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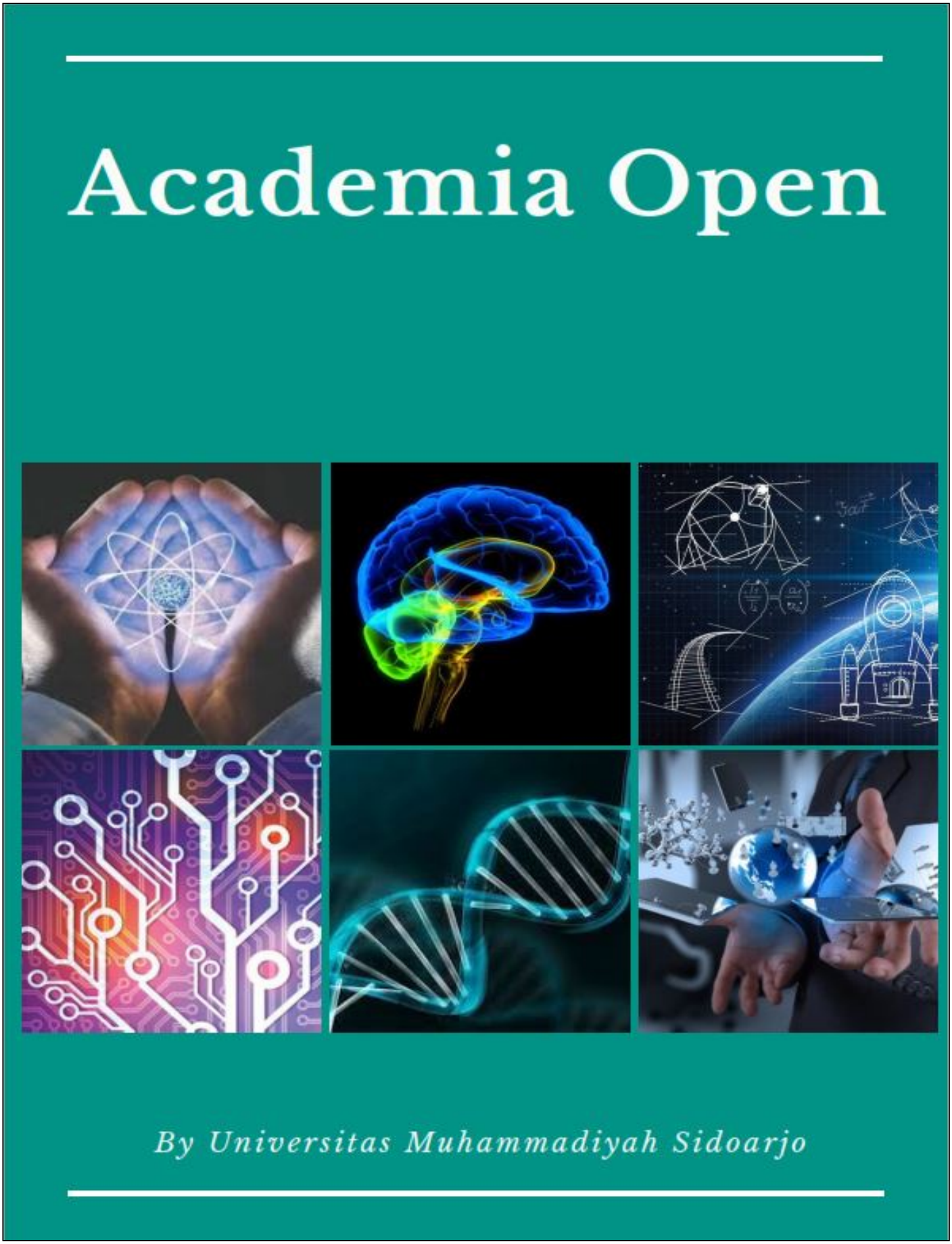

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The Effect of Hepatitis B Vaccine on Health Workers in Medina

