

ASSESSMENT OF HEPATITIS B VACCINATION STATUS AND FACTORS CONTRIBUTING TO NON-ADHERENCE AMONG SURGICAL STAFF AT SOCIAL SECURITY HOSPITAL, LAHORE

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ABSTRACT

Background: Blood, body fluids and sharp instruments are sources of exposure for healthcare workers, particularly surgical workers, and pose a high risk for infection with hepatitis B virus (HBV). The most effective measure to prevent is vaccination; however, even in many developing countries such as Pakistan the vaccination coverage of HCWs is not optimum.

Objective: To determine the hepatitis B vaccination status of surgical staff of public hospital, Lahore and to determine the factors hindering the adherence of Hepatitis B vaccination policy in these hospitals.

Methods: This will be a cross sectional study to be conducted in selected public hospital at Lahore including hospital social security. Using purposive sampling, surgical personnel having at least six months work experience in surgical departments will be recruited by the researcher. Structured questionnaires to record vaccination status and factors associated with incomplete and non-vaccination will be used to collect the data. Descriptive and inferential statistics will be used to give quantitative assessment of the data to estimate the extent of vaccination coverage and contributing factors.

Expected Results: The study should reveal the percentage of fully vaccinated surgical staff as well as the main barriers to vaccination (such as lack of awareness, vaccine availability, institutional policies, time and financial constraints).

Conclusion: The findings will provide evidence regarding Hepatitis B Vaccination Coverage among SHWs in Lahore and can be helpful in designing specific interventions and institutional policies that will help to increase the uptake of Hepatitis B vaccination and ensure occupational safety.

INTRODUCTION:

Despite the availability of a safe and effective vaccine, hepatitis B virus (HBV) infection continues to be a significant public health problem all over the world, causing huge morbidity and mortality. HBV is a partially double-stranded DNA virus of the family

Hepadnaviridae, which infects mainly hepatocytes leading to acute and chronic liver disease. HBV can cause chronic infection which can lead to liver cirrhosis, liver failure and hepatocellular carcinoma, and is a major cause of liver-related death worldwide (Lavanchy, 2004). World Health Organization (WHO) estimates in 2022 that about

254 million people were chronically infected with hepatitis B and almost 1.1 million people died from liver disease due to hepatitis B infection and its consequences (WHO, 2024). Even though there are effective vaccines and anti-viral treatment, the issue of Hepatitis B is still a problem because vaccination uptake and access to health care are low in many countries of the world, particularly in the developing world. HBV is spread by contact with blood and other body fluids of an infected person. Transmission of the virus is perinatal, unsafe injection, blood transfusion, occupational and sexual contact, and sharing of contaminated needles (Lewis, Enfield and Harris, 2006).

Sifri, 2015). Occupational exposure is the one route of exposure that can be most easily prevented. Healthcare workers are at much greater risk than the general population because they are constantly having contact with blood and/or bodily substances that may contain blood or infectious diseases at time of clinical activities. Needlestick and sharp object exposures, as well as exposures to infected blood and body fluids, remain prevalent work-related exposures that occur in health care.

Health care is one of the occupations where the risk of contracting blood borne infections is great. Exposure of healthcare workers to blood has been estimated to occur in millions annually (Ogoina et al., 2014), and thus probably thousands of new hepatitis B infections occur annually worldwide as well. The transmission associated with the exposure to infected blood is much greater for hepatitis B virus (HBV) in comparison to hepatitis C virus (HCV) and human immunodeficiency virus (HIV). HBV transmission following an HBV surface antigen positive and HBV e-antigen positive source needle-stick injury has been estimated to be 22% to 31% in HBV susceptible persons (Lewis, Enfield and Sifri, 2015). This high transmission rate highlights the importance of effective prevention measures in healthcare settings. It is accepted that surgical staff is among the most-at-risk group of occupational health care workers, because of normal surgical activities. Sharp objects, needles, scalpels and contaminated equipment with blood are present and can pose a

significant risk to the surgeons, anesthesiologists, surgical technologists, operating room nurses and other workers in the theatre during surgery. Although the universal precautions are employed in the course of any surgical procedure, pricking and splashes with sharp blood indicators are very common (Alhassan, Kuugbee and Der, 2021). Thus, complete vaccination against hepatitis B is considered as an essential component of surgical worker's occupational health and patient safety.

Vaccination against hepatitis B is recognised as the most effective way to prevent hepatitis B infection. Major decreases in the number of cases of HBV have been reported since the introduction of the hepatitis B vaccine, in the early 1980s. The standard vaccination schedule is 3 doses over 6 months and has a > 95% efficacy in adult healthy persons (Lavanchy, 2004). Vaccine has good safety profile and has long-lasting immunity among most vaccinated persons. All of these factors have contributed to the success of vaccination against hepatitis B as a tool for prevention in modern medicine.

The World Health Organization and Centers for Disease Control and Prevention (CDC) recommend that all health care workers be fully vaccinated for hepatitis B at the time of beginning clinical practice (CDC, 2023; WHO, 2024). High coverage rates (more than 90%) have been reached in some health care facilities in many developed countries where vaccination of health care workers is mandated. Incorporating the compulsory vaccination scheme, postvaccination antibody testing and infection control practices has markedly decreased the transmission of hepatitis B virus (HBV) infection among healthcare workers (Hussein, Ismail and Jama, 2022).

Despite these recommendations, there is still insufficient rate of vaccination for healthcare workers in several developing countries. Many of the studies have shown that large percentage of health care workers are not getting vaccinated or do not get three doses (Awoke et al., 2020). Lack of awareness, unavailability of vaccine, bad institutional policies, financial issues, busy clinical practice, side effects of vaccines, and not following the occupational health guidelines are all factors that determine poor uptake of vaccines (Soomar et

al., 2021). All of these obstacles continue to pose difficulties to achieving universal vaccination of health care workers.

Pakistan is an intermediate level endemic country with HBV infection being widely prevalent among the general public (2-5%) and one of the important public health concerns (Ali et al., 2011). The healthcare workers in Pakistan are especially exposed because of growing patient volumes, lack of adequate care and infection control practices in certain healthcare institutions, frequent blood and body tissue contact with patients. While it is recommended to hepatitis B vaccinate all healthcare workers, in many health care institutions, vaccination rates are below international standards.

