PREVENTIVE BEHAVIOR AMONG DOCTORS WITH RESPECT TO HEPATITIS-B IN BOLAN MEDICAL COMPLEX HOSPITAL QUETTA, PAKISTAN

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ABSTRACT

Acquiring the Hepatitis-B (HB) infection is an occupational hazard for doctors and other Health Care Workers (HCWs). The aim of this study was to describe preventive behavior among doctors with respect to Hepatitis-B as well as the association of socio-demographic factors, knowledge, cues to action and perception with their behavior. A cross-sectional survey was conducted among doctors with respect to Hepatitis-B in the Bolan Medical Complex Hospital located in Quetta, Pakistan. Questionnaires were distributed to 384 doctors; 322 (84 %) were returned.

The majority of the respondents were male, between the ages of 31-40 years, and were medical officers working in a medical unit, from 1 to 10 years worth of experience. Almost 97 % of the respondents had a high level of knowledge concerning HB infection. Respondent's perception on severity of HB was low while susceptibility perception on HB was high. The serological test for HBsAg was negative among 94.7% of respondents. Preventive behavior was dichotomized into high and low from the mean of the responses to 21 questions about specific recommended practices consistent with Universal Precautions. Chi-square analysis showed there was an association between work department(χ^2 = 22.09, P-value =0.00) as well as perception of severity(χ^2 = 9.26, P-value =0.00) and HB preventive behavior.

Respondents with low accuracy in their perception on the severity of HB were 2 times more likely to have low HB preventive behavior as compared to those with a high level of accuracy in their perception of severity: OR (95% CI) = 2.11(1.26, 3.51). Respondents working in surgery departments were 54 % less likely to have low HB preventive behavior as compared to those working in medicine departments: OR (95% CI) = 0.46 (0.04,1.00).

Although their level of knowledge was high, the accuracy of the doctor's perception on the severity of HB was low. Therefore to increase preventive behaviors, further interventions are needed to promote the perception on severity of HB.

KEY WORDS : HEPATITIS-B PREVENTIVE BEHAVIOR / DOCTORS / PAKISTAN / UNIVERSAL PRECAUTION GUIDELINES

89 pages.

CONTENTS

CONTENTS (cont.)

CONTENTS (cont.)

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

HBM	:	Health Belief Model.
HBV	:	Hepatitis-B Virus.
HBsAg	:	Hepatitis-B surface antigen.
HBcAg	:	Hepatitis-B Core antigen.
HCC	:	Hepatocellular Carcinoma.
CDC	:	Centre for Disease Control.
BBI's	:	Blood-Borne Infections.
CLD	:	Chronic Liver Disease.
NSI's	:	Needle Stick Injuries
STD	:	Sexually Transmitted Disease.
HCW's	:	Health Care Workers.
BMCH	:	Bolan Medical Complex Hospital
WHO	:	World Health Organization.
UPs	:	Universal Precautions

CHAPTER I
INTRODUCTION

1.1 Rationale and Justification of the Study

1.1.1 Overview of Bolan Medical Complex Hospital Quetta (BMCH)

At the time of this study was performed during January 2009, Bolan Medical Complex Hospital Quetta (BMCH) was a 777 bed, tertiary care, teaching hospital attached to Bolan Medical University. It was the largest hospital of the province Baluchistan. It consist of various specialist faculties, like General Medicine, General Surgery, Ear, Nose Throat, Neurosurgery, Urology, Gyne/Obstetrics, Orthopedics, Cardiac Unit, Pediatric Medicine/Surgery Unit, Burn Intensive care Unit and Plastic Surgery unit.

There were 150 Specialist doctors and 400 other medical doctors in different departments. While about 200 nurses, and 250 other paramedics were serving in the hospital. Because BMCH Quetta was the largest tertiary care hospital of the province, all kinds of emergency, medical and surgical cases were referred to BMCH for further management from the 28 districts of the province.

Daily OPD prevalence in BMCH Quetta was about 500-700 patients, while admission cases were about 100-150, including all kinds of medical, surgical, gynecological and other emergency and injury cases.

1.1.2 Global Prevalence and Distribution of Hepatitis-B

Hepatitis-B is a highly infectious disease caused by Hepatitis-B virus (HBV) and recently has a global distribution and known as the world's one of the most

common and infectious diseases. According to estimation, more than 2 billion of world's population was infected with the high virulent Hepatitis-B virus. About 350 million people in the world were chronic carriers of HBV. While 15-40 % of infected cases developed liver cirrhosis, hepatic failure or Hepatocellular carcinoma (HCC). It was estimated that HB causes 50,0000 to 12,00000 deaths worldwide each year (1).

1.1.3 Prevalence of HBV in different geographical areas all around the world is distributed as follows;

1.1.3.1 Low prevalence areas

These areas included Canada, Western Europe, Australia and New Zealand. Prevalence of HBV infection in these areas was estimated less than 2 %.

1.1.3.2 Moderate prevalence areas

These areas include Japan, eastern and northern Europe, central Asia, Middle East, Latin and South America. In these areas, prevalence rate of HBV was 2-7%.

1.1.3.3 High prevalence areas include

These areas, included, sub-Saharan Africa, and Southeast Asia, China, Indonesia. In these areas prevalence rate of HBV was equal to or more than 8 % (2).

1.1.3.4 HB endemic areas

Countries in which HBV was endemic were South-East Asia, sub-Saharan Africa, parts of Middle East, Central-Asian Republics and some parts of Eastern Europe (3).

1.1.4 Hepatitis-B transmission

1.1.4.1 HBV is transmitted through the following ways: -

- From HB positive patient to a doctor during different surgical and medical procedures.

- Due to needle prick and sharp instrument injury from an HB positive patient to health care provider.
- Breaks in the skin without evident needle puncture, such as fresh cutaneous scratches, abrasions, burns, or other lesions, may also serve as routes of entry for HBV transmission.
- Needle recapping had a major contribution to needle-stick injuries among doctors and HCWs (4).

1.1.4.2 Other ways of Transmission are the followings:-

- From an infected mother to a newborn baby.
- Through sexual contact.
- Through blood transfusion.
- From unsterile dental and surgical equipments
- Injecting drug abusers
- People providing or receiving acupuncture and tattooing with an unsterile instrument (5).

1.1.5 Prevalence and distribution of Hepatitis-B in Pakistan:

In January 2009, Pakistan was still a developing country and HB infection was increasing day by day. Recently Pakistan has become one of the intermediate HB prevalence areas in the world. It was estimated that there were 4.5 million persons in Pakistan who were infected with HBV with a carrier rate of 3-4 % for HBV (6).

This increase was probably due to lack of proper health facilities, poverty and the most importantly lack of proper knowledge and health education about HBV transmission.

1.1.6 Distribution of HBV infection in Pakistan

Prevalence of HBV infection was about 2-10% among healthy blood donors, 5-9% among health-care personnel's, 3.6-18.66% among the general population, 3.16% among the pregnant women, 10-20% in patients with provisional diagnosis of HBV, and 3.16-10.4% among professional blood donors (7).

In Pakistan, HB viral infection has been known as *"Kaala Yarqaan"* which means black jaundice.

1.1.7 Hepatitis-B(HB) as an occupational hazard for doctors

Hepatitis-B has been an occupational hazard and doctors and Health care workers (HCWs) were at risk of acquiring this infection.

Needle pricks and sharp instrument injuries among health personnel was most common cause of HBV transmission, therefore surgeons, dentists, pathologists and staff in operation theater, wards and emergency rooms were more prone to be infected with HBV infection (5).

1.1.8 Proportion of global HB infection among doctors

There had been documented as the following:-

Sixteen percent in general dentists, 28 % in surgeons, 23 % in anesthesia personnel (8). Worldwide, each year 8,700 doctors contracted HB infection which was due to their occupational contact with the infected patients, while 200 among these infected cases would die, while other remained as carriers for this deadly virus (5). The risk of HBV transmission to health care workers who were non immunized or non vaccinated against HB, after exposure was proportional to the level of the virions in the contaminant and correlates with the presence or absence of hepatitis-B e Antigen (HBeAg) in the source patient (8).

According to Johanet et al, among 3,554 operative procedures which were Orthopedic, Vascular and Visceral surgeries, 4% of procedures were associated with percutaneous exposure of blood, with 51% of cases, surgeons were involved. Mortality rate among surgeons was high due to HB infection, compared to HIV infection (9).

HBV infection was found in high proportion among doctors and other health care workers. The prevalence of past HBV infection among doctors and health personnel has been found three- to- five fold higher than the general population **(**5).

The high prevalence of HBV in general population of Pakistan posed a great threat to the doctors and other health personnel's.

Doctors including, physicians, surgeons, pathologists, and dentists, had a higher incidence and risk of acquiring HB infection and prevalence of HBsAg was also higher than those who had no occupational exposure to patients or blood products (5).
Each year sharp needle injuries were frequently occurring among Doctors and other HCW's. Risk factors for doctors include HBV prevalence among people living with HBV, exposure and contact with infected patient's blood and others body secretions, and nature and frequency of contact with blood(5).

As mentioned above the risk for doctor was proportional to the HBV prevalence in the patient population, nature and frequency of contact with blood or other body secretions, their duration of employment in the health care setup or hospital, which indicated their exposure duration and the most important ,their immunization against HB(5).

Among doctors and other Health Care Workers (HCWs) it was estimated that the prevalence of HBsAg was about 4.8 % to 23.3 %. In Combined Military Hospital Azad Jamu Kashmir, Pakistan a serological study was conducted among doctors and other medical personnel's for the presence of HBsAg.

A sample of 199 individuals was taken. For diagnostic purpose all blood samples were tested by reverse hem-agglutination. Positive cases were further tested by Elisa method for confirmation. The overall prevalence of HBsAg, including doctors and other HCWs, was 4.1 % but the presence of HBsAg among doctors was high (33.3 %) (5).

1.1.9 Acceptance of universal precautions among doctors as their preventive behavior

"Universal precautions," as defined by CDC, were a set of precautions designed to prevent transmission of human immunodeficiency virus (HIV), hepatitis B

virus (HBV), and other blood-borne pathogens when providing first aid or health care under universal precautions. Blood and certain body fluids of all patients were considered potentially infectious for HIV, HBV and other blood-borne pathogens.

This study was to assess adaptation of Universal precautions among doctors as their preventive behavior such as: -

- Wearing gloves while doing minor or major surgical procedures.
- Tapping of blood and other pulmonary or ascitic fluids.
- During recapping or used needle bending whether they follow any preventive precaution.

Needle recapping has attracted attention as in doctor's majority of injuries occur while recapping used needles, so needle recapping was considered a major contribution to needle stick injuries .

- Modification of work practices like avoiding holding tissues with bare hands.
- During surgery improving coordination between members of the surgical Team can also minimize the risk of HB infection (5).
- So the modification of working skills during their clinical practice is also an attribute of their preventive behavior.
- While handling a known patient of HB during surgical procedures, wearing of double gloves to minimize the risk of infection.
- Using gloves while performing all phlebotomy procedures and catheterization (5).
- Besides wearing gloves, whether the doctors use masks, face shields or goggles. In certain cases of surgery of HB patients, there are lots of chances of blood splashes or other secretions of the patient, may make a way into the eyes of doctors(5).
- Wearing gown for procedures where possibility of blood/body fluid splash in cases when they are exposed to blood, body fluids which

contains blood which are visible or other body fluids to which universal precautions apply.

- Whether they immediately and thoroughly wash their hands and other body surfaces which are contaminated.

1.1.10 Vaccination status of the doctors as their preventive behavior

Due to contact with the blood and body secretions of the patients Health care providers were constantly in danger of acquiring HB infection. But fortunately HB can be prevented by vaccination (6).For complete protection against HB, it was necessary to follow complete vaccination series, because incomplete vaccination did not produce sufficient protective antibodies, made vulnerable to develop HB infection, due to insufficient immunity against HB (3).

[The risk of HBV infection to doctors in a health care setting far exceeds that for HIV infection. It has been estimated that among doctors risk of acquiring HBV infection following puncture with a needle contaminated by an HB carrier or HB positive patient during certain medical and surgical procedures ranges from 6% to 30% far in excess of the risk of HIV infection, which according to CDC was estimated to be less than 1% for HIV infection (CDC).]

This study also assessed the doctor's attitude, who had parenteral exposure or percutaneous exposure to fluids or tissues as their preventive behavior whether they might wish to know their own antibody status converted from negative to positive. As such a monitoring program could lead to prophylactic interventions in the case of HBV infection.

According to (Bukhari et al., 1999)

HB prevalence was about 16% in Quetta, which proved that HB was a noticeable and major health problem **(**5**).**

In the department of Chemical Pathology BMCH Quetta, Pakistan a study was conducted. 2466 patients were included in this study. Serological examination of

these patients was carried out. It was found that in 392 (15.9%) patients serological reports were positive for HBsAg whereas 11% were carriers for HBsAg (10).

Based on this survey, it was concluded that HB was a real threat for people in Quetta, as majority of people were unaware of this deadly disease and doctors were at risk due to occupational contact with these patients.

All these justifies that HB was a real threat for doctors serving in Bolan Medical Complex Hospital Quetta, and was more infectious then HIV in a health care setting, and due to its known infectivity how much doctors adopt more preventive measures due to their occupational contact with infected patients.

There have been no previous studies carried out addressing doctor's preventive behavior toward blood borne infectious diseases in Bolan Medical Complex Hospital Quetta. This study, therefore, could be used as a tool to know how much doctors are conscious in adopting HB preventive measures to minimize its risk of transmission. This study assessed to what extent doctors were following universal precautions and their vaccination status, as a preventive behavior.

1.2 Research Question

The study had two main research questions.

1. What were the characteristics of preventive behavior among doctors with respect to HB infection in Bolan Medical Complex Hospital, Quetta, Pakistan?

2. What factors were related with adopting Hepatitis-B preventive behavior among doctors in Bolan Medical Complex Hospital Quetta, Pakistan?

1.3 Research Objectives

1.3.1 General Objective

To study the HBV preventive behaviors and its related factors among doctors serving at Bolan Medical Complex Hospital, Quetta, Pakistan (BMCH).

1.3.2 Special Objectives

To assess HB preventive behaviors among doctors serving at Bolan Medical Complex Hospital Quetta, Pakistan.

To study the socio-demo-graphic, knowledge, perception, and cues to action among doctors in Bolan Medical Complex Hospital Quetta, Pakistan.

To study the association between HB preventive behavior and socio-demographic, knowledge, perception, as well as cues to action among doctors in Bolan Medical Complex Hospital Quetta, Pakistan.