Rayan Talaat Karali, rthk0558444476@hotmail.com, (1)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Faridah Mohd Said, Said@gmail.com, (0)
Lincoln University College , Malaysia

Khalid Homod Algaydi, Algaydi@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Abdulrahman G. Alharbi, Abdulrahman@gmail.com, (0)
Department of Pharmacology and Toxicology, College of Pharmacy, Taibah University, Saudi Arabia

Adel Muslim Alharbi, AdelMuslimAlharbi@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Mohammed Abdullah Alharbi, MohammedAbdullahAlharbi@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Basmah Meqbel Alharbi, BasmahMeqbel@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Majed Ghali Alharbi, MajedGhali@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Bader Awad Almohammadi, Almohammadi@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Khalid Adnan Shujaa, Shujaa@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Ahmed Fahed Alanazi, AhmedFahed@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

Abdullah Ghali Alharbi, Abdullahghali@gmail.com, (0)
Medina Health Cluster, Ministry of Health, Saudi Arabia

(1) Corresponding author

Abstract

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This study aimed to assess hepatitis B virus (HBV) vaccination rates among healthcare professionals and understand their knowledge about HBV transmission. Conducted in a healthcare setting, the research employed survey methods to collect data on vaccination status and awareness levels. Alarmingly, only 25% of healthcare workers were found to be vaccinated against HBV, highlighting a significant gap in protection. Additionally, a considerable lack of awareness regarding HBV transmission was observed among the participants. These findings underscore the urgent need for targeted vaccination campaigns and educational initiatives within primary healthcare environments. The study advocates for mandatory HBV vaccination as a condition of employment for healthcare workers, coupled with ongoing infection prevention and control training. Further research is recommended to explore the prevalence of HBV infection among healthcare professionals in primary care settings and to assess the broader implications for public health. This study serves as a critical call to action for healthcare systems to prioritize HBV vaccination and education, thereby safeguarding both healthcare providers and patients from HBV infection risks.

Highlights :

- **Low Vaccination Rates:** Only 25% of healthcare workers are vaccinated against HBV, indicating a critical need for improved vaccination coverage in healthcare settings.
- **Knowledge Deficit:** There is a significant lack of awareness among healthcare professionals about HBV transmission, necessitating educational programs.
- **Policy Implications:** The study advocates for mandatory HBV vaccination for healthcare workers, emphasizing the importance of infection control measures for public health safety.

Keywords : Hepatitis B Vaccination, Healthcare Workers, Infection Prevention, Public Health, Vaccination Awareness

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Introduction

Hepatitis B is a viral infection that primarily affects the liver, caused by the Hepatitis B virus. The aforementioned medical condition is a highly severe condition that can be transmitted through direct contact with an individual's blood or other bodily fluids. Even though there are vaccines for it, it is still a big health worry everywhere in the world. HBV is a virus that only makes humans sick, and we don't know of any other animal that can get this disease. The virus went from the blood to the liver, where it keeps getting bigger in the liver tissue. When someone gets a sudden hepatitis B infection, their liver becomes bigger and turns yellow. If the infection is not treated, it can cause really bad problems later in life, like hurting your liver or even causing cancer [1].

Globally, the prevalence of the infection exceeds 2 billion individuals, with approximately 250 million individuals experiencing a chronic HB infection. According to the World Health Organization, the global prevalence of hepatitis B virus (HBV) infection stands at approximately 325 million individuals, with an elevated incidence observed in the African and Western Pacific regions. It is estimated that about 68% of people in those areas have the virus (World Health Organization). Every year, almost 900,000 people died because of HBV. In Africa and some parts of Asia, around 8% to 10% of people in these places become infected by the virus. The regions with the highest prevalence of hepatitis B virus (HBV) worldwide include Africa as the primary region, followed by Eastern and Southern Europe, the Middle East, and to some extent, Japan (World Health Organization). It was previously estimated that the United States and Northern Europe have fewer cases of the virus compared to other places. It is believed that about 40% of healthcare workers in developing countries have the hepatitis B virus [2].

