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NEEDLE STICK INJURY AND HEPATITIS B VIRUS VACCINATION STATUS OF MEDICAL STAFF IN TERTIARY CARE

Hidayatullah Memon[1*], Saifullah[2], Gotam Kumar Jeswani[3], Mustafa Aatif[4], Muhammad Nouman[5], Ruqia Jamali[6]

[1*]Hidayatullah Memon, Lecturer Pathology, Ghulam Muhammad Mahar Medical College Sukkur, SMBBMU Larkana Pakistan. email: dr.hidayatullahmemon.ndr@gmail.com
[2]Saifullah, Assistant Professor Medicine, Mekran medical college Turbat Balochistan Pakistan. email: drsaifhassani@gmail.com
[3]Gotam Kumar Jeswani, Associate Professor Community Medicine, Peoples University of Medical and Health Sciences University Nawabshah Pakistan. email: drgotamkumar@gmail.com
[4]Mustafa Aatif, Final Year Student, Royal college of Surgeons in Ireland, Bahrain Campus. email: mustafaaatifshaikh@gmail.com
[5]Muhammad Nouman, Associate Professor Medicine, Indus Medical College Tando Muhammad Khan Pakistan. email: m.noumanshaikh@gmail.com
[6]Ruqia Jamali, Senior Medical Officer, Social Security Hospital Hyderabad Pakistan. email: drruqialaghari75@gmail.com

***Corresponding Author:** Hidayatullah Memon
*Email: dr.hidayatullahmemon.ndr@gmail.com

ABSTRACT

Background: One of the major public health concerns nowadays is Hepatitis B virus (HBV). According to research, there are about 360M people who are either diagnosed with chronic liver infection or at risk of getting this infection. Studies that were conducted in South Asian countries revealed that hepatitis B virus has a prevalence of 8%. Around 11M individuals are infected with HBV in Pakistan. Globally, approximately 36% of healthcare workers (HCWs) are infected with this virus through their work. In low-income and middle-income countries, about 50% of hepatitis B virus in HCWs occur because they are in contact with body fluids, infected blood, or contaminated medical tools.

Objective: To identify how many healthcare workers in the hospitals are vaccinated and which group of HCWs is most at risk of HBV infection and needle stick injuries

Study design: A descriptive, cross-sectional study

Duration and place of study: this study was conducted in Ghulam Muhammad Mahar Medical College Sukkur from March 2024 to March 2025

Methodology: This study is a descriptive and cross-sectional analysis which was performed in different hospitals. In order to collect data, a structured questionnaire was used which was taken from previous literature. The components of the questionnaire include vaccination status against HBV, socio demographics, exposure of needle stick injury, and other associated factors. The participants of this study include medical professionals, janitorial staff, and paramedics. Total participants of this study were about 200. All the participants were those healthcare workers who joined hospital duty one year back. The data was analysed using SPSS version 26 where the

frequencies of different demographic variables were calculated. Adjusted odds ratios (AOR) and crude odds ratios (COR) were also calculated.
Results: Total participants of this study were about 200. The participants of this study include medical professionals, janitorial staff, and paramedics. The majority of the participants were males (n=114). Most of the participants were among the age group of 30 to 40 years old, representing 51% of the total participants. 76% of the total participants did not receive HBV vaccination. Only 48 participants received HBV vaccination out of which 68.75% were doctors and 31.25% were paramedics.
Conclusion: In conclusion, HBV vaccination coverage is very low in healthcare workers. A high percentage of HCWs suffer from multiple or single time needle stick injuries.

INTRODUCTION

One of the major public health concerns nowadays is Hepatitis B virus (HBV). According to research, there are about 360M people who are either diagnosed with chronic liver infection or at risk of getting this infection [1]. Recent studies state that approximately 2 billion individuals globally have serologic evidence of hepatitis B infection [2]. Some research studies show that the prevalence of hepatitis B infection in regions like Africa and Asia is about 20% of the total population [3,4]. Studies that were conducted in South Asian countries revealed that hepatitis B virus has a prevalence of 8% [5,6]. Around 11M individuals are infected with HBV in Pakistan. If we talk about percentage, it is about 5% of the total population of Pakistan [7].

Globally, approximately 36% of healthcare workers (HCWs) are infected with this virus through their work [8]. In low-income and middle-income countries, about 50% of hepatitis B virus in HCWs occur because they are in contact with body fluids, infected blood, or contaminated medical tools [9]. If medical equipment is not sterilized and cleaned properly, patients can also get this infection from healthcare workers. Infants and newborns are the ones who are at high risk when exposed to HBV through infected HCWs or during birth. These children have a high chance of about 95% to develop hepatitis later in their life [10].

There are no specific rules in Pakistan that state the requirement of HCWs to be vaccinated against hepatitis B. Due to this, the healthcare system gets weakened and limits patient care [11]. Moreover, it puts the healthcare workers at risk as it clearly lacks protection. There are only a few private hospitals in Pakistan who have made a necessary requirement of HBV vaccine when hiring staff. However, in public hospitals, only 40% of the HCWs have received all 3 doses of the vaccine [12]. A multi-center survey revealed that 73% of the HCWs from both, private and public, hospitals have received their hepatitis B virus vaccination [13].

The factors that affect the vaccination coverage among healthcare workers include cost, awareness, mistrust towards vaccines, inadequate information, misunderstandings, and vaccine availability [14]. We can improve the overall safety of healthcare environments and reduce the occurrence of injuries by increasing the adoption of safety protocols, attention to high-risk areas and high-risk workers. This study can be made important because it may become useful to decision makers in developing customised initiatives which will reduce vaccine preventable disease outbreaks in hospitals and increase the vaccination rates among healthcare workers. Therefore, this study was conducted to identify how many healthcare workers in the hospitals are vaccinated and which group of HCWs is most at risk of HBV infection and needle stick injuries.