1.4 Conceptual Framework

Independent variables: **Dependent variables:**

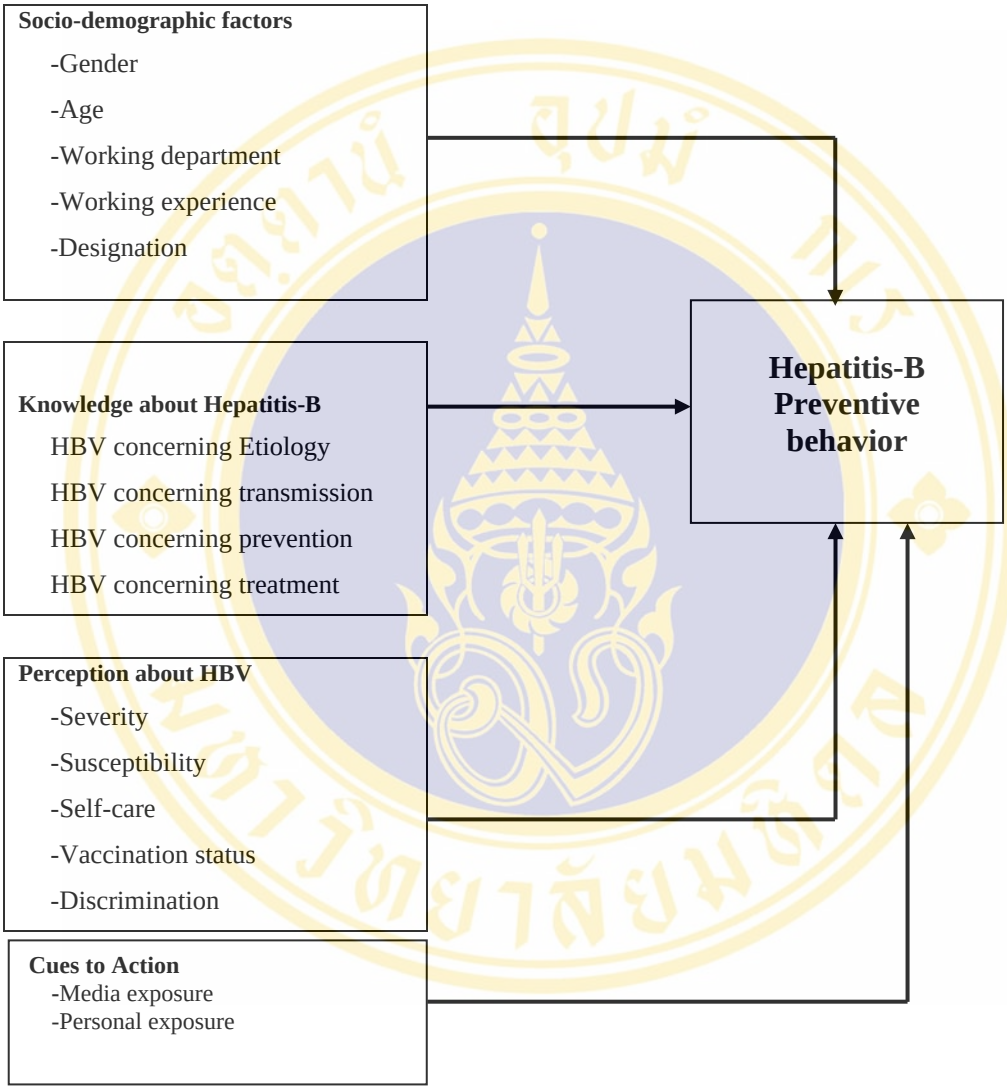


Figure 1 conceptual Framework

1.5 Operational definition

1.5.1 Hepatitis-B preventive behavior

This part includes to which extent doctors prevent themselves from HB during their clinical practice as Universal Precautions, Vaccination, and screening for HbsAg if experienced needle stick/sharp instrument injuries.

1.5.2 Universal precautions

Universal precautions are intended to prevent parenteral, mucous membrane, and intact skin exposures of doctors to blood borne pathogens like HB. Universal precautions include the use of protecting barriers which minimize the risk of HB transmission among doctors. The Universal precautions assessed are:

- Washing hands.
- Wear gloves (both hands):
- Wear Gown

Used needles recapping should be avoided and if recapping of needles was necessary, a “scoop” technique or a needle- recapping device should be used to prevent needle stick.

Masks, goggles, face msks

1.5.3 Gender

Gender refers to how many male and female doctors participate in this study.

1.5.4 Age

In this study age referred to age based on their reported birth date(dd/mm/yr).

1.5.5 Working department

In this study working department refers to where the respondents are working.

1.5.6 Hepatitis B

Hepatitis B was a condition characterized by inflammation of liver cells, caused by Hepatitis B Virus. The incubation period was usually from 42 to 161 days. Infection with this virus is detected by identifying the hepatitis surface antigen (HBsAg) in serum by radioimmunoassay or hem agglutination inhibition tests.

1.5.7 Exposure to Hepatitis-B positive patients

In this study it means exposure of the respondent to patients who are HB positive.

1.5.8 Perception

In this study perception means how doctors perceive and think about HB infection.

1.5.9 Severity

In this study severity means to which extent doctors perceive HB a health problem.

1.5.10 Susceptibility

In this study susceptibility means that whether the respondent considers him or herself for acquiring HB infection or not.

1.5.11 Self-care

In this study self care was the way the respondents protect him or herself of acquiring HBV, including their vaccination status.

1.5.12 Discrimination

In this study the attitude of the respondents with the HB positive patient.

1.5.13 Vaccination

In this study vaccination means whether the doctors were vaccinated against Hepatitis-B virus or not.

1.6 Research hypothesis

1. There is an association between socio-demographic factors and HBV prevention behavior among doctors in Bolan Medical Complex Hospital Quetta, Pakistan.

2. Controlling for the socio-demographic factors there is an association between-knowledge, perception and susceptibility related to HBV and HBV prevention behavior among doctors in Bolan Medical Complex Hospital Quetta, Pakistan.

1.7 Limitations of study

1. Since this study was only confined to Bolan Medical Complex Hospital Quetta and therefore we could not generalize or map this study on provincial or national level.

2. This study could not be used as representative either at National or provincial level due to sampling population

1.8 Expected outcome of the study

There are three main expected outcomes of this study.

If the results of this study show that doctors are not adopting appropriate prevention behaviors, then on the basis of this study, suggestions or recommendations will be given to the Health Department to ensure necessary preventive behaviors.

Given this study provides significant results, recommendations will be given to the Ministry of Health to replicate this study on provincial and national levels to examine preventive behaviors among doctors serving in the government and private health facilities.

Improving awareness of doctors and increasing their screening rates for chronic hepatitis may potentially decrease the high disease and economic burdens of cirrhosis and hepato-cellular carcinoma related to HBV.

CHAPTER 2
LITERATURE REVIEW

2.1 Health Belief Model (HBM)

Health Belief Model (HBM) was initially developed in the early 1950's by a group of social psychologists, to create awareness among masses regarding preventive measures about fatal diseases. This was an effort to provide a framework for analyzing why some people who were illness free take actions to avoid illness, whereas others failed to take such protective action.

Usually, it was supposed that individuals would take action to ward off, to screen for, or to control an ill-health condition if they considered themselves as predisposed to the condition, if they believed it to have potentially serious consequences, if they believed that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and if they believed that the anticipated barriers taking the action were outweighed by its benefits.

As a result this model has been used extensively in behavior research around the world. Following are the components of HBM:

2.1.1 Perceived Threat/Severity

It deals with one's perception of being at risk of some specific disease or health issue with respect to severity of disease. In this study, it addressed the perception of health service providers on severity of being at risk of Hepatitis-B.

2.1.2 Perceived Susceptibility

The dimension of perceived susceptibility refers to one's subjective perception of the risk of contracting a health condition. In the case of medically established illness, the dimension has been reformulated to include acceptance of the diagnosis, personal estimates of re-susceptibility and susceptibility to illness in general.

2.1.3 Perceived benefits

This component dealt with the efficiency of response against diseases or health issues that would reduce or minimize the risk of disease. In this study some variables will examine the perception of health service providers regarding the effectiveness of their response against Hepatitis-B.

2.1.4 Cues to action

There were some symptoms and complications like liver cirrhosis and hepato-cellular carcinoma associated with HB that compelled people to take action against disease or any health issue. Among doctors to get updates and information regarding any disease problem medical journals, news papers and internet were playing a vital role. This component of HBM dealt with such issues. This component was least studied by researchers.

2.1.5 Other factors / variables

There were some socio-demographic factors like gender, age, working department, designation and duration of work or socio-psychological factors like knowledge, attitude and practice that directly or indirectly affect one’s perceptions of health behavior. This study included such variables.

2.1.6 Self-efficacy

In 1977, Bandura introduced this concept. It dealt with one’s ability to execute required behavior that reduced the risk. This study included variables like following of Universal Precaution guidelines and vaccination status of the doctors that examined such self-efficacy among health care providers specific to Hepatitis-B.

2.2 Hepatitis-B virology

Hepatitis B is a condition caused by Hepatitis B virus, characterized by inflammation of Liver. HBV is a double stranded DNA virus, belongs to class hepadnaviridae.

2.2.1 Components of HB virus

HBV have different antigenic components, which are;

- Hepatitis B surface antigen (HBsAg)
- Hepatitis B core antigen (HBcAg)
- Hepatitis B envelope antigen (HBeAg).

2.2.1.1 HBsAg

A medical researcher, Baruch Blumberg in 1965 discovered a specific antigen associated with HBV in the serum of an Australian aborigine, who had multiple blood transfusions previously. So firstly it was named Australian antigen, which afterward renamed Hepatitis B surface antigen (HBsAg).This discovery brought a new knowledge about HBV in the medical world and knowledge of serological response of the host against the infection was established. Then in 1970 further research was done about HBV nature due to development of advanced immunologic techniques, which helped in the diagnosis (11).

HBsAg is divided into four major subtypes, these are;

Adw, adr, ayw, Ayr (12).

HBsAg can be detected in serum usually 30-60 days after exposure or infection with HBV and persists in serum for ill defined period. HBV produces HBsAg in serum in large amounts during replication.

Hepatitis infections may be acute or chronic. If infection persists less than six months then it is considered acute while it may be chronic when HBsAg persists and positive after 6 months and usually chronic hepatitis B infection can last a lifetime or the patient develop liver cirrhosis.

In liver cirrhosis liver cells damage occurs, which is an irreversible process. Damaged liver cell are progressively replaced with fibrotic tissue and ultimately nodule formation. Due to the presence of the virus a continuous immune response initiated, which leads to destruction of the internal structure of the liver. All these leading to obstruction of the blood flow and ultimately decrease in liver function (13).

2.2.1.2 HbcAg

HBcAg is different from HBsAg .It is a nucleocapsid protein core of HBV. It can be detected in liver tissues in cases when a person is suffering from acute or chronic HBV infection. It could not be detected in serum by ordinary or conventional techniques.

2.2.1.3 HbeAg

HBeAg contained in the core of HBV is a soluble protein. Presence of HBeAg in serum indicates high infectivity with HBV .It is usually detected in serum whenever there are high virus titers.

2.2.1.4 Incubation and convalescence period of HB

Incubation period of HBV infection is usually from 45-120 days. Clinical symptoms of acute viral hepatitis are anorexia, nausea, malaise, fatigability and jaundice. Acute viral hepatitis is characterized by marked elevation in serum transaminase (especially ALT) level. Usually within 10 days of acute viral hepatitis initial symptoms like dark urine followed by pale stools and yellowish discoloration of conjunctiva, sclera and skin, this was called icteric phase. When total bilirubin level reaches level of 20-40 mg/l, jaundice become clinically apparent. Acute form of the infection resolves spontaneously after a period of illness of 4-12 weeks. Acute viral hepatitis is characterized by the development of anti-HBc IgM antibodies in the serum of infected patient, which afterward converted into IgG during the period of convalescence and the transient presence of HBsAg. Mortality rate is very low from an acute HBV. Usually chronic hepatitis develops over many years characterized by

persistent presence of HBsAg and IgG anti-HBcAg. Chronic persistent hepatitis can lead to liver cirrhosis in 20 % of cases. (13)

A new antigen was detected in 1977 in a patients infected with HBV. Initially it was assumed as HB variant but by 1980 it was identified as Hepatitis D virus (HDV) which is dependent only on HBV and can replicate only in the presence of HBV. This is due to a defect in replication; as a result HDV is unable to synthesize a viral coat. So to complete the replication process HDV needs a coat from HBV. For the reason HDV is unable to cause infection by itself. In combination with HBV it causes co-infection or super-infection (11).

2.3 Hepatocellular carcinoma and Liver cirrhosis

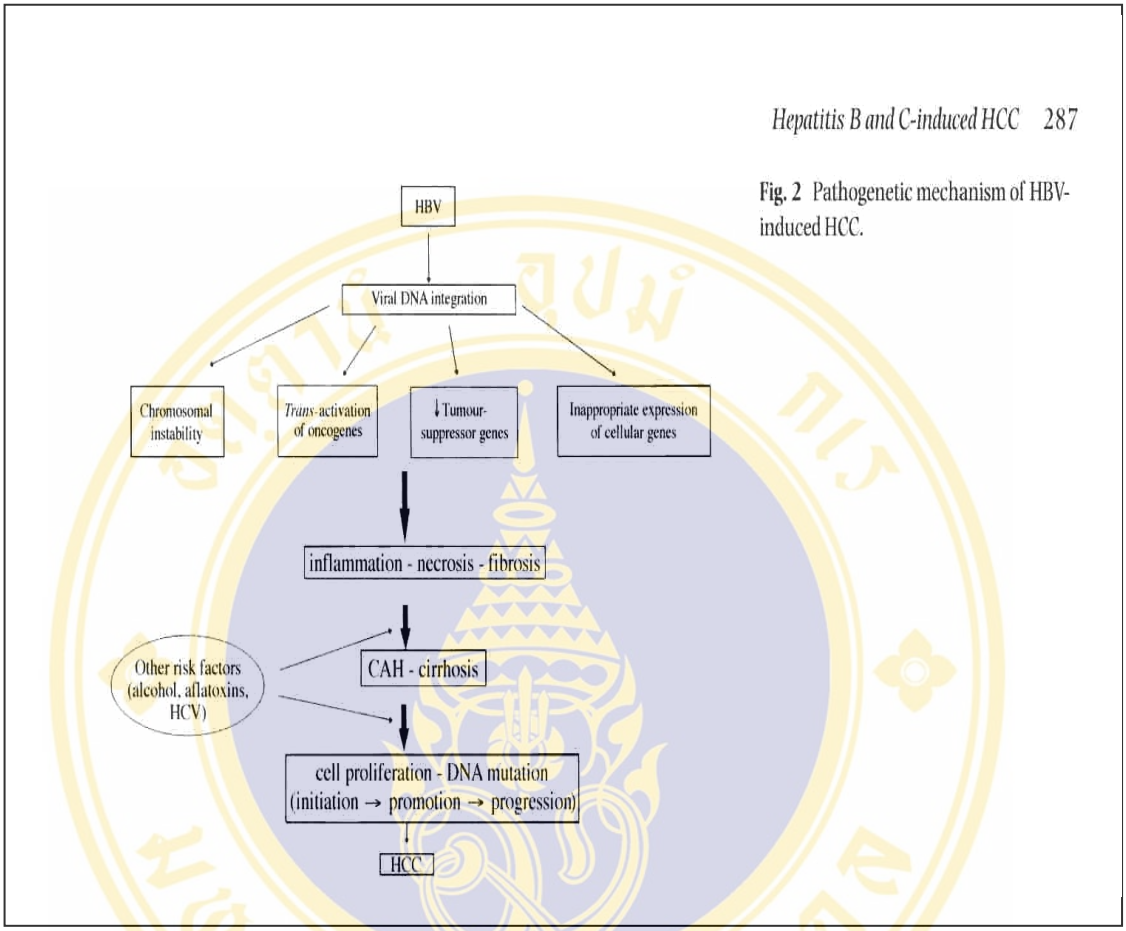
HB was one of the leading causes of HCC, liver cirrhosis. HCC which was a very malignant and devastating tumor, was the seventh prevalent cancer in men and ninth prevalent cancer in women (indicating high prevalence in male then female).In areas where HB was high prevalent its annual incidence was 30:100 000, while in low risk regions as mentioned above its incidence less then 2:100 000.

HCC was a aggressive malignant tumor with very poor prognosis, due to its inoperability at time of diagnosis. According to WHO persons who were chronic carriers of HB had 200 – 300 fold increased risk of developing HCC, compared with general population.