Healthcare professionals face a significantly higher risk of HBV infection compared to the general population due to their direct exposure to patients. This high risk could be because people are not following the work rules to stop the virus from spreading, such as washing hands or disposing sharp equipment safely as recommended by CDC. According to Coppola et al. (2016), the Centers for Disease Control and Prevention (CDC) emphasizes the significance of wearing appropriate personal protective equipment, such as gloves, and ensuring the proper disposal of sharp objects as crucial measures in preventing the transmission of blood borne infections like Hepatitis B Virus (HBV).

People with HBV infection should learn more about the disease, gain skills, and learn from their experiences. They should also know the best ways to stop the disease from spreading. In developing countries and, in the middle, healthcare workers sometimes don't follow safety guidelines. This makes the issue of hepatitis B even more serious. This happens because they don't realize how significant these rules are. It is very important to learn more about HBV infection so that we can reduce the chances of healthcare workers getting infected with the virus. In healthcare, experts suggest testing people to see if they understand the important health risks associated with the virus. Additionally, in order to check if someone knows the signs and symptoms that typically come with a virus infection [3].

Problem statement

Hepatitis B is a consequential hepatic infection resulting from the presence of the hepatitis B virus and in turns it poses a significant global health concern for individuals worldwide. If it is not treated, it can lead to sever conditions such as liver cancer, liver failure, and scarring on the liver. The Hepatitis B virus (HBV) has detrimental effects on individuals' well-being and imposes significant financial burdens associated with its treatment. This puts a big strain on the healthcare system. About 15 to 40 out of every 100 individuals who get infected may experience liver issues such as cirrhosis, liver failure, or liver cancer [4].

The global population affected by hepatitis B is estimated to be approximately 400 million individuals. Annually, approximately one million incidences of hepatitis B are documented. Additionally, it results in an annual mortality rate of approximately 1.45 million individuals. Furthermore, it is estimated that approximately 257 million individuals are affected by a chronic hepatitis B virus (HBV) infection, with a significant proportion of them remaining unaware of their infection status. This phenomenon enables the transmission of the infection to individuals, thereby potentially inducing hepatic complications and ultimately leading to mortality [5].

According to the Centers for Disease Control and Prevention (CDC), individuals of Asian descent, including those residing in the Arabian Peninsula who identify as Arabs, exhibit an elevated susceptibility to long-term hepatitis B infection. As mentioned before, this disease has the potential to result in hepatic complications, including cirrhosis, hepatocellular carcinoma, and hepatic failure. Tests in the US have shown that many healthcare workers (10-15%) have a long-lasting HBV infection compared to the general public (0.5%). Moreover, many of healthcare workers become injured by sharp things, which causes over 60,000 new cases of HBV each year [6].

Significance of the Study

Vaccines and learning can lower the amount of sickness in healthcare workers. Since 1997, doctors have said that it is important for all babies to get a shot to protect against HBV. Grown-ups who have a greater chance of getting HBV, such as those who require blood transfusions or use needles for drugs, should get vaccinated as well. This includes families of people with long-lasting HBV infection, sexual partners, individuals with multiple sexual

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partners, and individuals who provide health care services. Although the government is making efforts to ensure that everyone, including healthcare workers, receives the vaccine to decrease the virus's spread. This is not enough evidence to show that this is really happening and that the number of HBV cases is decreasing. Additionally, we don't have much information about the significance of healthcare workers getting vaccinated for HBV and how it impacts HBV infection. We are unsure about the level of knowledge that healthcare workers have about HBV in the entire Kingdom. This study aims to investigate the effects of the hepatitis B vaccine on healthcare professionals in the region of Medina.

Purpose of the Study

The objective of this research is to assess the impact of the hepatitis B vaccine on healthcare professionals in the Medina region.