Hepatitis B vaccination status of Healthcare Workers has been assessed in number of studies performed in Pakistan. An intermediate level of awareness on the part of health care workers of tertiary hospitals of Peshawar was found by Attaullah et al., (2011) however vaccination coverage was not satisfactory. Similarly, Usmani et al., 2010 found that the immunization status of majority of doctors in tertiary hospitals was not known or if known were not having the recommended vaccinations. Memon et al, (2007) also mentioned that the poor vaccination rate among the healthcare workers employed in the university hospitals and stated that the need of the hour is a well-organized vaccination scheme on institutional basis.

Similar conclusions have been found by international studies. Ogoina et al. (2014) conducted a study in Nigeria which showed low uptake of HBV vaccines among health care workers, who are at risk of exposure to blood-borne pathogens. Similarly, a study in Ethiopia showed low and inadequate vaccine uptake by healthcare workers, with institutional support and vaccine accessibility being the two major determinants of vaccine uptake (Awoke et al., 2020). Similarly, Mwangi, et al., (2023) reported low levels of vaccination coverage in medical staff in Kenya whilst emphasizing the need for regular medical staff health programmes and vaccination campaigns.

Literature review

Hepatitis B virus (HBV) infection is one of the worldwide most prevalent infectious diseases, and, notwithstanding the effective vaccine being available, is still a huge public health concern. HBV is a partially double-stranded DNA virus, in the family Hepadnaviridae, which predominantly targets the liver. HBV infection can lead to acute hepatitis, chronic hepatitis, cirrhosis of the liver, liver failure and hepatocellular carcinoma. The World Health Organization estimates that there were approximately 254 million people chronically infected with hepatitis B in the world in

In 2022, it was estimated that more than 1 million people died due to HBV (WHO, 2024). Virus is transmitted via exposure to contaminated blood and body fluid. Perinatal, unsafe injection, blood transfusion, sexual and occupational (among healthcare workers) are the most common types of transmission. The highest risk group for HBV infection are those who work in the healthcare sector, since as part of their job, they are likely to encounter blood and body fluids (Lewis, Enfield and Sifri, 2015). Healthcare workers are exposed to infectious materials many times; as a result, the occupational risk of the acquisition of hepatitis B is much greater than that of the general public.

Of all healthcare workers, surgical staff are regarded as one of the highest risk professions. Invasive or sharp objects like needles, scalpel, etc which are used in surgical procedure have the potential to be contaminated with patient blood. In the course of surgical interventions, accidental needle-stick injuries and blood splashes may happen in spite of the application of standard precautions. For this reason, occupational risk of getting an HBV infection is more prevalent for the surgeon, anesthetist, O.R. nurse and surgical technologist (Alhassan, Kuugbee and Der, 2021).

The one of the most important occupational hazard in health care settings is needle-stick injuries. Lewis (2015) states that the chances for the HBV to be transmitted after a needle-stick injury from HBeAg positive blood is between 22% to 31%. This rate is definitely also much greater than that of other blood transmitted pathogens like Human Immunodeficiency Virus (HIV).

Therefore, preventive measures, including immunisation, are considered to be an important component of an occupational health programme. The best way to prevent hepatitis B infection among health care workers is vaccination against hepatitis B. With the advent of hepatitis B vaccine in early 1980s, substantial declines in the incidence of HBV infection have been documented internationally. Standard immunization is 3 doses of vaccine spaced out over 6 months and is effective in more than 95% of healthy adults (Lavanchy, 2004). The vaccine has proven a very safety and efficacy profile vaccine and is still to be the cornerstone of HBV prevention strategies.

International health organizations, such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), have strong evidence that suggests all health care workers should be vaccinated before clinical exposure to protect against hepatitis B. The accentuation of these recommendations is on full vaccination and post-vaccination antibody testing by workers who are at high occupational risk (CDC, 2023). In most developed countries, today health care workers are required to be vaccinated for hepatitis B (HBV) and the number of occupational infections has been significantly reduced.

Even with these suggestions, coverage of healthcare workers with vaccines is far from ideal in many countries. Ogoina et al., 2014 reported a study conducted among health care workers in Nigeria which showed a small proportion of health care workers were vaccinated as recommended. Suitable results were obtained in different countries in Asia and Africa where unhealthy practices about vaccine uptake persist.

A Systematic review and meta-analysis on hepatitis B vaccination coverage among health care workers in Ethiopia was done by Awoke et al., (2020). It was found that full vaccination rate was below desired levels even though there was widespread knowledge about the occupational risk factor. Factors like also availability of vaccines, workplace policies and knowledge about HBV infection were seen as important determinants of vaccination status by authors.

The Kenya Study also revealed poor coverage of health care workers when it came to vaccination. Mwangi et al (2023) one of the immunovirologists identified noted that there were many HWs who were identified as being at high risk of HBV occupational exposure and had suboptimal antibody levels of HBV. The study participants were reminded of the necessity of regular assessment of immune status of health care workers and regular vaccination schemes.

The hepatitis B virus continues to be a problem in South Asia. HBV infection is considered intermediate endemic in Pakistan as the prevalence of infection in general population is between 2% to 5% (Ali et al., 2011). The prevalence rate of hepatitis B among the community is very high making the occupational exposures of healthcare workers vulnerable and thus requiring good preventive measures. A number of studies are done in Pakistan to assess coverage of Hepatitis B vaccination among health care professionals. Nasir et al. (2000) showed that there was poor health care workers' and medical students' level of awareness of the disease and therefore poor vaccination coverage. Similarly Memon et al. 2007 documented the under optimum status of vaccination in the participants of health circle of tertiary care hospitals and thus advocated for the better institutionalization of vaccination programmes. A finding in Services Hospital Lahore found that there were some doctors who were not initiating vaccinations and also not following the three dose vaccination schedule (Usmani et al., 2010). When it comes to vaccination, the study found lack of motivation and lack of institutional support to be barriers. Vaswani et al. (2010) found similar findings in health care workers in Karachi, a large proportion of health care workers were partially vaccinated. Attaullah et al (2011) ran a study to assess the HBV vaccination coverage amongst healthcare workers in tertiary hospitals of Peshawar and revealed a significant gap in coverage of HBV vaccination. A fairly high level of knowledge of hepatitis B and less than complete coverage of vaccination rates than internationally recommended. Policies for compulsory vaccination and better occupational health

services in healthcare institutions were stressed by the authors.