2.4 HB-induced cirrhosis and its relationship with HCC

It was noted that liver cirrhosis was present in 90 % of patients who had HCC. The pathology of liver cirrhosis and HCC association is still unclear. So patients who are carrier of HBsAg and have liver cirrhosis are at 10 times more risk of developing HCC compared with those who are non-cirrhotic.

Some studies showed that patients, who had persistent HBV infection, were 100 times at risk of HCC than non-infected persons (25).

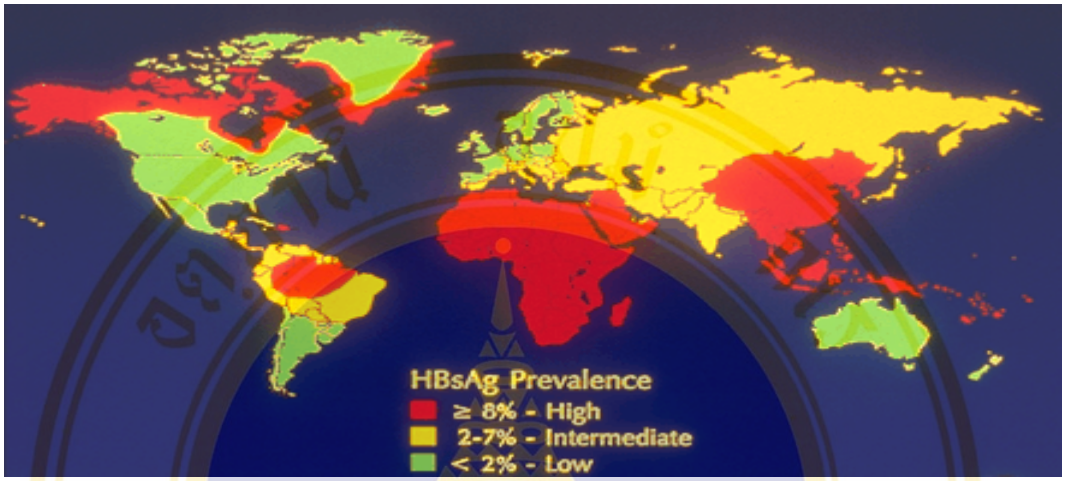


Source : Journal of Viral Hepatitis (26)

Figure 2 Pathogenetic mechanism of HBV- Induced HCC

2.5 Global hepatitis-B prevalence:

Global distribution of chronic HBV infection. Courtesy of the Centers for Disease Control and Prevention. (2)



Source: Proceedings of the American Thoracic Society

Figure 3 Global HbsAg prevalence

Infection with Hepatitis-B virus has become a global health issue and it is 100 times more infectious than HIV/AIDS. It was estimated that 2 billion people were infected with HBV worldwide and 360 million people are chronic carriers of HBV infection. HBV was the most common cause of liver cirrhosis and hepatocellular carcinoma (HCC). About 15-40% of infected persons with HBV develop liver cirrhosis and HCC. HBV accounts about 0.5 million to 1.2 million deaths per year worldwide (1).

Incidence of HCC has been increased in globally due to HBV. Among cancer diseases HCC is 5th most common and frequent cancer. It was estimated that HCC accounts for 30,0000-50,0000 deaths per year worldwide. HBV accounts for 60-80% of primary liver cancer worldwide, which was one of three most common and major cause of death in the Asian subcontinent, Africa and the Pacific Rim. Among 10th major causes of deaths worldwide, HBV accounts for 10%. It is estimated that about 45% population of world live in those areas where HBV is more prevalent.

Incidence and mortality rates from HCC due to HBV were currently high in United States (U.S). The majority of them are Asian-Americans, while most of the rest are Hispanic/Latinos. In U.S that 30-50 % HCC are due to HBV (26)

In USA it was estimated that about 1.2 million populations is infected with HBV, while men are at higher risk of acquiring HBV infection than women. Among ethnic groups living in USA, Asians are more prone to develop HBV infection due to high prevalence of HBV in Asian countries (15).

In majority of cases HBV infection occurred together with hepatitis D virus, which was also known as Delta virus because the delta virus can replicate only by attaching to Hepatitis-B and cannot exist without the presence of HBV(15).

2.5.1 Globally highly endemic areas for HB

HBV is endemic in many countries of the world like Africa, some areas of South America, Canada, Alaska, Eastern Europe, China, and South East Asia.

Carrier rate of HBV varies from 0.1 to 20% in different populations around the world and HBV carrier rate incidence in population is related to the incidence and age of primary infection with HBV. Incidence of HBV is highest among teenagers and young adults in the low risk areas of the world (13).

Infection rates among infants were very high in countries like China, Senegal, Thailand, and continues throughout the early childhood. While in other countries like Papua New Guinea, Panama, Solomon islands, infection rate was relatively low during infancy and increased rapidly during early childhood(13).In USA HB associated liver cancer was found mainly in Asian-Americans (14).

2.5.2 HB prevalence in Australia

In recent years prevalence of HB increased in Australia. This increase in HBV prevalence was due to increase in number of immigrants who were from areas where HBV is highly endemic**.** According to a Laboratory serosurvey, it was estimated

that between 60,000 to 16,0000 cases were chronic carriers of HBV, which represented a 0.5% to 0.8% prevalence of HBV in the population. As a result, HCC incidence and mortality rate has been increased in chronic HBV carriers. Among 20,0000 injecting drug users (IDUs) it was estimated that half of them had a marker of HBV infection, and 40,00 were chronic carriers (16).

2.5.3 HB and Doctors

Doctors were at risk developing HBV and other blood-borne infections due to their occupational contact with the infected patients. According to the model of Pruss-Ustun et al., 16,000 HCV, 66,000 HBV and 1,000 HIV infections occurred among HCW's by the year 2000 worldwide. All these infections occurred due to their occupational exposure with the infected patients**.** Needle recapping was the major risk of HBV transmission among HCW,s and attracted attention as a major contributor to needle stick injuries(4).

According to Annual Report from WHO, each year about two million HCW's including doctors, nurses and other health professionals around the world, experienced percutaneous exposure to infected cases (WHO 2007). The risk of acquiring an infection was proportional to the prevalence of the infections in the patients. As a result, both HCW's and health care system were significantly affected in such situation. When a HCW was infected or transmitted with an occupational blood-borne disease like HBV infection its effects were absenteeism, Morbidity and sometimes Mortality, which lead to reduced working performance of HCW's. This also created psychological stress among them which had a significant impact on their personal and professional life. All these ultimately lead to poor quality care of patients and safety services. In such conditions, the hospital face financial burden due to doctors' exposure to blood-borne diseases, which included loss of working hours and Out Patient, visits (17).

2.5.4 Prevalence of hepatitis-B in various areas (13)

Area	% of population Positive for infection			
	HBsAG	**Anti-HBs**	**Neonatal**	**Childhood**
Northern, western, and central Europe, North America, Australia.	0.2-0.5	4-6	Rare	Very frequent
Eastern Europe, the Mediterranean, Russia and Russian Federation, Southwest Asia, Central and South America.	2-7	20-55	Frequent	Frequent
Parts of china, South east Asia, tropical Africa.	8-20	70-95	Very frequent	Very frequent

2.6 HB infection situation in Pakistan

Pakistan remained an intermediate prevalence area for HBV. It was estimated that there were 4.5 million carriers with a carrier rate of 3-4 percent for HBV (18).

In Western counties and America liver cirrhosis was usually caused by excess alcohol intake, but in contrast in Pakistan chronic HBV infection was the leading cause of liver cirrhosis.

2.6.1 Distribution of HB in different parts of Pakistan

Distribution of HBV infection was as follows in different parts of Pakistan:-

Its prevalence was about 16 % in Quetta, Balochistan, while in Punjab it was 37 % ,while prevalence of HBsAg in healthy children was about 3.6 % in Pakistan ,which showed the prevalence was 0.8 – 2.5 % higher compared to developing and developed countries in the world (5).

Almost 16% prevalence in Quetta made HBV a noticeable disease. In Northern Pakistan, the prevalence of HBV was 37%, in Southern Punjab the prevalence rate was 61 and 20% in another study carried out in Shaikh Zayed Hospital, Lahore. The prevalence of HBsAg in healthy children was 3.6% in Pakistan, which was higher than 0.8–2.5% reported from both developed and developing countries. Malik and Wuz (1993) had reported prevalence rates of up to 10% (5).

To estimate the prevalence of HBV in patients suffering from chronic liver disease (CLD) a study was conducted in Sir Ganga Ram Hospital Lahore, Pakistan. For the study survey 120 patients were selected who were admitted in medical ward. Blood samples of these patients screened for HBsAg by Latex Agglutination method. It was reported that HBsAg was positive in 28.3 % of patients who were suffering from CLD (19).

2.6.2 HBsAg and its major subtypes in Pakistan

As mentioned earlier HBsAg has four major subtypes which are; *ayw, adw, adr, ayr*

In Pakistan, which have different Geographic distribution, prevalence of subtype ayw was 78-95%, adw prevalence was 2.4-14%, adr 1.0-7.7%, and ayr 2.4%. In majority of cases HBV infection occurs concomitantly with Hepatitis D virus also known as Delta virus. Co-infection and Super infection of HBV with Delta virus makes HBV more aggressive, as a result in cases where HBV and Delta virus co infection occurs mortality rate will be high. Recent statistics showed a case fatality of 30.2 percent in Punjab and Sindh provinces in Pakistan. Mortality rate was 30 percent of cases with HBV Co-infection with Delta virus. In a study on dialysis patients it was estimated that incidence of Delta infection was 14 percent in patients who had HBV during dialysis (20).

In 2007 Department of Virology, National Institute of Health, Islamabad, Pakistan conducted a subject study to determine the genotypes of HBV in the Pakistani population. For this purpose they enrolled 690 individuals for HBV screening. The screening method done with EIA and nested PCR. 110 individuals (15.94%) were detected as positive for HBV. Among the positive cases there were 64% males and 36% female. So it was estimated that male are more at risk of developing HBV infection. Among the 110 infected individuals, 58 individuals belonged to the age group of 21-40, while 39 individuals were age group of 41-60 years. So younger individuals of age 21-40 years were more prone to be infected with HBV infection compared to old age group who were at low risk of HBV infection. While among females it was found that those females, whose ages were below 20, were not positive for HbsAg. While the majority of HBV infected females were above 40 years of age.

Based on various studies in study groups the prevalence rate of HBV is 2-10% among healthy blood donors, 5-9% among health care professionals including doctors, nurses, paramedics, while among the general population it was 3.6-18.66%,

3.16% among the pregnant women, while among professional blood donors it was 3.16-10.4%.

Men are more prone to be infected with HBV infection because of their exposure to various risk factors. In Pakistan as male are more predominant part of the society, more educated than women and are working outside of their homes, while females due to religious and cultural influences are mostly involved in household activities. In men there are other means of HBV transmission are like undertaking circumcision due to religious customs, or shaving in street saloons which use unsterile blades or razors. Others factors which predispose men is homosexuality. In Pakistan sex between man to man is strictly prohibited by law and religion. For homosexuality in Pakistan is Section 377 Penal Code, which indeed criminalizes homosexuality and there is a punishment of minimum two years in prison for this act (21).

2.7 Knowledge about HBV

Assessment of risk factors related to HB is essential for designing the strategies for the control and the prevention of the disease. Knowledge of UP, such needle stick injuries are key instrument for doctors regarding prevention of HB infection.

In 2006 a cross-sectional study was conducted among health care workers including doctors, nurses, operation theater technicians, sanitary workers and laboratory technicians in civil Hospital Karachi to determine the Hepatitis-B vaccination status, knowledge, attitude regarding Hepatitis-B. 250 health care workers were interviewed including 122 nurses, 67 doctors 32 operation theater/laboratory technicians and 29 sanitary workers. Among these there were 52% healthcare workers who were vaccinated for Hepatitis-B, while 36.6% were not vaccinated, and 14.4% were partially vaccinated. 93% respondents were aware that they are at risk of transmitting the HBV due to their occupation due to contact with HBV positive patients, while 88% knew that HBV transmitted only by parenterally. 78% had knowledge that a vaccine can protect from HBV infection, while 50% were having

knowledge that by adopting safety measures like by wearing gloves, avoiding contact with patient's blood, and recapping of used needles and safe practices they can prevent HBV transmission. 74.8% respondents gave the history of needle stick injury, while 25.2% gave the history of not received any needle stick injury. 91% respondents declared that after needle stick injury they were not investigated; 42% declared that they adopt safe practices while attending their patients (6).

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2.7.1 Attitude and practices for hepatitis-B in HCW's (6)

Exposure to needle stick injury	%
Yes	74.8
No	25.2
Investigated after needle stick injury	%
Yes	09
No	91
Vaccinated for HBV	%
Yes	52
No	33.6
Partial	14.4
Observing Safe practices	%
Yes	42
No	58

In 2003 a cross-sectional study was conducted in Aga Khan University Hospital Karachi, Pakistan for the assessment of knowledge, attitude, and practices among health care workers regarding needle stick injuries (NSI). For this purpose a sample of 80 individual taken, which consists of 29 doctors, and 51 nurses. The results of study showed that 45% (36) respondents had a history of NSI during their practice. It was noticed that needle stick injury frequency was higher in doctors (72%) compared to nurses which was 29%. Factors identified as associated with NSI among health professionals were stress, work overload and long working hours.

It was noticed that 53% injuries were acquired mostly during drawing blood and injecting patients; 17% injuries were acquired during surgical procedures and suturing; while 11% injuries occurred during recapping the used syringes. Knowledge of HBV transmission through NSI among doctors and nurses was 88%, while awareness regarding HBV prevention was 86%. 94% respondents believe that through good training they can prevent HBV transmission. It was noted that 73% of nurses notified the health office regarding their NSI, while among doctors 38% only notified (22).

Another cross-sectional study was carried out in Nigeria regarding knowledge, attitude, and practices for HBV infection in four teaching hospitals in southwestern Nigeria, among obstetricians and midwives. Obstetricians and midwives are occupationally at risk of acquiring HBV infection due to their exposure to blood, vaginal secretions and amniotic fluids of the patients, during vaginal examinations, deliveries and other surgical procedures. As HBV infection is an endemic disease of the developing countries, therefore doctors and other HCW's are at risk of acquiring infection from infected patients. This study was carried out among 83 respondents including 45 midwives and 38 obstetricians. The former were practicing for average of 2-26 years while the later were for 1+-16 years. Regarding knowledge about HBV infection the mean score of obstetricians was 2.4 out of 5, while midwives scored 1.8. Only 18.1 % of the respondents were immunized for HBV, while 8.4 % were adopting preventive measures like before any surgical procedure or vagino-pelvic examination, advising their patients for screening for HBV (23).

2.8 Transmission of HBV

HBsAg is found in all body secretions and excretions including menstrual blood, semen and vaginal secretions which are usually more infectious. HBV is transmitted whenever there is percutaneous and mucosal contact with the infected body fluids occurs. HBV cannot cross the skin, mucous membrane and placental barrier unless there is break among these barriers. HBV cannot be transmitted through feces, contaminated food, water, insects and other vectors like mosquitoes.

2.8.1 Transmission of HB in Doctors:

HB transmission among doctors is very common due to contact with infected patient's blood and other body fluids. This contact may be either due to needle pricks during medical and surgical procedures or during histo-pathological procedures among patients for diagnostic purposes and in other ways during surgical procedures, among surgeons and gynecologists.

2.8.2 Intravenous blood transmission of contaminated blood

Intravenous blood transmission of contaminated blood, in persons suffering from any blood disorder and requires blood transfusions, or during accidents received blood from an infected person.