Research Questions/Hypothesis

The following Questions were identified in this research:

Operational Definitions

Healthcare Workers

Healthcare professionals are individuals who frequently come into contact with various objects such as needles, blood, and other bodily fluids. Healthcare professionals involve a range of occupations, including but not limited to physicians, registered nurses, certified nurse midwives, dentists, and laboratory technologists.

Vaccination Status

Healthcare workers (HCWs) who have been administered three or more doses of the HBV vaccine are believed to have achieved complete vaccination. Healthcare workers (HCWs) who have received only one or two doses of the vaccine do not meet the criteria for being considered as fully vaccinated. Healthcare workers (HCWs) who have not been given any doses of the hepatitis B virus (HBV) vaccine are considered unvaccinated.

Knowledge

The comprehension of healthcare professionals regarding HBV infection was categorized into two distinct groups. Individuals who were able to correctly answer six or more questions regarding knowledge were believed to possess a high level of knowledge. Individuals who answered fewer than six questions correctly were classified as having "poor knowledge."

Methods

A quantitative cross-sectional community-based study design will be used for the conduction of this study.

The study was conducted in hospitals of Medina region of Saudi Arabia.

Health care staff in Medina, the sample size was not estimated, and convenience sampling technique was adopted to obtain as many respondents as possible in order to provide a significant data.

Sample Criteria:

The study employed specific inclusion and exclusion criteria for participant recruitment.

Inclusion criteria

Primarily health care staff and patients who were present at work in Medina hospitals:

1. Doctors
2. Nurses
3. Medical students
4. Technical staff
5. Nursing students
6. Administrative staff
7. Laundry and grade IV staff (sweepers or cleaners)

Exclusion criteria:

Individuals who do not fall into the inclusion criteria will be excluded from the study and those who are:

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The information about the personal health of the healthcare workers included their basic details like age, gender, occupation, how long they have been working, their alcohol history, and if they have donated blood or received a blood transfusion in the past. Furthermore, we also noted down information about whether people had received the HBV vaccination, come into contact with blood or blood products, and how HBV spreads. We also thought about using universal precautions in our daily activities.

The number of participants in the study was determined according to research conducted by Alfaleh *et al*. They discovered that 38% of the people still had protection against HBs after getting vaccinated. Based on a 95% confidence interval (CI) and a margin of error of 5%, our estimation suggests that a sample size of 1000 is required. The number of participants in the study was determined using an online tool called OpenEpi calculator. We made the sample bigger to have enough data. A method of gathering data was used that made it easy and convenient.

Data Analysis:

The information that was gathered was studied using a software called SPSS, which is used for analyzing data in social science research. The version used in this analysis was 23. The answers were collected and studied using basic statistics. The information was arranged neatly and displayed in tables and pictures.

Ethical approval:

We got permission from the ethics committee to do this research. At the beginning of the questionnaire, each person will learn why we are doing the study and what it involves. We want to make it clear that taking part is their choice. Before starting the questionnaire, permission was obtained for people to participate. Furthermore, the data was kept private and not shared with others. This was explained and written down in the questionnaire. The information collected will only be used for the study and will not reveal who participated. The participants will remain anonymous.

People have the choice to join in if they want to and they can stop or change their training whenever they want.

You do not need to give your name or any personal information to complete the questionnaire.

The information was being kept private and was not shared with anyone.

Every person involved will agree to let us ask them questions on the form, after understanding what they are consenting to.

Result and Discussion

Participant socio-demographics in the research

The present research conducted a sampling of 1200 healthcare workers (HCWs) who were actively engaged in their professional duties within the Medina region. The average age of the participants was 34.9 ± 7.7 years (95% CI, 34.1–35.1), with a significant proportion falling between the 30–40-year age range, as seen in Table 1 and Figure 1.

Majority of participants were female 60% (720/1200) table 2 , figure 2. 75% of them were married and 25% wee unmarried as shown in table 3 and figure 3.