Yousafzai et al. (2014) investigated Hepatitis B vaccine practices in primary healthcare workers in the Northwest of Pakistan, and found similar worries. This study revealed that educational status, professional category and accessing vaccine services were correlated to vaccination uptake. HWs who reported more frequent exposure to IPE were more likely to report completed vaccinations than HWs who reported less frequent exposure to IPE.

Vaccination attitudes of health care workers are impacted by multiple factors. This knowledge of mode of transmission and prevention of HBV has consistently been associated with increased uptake of HBV vaccine. In addition, more awareness about Hepatitis B amongst healthcare professionals (HCP) was found to be correlated with more positive attitudes towards vaccination (Ali et al., 2017). Knowledge, however, was not enough in and of itself to assure that compliance was complete, and points to further institutional and behavioral components.

Institutional support is an important aspect to boost immunisation coverage for HCWs. Vaccination coverage rate has been indicated to be much higher in health care facilities having epidemiological catchment area (ECA) vaccination programs and improved vaccine availability compared to health care facilities without ECA vaccination programs (Hussein, Ismail and Jama, 2022). There has been good success with employer sponsored vaccination programs to increase compliance among HCWs. Vaccine uptake is also believed to be a determinant of free vaccination services uptake. Many developing countries do not make vaccinations obligatory for health workers, which can result in poor uptake of vaccinations due to health workers' cost-sharing. Observations made in Somalia revealed that provision of free vaccination services was observed to increase uptake of vaccination among the healthcare personnel (Hussein, Ismail and Jama, 2022).

Attitudes towards vaccination is another aspect of compliance. Despite the wealth of information on vaccination, some health care providers are still

worried about the safety, effectiveness or side effects of vaccines. These misconceptions and belief that contributes to vaccine hesitancy and poor health care personnel (HCP) vaccination coverage (Aniaku, Amedonu and Fusheini, 2019). It has been demonstrated that educational interventions can enhance acceptance of vaccines if they address the misconceptions.

One such area in which vaccination interventions would be particularly relevant is the operating theater, because of the risks involved with this profession. Working in the operating room, surgical personnel are at a high risk for exposure to blood and sharp injuries during some surgery. Thus, surgical staff should be completely vaccinated against hepatitis B to prevent transmission to patients (Lewis, Enfield and Sifri, 2015).

3.1: OBJECTIVE(S)

- To determine the vaccination status against Hepatitis B among surgical staff in public hospitals of Lahore.
- To identify the factors influencing non-adherence to the Hepatitis B vaccination policy among surgical staff

3.2: RATIONALE

Prevention is the ultimate treatment option for hepatitis B; therefore, it has been included in the national immunization schedule. Every healthcare staff member, especially those in surgical departments, is encouraged to complete the three doses of the HBV vaccine before joining clinical duties. However, the proportion of vaccinated staff is very low and varies across regions and organizations due to various reasons. Therefore, a research study is needed to obtain baseline data for the local medical community, especially the healthcare workers (HCWs) of the surgical and allied departments, and to determine the reasons for non-compliance.

3.3: OPERATIONAL DEFINITION(S)

Hepatitis B Vaccination Status

Hepatitis B vaccination status refers to the immunization condition of a surgical staff

member against Hepatitis B virus, determined by self-report and/or vaccination records.

- **Fully Vaccinated:** Received all three recommended doses of the Hepatitis B vaccine.
- **Partially Vaccinated:** Received one or two doses of the Hepatitis B vaccine.
- **Unvaccinated:** Has not received any dose of the Hepatitis B vaccine.

Surgical Staff

The surgical staff comprise health care providers who work in the surgical departments of the selected hospitals at the time of operations or surgery including surgeons, surgical residents, operation theatre nurses, surgical technologists, anesthesia staff and others directly contributing to surgeries.

Public Hospitals

Public hospitals refer to government-funded healthcare institutions included in the study, namely Social Security Hospital Lahore).

Non-Adherence to Hepatitis B Vaccination

Non-adherence refers to failure to receive the complete three-dose Hepatitis B vaccination schedule as recommended for healthcare workers.

Factors Influencing Non-Adherence

The barriers reported by the participants that prevented the completion of Hepatitis B vaccination courses are considered factors influencing non-adherence: no adequate institutional support, fear of the side effects, lack of vaccine, no vacations, busy work schedule, and individuals' lack of awareness.

Work Experience

Work experience is the number of years (full years completed) or months (full months completed) spent working in surgical departments.

Awareness of Hepatitis B

Awareness of Hepatitis B - participant's knowledge on the transmission, prevention, complication and vaccine for infection by Hepatitis B virus as measured by the study questionnaire.

MATERIAL AND METHODS

4.1: Study Design: It was descriptive cross sectional study.

4.2: Settings: Data was collected from Social Security Hospital

4.3: Study Duration: The duration of this study was 4 Months after the approval of synopsis from the Departmental Research Committee.

4.4: Sample Size: The sample size of our cross-sectional study was 126.

Sample Size for Frequency in a Population	
Population size (for finite population correction factor or fpc) (N):	1000000
Hypothesized % frequency of outcome factor in the population (p):	20.1% +/- 7
Confidence limits as % of 100 (absolute +/- %)(d):	7%
Design effect (for cluster surveys-DEFF):	1
Sample Size(n) for Various Confidence Levels	
Confidence Level(%)	Sample Size
95%	126
80%	54
90%	89
97%	155
99%	218
99.9%	355
99.99%	497
Equation	
Sample size $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p * (1-p)]$	
SSPropor Version 3, open source calculator--SSPropor	

4.5: Sampling Technique: Purposive Sampling Technique.