2.8.3 I/V drug abuser

Among Injecting drug abusers (IDU), sharing of unsterile, infected needles is the most common way of transmitting HBV infection. UNDP and UNAIDS conducted a survey in Lahore, which is the 2nd largest city of Pakistan, in1999. In this survey it was found that the prevalence of HBV was high among IDU's. Afghanistan is the neighboring country of Pakistan and is the world's largest producer of opiates. Major transit of opiates occurs through Pakistan. In the past two decades due to high production of opiates in the region, Pakistan is badly affected and now is the one of counties in world where addiction is quite high. Anti-Narcotic Force presented a statistics that there are 4 million drug addicts in Pakistan, and 3% were women, among these 3%, about 12% women use injections, which was leading cause of HBV transmission (24).

2.8.4 Perinatal transmission.

Perinatal transmission or transmission of HBV from infected mother to an infant occurs by three possible ways:

2.8.4.1 Antenatal transmission

In this way, HBV transmission to the fetus occurs in the uterus through placenta. Hepatitis B vaccine and Hepatitis B Immunoglobulin cannot block virus transmission through this route. HBV can be transmitted through transplacental route by two possible ways:

1. Hemagenous route: In this way placental micro vasculature can be broken due to certain factors, e.g. Threaten abortion, as a result maternal blood leakage occurs into the fetus circulation, containing high titer HBV.

2. Cellular transfer: High titer maternal blood infects the placental tissue from the maternal side to the fetus, step by step and finally through the villous capillary endothelial cells, HBV reaches the fetus circulation.

2.8.4.2 Natal transmission

In this HBV transmits to the newborn at the time of delivery.

2.8.4.3 Post-natal transmission

It occurs after delivery through breast milk or caring the infant (25).

2.8.5 Tattooing, pricking

Tattooing, pricking the ear is most common cause of HBV transmission in women.

2.8.6 Sexual transmission

Sexual contact with an infected person is another most common way of transmission of HBV.

2.8.7 Men sex men (MSM)

Due to sexual contact MSM are at risk of developing HBV infection (After sexual activity of 5 years, 70 % homosexuals were infected) (25). Along homosexual transmission, however heterosexual transmission also accounted for a large amount of HBV infection. Among heterosexuals, there were various factors which were associated with HBV infection, which includes;

- Number of sexual partners
- Duration of sexual activity
- Previous history of syphilis and other sexually transmitted disease.
- Sexual contacts of injecting drug users, Commercial sex workers and their clients are at major risk of acquiring HBV infection (25).

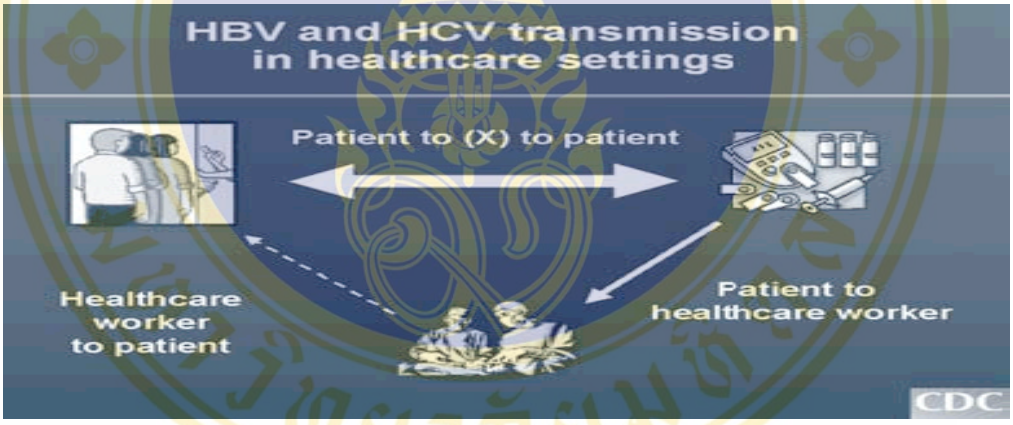
In USA it was estimated that all new cases of HBV infection were prevalent in MSM. Which were mostly due to their low level of knowledge about

HBV infection, lack of vaccination, unprotected sexual behavior, and sharing of unsterile syringes (16**)**. So HBV was one of the major sexually transmitted diseases in world's low endemic areas.

2.9 Transmission of HB in the hospital setting

Within a health care setting transmission of HB can occur by following three ways:

- From patient to patient
- From health professional to a patient, this is very rare.
- From patient to a health professional, which is more common.



Source: CDC.

Figure 4 HBV and HCV Transmission in healthcare settings (27)

2.9.1 From patient to patient

It was reported that therapeutic injections accounted for 21 million new cases of HBV worldwide each year. In underdeveloped and poor countries unsterile or unsafe injections accounting for many outbreaks of HB infection.

Transmission of HBV from patient to patient occurs usually in an indirect way, mostly due to contact with hands of HCW's, medical or surgical instruments, or

environmental surfaces. This transmission is usually the result of failure to adopt principles of aseptic techniques during the preparation and administration of parentral medications in multi-dose vials.

So it is assumed that hospital environment played a vital role in the transmission of most BBI (HB). Like in dialysis centers majority of patient became infected, so it is assumed that dialysis setting also provides a highly risky environment for the transmission of HB.

In USA a recent outbreak of HB noticed, which was due to unsafe use of needles. For this incidence of HBV transmission three nursing homes were responsible. When the cause of transmission was investigated, it was found that source of infection was due to finger sticks for the patients of diabetes mellitus. For the investigation even though new lancets were used, a single gluco-meter had been used for several patients and between the consecutive tests the device which they were using on multiple patients was not cleaned. On the other side insulin which they were administrating was not properly labeled and they were using a single multi-dose vial for several patients.

2.9.2 From health professional to a patient

Transmission of HBV from health care professional to a patient was very rare, but surgery was a risk factor and in some instances during surgery transmission of HB occurred from an infected HCW to a patient. This transmission usually occurred in exposure- prone invasive procedures. Surgeons who were infected with HBV, during exposure-prone invasive procedures render the patient at risk of acquiring HBV. In Canada one technician infected about 75 patients during the procedure involving implantation of sub-dermal electrodes.

Risk of transmission of HBV from a HCW to one patient was about 0.024 % - 0.24 % during a single procedure but overall the risk of HB transmission from doctors was very low.

2.9.3 From patient to a health professional

This was most common way of transmission of HB in hospitals. It was estimated that after a NSI risk of HB transmission in a doctor or HCW was 37 % -62 % in the absence of vaccination. This risk increases when the doctors don't follow universal precautions to prevent themselves from HB infections. In USA and other countries this risk is highly decreased, as doctors are following all preventive measures and are immunized against HB (27).

According to Johanet et al., among 3554 operative procedures which were orthopedic, vascular and visceral surgeries, 4% procedures were associated with percutaneous exposure of blood, and in 51% cases, surgeons were involved in percutaneous exposure of blood. Mortality rate among surgeons is high due to HBV infection, compared to HIV infection (9).

A cross-sectional study was conducted among hospital health workers in darker, Senegal to assess the prevalence of HBV infection. For the study survey a sample of 775 individual including both male and female taken for the serological markers of HBV. 17.8% respondents were positive for HBsAg, while 79.2% were positive for Anti-HBc. In dentistry department 15 respondents were positive for HbsAg .This study shows the high prevalence of HBV infection among health care workers (28).

2.10 HB preventive behavior among doctors and acceptance of Universal Precautions

2.10.1 Needle pricks and sharp instrument injuries among health personnel's

To transmit HBV infection, 0.05 ml quantity of blood or about 0.0001 ml of plasma is sufficient (29).

Needle pricks and sharp instrument injuries among health personnel's were the most common cause of HBV transmission therefore surgeons, dentists, pathologists and staff in operation theater, wards, and emergency rooms were more prone to be infected with HBV (5).

Hollow bore needle are the instruments or equipments, which are mostly responsible for the transmission of Blood Borne Infections (BBI) like HBV. This occurs because after use blood usually remains inside the bore of the needle, which contains a large amount of virus. HCW,s acquire HBV during the following activities.

A study carried out among health care workers in Nepal on needle stick injuries, shows that most injuries occurred while recapping the used needle. While health care workers knowledge of risk of HBV transmission through needle stick injury and the preventive behavior adaptation was not adequate (30).

Needle stick injuries were more among HCW's in developed countries like USA, where it was reported that about 2000 needle stick injuries were occurring everyday, rendering them to the risk of acquiring Blood Born Infections (BBI) like HBV. Due to occupational risk chances of HBV among HCW's is 6 % to 30 %. In developing where HCW's were not adopting preventive measures incidence of HBV infection was rather high than of developing countries.

In Combined Military Hospital Azad Jamu Kashmir, Pakistan a serological study was conducted among doctors and other medical personnel for the presence of HBsAg. A sample of 199 individuals was taken. For diagnostic purpose all blood samples were tested by reverse hem-agglutination. Those cases who were positive were further tested by Elisa for confirmation. The overall prevalence of HBsAg, including doctors and other HCWs, was 4.1% but the presence of HBsAg among doctors was high (33.3 %) (5).

Universal precautions apply to blood and to other body fluids which usually containing evident blood. Occupational transmission of HBV to a doctor by

blood is a known way of transmission of HB so we can say that blood is the single most important source of HBV, and other blood borne infections (BBI) in the occupational setting. Infection control efforts for HBV must focus on preventing exposures to blood as well as on HBV immunization delivery to doctors.

UP is also applied for vaginal secretions, and the routine practice of wearing gloves for performing vaginal and pelvic examinations protects from exposure to potentially infectious vaginal secretions doctors and prevents the transmission of HB (37).

Doctors and HCW's were occupationally more exposed to the risk of acquiring HBV infection from infected patients, especially surgeons, dentists and obstetricians. A study was conducted in Victoria, Australia to assess the preventive health behavior among general practitioners for Hepatitis-B. For the purpose a cross sectional study postal questionnaire survey was performed. Sample size was 544. To prevent themselves from HBV infection 87% respondents had completed their vaccination, while 49% had confirmed their immune status for HBV. Although 49% of the respondents had been suffered from needle stick injuries, half of them did not took any action after exposure to HBV (32).

Another study conducted among Moroccan heath care workers to assess their knowledge and preventive behavior regarding HBV infection. For the purpose 420 HCWs interviewed. According to their exposure status screening for HBsAg and vaccination status also evaluated. 68% respondents participate in study.

Knowledge of HCWs that HBV is transferred through blood was 100%. 98% said that vaccination is effective means of preventing HBV transmission. The Hepatitis-B surface antigen prevalence was 1%, while 5% HCWs gives the history of having HBV infection. Vaccination status of the HCWs was as; Medical staff 38%, 75% among midwives, and 61% among nurses. Among HCWs who were immunized against HBV, serological evidence of HBV protection was 51% (33).

HCW's are instructed to follow Universal precautions (UP) to prevent themselves from HBV infection and other BBI. These UP guidelines are;

- If having cut, wounds or skin lesions, then it's necessary to cover them by proper dressing.
- Always avoid any close contact with patient's blood or other body fluids.
- In cases accidental contact occurs, immediately and thoroughly wash hands and other skin surfaces that are contaminated with blood, body fluids containing, body fluids and visible blood.
- When performing dressings of patients or other surgical and medical practices or dealing with patients' blood or body fluids like pulmonary or ascitic fluids or Cerebro-spinal fluid after tapping, it is necessary to wear disposable gloves and apron.
- While handling used sharps it is necessary to handle them carefully and dispose them safely.
- Avoid contact of blood splashes or bother body fluids with mouth, eyes and nose.
- Following these general measures protect both the Doctors and patients especially in cases of close contact with the body fluids and blood.

2.10.2 Measures to Stop HBV infection

To stop transmission of BBI like HBV there were many measures such as, like in spite of doing open surgery, surgeons should prefer laparoscopic surgery. Other preventive measures were use of stapling devices instead of using suturing material. Where as to minimize the risk of gloves and skin puncture injury which occurs due to suture needles, whenever suturing required, blunt needle use is reasonable.

Wearing of double gloves while operating an infected patient is also helpful and minimizes the risk of infection, because it not only reduces the transmission of infected fluid volume mainly in solid bore needles, but also to a lower extent in hollow bore needles (27).

While recapping needle it is to keep in mind that never recap used needles by hands, while after use of needles, don't bend, break or manipulate used needles by hand.

After use, syringes, needles and scalpel blades should be placed for disposal in puncture resistant containers (9).

If a patient transmits a BBI like HBV to a doctor, on the other hand, doctors and other HCWs who are infected with HBV are also a risk for others or patients. Usually this transmission occurs during invasive surgical procedures when exposures of direct blood-to blood occur between doctor and the patient occurs. In such situations the doctor should inform the patient about the risk. While during the procedure the doctor should ensure all safety precautions, like wearing of double gloves, and avoid any sharp injury to patient. (8).

2.11 Vaccination as a tool for doctors regarding their preventive behavior

In this study vaccination status was another tool to doctor's preventive behavior regarding HB protection and transmission.

There were only way to prevent the infection of HB among doctors, that is vaccination and avoidance of practices which predispose some one to the risk of HB infection.

In recent years HBV infection becomes a major threat for doctors and other HCW's. It was estimated that in hospitals about 30 injuries per 100 beds per year were occurred. Doctors were 4 times at risk of transmitting HBV infection, compared with that of general adult population (4).

Hepatitis B vaccine is a composition of purified hepatitis B surface antigen (HBsAg) and is prepared from the plasma of individuals who are chronic carriers for HBsAg. Immune response was very good in infants, children and adolescents after administration of a vaccine, but as the age advances immune response decreases. Immune response was also poor in patients of chronic renal failure and of immune-suppression disorders. Non responsiveness of vaccine is also due to either breaking of cold chain of vaccine, freezing it or administration of vaccine in the buttocks in spite of injecting it into the deltoid region (8).

2.11.1 HB vaccine acceptance among doctors as preventive behavior

To assess the vaccination status among the US transplant surgeons a study was carried out by mailed questionnaires. For study 619 individuals were selected, from which 347 (56.1 %) responded by returning back the completed questionnaire. Among surgeons 311 were those who were vaccinated for HBV, while 70 (22.5 %) surgeons were among those who received less than 3 recommended doses of HBV vaccination. Attitude related with surgeons inadequate vaccination include their work overload which was due to long working practicing hours, injection site pain fear, and some of them did not screened them for HBV. 94 (14.9 %) surgeons reported that they were exposed to HBV positive patient by getting needle stick injuries among these surgeons 14 were those who were not vaccinated properly for HBV. While among these 14 surgeons just 5 (35.7 %) went for proper screening testing for HBV and sought active immunization counseling. From this study it was concluded that surgeons took too lightly the risk of acquiring HBV infection while performing operations (34).

2.11.2 Vaccination status of doctors and HCW's globally

Doctors and HCW's who were vaccinated for HBV, their number is distributed was follows:

In North America it was about 67 %, in Europe was 71 %, in the Western Pacific region it was 77%, while in the South-East Asia is 18% (29).

Hepatitis-B infection can be prevented by vaccination**.** Since HBV vaccination has been introduced it shows proven efficacy and safety and Prophylaxis against HBV infection. Because chronic HBV is the one of the common cause of Hepatocellular carcinoma (HCC), so HB vaccine besides providing immunity against HBV infection but also minimizes the risk of developing HCC.

The American Health Inspection Service had reported a reduction in HBV incidence among HCW's during the last few years, which was due to adaptation of vaccination practice and other recommended safety measures by HCW's (15).