Variable	Frequency	Percentage
Age		
<20 years20-30 years 30-40 years40-50 years>50 years	120240600120120	10%20%50%10%10%

Table 1. ***Distribution of included population according to age (n 1200)***

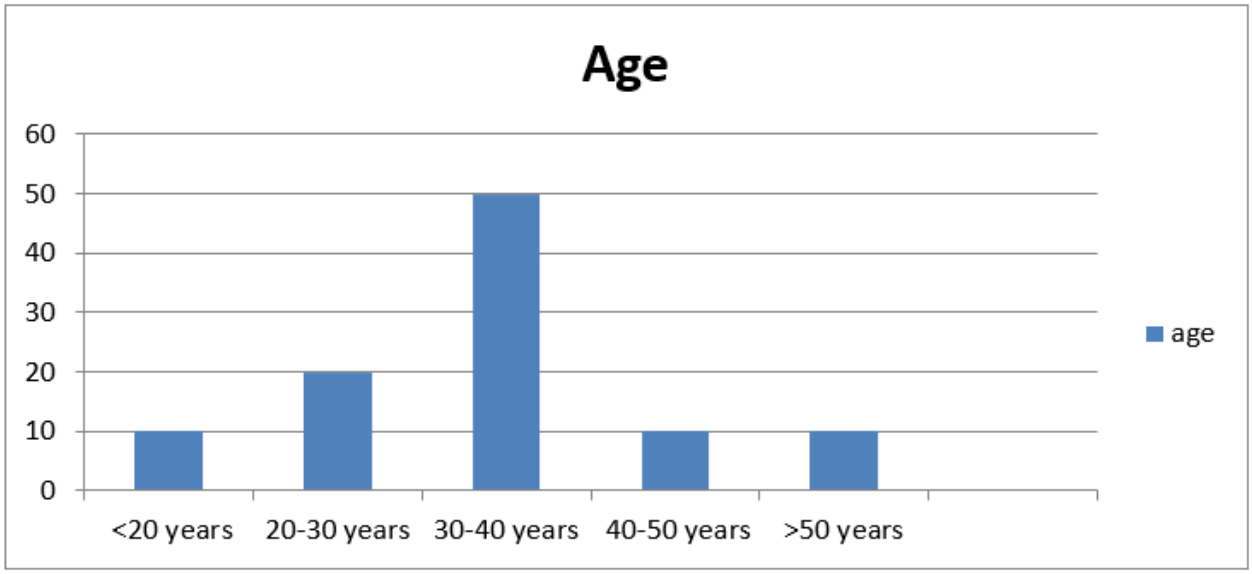

Figure 1. ***Distribution of included population according to age.*** *The research had a total of 1200 participants. The age group of 30-40 years has the largest proportion of participants.*