4.6: Sample Selection:

4.6.1: Inclusion Criteria:

All surgical staff working in different surgical departments.

Staff having at least six months of working experience in surgical units will be used.

4.6.2: Exclusion Criteria:

Surgical staff who are reluctant to participate in the study.

Staff who have difficulty in providing the required information will be excluded.

4.8: ETHICAL CONSIDERATIONS

- The study was approved from The University of Lahore in Ethics before conducting the study.
- All participants gave written informed consent.
- The participation was on a voluntary basis and participants were able to withdraw at any time.
- The confidentiality and anonymity of participants was ensured throughout the duration of the study.
- The participants were told there were no risks or disadvantages in participating in this study.

- It can be ensured that all recorded information was used solely for research endeavors.

- A desktop computer was secured by locking it and keeping a hard copy of all the detailers, and a password was used for the laptop that stored the data electronically.

4.9: DATA COLLECTION PROCEDURE

After being approved by the Institutional Review Board (IRB) and the administrations of the selected teaching hospitals, data was collected using a structured self-administered questionnaire. Surgical personnel (surgeons, anesthetists, surgical technologist and operating room nurses) were given a questionnaire. Prior to the data collection, all subjects were told the purpose of the study and written informed consent was gained. The participants' confidentiality and anonymity were ensured. The questionnaires were checked for completeness and accuracy of the data entered in the database for analysis.

4.10: DATA ANALYSIS PROCEDURE:

The collected data were entered, cleaned and analyzed by Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics was used to describe the data. For categorical variables, frequencies and percentages were calculated and

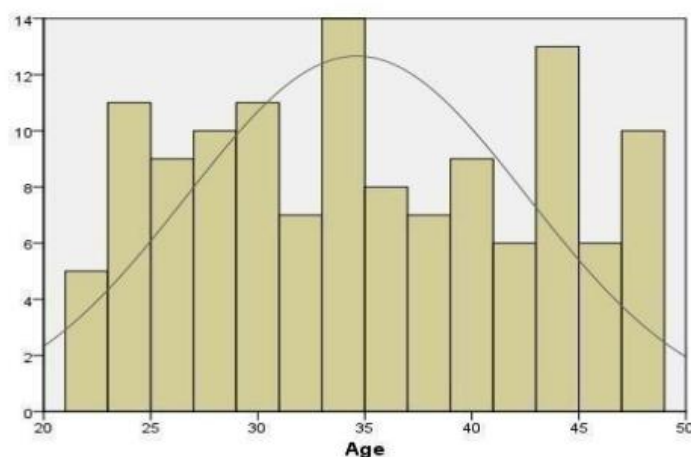
for continuous variables, means and standard deviations were calculated. The results were displayed regarding tables and graph. The P value < 0.05 was used to consider the results as statistically significant.

Results

The statistical information from surgical staff of the selected public hospital of Lahore, Pakistan will be analysed in this chapter. The surgical

healthcare workers will be assessed for their Hepatitis B vaccination status and factors influencing the failure to meet the vaccination guidelines of the surgeons will be evaluated. Data collection will be done by using the structured questionnaire, data analysis will be done using IBM SPSS Statistics version 27.0. The vaccine coverage and socio-demographic factors of the study participants will be presented in frequencies, percentages, tables and charts.

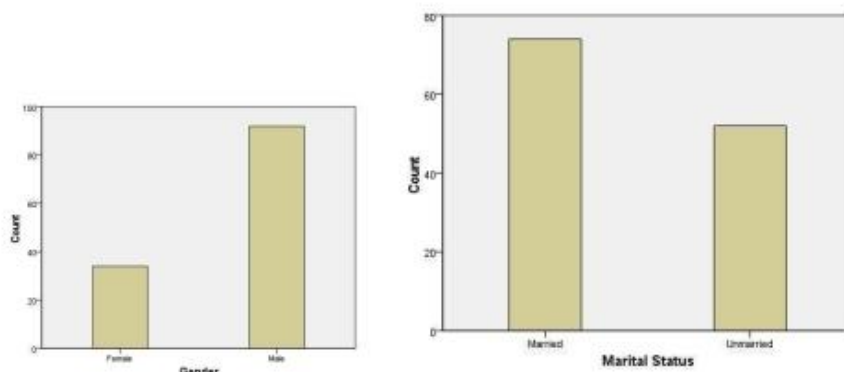
Figure 1: Age



The histogram shows the ages in the range 21-<49 years. The majority of these are in their 30s to 40s of age with the highest accumulated around 34-35 years. The overall trend is close to a normal

distribution which means that there is a relatively even distribution of ages around the centre of the distribution.

Figure 2: Gender / Marital Status



A total of 126 surgical personnel with a mean age of 34.63 ± 7.94 years (range: The majority of them were young to middle aged (22-48 years) people.

The results showed that males were in more numbers in the population with a ratio of 73.0% to 27.0% women.

TABLE 1: Institute/hospital

	Frequency	Percent
Social Security Hospital	126	100.0%

All 126 participants (100.0%) were recruited from Social Security Hospital, indicating that the entire study sample was drawn from a single study setting.