According to new health policy experts now recommend that every newborn should be vaccinated immediately after birth. In cases where the mother is infected with HBV, the newborn should be treated with HB immunoglobulin within 12 hours of delivery, followed by HB vaccination (15).

In Bolan medical complex hospital Quetta, there are no previous studies on doctors vaccination status addressing their preventive behavior.

2.12 Doctors and HCW's and HB induced financial burden

Cost of needle stick injuries among health professional was calculated in terms of the monetary cost, by Jagger et al. (1990). She calculated the cost of treatment and prophylaxis and employee personal time. She estimated that per needle stick injury cost was around 405 US $.

In another study cost of needle stick injury was estimated about 363 US $. This 363 US $ included 184 US $ cost of incident reporting, investigations and treatment follow up of HCW (22).

2.13 HB vaccination program in Pakistan

In Pakistan, National program for the prevention and control of Hepatitis-B and c is providing vaccination services. HB vaccine has been now added in the expanded program of immunization (EPI). The aim of Hepatitis Prevention & Control Program was to reduce the prevalence, morbidity and mortality due to Viral Hepatitis infections in the general population and achieve 50% reduction by FY 2010 (35).

2.14 Indications of HB vaccine:

- Doctors and HCW's who at risk of acquiring HB infection, which accounts for 15-30% of risk of transmission, due to their contact with infected persons.
- patients suffering any chronic illness or disorder and require blood transfusion and are not infected with HBV.
- persons who are involved in high risk sexual behavior especially men sex with men (MSM), and persons having multiple sexual partners.
- IDUs who are high at risk.
- Patients who are suffering from any renal disorder and require repeated dialysis.
- Persons who are living in HBV endemic areas.
- Patients suffering from chronic renal failure, and are on hemodialysis.
- Patients who are receiving cyto-toxic or immunosuppressive medicines.
- Patients who are suffering from a malignant disorder or disease with low immune status.
- Persons who are working in laboratories and blood banks.
- Infants require vaccination instantaneously after birth, especially in areas where HBV infection is endemic (29).

2.15 HB vaccine contraindications and effectiveness

There is no any contra-indication for HB vaccination; it can be given even in pregnancy and lactation, as there is no any apparent side effects of HB vaccine to the developing fetus. HB vaccine has non-infectious HBsAg particles, which do not have any adverse effects on fetus.

How long HB vaccine provides protection, after long term studies among healthy adults and children shows that those who have developed antibodies to HBsAg, there immune system remains intact against HBV for approximately 15 years, by protecting against HBV infection (35).

2.16 Doctors and HB associated discrimination

As doctors are occupationally exposed and are at risk of HB transmission from infected patients, so some times a known infected patient becomes a challenge for doctor, especially for a surgeon. As risk if needle stick injury while operating such patients is high and sometimes psychological factor associated with infected cases, also effects surgeons' performance.

In 2001 a study was conducted among Taiwanese dentists regarding their knowledge attitude, and behavior towards HBV, HCV, and HIV infected patients and their response in case of infected patient. For the reason a self-administered questionnaire study was conducted among 1930 dentists. Their response for this study was 54.4%. There were 80% respondents who were willing to treat HBV infected patients, while 75% respondents were willing to treat HCV infected patients, while 49% was for HIV patients. Their attitude to treat HBV and HCV infected patients was associated with various factors like some of them believe that it is their moral responsibility and some of them were feeling that they can safely treat the infected patient (36).

The acceptance of Universal precautions is a very important tool regarding the doctor's preventive behavior and this helps the doctors to be sure and safe while practice their work that it can reduce the risk of blood and other body fluids which may be contaminated with HBV. So through better protection a health professional can minimize the risk of HB transmission and this is a very important policy to prevent discrimination with an infected patient. So the idea of an health professional to protect themselves from acquiring infection will ultimately leads to better provision of health care of the patient (37).

CHAPTER III
RESEARCH METHODOLOGY

3.1 Study design

The study design was cross-sectional study, which aimed to assess the preventive behavior of doctors in Bolan Medical Complex Hospital Quetta, Pakistan, with respect to HB as well as to determine the factors related to their socio-demographic characteristics, psychosocial related factors, and their knowledge and perception on HB preventive behavior.

3.2 Study population

The target population for this study was doctors in the Bolan Medical Complex Hospital Quetta, Pakistan.

3.3 Sample description

Doctors selected based on sampling from BMCH hospitals from all departments

3.4 Sample size calculation and sampling technique

3.4.1 Sample size

The sample size was calculated by using the following statistical formula.

$$n = \frac{Z^2_{\alpha/2} pq}{d^2}$$

Where,

n = sample size

Z = Standard normal score set at 1.96, corresponding 95% confidence interval (α equal to 0.05)

p = As there are no data presently available on preventive behavior, it was assumed at 50 % (0.50)

d = degree of accuracy desired, setting at 0.05%

$$n = \frac{(1.96)\ 2(0.50)\ (0.50)}{(0.05)^2} = 384$$

3.4.2 Sampling technique

Once the sample size was calculated, this study made use of proportionate sampling method (PSM) to identify the sample.

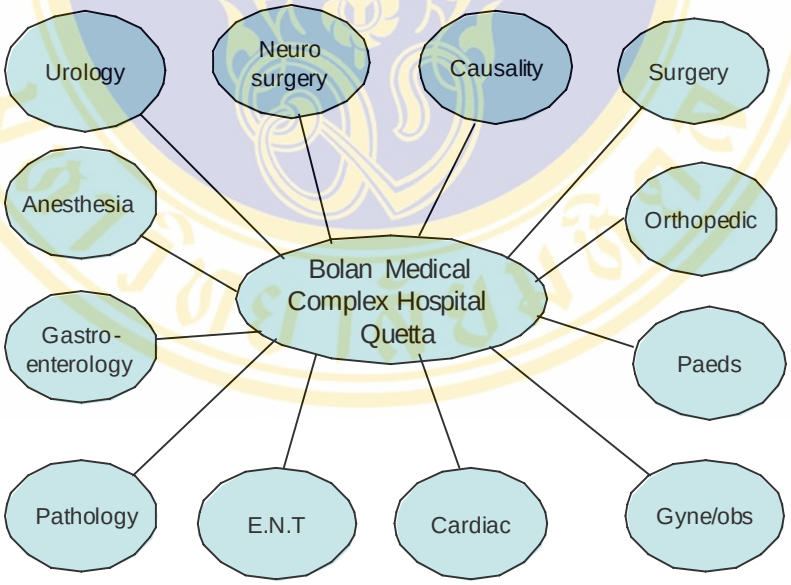


Figure 5 Distribution of Departments in Bolan Medical Complex Hospital Quetta.

3.5 Sample specification

3.5.1 Inclusion criteria

- Doctors serving in Bolan Medical Complex Hospital Quetta Pakistan.
- Those who volunteered to participate in this study
- Those who were willing to spend their time to complete the questionnaire.

3.5.2 Exclusion criteria

Doctors who were sick or absent from any cause during the data-collecting period.

3.6 Research instruments

The research instrument in this study for the data collection was through a self-administered structured questionnaire. The questionnaire was prepared in five parts:

3.6.1 Part 1: Socio demographic characteristics

This part of questionnaire consists of questions dealing with age, gender, working department, designation, working experience (years of working).

3.6.2 Part 2: Knowledge on HBV

This section consists of questions on knowledge about HB. In each question there is only one correct answer. For the correct answer respondents get “1” score and for incorrect answer respondents get “0” score.

The Benjamin Bloom Criteria was established with respect to knowledge of HIV. Because, Hepatitis-B and HIV/AIDs have same mode of transmission and while precautions to protect from acquiring HB and HIV/AIDs are also similar, so referring Benjamin Bloom Criteria to explore knowledge of HB is used in this study.

High level of knowledge = If score is > 80%

Medium level of knowledge = If score is between 60-80 %

Low level of knowledge =If the score is <60% of correct answer (38).

3.6.3 Part 3: Perception towards HBV

Perception in this study was divided into perception of severity, susceptibility, benefits, barriers towards HBV prevention behavior. Doctors were asked to agree, not sure, disagree with perception on severity, susceptibility, benefits and barriers using Likert scale ranging from:

Strongly agree = 5, Agree = 4, Not Sure = 3, Disagree = 2 , Strongly disagree = 1

5 score = strongly agree

4 score = agree

3 score = Not sure

2 score= strongly disagree

1 score = Disagree

3.6.4 Part 4: Preventive behavior on HBV

This part included to which extent doctors were conscious to prevent themselves from HB during their clinical practice while handling the patients; whether doctors were following UP while handling the patients; and how doctors behave when they were handling a known infected patient.

3.7 Preventive behavior on HBV

In this part respondents were asked about their preventive behavior with respect to hepatitis-B .They were asked, whether they were following Universal Precaution Guidelines, whether they wore gloves, eye shields, face masks in surgical/medical procedures when there was possibility of body fluids or blood splash from patients, while after using needles they bent it by hand or using any needle

uncapping device or scoop technique and after contacted with a patient they washed their hands or not.

3.7.1 Divided into two parts

In first part, 9 questions each of which divided into 3 outcomes:

Yes, always = 2, Yes, sometimes = 1, Never = 0

In second part 6, questions each of which divided into 2 outcomes

Yes= 1 No = 0

Those respondents who were following Universal Precaution Guidelines and were completed their vaccination against HB were considered as having high preventive behavior.

3.8 Cues to action

This part included media information and personal influence on prevention behavior of HBV.

3.9 Data collection

Self-administered structured questionnaire on the sampled population

3.10 Data analysis

Data collection was processed by using Minitab soft-ware.

3.10.1 Statistical analysis

3.10.1.1 Part I: Univariate analysis

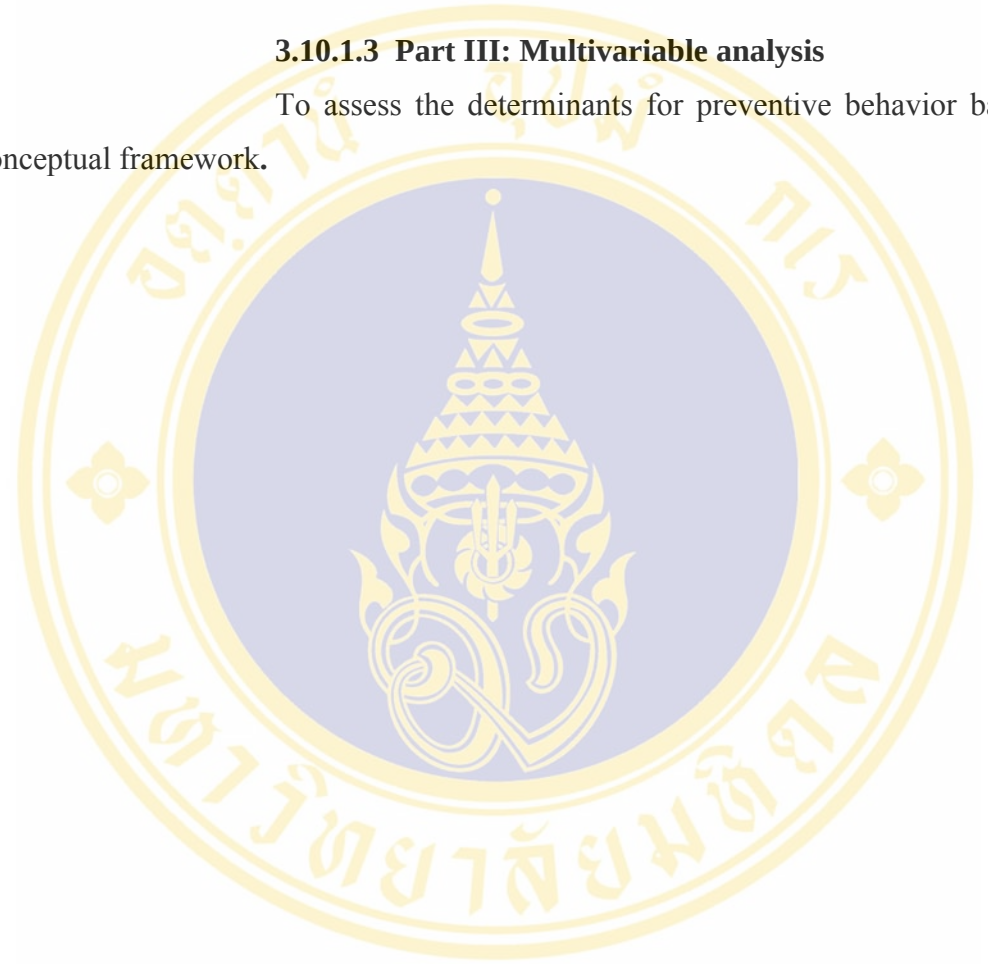
Descriptive statistic was used for frequency and percentage distribution of preventive behavior on HBV infection among doctors, socio-demographic, knowledge, perception and cues to action.

3.10.1.2 Part II: Bivariate analysis

Chi-square test or Spearman Rank Correlation analysis was used to describe the association between preventive behavior among doctors on HBV and their socio-demographic characteristics, knowledge, perception, cues to action.

3.10.1.3 Part III: Multivariable analysis

To assess the determinants for preventive behavior based on conceptual framework.



CHAPTER IV
RESULTS

The main objective of this study was to describe preventive behavior and its related factors among doctors with respect to Hepatitis-B in Bolan Medical Complex Hospital Quetta, Pakistan. This study was conducted among 322 doctors through a self-administered questionnaire on 07 February 2009.

All questionnaires distributed to the respondents were fully completed. The results of the study were described according to socio-demographic factors, knowledge, perception, cues to action and preventive behavior of Hepatitis-B.

The results are presented in the form of tables using frequency and percentage distribution for description of the doctors' characteristics, their knowledge, perception, cues to action and preventive behavior with respect to Hepatitis-B.

4.1 Frequency and percentage distribution of independent and dependent variables

4.1.1 Socio-demographic factors

According to gender, 216(67.0%) respondents were male while the remaining 106 (32.9 %) were female. Ages of the respondents were divided into 5 age groups. Majority (61.4 %) of respondents, were between the age group of 31-40 years, while 27.3 percent with 20-30 years, where as 9.3 percent between 41-50 years, while 1.6 percent between 51-60 and only 0.3 percent with the age group of 61-70. Mean age of the respondents was 33.9 years. Regarding working department where respondents were performing their duties, Majority of respondents, (22.6 %) were working in medical unit, 17.0 percent in surgical unit, 13.9 percent in pediatrics, 12.7 percent in

obstetrics/gynecology ,whereas 4.3 percent in emergency room, 6.5 percent in ICU,2.8 percent in laboratory ,2.5 percent in the pathology unit, where as 13.9 percent respondents were working in other departments like, orthopedics, Oncology unit, skin, urology, neurosurgery, ENT, Plastic surgery. Regarding the designation of respondents, it was seen that majority of respondents were medical officer (87.8%), where as 5.3 percent were Assistant professor, 4.3 percent were senior registrar, 2.2 percent were professor and only 0.3 as associate professor. With respect to duration of work as doctor in the department in which they were working majority of respondents (90.6%),were working since 1-10 years, 7.5 percent since 11-20 years, whereas respondents who were working since long time from 21-32 years were 1.9 percent while, Mean of the duration of work was 4.5 years.

Table: 1 Number and percentage of respondents by socio-demographic factors

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	216	67.1
Female	106	32.9
Age (years)		
31-40	198	61.5
20-30	88	27.3
41-50	30	9.3
51-60	5	1.5
61-70	1	0.3
Department		
Medical	73	22.7
Surgical	55	17.1
Pediatrics	45	14.0
Obs/Gyne	41	12.7
Operating room	21	6.5
Emergency room	14	4.4
ICU	11	3.4
Laboratory	9	2.8
Pathology	8	2.5

Table 1 Number and percentage of respondents by socio-demographic factors(Cont.)

