa virusi B abakozi bakora kwa muganga , no gukaza ingamba zo kubarinda Virusi C mu mavuriro yose ndeste n'abaturage bose muri rusange. Urumva ko ufite uruhare mu kudufasha muri ubu bushakashatsi kugira ngo tubigereho. Niba wumva ubwo bushake rero urashyira umukono kuri uru rupapuro. Tukwibutse ko ufite uburenganzira bwo kubyemera cg kubyanga, kandi ntibigire icyo bihindura ku burenganzira bwawe mu byerekeranye no kuvurwa igihe byaba ngombwa.

Ingorane wahura nazo muri ubu bushakashatsi

Niba wemeye kugira uruhare muri ubu bushakashatsi, turagifata amaraso yo mu mutsi dukoresheje urushinge. Urwo rushing reo ushoborakumva ruguteye ububabare budakabije aho bazaba bafatira ayo maraso. Gusa ubwo bubabare bumara iminota mike cyane kandi burikiza ubwabo bitagombye imiti.

Uwemeye kujya mu bushakashatsi

Amazina.....

Italiki yavutseho.....

Umukono cg igikumwe.....

italiki.....

Umuntu wamusobanuriye iby'ubushakashatsi

Amazina.....

Umukono.....

Italiki.....

Identification of participant

Code :.....

Names :.....

Phone number :.....

Email :.....

Department :.....

I accept to participate in this study giving blood sample to test HVC and HBV after receiving pretest counselling.

Participant's signature

Counsellor's signature

.....
.....

Date :.....

Date :.....

Rapid **test results for HBV:** positive.....

Negative.....

Rapid **test results for HCV:** positive.....

Negative.....

Umwirondoro w’uwemeye kujya mu bushakashatsi

Code:.....

Amazina:.....

Inimero za telefone:.....

Email

Igice cy’ibitaro akoreramo.....

Nyuma yo guhabwa ubujyanama ku ndwara ifata umwijima,Nemeye kugira uruhare muri bushakashatsi nemera ko bamfata amaraso azapimwamo virusi B Na C bitera iyo ndwara y’umwijima.

Uwemeye kujya mu bushakashatsi

.....

Italiki

Uwakoze ubujyanama

.....

Italiki

Rapid **test results for HBV:** positive.....

Negative.....

Rapid **test results for HCV:** positive.....

Negative.....

QUESTIONNAIRE

Hepatitis B and C prevalence and prevention awareness among health care workers in Butare University Teaching Hospital

S01 - Socio-Demographic details

S01 - Participant ID _____ Number

S01.02 - Gender _____ Select from the options below

1. Male
2. Female

S01.03 - What is your age _____ Number

S01.04 - What is your Religion _____ Select from the options below

1. Catholic
2. Protestant
3. Muslim
4. SDA
5. Jehova's witness
6. Traditionnal beliefs
7. No religion
8. Other

S01.04.2 - Specify other religion _____

S01.05 - What is the highest level of school you attended? _____ Select from the options below

1. None
2. Primary
3. Post-primary/vocational, secondary of higher
4. Other

S01.05.2 - Specify other education level _____

S01.06 - What additional specialized training did you receive? ____ Select from the options below

01. General nurse
02. Midi-wife
03. Double trained nurse
04. Comprehensive
05. Specialized nurse
06. Intern doctor
07. General doctor
08. Specialized doctor
09. Lab technologist
10. Lab technician

S01.07 - What is your primary occupation? _____

S01.08 - Current Department of work _____ Select from the options below

01. Medicine
02. Pediatrics

- 03. Surgery
- 04. OBS&GYN
- 05. Public health
- 06. Laboratory
- 07. Administration
- 08. Sterilization
- 09. Other (specify)
- 88. None

S01.08.2 - Specify other _____

S01.09 - What other departments have you worked in? _____ Select from the options below

- 01. Medicine
- 02. Pediatrics
- 03. Surgery
- 04 .OBS&GYN
- 05 .Public health
- 06. Laboratory
- 07. Administration
- 08. Sterilization
- 09. Other (specify)
- 88 .None