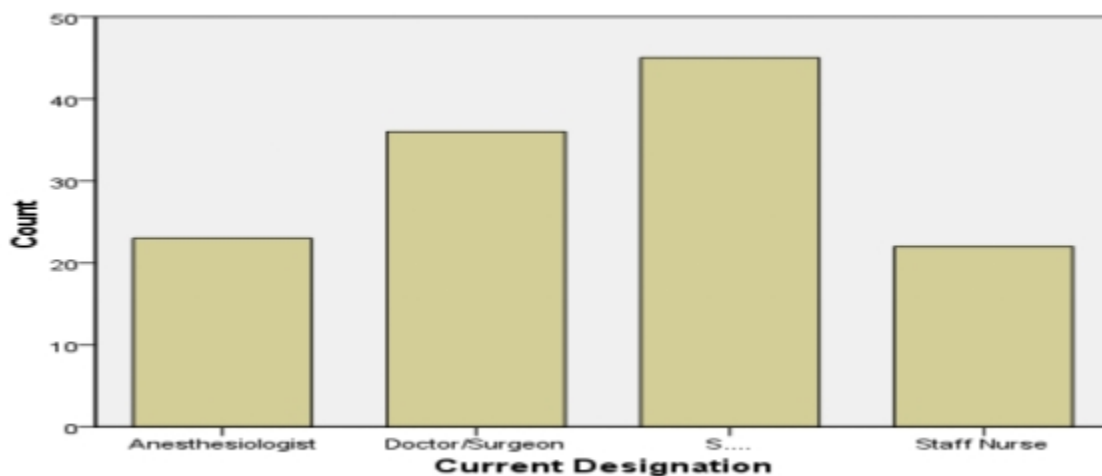
TABLE 2: Educational Qualification

Subject	Frequency	Percent
BS (Anesthesia)/ Anesthesiologists	23	18.3%
BS (Nursing)	22	17.5%
Bs(surgical Technologist/ OT technician)/diploma	45	35.7%
MBBS /FCPS/ MCPS	45	35.5%
MPhil/MS	8	6.3%
Total	126	100.0%

The majority of participants were Bs(surgical Technologist/ OT technician)/diploma holders (45, 35.7%), followed by BS (Anesthesia)/ Anesthesiologists (23, 18.3%) and BS (Nursing)

(22, 17.5%). The remaining participants had MBBS /FCPS/ MCPS(45, 35.5%) and MPhil/MS (8, 6.3%) qualifications.

Figure 3: Current Designation



Most of the respondents were Bs(surgical Technologist/ OT technician)/diploma This was followed by holders (45), Doctor/Surgeons (36), Anesthesiologists/BS anesthesia (23) and Staff

Nurses (22). Therefore, the highest number of study participants were BS (Surgical/OT Technologist) or Diploma.

Table 3. Hospital Policy and concerns regarding being infected with HBV

	Frequency	Percentage
What is the Policy of Vaccination in Your Institute		
Compulsory	121	96.0%
Don't know	1	.8%
Optional	4	3.2%
Total	126	100.0%
Is it compulsory for every HCWs regardless of their nature of job		
No	19	15.1%
Not Sure	10	7.9%
Yes	97	77.0%
Total	126	100.0%
Surgical staff are at risk of contracting and spreading HBV.		
No	8	6.3%
Not Sure	11	8.7%
Yes	107	84.9%
Total	126	100.0%
Do you have concerns regarding being infected with HBV?		
No	19	15.1%
Not Sure	10	7.9%
Yes	97	77.0%
Total	126	100.0%

Among 126 respondents, 96.0% reported that vaccination is compulsory in their institute. Most (77.0%) stated that vaccination is mandatory for all healthcare workers regardless of job role. A

majority (84.9%) agreed that surgical staff are at risk of HBV infection, and 77.0% expressed concern about being infected with HBV.

Table 4. Perception about their current status

	frequency	Percentage
Current status immunity against HBV		
NO	57	45.2%
Yes	69	54.8%
Total	126	100%
If yes please specify (n=126)		
Chronic infection	2	1.6%
Don't know	25	19.8%
Fully immunized	52	41.3%
Susceptible	47	37.3%
Total	126	100.0%
Hospital policy about HBV vaccination		
No	42	33.3%
Not sure	39	31.0%
Yes	45	35.7%
Total	126	100.0%
Compliance with recommended by WHO		
No	63	50.0%

Yes	63	50.0%
Total	126	100.0%
If yes, have you completed three doses (63)		
three	52	82.5%
Two	10	15.9%
One	1	1.6%
Total	63	100%

Among 126 participants, 69 (54.8%) reported immunity against HBV, while 57 (45.2%) did not. Overall, 41.3% were fully immunized, 37.3% were susceptible, 19.8% were unaware of their HBV status, and 1.6% had chronic infection. Hospital HBV vaccination policy was reported by 35.7% of

participants, while 33.3% reported no policy and 31.0% were unsure. Compliance with WHO recommendations was 50.0%; among those compliant, 82.5% had completed all three vaccine doses.

Table 5. Reason for not Vaccination or non-adherence to the recommendation of WHO/hospital Policy

	Frequency	Percent
Unawareness about vaccination(n=57)		
No	23	40.4%
Yes	34	59.6%
Total	57	100.0%
Vaccine not available(n=57)		
No	30	52.6%
Yes	27	47.4%
Total	57	100.0%

Lack of trust in effectiveness(n=57)		
No	34	59.6%
Yes	23	40.4%
Total	57	100.0%
High cost of vaccine(n=57)		
No	27	47.4%
Yes	30	52.6%
Total	57	100.0%
Lack of time(n=57)		
No	30	52.6%

Yes	27	47.4%
Total	57	100.0%
Long vaccination schedule(n=57)		
No	38	66.7%
Yes	19	33.3%
Total	57	100.0%
Carelessness / Poor attitude(n=57)		
No	32	56.1%
Yes	25	43.9%
Total	57	100.0%
Fearlessness about infection(n=57)		
No	27	47.4%
Yes	30	52.6%
Total	57	100.0%
Don't know where to get vaccinated(n=57)		
No	24	42.1%
Yes	33	57.9%
Total	57	100.0%
Lack of institutional support (n=57)		
No	30	52.6%
Yes	27	47.4%
Total	57	100.0%

Among the 57 respondents, the most commonly reported barriers to vaccination were **unawareness about vaccination** (34, 59.6%) and **not knowing where to get vaccinated** (33, 57.9%). More than half of the participants also identified **high cost of the vaccine** (30, 52.6%) and **fearlessness about infection** (30, 52.6%) as reasons for not being

vaccinated. Nearly half reported **vaccine unavailability** (27, 47.4%), **lack of time** (27, 47.4%), and **lack of institutional support** (27, 47.4%) as barriers. Additionally, **carelessness or poor attitude** was reported by 25 (43.9%) respondents, while **lack of trust in vaccine effectiveness** was cited by 23 (40.4%). The least

frequently reported barrier was the **long vaccination schedule**, mentioned by 19 (33.3%) respondents.