Characteristics	Frequency (n)	Percentage (%)
Others	45	14.0
Designation		
Professor	7	2.2
Associate Professor	1	0.3
Assistant Professor	17	5.3
Senior registrar	14	4.3
Medical officer	283	87.9
Duration of Working in years		
1-10	290	90.6
11-20	24	7.5
21-32	6	1.9

4.1.2 Level of Knowledge on Hepatitis-B

Table 2 shows the knowledge that majority of respondents (95.3 %) answered correctly the causative agent of hepatitis-B.

To the question “HB cannot be transmitted by eating and drinking in the same utensils used by a HB positive patient,” a large majority (89.7 %) of respondents agreed. Almost all (99.6 %) of respondents agreed that most common way of transmission of HB was when a person was pricked by an instrument which was contaminated by the blood or body fluid of an HB infected person, whereas (98.4 %) that use of condoms not only prevents the transmission of HB infection but also other sexually transmitted diseases and (98.4 %) of respondents agreed that liver cirrhosis and hepato-cellular carcinoma were complications of HB and 98.4 percent of respondents agreed that needle stick injury was the most common way of transmitting HB infection among doctors.

To the statement that “adopting safe behavior and safe sex prevents HB infection,” large majority (98.1 %) of respondents agreed, whereas 97.6 percent agreed that whenever someone infected with HB could remain symptom free for long time and 96.5 percent that HB could be prevented by a vaccine while 95.9 percent of respondents agreed that soon after needle stick injury to a positive HB patient, immunoglobulin should be started, while 61.1 percent did not agreed that HB be cured by a vaccine.

Table 2 Number and percentage of respondents by questions asked about Hepatitis-B Knowledge

	Level of knowledge	**n (%)**	**Agree**	**Do not Agree**	**Not sure**
1.	HBV cannot be transmitted by using eating and drinking utensils commonly used by HB infected persons.		289 (89.8)	27 (8.4)	6 (1.9)
2.	HBV can be transmitted by being Pricked by a needle or surgical instrument By blood of an infected person.		321 (99.6)	1 (0.3)	0 (0)
3.	Hepatitis-B infected person can remain Asymptomatic for months or years.		314 (97.5)	4 (1.2)	4 (1.2)
4.	Hepatitis-B can be cured by a vaccine		89 (27.6)	197 (61.2)	36 (11.2)
5.	Practicing safe sex prevents HBV infection		316 (98.2)	3 (0.9)	3 (0.9)
6.	Condom use can prevent HB and other Sexually transmitted diseases		317 (98.4)	2 (0.6)	3 (0.9)
7.	Liver cirrhosis and Hepato-cellular carcinoma are complications of HB?		317 (98.4)	3 (0.9)	2 (0.6)
8.	Needle stick injury is the most common cause of HB transmission among doctors?		317 (98.4)	2 (0.6)	3 (0.9)
9.	HB vaccine is effective by preventing HBV infection?		311 (96.6)	4 (1.2)	7 (2.2)
10.	Soon after needle stick injury to a known patient of HB, immunoglobulin started?		309 (96.6)	8 (2.5)	5 (1.6)

Table 3 shows the level of knowledge according to percent score. The response of more than 80 percent showed a “high level of knowledge”; whereas a percent of between 60-80 showed a “medium level of knowledge”, while a percent of

less than 60 percent indicated a “low level of knowledge”. In this study majority (96.5 %) of respondents had high level of knowledge, while 3.1 percent of respondents had medium level of knowledge and only 0.3 percent of respondents had low level of knowledge with respect to HB. This showed that doctor’s knowledge with respect to HB was quite adequate.

Table 3 Number and percentage of respondents by level of Knowledge on Hepatitis-B

Level of knowledge	**frequency (n)**	**Percentage (%)**
High	311	96.5
Medium	10	3.1
Low	1	0.3

Score: High = >80%, Medium = 60-80, Low = < 60%

4.1.3 Level of perception on Prevention of Hepatitis-B

Table 4 shows frequency and percentage distribution of respondent’s perception with respect to the prevention of HB infection. With respect to perception of severity responding to the question “HB is a serious problem,” majority (68.0 %) of respondents strongly agreed, whereas 48.4 percent that HB can cause premature death of an individual and fewer (40.0 %) individuals agreed that when a person infected with HB, could not live like normal person, while responding to question that HB was a curable disease, 34.4 percent respondents disagreed.

With respect to perception of susceptibility that “following Universal precaution guidelines needle stick injuries can be prevented, majority (70.8 %) of respondents strongly agreed,” while 69.8 percent that tattooing, ear and nose piercing can transmit HB. Majority (69.2 %) strongly agreed that HB could be transmitted by skin cuts and abrasions while 65.5 percent agreed that after a needle stick injury, Anti-HBs Immunoglobulin should be started and 64.6 percent of respondents strongly agreed that if a person infected with HBV, could remain positive for whole life and only 53.1 percent strongly agreed that condom use during intercourse prevented from

HB infection where as 52.8 percent of respondents strongly agreed that sexual contact limited with only one partner prevents from acquiring HB infection, while responding to the question that that each patient should be treated if they were carrier of HBV, 50.6 percent of respondents strongly agreed, and fewer (40.3 %) respondents disagreed that a patient who is infected with HB virus should be treated only in emergency cases.

Table 4 Number and percentage of respondents by questions asked about Perception towards Hepatitis-B

Level of perception	**n (%)**	**SA**	**A**	**NS**	**DA**	**SDA**
SEVERITY						
1. HB is a curable disease		51 (15.8)	42 (13.0)	15 (4.7)	111 (34.4)	103 (31.9)
2. HB is a serious problem		219 (68.0)	93 (28.8)	3 (0.9)	4 (1.2)	3 (0.9)
3. HB can cause premature death		156 (48.5)	138 (42.8)	15 (4.7)	6 (1.9)	7 (2.2)
4. When infected with HB virus you cannot live like normal people		97 (30.1)	129 (40.0)	23 (7.1)	38 (11.8)	35 (10.8)
SUSCEPTIBILITY						
Level of perception	**n (%)**	**SA**	**A**	**NS**	**DA**	**SDA**
1. Skin cuts and abrasions can transmit HBV		223 (69.2)	86 (26.7)	7 (2.17)	3 (0.9)	3 (0.9)
2. Needle stick injury can be prevented by Following Universal Precaution Guidelines		228 (70.8)	87 (27.0)	6 (1.8)		1 (0.3)

Table 4 Number and percentage of respondents by questions asked about Perception towards Hepatitis-B (Cont.)

Level of perception	n (%)	SA	A	NS	DA	SDA
3. Anti-HBs Immunoglobulin should be administered after needle stick injury with infected person.		211 (65.5)	100 (31.0)	2 (0.6)	6 (1.9)	3 (0.9)
4. Use of condoms during intercourse Prevents HB infection		171 (53.1)	138 (42.8)	9 (2.8)	2 (0.6)	2 (0.6)
5.Sexual contact limited only with one partner prevents HB infection		170 (52.8)	129 (40.0)	14 (4.4)	4 (1.2)	5 (1.6)
6. A patient positive for HB should be treated only in emergency cases		25 (7.8)	27 (8.4)	17 (5.3)	130 (40.3)	123 (38.2)
7. each patient should be treated if they are carrier for HB?		163 (50.6)	101 (31.3)	16 (5)	29 (9)	13 (4)
8. HB can be transmitted by tattooing, ear and nose piercing.		225 (69.8)	91 (28.2)	1 (0.3)	2 (0.6)	3 (0.9)
9. HB can persist for ones whole life		208 (64.6)	86 (26.7)	9 (2.8)	10 (3.1)	9 (2.8)

SA Strongly Agree, **A** Agree, **NS** Not sure, **DA** Disagree, **SDA** Strongly disagree

Table 5 shows the number and percentage and distribution of respondents with respect to level of perception and severity about HB. Majority (53.7 %) of respondents had low level of perception for severity towards HB, while 46.2 percent of respondents had high level of perception of severity toward HB. With respect to perception of susceptibility 51.2 percent of respondents had high level of susceptibility towards HB, while only 48.7 percent respondents had low level of susceptibility towards HB infection.

Table 5 Number and percentage of respondents by level of perception towards Hepatitis-B

Level of perception	Frequency (n)	Percentage (%)
SEVERITY		
High	149	46.2
Low	173	53.7
	Mean: 15.084	**SD: 2.174**
SUSCEPTIBILITY		
High	165	51.2
Low	157	48.7
	Mean: 38.127	**SD: 3.896**

4.1.4 Cues to action

Regarding the cues to action, information on various aspects of HB infection in table 6, results showed overall (99.3%) received information on HB transmission and prevention (99.3 %), whereas on etiology of HB, large majority (99.0 %) of respondents received information, and 96.8 percent of respondents received information about treatment of HB while only 17.4 percent received information related to HB patient stigmatization or discrimination.

Table 6 Views of respondents on various aspects of Hepatitis-B infection

Information	Frequency (n)	Percentage (%)
Etiology		
Yes	314	99.0
No	3	1
Transmission		
Yes	320	99.0
No	2	0.6
Prevention		
Yes	319	99.3
No	2	0.6

Table 6 Views of respondents on various aspects of Hepatitis-B infection (Cont.)

Information	Frequency (n)	Percentage (%)
Treatment		
Yes	311	96.8
No	10	3.1
Stigmatization		
Yes	56	17.4
No	265	82.5

Regarding to cues to action, updates on HB and other infection 97.8 percent respondents received information through medical journals, 1, while 1.86 percent received information through mass media, and only 0.31 percent through internet.

Table 7 Through which source respondents get updates on Hepatitis-B

	Frequency (n)	Percentage (%)
Medical Journals	315	97.8
Internet	1	0.3
Mass Media	6	1.9

4.1.5 Preventive behavior with respect to Hepatitis-B

Serological tests was negative for HBsAg among vast majority (94.7 %) of respondents, while only 3.7 percent were positive for HBsAg. 1.6 percent did not know about their serological status for HBsAg.

Table 8 Number and percentage of respondents for serological test of HBsAg

	Frequency (n)	**Percentage (%)**
Positive	12	3.7
Negative	305	94.7
Do not know	5	1.6

Regarding preventive behavior while responding to the question “Do you consider yourself at risk of getting HB during your job,” majority (85.0 %) of respondents considered themselves always at risk.85.4 percent always wore gloves while dressing a wound whereas 81.0 percent respondents always wore gloves when performing any medical/surgical procedure, and 78.8 percent of respondents thought that needles always should not be recapped by hand after use. 74.8 percent respondents always wore gown for procedure where was possibility of blood/body fluid splash whereas 67.7 percent of respondents always washed their hands before and after patient contact. While 53.7 percent of respondents always wore mask, eye protection or face shield during procedures where there was possibility of splashing of blood and body fluids and only 49.0 percent respondents answered that they never recapped, bent or broke needles by hand after use. While 48.7 percent of respondents followed Universal Precaution Guidelines always whereas 48.1 percent followed Universal Precaution Guidelines sometimes while only 39.1 percent sometimes used a scoop technique or a needle recapping device after use.

Table 9 Number and percentage of respondents by questions asked about preventive behavior towards Hepatitis-B

	Level of preventive behavior	n (%)	Yes always	Yes sometimes	Never
1.	Do you consider yourself at risk of getting HB through your job?	274 (85.0)	44 (13.6)	4 (1.2)	
2.	Do you follow Universal precaution Guidelines?	157 (48.7)	155 (48.1)	10 (3.1)	
3.	Do you think needles should not be recapped by hand after use?	253 (78.8)	28 (8.7)	40 (12.4)	
4.	Do you recap, bend or break needles by hand after use?	70 (21.8)	93 (29.0)	157 (49.0)	
5.	Do you use a scoop technique or a needle recapping device after use?	89 (27.6)	126 (39.30	107 (33.2)	
6.	Do you wear gloves for any medical/surgical procedure?	261 (81.0)	58 (18.0)	3 (1.9)	
7.	Do you wash your hands before and After patient contact?	218 (67.7)	101 (31.3)	3 (0.9)	
8.	Do you wear mask, eye protection or face shield during any procedure that may result in splashing of blood and body fluids?	173 (53.7)	126 (39.1)	23 (7.1)	
9.	While dressing a wound do you wear gloves?	275 (85.4)	45 (13.9)	2 (0.6)	
10.	Do you wear gown for procedures where possibility of blood/body fluid splash?	241 (74.8)	72 (22.3)	9 (2.8)	

Regarding preventive behavior with respect to Hepatitis-B vast majority (93.7) of respondents were vaccinated against HB. Only 6.2 percent did not vaccinate for HB, among which 50 percent forgot to have HB vaccine. With respect to vaccination majority (89.0%) of respondents were completely vaccinated against HB, while only 68.0 percent checked their anti-HBs antibody titer after completing their

vaccination. 41.1 percent respondents had experienced a needle stick injury ,while only 70.1 percent respondents checked their HBsAg serological test after a needle stick injury.

Table 10 Number and percentage of respondents by questions asked about preventive behavior towards Hepatitis-B

Level of preventive behavior	n (%)	Yes	No
1. Are you vaccinated for HB?		302 (93.7)	20 (6.2)
2. You forget to have HB vaccine.		10 (50.0)	10 (50.0)
3. Have you completely vaccinated for HB vaccine course?		275 (89.0)	34 (11.0)
4. After vaccination did you checked your Anti-HBs antibody titer?		209 (68.0)	98 (31.9)
5. Have you ever experienced a needle stick injury?		132 (41.1)	189 (58.9)
6. Were you checked for HbsAg serological test after the needle stick injury?		94 (70.1)	40 (29.8)

Table 11 shows that among all respondents 54.6 percent had a high preventive behavior with respect to HB. Preventive behavior was low in 45.3 percent of respondents.

Table 11 Number and percentage of respondents by level of preventive behavior with respect to Hepatitis-B

Level of behavior	frequency (n)	Percentage (%)
High	176	54.6
Low	146	45.3

4.2 Association between the Independent factors and Preventive Behavior

4.2.1 Association between socio-demographic characteristics and Hepatitis-B preventive behavior

Table 12 shows the results of analysis between socio-demographic characteristics and preventive behavior with respect to Hepatitis-B. The result showed that there was no any significant association between gender and Hepatitis-B preventive behavior with a P-value = 0.14. Results also showed that the high percentage of high preventive behavior (60.4 %) was found in female, and low percent (51.9 %) of low preventive behavior was also found among female.

The results showed that percent of high preventive behavior was found similar across all age groups. While the analyzed data also shows that there was no association between age and preventive behavior with respect to Hepatitis-B with a P-value = 0.918.

The result showed that the highest percent (67.3 %) of high preventive behavior was found among doctors working in surgical departments while the lowest percent of high preventive behavior was found among doctors working in operating room. The result of the analyzed data showed that there was an association between working department of the respondent and Hepatitis-B preventive behavior was statistically significant with a P-value =0.008.

The result show that highest percent (71.4 %) of high preventive behavior was found among senior registrar, while professors only had 48 % of high preventive behavior. There was no statistically significant association between designation of the respondent and hepatitis-B preventive behavior with P-value = 0.348 and chi-square 2.043.

The result showed that percent of high preventive behavior was similar across all respondents regarding their duration of work. The result of the analyzed data indicated that there was no association between years of working and Hepatitis-B preventive behavior with a P-value = 0.791.