S01.09.2 - Specify other _____

S02 - B. Marital Status Question

S02 - What is your current marital Status _____ Select from the options below

- 1. Never married
- 2. Married
- 3. Living together
- 4 .Separated/divorced
- 5 .Widow/widower

S02.2 - Is your (wife/partner) living with you now or is she staying elsewhere? _____

S02.3 - Do you have other wives or do you live with other women as if married? _____

S02.4 - How many official spouses do you/does your partner have currently? _____ Number

S02.5 - Do you or your husband/wife have a dead/separated spouse? _____

S03 - C. Alcohol consumption.

S03 - Do you take alcohol? ___ **Yes** _____ **Non** _____

S03.2 - How many days in a week on the average? _____ Number between 1 and 7

S03.3 - How long have you taken alcohol? _____ Select from the options below

- 1. Less than 6 months

2. Between 6 months and 5 yrs
3. More than 5 yrs

S04 - D. Obstetric history (to be asked of only female participants):

S04 - Do you have any children? ___**Yes** _____**Non**_____

S04.2 - If yes, how many children? _____ Number

S04.3 - For these children, what was the type, place and who assisted you during delivery? _____
(optional)

S04.4 - Type of delivery _____ Select from the options below

1. Natural
2. Caesarian section

S04.4.2 - Delivery place _____ Select from the options below

1. Home
2. Health centre
3. Hospital
4. Others

S04.4.2.1 - Specify other _____

S04.4.3 - Who delivered you _____ Select from the options below

1. Medical personnel
2. CHW
3. Other (specify)

S04.4.3.2 - Specify other _____

S04.5 - Have you ever had an abortion? ___**Yes** _____**Non**_____

S04.5.2 -How many abortions have you had in your lifetime? _____ Number

S04.5.3 - Where were you managed for the last of these abortions? Select from the options below

1. Medical facility
2. Other

S04.5.3.2 - Specify other _____

S05 - Clinical history

S05 - Have you had yellowing of eyes in the past? ___**Yes** _____**Non**_____

S05.2 - How long ago was it? _____ Select from the options below

- 1 Less than a year
- 2 1 to 5 years
- 3 More than five years

S05.3 - Was this episode associated with fever? _____ Select from the options below

1. 0 No
2. 1 Yes
88. 88 Don't remember

S05.4 - Was it associated with any pain? _____ Select from the options below

- 0. No
- 1. Yes
- 88. Don't remember

S05.5 - Where was the pain located? _____ Select from the options below

- 1. Abdomen
- 2. Chest
- 3. Both chest and abdomen
- 4. Other (specify)

S05.5.2 - Specify _____

S05.6 - How was this yellowing of eyes problem managed? _____ Select from the options below

- 1. Sough professional medical attention
- 2. Took traditional medication
- 3. Self medication
- 4. I don't remember
- 5. Other

S05.6.2 - Specify other _____

S05.7 - If you sought professional medical help, what where you told you were suffering from ? _____

S05.8 - Has any family member been diagnosed with any of the following?
(Tick where applicable)

S05.8 - Hepatitis B virus _____

S05.8.2 - Hepatitis C virus _____

S05.8.3 - yellowing of Eyes/Body _____

S05.8.4 - Liver disease _____

S06 - Blood transfusion questions

S06 - Have you ever received blood transfusion/blood products? __ Select from the options below

- 0. No
- 1. Yes
- 88 .Don't remember

S06.2 - How many times have you received any blood products? _____ Number

S07 - Treatment with Injections and Intravenous drugs

S07 - Have you been treated with injections before? ____

S07.2 - How many times do you remember an injection being administered to you? Select from the options below

- 1. Less than 5
- 2. 5 to 10 times
- 3. I don't remember

S07.3 - Have you ever received Intravenous drugs? ___Yes _____Non_____

S07.4 - How many IV drugs do you remember to have received in your life? ___ Select from the options below