Table 6 : Comparing the variable status of job description categorical variable

Received HBV vaccination				p-value
		No	Yes	
	female	16(47.1%)	18(52.9%)	0.83
	male	41(44.6%)	51(55.4%)	
	Anesthesiologist	12(52.2%)	11(47.8%)	0.317
	Doctor/Surgeon	13(36.1%)	23(63.9%)	
	Staff Nurse	13(59.1%)	9(40.9%)	
	Bs(surgical Technologist/ OT technician)/diploma	19(42.2%)	23(57.8%)	
Total		57(45.2%)	69(54.8%)	126

Sixty-nine (54.8%) were HBV vaccinated and 57 (45.2%) were not. There was no significant difference in vaccination status between the genders ($p = 0.803$) or professions ($p = 0.317$).

DISCUSSION

This study aimed at assessing the vaccination status of surgical health care workers working in Social Security Hospital Lahore and finding out the factors related to non-compliance to the Hepatitis B vaccination recommendations. The results were calculated and compared with the previous studies done in Pakistan and other countries.

Of the 73.0% that were male and 27.0% female, the majority of healthcare workers in the present study were male. These findings are consistent with the findings of the study conducted by Attaullah et al. (2011) who also found that there was more male healthcare personnel in surgical departments of the tertiary care hospitals of Peshawar. Similarly, Usmani et al (2010) reported that majority of the doctors working in tertiary care hospitals of Lahore were males and that the surgical specialties are still dominated by males in Pakistan.

The age range of the respondents had a mean age of 34.63 ± 7.94 years with the majority of respondents in the young and middle aged group (22-48 years). In this study, the median age of

healthcare workers was 25, which is similar to the findings of Khan et al. (2017) and Shrestha et al. (2020) whose study subjects were health care workers in surgical situations were mostly young adults with a higher occupational risk of getting exposed to blood-borne infections.

In terms of education, most respondents (35.7%) were graduates of a BS (Surgical/OT Technologist); next, those who graduated from a BS (Anesthesia) (18.3%) and those who graduated from a BS Nursing (17.5%). A small proportion of the sample were represented by doctors who have MBBS, FCPS, MCPS and MPhil/MS qualifications. This distribution is representative of the multidisciplinary nature of the operation theatre team and is comparable to that seen in the study by Afzal et al. (2018) which reported that allied health professionals made up the largest workforce in surgical units.

Over half of the participants (54.8%) indicated having received Hepatitis B vaccination while 45.2% had not. The vaccination uptake in the current study is higher than some previous studies in Pakistan, but still does not meet the World Health Organization (WHO) recommendation of full vaccination of healthcare workers. Ziraba et al. (2016) and Khan et al. (2021) reported similar vaccination coverage rates, noting that incomplete vaccination is an important occupational health issue in LMICs.

The present study also noted that only 41.3% of the participants had completed the recommended 3 dose vaccination schedule, 50.8% were 1 dose only and 7.9% were 2 dose vaccination. The results indicate that even though vaccination was started, there is a low level of adherence to the full vaccination program. A similar finding was noted by Simard et al., (2007) and Abiola et al., (2016) who concluded that despite the initiation of the Hepatitis B immunization series, many healthcare workers do not complete the series due to poor follow-up and institutional monitoring.

Upon questioning about awareness, it was found that 50.0% of the participants were aware of the World Health Organization (WHO) recommendation of the three dose regimen of Hepatitis B vaccination while the other 50.0% were unaware. Mungandi et al. (2017) reported comparable poor awareness and noted that lack of information about vaccination schedule is a major factor in the poor immunization status of health care providers.

Concerning perceptions, most respondents (93.7%) felt that it was important for surgical health care workers to be vaccinated against Hepatitis B. Likewise, 84.9% agreed that surgical personnel are at greater risk for Hepatitis B infection and 77.0% felt that they would be more likely to become infected due to their work. This is in line with earlier studies conducted by Sukriti et al. (2008) and Noubiap et al. (2013) that had found that healthcare workers have generally acknowledged their occupational risk, and had strong views in favor of compulsory vaccination.

Just 35.7% of the respondents said that their institution required proof of vaccination, while 96.0% reported having a compulsory vaccination policy. This divergence indicates that vaccination policies may not be effectively implemented and monitored. The same type of observations has been noted by a number of studies in developing countries, where institutional vaccination policies are in place but not enforced, resulting in low compliance.

A number of key barriers to Hepatitis B vaccination were identified in the study. The most frequently mentioned barriers were: vaccine cost (53.2%), lack of vaccine availability (51.6%), lack

of institutional support (50.0%), lack of vaccine efficacy (49.2%), lack of awareness of vaccination (48.4%), fearlessness of infection (48.4%), lack of time (47.6%), carelessness or poor attitude (47.6%), ignorance of where to get vaccination services (48.4%) and long vaccination schedule (44.4%). Hofmann et al., (2002), Dannelun et al., (2006) and Pathoumthong et al., (2014) reported similar barriers with vaccine cost, vaccine accessibility, lack of awareness and organisational barriers as the main factors not promoting uptake in the vaccination of HCWs.

Selected demographic factors were also assessed as possible correlates of vaccination status for the present study. Gender ($p = 0.803$) and professional designation ($p = 0.317$) were not found to be statistically significant. These results suggest that occupational differences and male to female differences in vaccination practices were modest. This finding is similar to the conclusions of Alavian et al. (2011) who found that Hepatitis B vaccination uptake among healthcare workers was more affected by institutional and organizational factors than by their demographic characteristics.

In conclusion, this study shows that while there is a relatively high level of awareness about the occupational risk and most of the health care workers believe compulsory vaccination, there is still a problem with the vaccination coverage of health care workers. Currently, despite improvements in vaccine availability, lack of knowledge, institutional support and financial barriers remain to be addressed for improving vaccine uptake among surgical healthcare workers. Improvement of the institutional vaccination program, increasing vaccine accessibility, strengthening educational interventions and enforcing strict adherence to the occupational vaccination policy could have a significant potential effect on Hepatitis B vaccination coverage as well as to decrease the number of occupational exposure among surgical health care workers.