Table 12 Association Between socio-demographic factors and preventive behavior

Socio- demographic characteristics	**Preventive behavior**			
	High		**low**	
	n	**(%)**	**n**	**(%)**
Gender				
Male	112	51.9	104	48.1
Female	64	60.4	42	39.6
χ^2 = 2.08 p-value = 0.14				
Age (years)				
31-40	110	55.6	88	44.4
20-30	47	53.4	41	46.6
>40	19	52.7	17	47.2
χ^2 = 0.17 p-value = 0.91				
Department				
Operating room	6	28.6	15	71.4
Medical	37	50.7	36	49.3
Surgical	37	67.3	18	32.7
Pediatrics	18	40	27	60
Obs/Gyne	27	65.9	14	34.1
Others	51	58.6	36	41.4
χ^2 = 22.09 p-value = 0.00				

Table 12 Association Between socio-demographic factors and preventive behavior (Cont.)

Socio- demographic characteristics	Preventive behavior			
	High		low	
	n	(%)	n	(%)
Designation				
Professor	12	48.0	13	52.0
Senior registrar	10	71.4	4	28.6
Medical officer	154	54.4	129	45.6
χ^2 =2.04 p-value = 0.34				
Duration of Work in years				
1-10	157	54.1	133	45.9
11-32	17	56.7	13	43.3
χ^2= 0.07 p-value = 0.79				

4.2.2 Association between knowledge and Hepatitis-B preventive behavior

Table 13 shows the results of analysis between knowledge and preventive behavior. The respondents who had had high level of knowledge had a high preventive behavior with 54.3 percent, as compared to those who had lower level of knowledge but high preventive behavior (36.3 %). The results showed that there was no association between the knowledge and preventive behavior with respect to Hepatitis-B was not found statistically significant with a P-value =0.75.

Table 13 Association Between knowledge and preventive behavior

Knowledge	Preventive Behavior			
	High		Low	
	n	%	n	%
High	169	54.3	142	45.7
Low	7	63.7	4	36.3
χ^2= 0.37 p-value = 0.75				

4.2.3 Association between Perception of Severity and Hepatitis-B Preventive Behavior

The result shows that those who had high level of perception of severity had high preventive behavior with 63.8 percent, and those who had low level of perception and had a high preventive behavior were (36.6 %). Analysis of the data shows that there was association between perception of severity and preventive behavior with respect to Hepatitis-B with a P-value =0.002.

Table 14 Association between perception of severity and preventive behavior

Level of perception	Preventive Behavior			
	High		Low	
	N	%	n	%
High	95	63.8	54	36.2
Low	53	36.6	92	63.4

χ^2= 9.26 p-value = 0.00

4.2.4 Association between Perception of susceptibility and Hepatitis-B preventive behavior

Respondents who had high level of susceptibility perception and had high preventive behavior were 59.4 percent, and those who had low susceptibility perception and had high preventive behavior were 49.7 percent. The result of the analyzed data showed there was no association between perception of susceptibility and preventive behavior with respect to Hepatitis-B with a P-value = 0.080.

Table 15 Association between perception of susceptibility and preventive behavior

Level of perception	Preventive Behavior			
	High		Low	
	N	%	n	%
High	98	59.4	67	40.6
Low	78	49.7	79	50.3

Table 16 Multiple Logistic Regression Analysis of knowledge

Knowledge	Odds ratio	95% CI for HB preventive behavior		p-value
		Lower	Upper	
High	1			
Low	0.88	0.22	3.53	0.85

Table 17 Multiple Logistic Regression Analysis on perception of severity

perception of severity	Odds ratio	95% CI for HB preventive behavior		p-value
		Lower	Upper	
High	1			
Low	2.11	1.26	3.51	0.00

Respondents with low perception on severity were 2 times more likely to had low HB preventive behavior as compared to those with high perception on severity: (OR (95% CI) was 2.11(1.26, 3.51).

Table 18 Multiple Logistic Regression Analysis on perception of susceptibility

perception of susceptibility	Odds ratio	95% CI for HB preventive behavior		p-value
		Lower	Upper	
High	1			
Low	1.22	0.74	2.01	0.43

Table 19 Multiple Logistic Regression Analysis for Socio-demographic Characteristics and HB Preventive Behavior

	Odds ratio	95% CI for HB preventive behavior		p-value
		Lower	Upper	
Gender				
Female	1			
Male	1.49	0.83	2.69	0.18
Age				
>40	1			
20-30	1.33	0.46	3.86	0.59
30-40	1.44	0.42	3.09	0.79
Working department				
Medical	1			
Obs/Gyne	0.71	0.28	1.79	0.46
Operating room	2.41	0.81	7.16	0.11
Others	0.76	0.39	1.46	0.40
Pediatrics	1.58	0.72	3.48	0.25
Surgical	0.46	0.21	1.00	0.04
Designation				
Medical officer	1			
Professor	1.92	0.68	5.43	0.21
Senior registrar	0.45	0.13	1.61	0.22
Duration of work				
1-10	1			
11-32	0.96	0.35	2.65	0.93

Respondents working in surgery department were 54 percent less likely to had low HB preventive behavior as compared to those working in medicine department: OR (95% CI) was 0.46 (1.00, 0.04).

CHAPTER V
DISCUSSION

This study was conducted in the Bolan Medical Complex Hospital Quetta. For the purpose of study 322 questionnaires were received out of 384 potential respondents. The aim of this study was to describe the preventive behavior among doctors with respect to Hepatitis-B, and its association with socio-demographic factors knowledge, cues to action and perception factors.

5.1 Preventive behavior with respect to Hepatitis-B

With respect to all the measures of preventive behavior, most of the doctors were aware that they were at risk of getting HB during their job, and most took appropriate measures to prevent exposure and prevent infection although almost half only followed Universal Precautions for some of the time. Among the behaviors which were least followed were using of a scoop technique or a needle recapping device after use. Needle recapping has attracted attention as in doctor's majority of injuries occurred while recapping used needles, so needle recapping was considered a major contribution to needle stick injuries. In this study, 41.1 percent of respondents experienced needle stick injury, for the reason efforts such as use of scoop technique and needle recapping devices in hospital were most important part of preventing HB and other blood-borne infections and to increase these behaviors would seem beneficial for doctors as their preventive behavior as well as for doctors who handle the needles with bare hands, there was need for education in standard precautions against blood-borne diseases like HBV, HCV, HIV etc.

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However among the total respondents 54.6 percent had a high preventive behavior with respect to HB, which was indicating that overall most of the doctors were familiar with the guidelines of Universal Precautions.

5.2 Socio-demographic characteristics

According to the sample size of the study 384 questionnaires were distributed, out of which 322 (84.0) percent received, so it was a good sample size. Majority of respondent were male and between the age group of 31-40 and medical officers. Studies showed that for surgeons the prevalence of Hepatitis infection increased with age but in this study there was no any association of HB with increasing age of the respondents.

5.3 Knowledge with respect to Hepatitis-B

To assess the knowledge of the respondents the questions were prepared likely to Benjamin bloom criteria.

Regarding knowledge, majority (96.5 %) of respondents had high level of knowledge, while 3.1 percent of respondents had low level of knowledge and only 0.3 percent of respondents had low level of knowledge with respect to HB. This showed that doctor's knowledge with respect to HB was quite adequate. High level of knowledge regarding HB among doctors was due to prevalence of HB in general population, as well as they were familiar with the complications when infected with HBV .Knowledge regarding preventive behavior of infectious diseases plays a vital role in control of the diseases, and if knowledge of the doctor would be adequate about the disease and its preventive behavior ,this could be very beneficial for the communities, who which come into contact with them during their clinical practice. In Pakistan there are many medical journals like Pakistan Medical Journals, British Medical journal, The Lancet, etc ,which regularly updated doctors regarding the emergence of new and existing disease conditions. So high knowledge leaded to high preventive behavior practiced by medical doctors.

5.4 Perception of severity

Regarding the perception of severity, the number and percentage of distribution of the respondents, level of perception with respect to Hepatitis-B, among total respondents, 46.2 percent had high level of perception of severity; where as 53.7 percent of respondents had low level of perception of severity with respect to Hepatitis-B. Although knowledge, perception of susceptibility as well as preventive behavior regarding HB was high, but perception of severity was low, the reason would be doctors were still not considering HB as a major health problem, and other most important was due to prevention of HB by a vaccine as well as possibly most patients they saw get better.

5.5 Perception of susceptibility

Perception of susceptibility was high towards Hepatitis-B. sixty percent said that a patient with positive Hepatitis-B should be treated only in emergency cases, where as 49 percent did not agree that each patient should be treated if they are carrier for Hepatitis-B .It indicated that there is no stigmatization related to a Hepatitis-B infected patient among doctors working in Bolan Medical Complex Hospital Quetta.

5.6 Cues to action

Regarding the cues to action with respect to various aspects of Hepatitis-B infection, most of them received information on Etiology, Transmission and Prevention related to Hepatitis-B, while majority of respondents received information through medical journals.The reason is availability of medical journals in every unit of hospital and also in library, and prevalence of Hepatitis-B in general population and exposure of doctors with these patients.

5.7 Association between Gender and Hepatitis-B preventive behavior

Results showed that the high percent of high preventive behavior (60.4 %) was found in female, while low percent (51.9 %) of preventive behavior was found among female. But the results showed there was no association between gender and HB preventive behavior.

5.8 Association between Age and Hepatitis-B preventive behavior

The results showed that high percent (62.5%) of high preventive behavior was found in age group of 31-40 years respondent while lowest (11.7 %) preventive behavior was found in the age group of >40.It is indicated that increasing age is associated non-significantly with the practice of low preventive behavior.

5.9 Association between working department and Hepatitis-B preventive behavior

The result showed that the highest percent (67.3 %) of high preventive behavior was found among doctors working in surgical departments while the lowest percent of high preventive behavior was found among doctors working in operating room. It was surprising that the lowest rate of high preventive behavior were in the operating room, where blood exposure is more common, while attending all kinds of accidental and emergency cases, and it was concluded that doctors were not adopting preventive measures adequately.

5.10 Association between designation and Hepatitis-B preventive behavior

The result show that highest percent (71.4 %) of high preventive behavior was found among senior registrar, while professors only had 48 % of high preventive behavior. As senior registrar was always the first contact with the patients as well as

had accumulated years of experience for the reason their preventive behavior was high.

5.11 Association between working of years and Hepatitis-B Preventive behavior

The results showed that percent of high preventive behavior was similar across all respondents regarding their duration of work .The result of the analyzed data indicated that there was no association between years of working and Hepatitis-B preventive behavior with a P-value = 0.791. Some studies showed that duration of work of respondent increase the risk of acquiring HB infection, but in this study no significant association was found.

5.12 Association between knowledge and Hepatitis-B preventive behavior

The respondents who had had high level of knowledge had a high preventive behavior with 54.3 percent, as compared to those who had lower level of knowledge but high preventive behavior (36.3 %). The results showed that there was no association between the knowledge and preventive behavior with respect to Hepatitis-B was not found statistically significant with a P-value =0.75. The reason could be that doctors had adequate knowledge and were familiar with Universal Precautions guidelines. Adequate knowledge was due to availability of medical journals**.**

5.13 Association between Perception of severity and Hepatitis-B preventive behavior

The results showed that those who had high level of perception of severity had high preventive behavior with 63.8 percent, and those who had low level of

perception and had a high preventive behavior were (36.6 %). So high perception of severity was associated with high preventive behavior.

5.14 Association between Perception of susceptibility and Hepatitis-B preventive behavior

The result showed that those who perceptived their susceptibility to be high were more likely to engage in significantly higher preventive behavior is perhaps as one might expect. What is perhaps surprising was that the preventive behavior was not even higher in those who perceived themselves to be highly susceptible.

Overall results of the study showed that there was an association between working department of the respondent and Hepatitis-B preventive behavior, and low preventive behavior was found among doctors working in emergency room. So it was surprising that the lowest rate of high preventive behavior was found among respondents working in the operating room, where blood exposure is more common, while attending all kinds of accidental and emergency cases, and it was concluded that doctors were not adopting preventive measures adequately. Whereas there was also an association between perception of severity and Hepatitis-B preventive behavior.

Strength and limitation of study

In this study the compliance was good because the study population was doctors and it was first study conducted in Bolan Medical complex Hospital Quetta, to find out the doctors preventive behavior towards HB and the measurement of preventive behavior. The questionnaire was in English and well interpreted by the doctors because in Pakistan official language is English and doctors can read and write English well, as well as doctors were adequately aware about the HB.

This study could not be generalized because it was conducted in only one hospital and cannot represent the whole country.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study was carried out among doctors working in Bolan Medical Complex Hospital Quetta, Pakistan in order to determine the factors which were associated with their preventive behavior. This study aimed to describe preventive behavior on socio-demographic factors, knowledge with respect to Hepatitis-B, perception of severity and susceptibility of risk related to Hepatitis-B, and cues to action. The research design of the study was cross-sectional study. Target population of the study was doctors. The total studied sample size for this study was 384 doctors. A self-administered questionnaire was used as research instrument. Three-hundred-twenty-two questionnaires were received after completion from respondents. Data was analyzed by using statistical methods, chi-square and descriptive statistics.

The results in this study showed that majority of respondents were male and most of them were in the age group of 31-40 years. Majority of respondents were performing their duties in the medical unit and most of the respondents were medical officer. With respect to duration of work as doctors in the department in which they were working majority of respondents were working for 1-10 years.

1. Statistically analyzed data showed that Gender, Age, Designation and Years of working had no significant association with Hepatitis-B preventive behavior. The result of the analyzed data showed that there was a statistically significant association between working departments of the respondents and Hepatitis-B preventive behavior as well as an association between perception of severity and HB preventive behavior.

2. Among the 322 respondents, majority of respondents (95.3 %) answered correctly the causative agent of hepatitis-B. Almost 90 percent of respondents were agreed that HB could not be transmitted by eating and drinking in the same utensils used by a HB positive patient. About 61 percent replied that they did not agree that HB could be cured by vaccination. Almost 98 percent of respondents agreed that among doctors needle stick injury was the most common way of transmitting HB infection over 96 percent respondents agreed that HB could be prevented by a vaccination. Regarding to cues to action, updates on HB and other infection, 97.8 percent respondents received information through medical journals. With respect to perception of severity, 34.8 percent of respondents disagreed that HB was a curable disease whereas 68.0 percent of respondents strongly agreed that HB was a serious problem. Regarding to perception of susceptibility, 69.2percent of respondents strongly agreed that HB could be transmitted by skin cuts and abrasions. With respect to response on perception of susceptibility, the following universal precaution guidelines, needle stick injuries could help to prevent from HB, with 70.8 percent respondents strongly agreed. While responding to question that a patient who was infected with HB virus should be treated only in emergency cases, 40.3 percent of respondent disagreed, while 50.6 percent of respondents strongly agreed that each patient should be treated if they were carrier of HB.

3. In this study with respect to Hepatitis-B preventive behavior, 48.7 percent of respondents always followed Universal Precaution Guidelines, 78.8 percent of respondents thought needles should not always be recapped by hand after use. Eighty-one percent of respondents always wore gloves when performing any medical/surgical procedure. Among the total respondents 93.8 percent of respondents were vaccinated against HB, where as 89.0 percent of respondents had completed vaccination schedule for Hepatitis-B. About 41 percent experienced needle stick injury, while 70.1percent respondents checked their HBsAg serological test after a needle stick injury.