- 1 . Less than 5
- 2 . 5 to 10 times
3. I don't remember

S07.5 - For IV drugs, have you ever received one outside a health facility? _____

S08 - History of surgical and dental procedures

S08 - Has a surgical procedure been performed on you before (both simple and complicated)? ___
___ **Yes** _____ **Non** _____

S08.2 - How many procedures have been performed on you? _____ Number

S08.3 - (For men) Are you circumcised? ___ **Yes** _____ **Non** _____

S08.4 - Where was it done? _____ Select from the options below

1. Health facility
2. Other

S08.4.2 - Specify other _____

S08.5 - Have you ever had a dental procedure done to you? ___ **Yes** _____ **Non** _____

S08.6 - How many dental procedures have been performed on you? _____ **Number**

S09 - Questions on hygiene/beauty

S09.1 - Do you visit a salon for shaving (men) or hair treatment (women)? **Yes** _____ **Non** _____

S09.1.2 - If yes, how many times on average per month do you visit the salon? _____ Number

S09.2 - Have you ever had an accident (such as a cuts or a burn while at the barbershop/salon?.. **Yes** **Non**...

S09.2.2 - How many accidents have you experienced? _____ Number

S09.3 - Who cuts your nails?

S09.3 - Self ___ **Yes** _____ **Non** _____

S09.3.2 - My spouse ___ **Yes** _____ **Non** _____

S09.3.3 - At the salon ___ **Yes** _____ **Non** _____

S09.3.4 - Other ___ _____ **Yes** _____ **Non** _____

S09.3.4.2 - Specify other _____

S09.4 - What is used for cutting your nails? _____ Select from the options below

1. Razor
2. Nail cutter
3. Other

S09.4.2 - Specify other _____

S09.5 - Do you share your nail cutter at home? ___ **Yes** ___ _____ **Non** _____

S09.6 - Have you experienced any cut during the pedicure/manicure process? Yes Non
S09.7 - Do you have any ear-nose-body piercing? Yes Non
S09.7.2 - Where was it done from? _____

S09.8 - Do you have any body tattoos? Yes Non
S09.8.2 - Where was it done from? _____

S10 - Traditional practices

S10 - Have you ever had a surgery done for traditional purposes? Yes Non
S10.2 - What procedure was done on you? _____
S10.3 - How many procedures were done on you? _____ Number

S10.4 - For the last of these procedures, who performed it on you? _____
S10.5 - Do you know whether any traditional practice (like tooth removal) was done on you in your childhood? Yes Non
S10.6 - Specify type of procedure _____

S11 - Use of unregistered healthcare providers

S11 - Have you ever sought care from an unregistered health care provider? Yes Non

S11.2 - What were you suffering from? _____

S11.3 - Did you receive any surgical help from these providers? Yes Non

S11.4 - What procedure was performed on you? _____

S12 - Questions on injection drug use, tattoos

S12 - Have you ever practiced injection drug use Yes Non
S12.2 - If yes, for how long? _____ Number

S12.3 - Did you ever share the injections you used? Yes Non

S12.4 - Have you ever used Pethidine, an injectable drug used to fight pain, or any other Injected pain killer drug that was self-prescribed and administered? Yes Non

S12.5 - If yes, for how many times did you use these injectable drugs? _____

S13 - Sexuality questions:

S13 - Now I would like to ask some questions about sexual activity in order to better understanding some important life issues. Let me assure you again that your answers are completely confidential. _____ (optional)

S13.1 - If we should come to any question that you don't want to answer, just let me know and we will go to the next question. _____ (optional)

S13 - How old were you when you had sexual intercourse for the very first time? _____ Number

S13.2 - How many sexual partners have you had in your life time? _____ Number

S13.3 - How many sexual partners in the last 12 months? _____ Select from the options below

1. None
2. 1 to 2
3. 3 to 5
4. More than 5

S13.4 - For these sexual partners, did you use condoms all the time? _Select from the options below

0. No
1. Yes
2. Sometimes

S13.5 - Have you ever suffered from a sexually transmitted disease? ___ **Yes** ___ **Non** _____