7.1: CONCLUSION(S)

The results showed that although awareness regarding the occupational risk of Hepatitis B infection among surgical healthcare workers was

generally satisfactory, knowledge about the recommended Hepatitis B vaccination schedule was inadequate. The Hepatitis B vaccination was given to over half of the participants but only 41.3% had completed all three doses and a large proportion were partially vaccinated or not vaccinated at all.

Moreover, a significant proportion of the participants were reported as susceptible to Hepatitis B infection or did not know their immunity status, suggesting a poor vaccination rate and inadequate post-vaccination follow-up. Most health care workers felt Hepatitis B vaccination should be a mandatory requirement, and felt there was higher risk in health care, but there was not a consistent enforcement of institutional implementation of vaccination requirements.

Several challenges were identified to Hepatitis B vaccination, such as high cost and low availability of Hepatitis B vaccine, lack of awareness about Hepatitis B vaccine, lack of institutional support, lack of trust on vaccine effectiveness, limited time, carelessness, fearlessness about infection, lack of awareness where to obtain Hepatitis B vaccine, and long vaccination schedule. The results indicated that there are individual and organizational factors that contribute to the lack of compliance with vaccinations among surgical HCWs.

In general, the study finds that, while the level of awareness about the need for vaccination against Hepatitis B infection is acceptable, the coverage of vaccination among surgical health care workers is not at the recommended level, especially for completion of the three doses. So, institutional vaccination policy, availability of free or affordable vaccine, better monitoring of vaccination status, and regular educational and awareness activities are key to promote Hepatitis B vaccination uptake and minimize the occupational risk of infection for surgical healthcare workers.

7.2: RECOMMENDATIONS

- **Mandatory Vaccination Policy:** All institutions with healthcare should have mandatory Hepatitis B vaccination policy for all males or females who enter into the practice of

surgery—before they can be employed in an institution or be sent for clinical placement.

- **Free Vaccination Programs:** Hospitals should be available for free and easily accessible
- **Eliminate financial barriers** providing Hepatitis B vaccination service to healthcare workers.
- **Educational seminars, workshops and training programs** on infection control measures should be conducted on regular basis to raise awareness about the Hepatitis B virus, how it spreads, how to prevent it and the importance of vaccination.
- **Adopt a Vaccination Monitoring System:** Healthcare centers need to have a vaccination record systems and track vaccination status to complete the 3-dose vaccination schedule.
- **Prove Immunization Necessary:** Hospitals desire to have proof of immunization.
- **Occupational health policies:** Hepatitis B vaccination and immunity.
- **Improved Vaccine Availability:** There should be continuous availability of Hepatitis B vaccines within healthcare facilities in order to not miss the vaccination opportunity.
- **Periodic Screening and Antibody Testing:** Antibody tests should be offered periodically and/or after an appropriate vaccine series and should be used as a periodic screening test to help confirm protective immunity among healthcare workers.
- **Enhancing Institutional Support:** hospital administrations need to support the vaccination programs actively such as policy making, reminders, occupational health programs etc.
- **Special consideration for targeted interventions** for high-risk staff (newly employed or health care workers who are NOT fully vaccinated).
- **Multicenter studies** with a larger sample size should be conducted to evaluate the coverage of Hepatitis B vaccination among all health care workers of different hospitals and different regions of Pakistan.

7.3 LIMITATIONS OF THE STUDY

There were a number of limitations that need to be taken into account when considering and interpreting the results of the present study:

- The study was conducted in a single health care institution (Social Security Hospital, Lahore) so its findings cannot be generalized for other health care institutions in Pakistan.
- The sample size was relatively small which may not be highly representative of the study population.
- The study designed was a cross-sectional type and causal relationships among identified factors and vaccination statuses were not elucidated.
- Vaccination status and immunity information was mostly self-reported and may have been subject to recall and/or reporting bias.
- Not all the vaccination status and/or serological immunity status of all the participants were checked.
- Only surgical staff were included and no other hospital staff.
- Questionnaires were used to measure knowledge level, attitudes and institutional practices which might have been influenced by the perception and willingness of the respondents to provide the information.
- Multiple hospitals were not included and multiple measuring times were not achieved, due to time and resource limitation.

REFERENCES

- Ali, A., Khan, S., Malik, S.M., Iqbal, M.H. and Aadil, M. (2017) 'Comparison of knowledge and attitudes regarding hepatitis B among healthcare professionals in Pakistan', *Cureus*, 9(2), p. e1049.
- Attaullah, S., Khan, S., Naseemullah, Ayaz, S., Khan, S.N., Ali, I. and Hoti, N. (2011) 'Prevalence of HBV and HBV vaccination coverage in health care workers of tertiary hospitals of Peshawar, Pakistan', *Virology Journal*, 8(1), p. 275.
- Awoke, N., Mulgeta, H., Lolaso, T., Tekalign, T., Samuel, S., Obsa, M.S. and Olana, R. (2020) 'Full-dose hepatitis B virus vaccination coverage and associated factors among health care workers in Ethiopia: A systematic review and meta-analysis', *PLOS ONE*, 15(10), p. e0241226.
- Hussein, N.A., Ismail, A.M. and Jama, S.S. (2022) 'Assessment of hepatitis B vaccination status and associated factors among healthcare workers in Bosaso, Puntland, Somalia', *BioMed Research International*, 2022, pp. 1-8.
- Lewis, J.D., Enfield, K.B. and Sifri, C.D. (2015) 'Hepatitis B in healthcare workers: Transmission events and guidance for management', *World Journal of Hepatology*, 7(3), pp. 488-497.
- Memon, M.S., Ansari, S., Nizamani, R., Khathri, N., Mirza, M.A. and Jafri, W. (2007) 'Hepatitis B vaccination status among healthcare workers in two university hospitals of Pakistan', *Journal of Liaquat University of Medical and Health Sciences (JLUMHS)*, 6(2), pp. 48-51.
- Mwangi, I.A., Wesongah, J.O., Musyoki, V.M., Omosa-Manyonyi, G.S., Farah, B., Edalia, L.G. and Mbuchi, M. (2023) 'Assessment of hepatitis B vaccination status and hepatitis B surface antibody titres among healthcare workers in selected public hospitals in Kenya', *PLOS Global Public Health*, 3(4), p. e0001741.
- Ogoina, D., Pondei, K., Adetunji, B., Chima, G., Isichei, C. and Gidado, S. (2014) 'Prevalence of hepatitis B vaccination among health care workers in Nigeria', *International Journal of Occupational and Environmental Medicine*, 5(1), pp. 51-56.
- Soomar, S.M., Siddiqui, A.R., Azam, S.I. and Shah, M. (2021) 'Determinants of hepatitis B vaccination status among health care workers in secondary care hospitals of Sindh, Pakistan', *Human Vaccines & Immunotherapeutics*, 17(12), pp. 5579-5584.