6.2 Recommendation

Based on the finding of this study the recommendations suggested as follows:

- Since the level of knowledge is high, but perception of severity is low with respect to HB, so further interventions are needed to promote the perception of severity. These interventions can be applied by involving ministry of health to promote further health promotion strategies. While there should be proper training for doctors regarding prevention of blood-borne infections.
- To promote the adaptations of Guidelines of Universal Precautions by the doctors to reduce the frequency of needle stick injuries.
- Motivation of acceptance of Hepatitis-B vaccination among medical doctors.
- Information and education of HCWs on policy and risk of transmission of HB and other blood-borne infections.
- Prompt reporting of occupational exposure cases to the higher authorities.
- Proper vaccination program should be implemented and should be a part of recruitment process for new doctors.

6.3 Recommendations for Implementation

- Further researches are needed to find out the level of knowledge and following Universal Precautions with respect to Hepatitis-B among doctors in different hospitals of Pakistan.
- Since this study was a cross-sectional study, through structured questionnaire only quantitative information was collected with respect to Hepatitis- B. Qualitative methods, such as focus group discussions and in- depth interviews should be applied to find out in detail the preventive behavior and factors related to Hepatitis-B preventive behavior and the level of Universal Precaution Guidelines among doctors.

REFERENCES

1. Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. J Viral Hepat 2004; 11:97-107.
2. Baruch B S. The Curiosities of Hepatitis B Virus, Prevention, Sex Ratio, and Demography. Proceedings of the American Thoracic Society 3:14-20; 2006.
3. World Health Organization.[Online] Available from: who.int/immunization_ delivery/new_Vaccines/hepb/en/index.html [Accessed 2008 Dec 4
4. Mukti Ghufron Ali, Treloar Carla, Suprawimbarti, Asdie Ahmad Husain, D'Este Kate, Higginbotham Nick and Heller Richard. A universal precautions education intervention for health workers in Sardjito and Pku hospital Indonesia. Southeast Asian J Trop Med Public Health. 2000 Jun; 31(2)
5. Naz Saima, Ahmad Mushtaq, Asghar Humayun. Prevalence of Hepatitis 'B' Among Hospital Personnel in Combined Military Hospital (CMH) Muzaffarabad. International Journal of Agriculture & Biology
6. Memon Rauf Abdul, Sheikh Ahmed Munir, Asfar Salahuddin, Zubairi Fayaz Badar, Qadeer Rashid,Baloch Inayat. Hepatitis B vaccination status and knowledge, attitude, practices of health care workers (HCWS) regarding Hepatitis B and C in a tertiary care setting of Karachi.Infect Dis J 2007Oct-Dec; 16(4):105-7.
7. Alam Masroor Muhammad, Zaidi Zahoor Sohail, Salman Akbar Malik, Shaukat Shahzad,Naeem Asif, Sharif Salmaan, Angez Mehar and Butt Aslam Javed. Molecular epidemiology of Hepatitis B virus genotypes in Pakistan. BMC Infectious Diseases 2007, 7:115
8. Hepatitis B Seronegative Commonalties in Health Care Workers. [Online] Available from: www.htms.com/fhorvat/thesis3.htm [Accessed 2009 Feb 3]

9. Rana.J.S, Khan.A.R, Haleem.A.A, Khan F.N, Gul A, Sarwari A.R. Hepatitis C: Knowledge,Attitudes and Practices among Orthopedic Trainee Surgeons in Pakistan. Annals of Saudi Medicine 2000;20:5-6

10. Marri Shah M, Ahmed Jamil. Prevalence of Hepatitis B Antigenaemia in General Population of Quetta,Balochistan. Pakmedinet. Biomedica 1997 13(2):51-2.

11. Hussami-Al Mahmoud. Knowledge And Acceptance of Hepatitis B vaccine. The Internet Journal of Health Care Administration 2002 Volume 2 Number 1.

12. Echevarria JE, Leon P, Lopez J A, Tenorio A, Domingo C J & Echevarria JM. HbsAg subtype distribution among different population of HBsAg carriers in Spain. Europian journal of epidemiology. 1995; 11: 39-45

13. World Health Organization, 2002.[Online] Available from: WHO/CDS/CSR/ LYO/ 2002.2: Hepatitis B.[online] [Accessed 2008 Oct 8]

14. Ferrante JM, Winston DG, Chen PH,de la,Torre A. Family physicians' knowledge and screening of chronic hepatitis and liver cancer.Health Services Research. Vol.40,No.5.

15. Hepatitis C Hepatitis B and D Health Guide.The New York Times.[Online] Available from: http://health.nytimes.com/health/guides/disease/hepatitis-c/hepatitis -b-and-d.2008 [Accessed 2008 Dec 19]

16. Nguyen TT Van,Dore J Gregory. Prevalence and Epidemiology of Hepatitis. [Online] Available from: http://www.ashm.org.au/uploads/B_Positive -Chapter 1.pdf.

17. Parantainen Annika, Anthoni Minna, Valdes America, Lavoie Marie-Claude, Hellgren Ulla-Maija, Verbeek Jos H. Prevention of percutaneous injuries with risk of hepatitis B,hepatitis C, or other viral infections for health-care workers. (Protocol) Cochrane Database of Systematic Reviews 2008, Issue 2.

18. Hamid Saeed,Ismail Faisal W,Jafri Wasim. Hepatitis and the Health Care Worker-A Pakistani Perspective. JCPSP 2007;17 (4); 240-45.

19. Younas bilal bin**,** Khan gulsana Masood, Ashfaq Mohammad, Chaudary Mohammad Akbar. Prevalence of Hepatitis B in patients suffering from Chronic Liver Disease.PakMediNet. Mother & Child. 2000Jun; 38(2):68-71.

20. Kazmi Khalida. Situation of hepatitis-B in Pakistan and preparation of Diagnostic Reagents for the detection of HBsAG (ELISA).[Online] Available from:hec.gov.pk [Accessed 2008 Oct 10].

21. Abdulla .M Essa , Abdulla. E Farhan. Seropositive HBsAg frequency in Karachi and interior Sindh, Pakistan. Pak J Med Sci 2007 Apr; 23(2):157-60

22. Zafar Afia, Aslam Naveen, Nasir Nosheen, Meraj Riffat, Vikram. Knowledge,attitudes and practices of health care workers regarding needle stick. Journal of Pakistan Medical association.

23. CA Adebamowo, A A Odukogbe, A J Ajuwon. Knowledge, attitude, and practices related to hepatitis B virus infection among Nigerian obstetricians and midwives. Journal of Obstetrics & Gynecology. 1998;18(6)

24. Alam Masroor Muhammad, Zaidi Zahoor Sohail, Shaukat Shehzad ,Naeem Asif, Sharif Salmaan, Angez Mehar, Naeem Asif, Saleha Shamim, Butt Aslam Javed, Malik Akbar Salman. Common Genotypes of Hepatitis B virus prevalent in Injecting drug abusers (addicts) of North West Frontier Province of Pakistan. Virology Journal 2007; 4:63

25. Hou jinlin , Liu Zhihua , Gu Fan. Epidemiology and Prevention of Hepatitis B Virus Infection. Int J Med Sci 2005; 2:50-57

26. Idilman R,Maria De.N,Colantoni.A and Thiel Van .D. H. Pathogenesis of epatitis B and C-induced hepatocellular carcinoma. Journal of Viral hepatitis.1998; 5:285- 99

27. Viral Hepatitis B Prevention Board Meeting, Rome, Italy, 17-18 March 2005. [Online] Available from: http://www.vhpb.org/files/html/Meetings and publications/ Viral_Hepatitis_Newsletters/vhv14n1. [Accessed 2009 Jan 17]

28. Romieu I , Sow I , Lu S , Laroque G , Prince-David M, Romet-Lemonne J L. Prevalence of hepatitis B markers among hospital workers in Senegal. Journal of Medical Virology 27(4): 282 – 7.

29. Banker D D. Viral Hepatitis. Ind J Med Sci; 57(9)

30. DL Gurubacharya, Mathura KC, DB Karki. Knowledge, attitude and practices among health care workers on needle-stick injuries. Kathmandu University Medical Journal 2003;1(2):91-4.

31. Perspectives in Disease Prevention and Health Promotion Update: Universal Precautions for Prevention of Transmission of Human Immunodeficiency Virus, Hepatitis B Virus,and Other Bloodborne Pathogens in Health-Care Settings. CDC [Online] Available from: http://www.aegis.com/pubs / mmwr/1988/MM 3724-377.html. [Accessed 2009 Jan 11].
32. McCall L, Maher T, Piterman L. Preventive health behavior among general Practioners in Victoria. Aust Fam Physician. 1999 Aug; 28(8):854-7.
33. Djeriri K, Laurichesse H, Merle J. L, Charof R, Abouyoub A, Fontana L, Benchemsi N,Elharti E, Aouad R. El, Chamoux A. and Beytout J. Hepatitis B in Moroccan Health care workers. Occupational Medicine 2008; 58(6):419-24
34. Scott D, Halpern, David A, Asch, MBA , Abraham,Shaked ,Peter, Stock,Emily A, Blumberg. Inadequate Hepatitis B Vaccination and Post-Exposure Evaluation Among Transplant Surgeons: Prevalence, Correlates, and Implications. Annals of Surgery. 2006 Aug; 244(2):305-9.
35. Ministry of Health Government of Pakistan (Prime Minister's Program for Prevention & Control of Hepatitis). Pakistan: The ministry ;n.d.
36. SW Hu, HR Lai, PH Liao. Comparing dental students' knowledge of and attitudes toward hepatitis B virus-, hepatitis C virus-, and HIV-infected patients in Taiwan. AIDS Patient Care STDS 2004 Oct; 18(10):587-93
37. Bell DM. Occupational risk of Human Immunodeficiency Virus infection in health care workers. Am J Med 1997 May; 102(5B):9-15.
38. Zolaiha. HIV/AIDS Prevention behavior among adolescents in High School of Jakarta,Indonesia. [M.P.H.M.Thesis in Primary Health Care Management]: Nakhon pathom : Faculty of Graduate Studies,Mahidol University;2005.

APPENDIX

APPENDIX A
QUESTIONNAIRES

PREVENTIVE BEHAVIOR AMONG DOCTORS WITH RESPECT TO HEPATITIS-B IN BOLAN MEDICAL COMPLEX HOSPITAL QUETTA PAKISTAN

Part 1: Socio-Demographic Factors

1. ***Gender***
   - ☐ 1 = Male
   - ☐ 2 = Female
2. ***What is your date of birth?*** ...../...../…….
   Day Month Year
3. ***Which area or unit do you work in?***
   - ☐ 1= Emergency room
   - ☐ 2=Operating room
   - ☐ 3=ICU
   - ☐ 4=Medical
   - ☐ 5=Surgical
   - ☐ 6=Paediatrics
   - ☐ 7=Obs/Gyne
   - ☐ 8=Laboratory
   - ☐ 9=Pathology
   - ☐ 10=Others……
4. ***Designation*** …….
5. ***How long have you worked in the area mentioned above (question #3)?***
   Years……

Part 11: Knowledge about Hepatitis-B

6. ***Do you know what the causative agent of Hepatitis B infection is?***

☐ 1= A bacteria

☐ 2= A Virus

☐ 3= A Parasite

☐ 4= A Fungi

Please put only one tick mark (✓) if you:

Agree = 2, Do not Agree = 1, Not Sure = 1,

No	Statement	Agree	Do not Agree	Not sure
7.	HBV cannot be transmitted by using eating and drinking utensils commonly used by HB-infected persons.			
8.	HBV can be transmitted by being pricked by a needle or surgical instrument contaminated by blood of an infected person.			
9.	HB infected person can remain asymptomatic for Months or years			
10.	Hepatitis B can be cured by a vaccine			
11.	Practicing safe sex prevents HBV infection			
12.	Condom use can prevent HB and other sexually transmitted diseases			
13.	Liver cirrhosis and Hepatocellular carcinoma are complications of HB?			
14.	Needle stick injury is the most common cause of HB transmission among doctors?			
15.	HB vaccine is effective by preventing HBV infection?			
16.	Soon after needle stick injury to a known HB positive patient, HB Immunoglobulin should be started?			

Part 111: Perception of Hepatitis-B

Please put only one tick mark (✓) if you : Strongly agree = 5, Agree = 4, Not Sure = 3, Disagree = 2 , Strongly disagree = 1, with each of the following statements :

NO	Statement	5	4	3	2	1
	Severity of HBV infection					
17.	HB is a curable disease					
18.	HB is a serious problem					
19.	HB can cause premature death					
20.	When infected with HB virus you cannot live like normal people					
	Susceptibility					
21.	Skin cuts and abrasions can transmit HBV					
22.	Needle stick injuries can be prevented by following Universal Precautions Guidelines					
23.	Anti-HBs immunoglobulin should be administered after needle stick injury with infected person					
24.	Sexual contact limited only with one partner prevents HB infection.					
25.	Use of condoms during intercourse prevents HB infection.					
26.	A patient positive for HB, should be treated only in emergency cases?					
27.	Each patient should be treated as if they are carrier of HB?					
28.	HBV can be transmitted by tattooing, ear and nose piercing.					
29.	HBV infection can persist for ones whole life					

Part IV : Sources of information

Please read carefully questions. Tick only one mark ( ) in the box□

30. ***Have you have received information about the following aspects of HB?***

(a) Etiologic 1= Yes □ 2= No □

(b) Transmission 1= Yes □ 2= No □

(c) Prevention 1= Yes □ 2= No □

(d) Treatment 1= Yes □ 2= No □

(e) Stigmatization 1= Yes □ 2= No □

31. ***How do you get updates regarding HBV and other infection?***

(Answer more than one)

☐ 1= Medical Journals ☐ 2= Mass Media (News Papers, TV)

☐ 3= Workshops ☐ 4=Internet ☐ 5= Other……

Part V: PREVENTIVE BEHAVIOUR

32. ***Your Serological test for HBsAg is***

☐ 1= Positive ☐ 3= Do not know

☐ 2= Negative

Please put only one tick mark (✓) if you:

Yes always = 2, Yes sometimes = 1, Never = 0 with each of the following statements:

No.	Statement	Yes always	Yes sometimes	Never
33.	Do you consider yourself at risk of getting hepatitis- B through your job?			
34.	Do you follow Universal Precaution Guidelines?			
35.	Do you think needles should not be recapped by hand after use?			
36.	Do you recap, bend or break needles by hand after use?			

No.	Statement	Yes always	Yes sometimes	Never
37.	Do you use a scoop technique or a needle uncapping device to recap the used needle?			
38.	Do you use gloves for any medical/surgical procedure?			
39.	Do you wear gloves in a procedure where there is the possibility of blood/body fluid exposure?			
40.	Do you wash your hands before and after patient contact?			
41.	During emergency situation if condition of patient is very serious, no time to wash hands; do you wear gloves before going to patient?			
42.	Do you wear mask, eye protection or face shield during any procedure that may result in splashing of blood and body fluids?			
43.	While dressing a wound do you wear gloves?			
44.	Do you wear gown for procedures where possibility of blood/body fluid splash?			

Please put only one tick mark (✓) if you:

Yes = 1, ***No= 0*** with each of the following statements:

No.	Statement	Yes=1	No=0
45.	Are you vaccinated for HB?		
	If your answer is <u>No</u> ,answer the next question ***If <u>Yes</u> skip to question <u>48</u>***		
46.	You forgot to have HB vaccine		
47.	You did not have HB vaccine due to side effects		
48.	Have you completely received the HB vaccine course?		
49.	After HB vaccination, did you check your Anti-HBs antibody titre?		
50.	Have you ever contacted with the blood, body fluids or other secretions of an HB-infected person?		
51.	Have you ever been exposed to an HB infected patient?		
52.	Have you ever experienced a needle stick injury?		
	If your answer is no for question 52, skip question 53.		
53	Were you checked for HBsAg serological test after the needle stick injury?		

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