S13.6 - How many episodes have you suffered from? _____ Number

S13.7 - Did you get treatment for the last of these STD? _____ Select from the options below

0. No
1. Yes
88. Don't remember

S13.8 - During your sexual exposure, is kissing practiced? ___ **Yes** ___ **Non** _____

S13.9 - Do you know whether Kissing can lead to transmission of HBV infection? _____ Select from the options below

0. No
1. Yes
88. Don't know

S14 - Knowledge and attitudes on HBV/HCV prevention

A - HBV Infection

S14 - Have you heard of ___ **Yes** ___ **Non** _____

S14.2 - Do you know howis transmitted ___ **Yes** ___ **Non** _____

S14.3 - List ways of transmission you know _____

S14.4 - Do you know how it is prevented ___ **Yes** ___ **Non** _____

S14.5 - If yes, list ways you can prevent _____

S14.6 - Do you think that Kissing causes _____? **Yes** ___ **Non** _____

S14.7 - Do you think you are at risk of _____? **Yes** ___ **Non** _____

S14.7.2 - If yes, on a scale of low, medium, high, very high, rate your risk? Select from the options below

1. Low
2. Medium
3. High
4. Very high

S14.8 - Have you heard any messages about prevention of HBV in past 12months?

Yes ___ **Non** _____

S14.8.2 - If yes, through which media did you receive these message? _____

B - HCV Infection

S14 - Have you heard of ___ **Yes** ___ **Non** _____

S14.2 - Do you know howis transmitted **Yes** _____ **Non** _____

S14.3 - List ways of transmission you know _____

S14.4 - Do you know how it is prevented **Yes** _____ **Non** _____

S14.5 - If yes, list ways you can prevent _____

S14.6 - Do you think that Kissing causes _____? **Yes** _____ **Non** _____

S14.7 - Do you think you are at risk of _____? **Yes** _____ **Non** _____

S14.7.2 - If yes, on a scale of low, medium, high, very high, rate your risk _____ Select from the options below

1. Low
2. Medium
3. High
4. Very high

S14.8 - Have you heard any messages about prevention of HCV in past 12 months? **Yes** _____ **Non** _____

S14.8.2 - If yes, through which media did you receive these message? _____

S15 - HBV vaccination questions

S15 - Are you vaccinated against HBV? **Yes** _____ **Non** _____

S15.2 - What is your current HBV Vaccination status: _____ Select from the options below

1. Completed
2. Started but did not complete
3. Not vaccinated
4. Don't remember

S15.3 - How long ago was it? _____ Number

S16 - Occupational risk assessment

S16 - How long have you worked as a health care worker? _____ Number

S16.2 - Have you ever had any accident (where you were exposed to blood or any body fluid) at work while working in a health facility? _____

A - Needle prick injury

S16.3 - How many times did it occur _____ Number

S16.3.2 - On what part of your body was the blood borne exposure _____

S16.3.3 - What time was it? _____ Select from the options below

1. Morning
2. Afternoon
3. Night

B - Fluid splash in the eye

S16.3 - How many times did it occur _____ Number

S16.3.2 - On what part of your body was the blood borne exposure _____

S16.3.3 - What time was it? _____ Select from the options below

1. Morning
2. Afternoon
3. Night

C - Other

S16.3 - How many times did it occur _____ Number

S16.3.2 - On what part of your body was the blood borne exposure _____

S16.3.3 - What time was it? _____ Select from the options below

1. Morning
2. Afternoon
3. Night

S16.4 - In your experience, what is usually used at your work place to lower the risk exposure to blood or any body fluids? _____

S16.5 - Have you ever tested for HIV? ___**Yes** _____ **Non** _____

S16.5.2 - How many times have you been tested? _____ Number

S16.5.3 - When was the last test _____ Select from the options below

1. This week
2. Last two week
3. Last three week
4. Last month
5. More than a month

S16.5.3.2 - How many months? _____ Number

S16.5.4 - What was your reason of undertaking the last HIV test? _____