- Usmani, R.A., Rana, M.S., Wazir, M.S., Sarwar, H., Fazli, H. and Pervaiz, M.A. (2010) o 'Assessment of hepatitis B vaccination status among doctors working at Services o Hospital Lahore', *Journal of Ayub Medical College Abbottabad*, 22(2), pp. 36–39.
- World Health Organization (WHO) (2024) *Hepatitis B*. Geneva: World Health Organization. Available at: <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b> (Accessed: 29 June 2026).
- Yousafzai, M.T., Qasim, R., Khalil, R., Kakakhel, M.F. and Rehman, S.U. (2014) 'Hepatitis B vaccination among primary healthcare workers in Northwest Pakistan', *International Journal of Health Sciences*, 8(1), pp. 67–76.
- Ali, M. et al. (2011) *Virology Journal*, 8, p.102.
- Alhassan, A.R., Kuugbee, E.D. and Der, E.M. (2021) *Canadian Journal of Infectious Diseases and Medical Microbiology*, 2021, pp.1–9.
- Aniaku, J.K., Amedonu, E.K. and Fusheini, A. (2019) *Annals of Global Health*, 85(1), pp.1–8.
- Attaullah, S. et al. (2011) *Virology Journal*, 8, p.275.
- Awoke, N. et al. (2020) *PLOS ONE*, 15(10), e0241226.
- CDC (2023) *Hepatitis B Vaccination Recommendations for Healthcare Personnel*.
- Hussein, N.A., Ismail, A.M. and Jama, S.S. (2022) *BioMed Research International*, 2022, pp.1–8.
- Lavanchy, D. (2004) *Journal of Viral Hepatitis*, 11(2), pp.97–107.
- Lewis, J.D., Enfield, K.B. and Sifri, C.D. (2015) *World Journal of Hepatology*, 7(3), pp.488–497.
- Memon, M.S. et al. (2007) *JLUMHS*, 6(2), pp.48–51.
- Mwangi, I.A. et al. (2023) *PLOS Global Public Health*, 3(4), e0001741.
- Ogoina, D. et al. (2014) *International Journal of Occupational and Environmental Medicine*, 5(1), pp.51–56.
- Usmani, R.A. et al. (2010) *Journal of Ayub Medical College Abbottabad*, 22(2), pp.36–39.
- WHO (2024) *Hepatitis B Fact Sheet*. Geneva: World Health Organization.
- Yousafzai, M.T. et al. (2014) *International Journal of Health Sciences*, 8(1), pp.67–76.
- Ali, A., Fatima, M., Ali, S. and Ahmad, S. (2017) 'Knowledge, attitude and vaccination status of hepatitis B among healthcare workers in Pakistan', *Journal of the College of Physicians and Surgeons Pakistan*, 27(5), pp. 281–284.
- Attaullah, S., Khan, S., Naseemullah, Ayaz, S., Khan, S.N., Ali, I., Hoti, N. and Siraj, S. (2011) 'Prevalence of HBV and HBV vaccination coverage among healthcare workers of tertiary hospitals in Peshawar, Pakistan', *Virology Journal*, 8, p. 275.
- Awoke, N., Muluneh, K., Woldeyes, W. and Tsegaye, A. (2020) 'Hepatitis B vaccination coverage and associated factors among healthcare workers in Ethiopia', *BMC Infectious Diseases*, 20, p. 941.
- Hussein, M.A., Ismail, A.A. and Jama, S.S. (2022) 'Hepatitis B vaccination status and associated factors among healthcare workers in Somalia', *International Journal of General Medicine*, 15, pp. 5221–5230.
- Lewis, J.D., Enfield, K.B. and Sifri, C.D. (2015) 'Hepatitis B in healthcare workers: Transmission events and guidance for management', *Current Infectious Disease Reports*, 17(8), p. 451.
- Memon, A.R., Sheikh, M.A., Memon, A. and Memon, B. (2007) 'Hepatitis B vaccination status among healthcare workers in Pakistan', *Journal of the Pakistan Medical Association*, 57(6), pp. 308–311.
- Mwangi, J., Wanzala, P., Muriuki, J. and colleagues (2023) 'Completion of hepatitis B vaccination among healthcare workers and associated factors', *BMC Health Services Research*, 23, p. 498.

- Ogoina, D., Pondei, K., Adetunji, B., Chima, G., Isichei, C. and Gidado, S. (2014) 'Prevalence and determinants of hepatitis B vaccination among healthcare workers in Nigeria', *BMC Infectious Diseases*, 14, p. 610.
- Soomar, S.M., Memon, A.A., Shaikh, F. and colleagues (2021) 'Barriers to hepatitis B vaccination among healthcare workers in Pakistan', *Pakistan Journal of Medical Sciences*, 37(5), pp. 1330–1336.
- Usmani, A., Abbas, Z., Jafri, W. and colleagues (2010) 'Knowledge and vaccination status of hepatitis B among doctors working in tertiary care hospitals in Lahore', *Journal of the Pakistan Medical Association*, 60(10), pp. 836–840.
- Yousafzai, M.T., Qasim, R., Khalil, R., Kakakhel, M.F. and Rehman, S.U. (2014) 'Hepatitis B vaccination among primary healthcare workers in Northwest Pakistan', *International Journal of Health Sciences*, 8(1), pp. 67–76.