METHODOLOGY

This study is a descriptive and cross-sectional analysis which was performed in different hospitals. In order to collect data, a structured questionnaire was used which was taken from previous literature. The questionnaire was first modified then questions were asked from all the participants. The components of the questionnaire include vaccination status against HBV, socio demographics,

exposure of needle stick injury, and other associated factors. All the participants were informed about this research and their verbal consent was obtained. The Ethical Review Committee approved this research.

Simple random sampling was done to select the participants. The participants of this study include medical professionals, janitorial staff, and paramedics. They all were working in different wards such as Urology, Laboratory, Surgery, Nephrology, Emergency, Medicine, Paediatrics, and Gynae. Total participants of this study were about 200. All the participants were those healthcare workers who joined hospital duty one year back.

Participants were not given access to the data set in either way, directly or indirectly. We assured the participants that their information will remain confidential and the data is only used for research purposes. This study is a non-interventional and non-invasive study and there is no physical risk to the individuals participating in this research. Participants were not benefited directly but the community and country would be beneficial in the long run. Data was collected and then reviewed to eliminate errors. The data was analysed using SPSS version 26 where the frequencies of different demographic variables were calculated. Adjusted odds ratios (AOR) and crude odds ratios (COR) were also calculated.

RESULTS

Total participants of this study were about 200. The participants of this study include medical professionals, janitorial staff, and paramedics. The majority of the participants were males (n=114). Most of the participants were among the age group of 30 to 40 years old, representing 51% of the total participants. Table number 1 shows the socio-demographic information of the participants.

Table No. 1:

Variables	**N**	**%**
Gender		
● **Male**	114	57
● **Female**	86	43
Age (yrs)		
● **Below 30**	68	34
● **30 to 40**	102	51
● **Above 40**	30	15
Profession		
● **Janitorial staff**	18	9
● **Doctors**	78	39
● **Paramedics**	104	52
Working experience (yrs)		
● **Below 10**	34	17

● **10 to 20**	132	66
● **Above 20**	34	17
Wards		
● **Pediatric**	36	18
● **Medical**	66	33
● **Obs/Gynae**	22	11
● **Surgery**	20	10
● **Emergency room**	32	16
● **Nephrology & Urology**	10	5
● **Laboratory**	14	7

Table number 2 shows the characteristics of the participants.

Table No. 2:

Variables	**N**	**%**
HBV Vaccination		
● **Yes**	48	24
● **No**	152	76
HBV vaccination status in participants		
● **Janitorial staff**	0	0
● **Doctors**	33	68.75
● **Paramedics**	15	31.25
Exposure to needle stick injury		
● **No**	30	15
● **One time**	68	34
● **Multiple time**	102	51
Frequency of One Time Needle Stick injury		
● **Janitorial staff**	14	20.5
● **Doctors**	26	38.2
● **Paramedics**	28	41.3

Frequency of Multiple Times Needle Stick Injury		
● **Janitorial staff**	27	26.4
● **Doctors**	20	19.7
● **Paramedics**	55	53.9

Table number 3 shows the COR and AOR values in the variables.

Table No. 3:

Variables	**COR**	**AOR**
Gender		
● **Male**	2.81	2.8
● **Female**	1.94	1.5
Age (yrs)		
● **Below 30**	1	1
● **30 to 40**	0.509	0.236
● **Above 40**	0.224	0.133
Profession		
● **Janitorial staff**		
● **Doctors**	3.8	2.2
● **Paramedics**	1.56	
Working experience (yrs)		
● **Below 10**	0.40	2.98
● **10 to 20**	0.67	5.59
● **Above 20**	1	1

DISCUSSION

In this study, it was found that only 24% of the participants (n=48) have received HBV vaccination. This is similar to a study which was performed in China by Yuan Q et al. Yuan et al. revealed that the coverage of HBV vaccination amongst healthcare workers in developing countries is about 11.3% which is very low [15]. Moreover, Chang Hun Lee at al. also revealed that the HBV vaccination rate is very low [16]. They have suggested an urgent need for interventions which can be used to increase accessibility and awareness of vaccination. Other studies observed that there is a high HBV vaccination rate in countries like the USA, North America, Canada, and Europe [17].

Our study also observed that out of 48 vaccinated participants, 68.75% were doctors and 31.25% were paramedics. None of the janitorial staff was vaccinated. Potential discrepancies are highlighted due to this disparity. Therefore, it raises the need for accessibility and awareness to vaccination. The same results were similar to a study which observed that janitorial staff and paramedics often have lower vaccination rates [18].

Our study also revealed that 34% of the participants experience one time needle stick injury while 51% of the total participants experience multiple needle stick injuries. Only 15% were those who had no exposure to needle stick injury. These percentages suggest that due to unsafe practices, a large number of healthcare workers are at high risk of exposure to HBV. Najma et al. had observed similar results stating that needle stick injuries are a prevalent occupational hazard [19].

Our study also revealed that paramedics had the highest percentage in both multiple time (53.9%) and single time needle stick injury (41.3%). It may be due to the nature of their job where they have to provide emergency medical services as they are involved in procedures with higher risk. This highlights the importance of interventions that could reduce the occurrence of needle stick injuries among this group [20]. In this study, 76% of the participants are not vaccinated. Overall, the study revealed that the most neglected group was janitorial staff. Moreover, paramedics were the most vulnerable group for exposure to HBV.

CONCLUSION

In conclusion, HBV vaccination coverage is very low in healthcare workers. A high percentage of HCWs suffer from multiple or single time needle stick injuries.

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Conflict in the interest

The authors had no conflict related to the interest in the execution of this study.

Permission

Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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