Variable	Frequency	Percentage
Gender		
Male	480	40%
Female	720	60%

Table 2. ***Distribution of included population according to G ender (n 1200)***

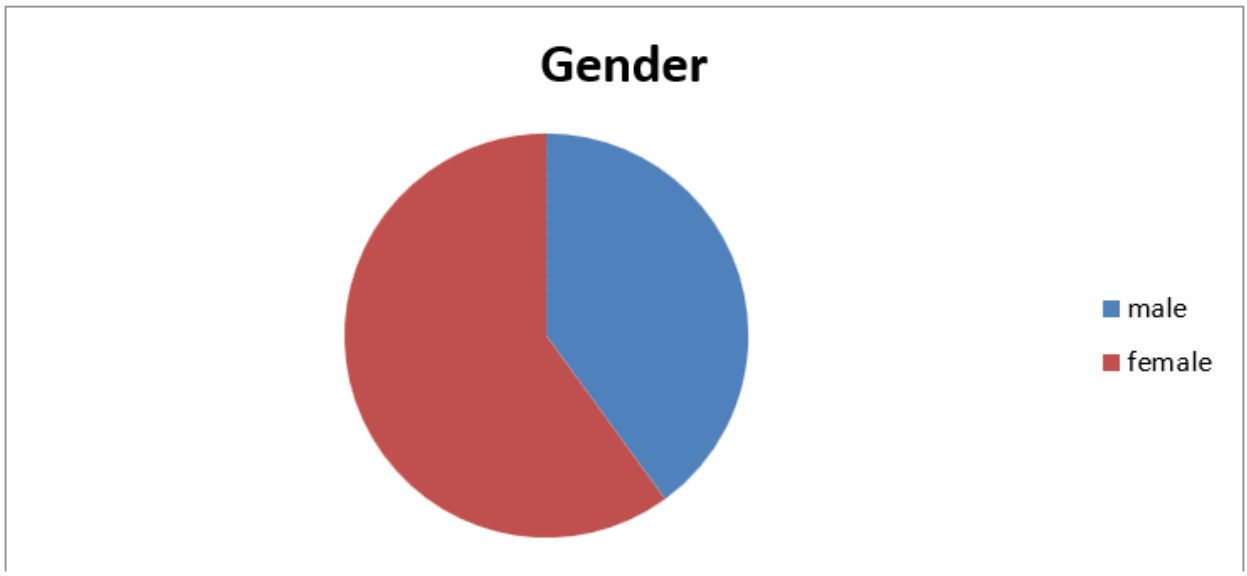

Figure 2. ***Distribution of gender of the participants.*** *Most participant were females (60%) and 40% were males.*

Variable	Frequency	Percentage
Marital status		
Married	900	75%

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Unmarried	300	25%

Table 3. ***Distribution of included population according to marital status (n 1200)***

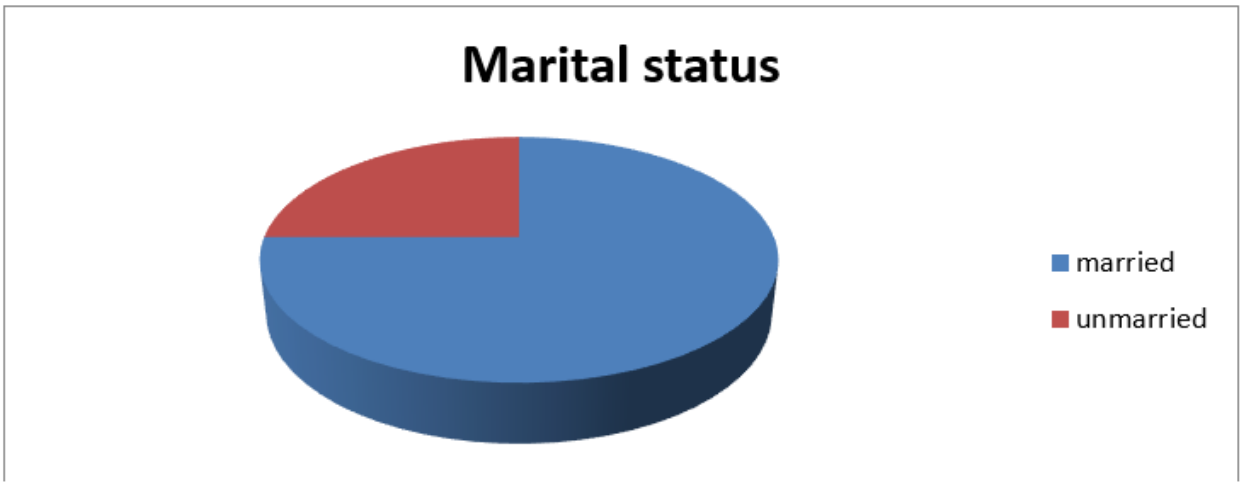

Figure 3. ***Distribution of included population according to marital status (n 1200).*** *The present study examines the distribution of the included population based on their marital status. The majority of participants were married individuals.*

Regarding educational level 10% had certificate, 20% had diploma, 50% had bachelor, 10% had master and 10% had MD as shown in table 4 and figure 4.

Variable	Frequency	Percentage
Educational level		
Certificate Diploma BachelorMaster MD	120240600120120	10%20%50%10%10%

Table 4. ***Distribution of included population according to educational level (n 1200)***

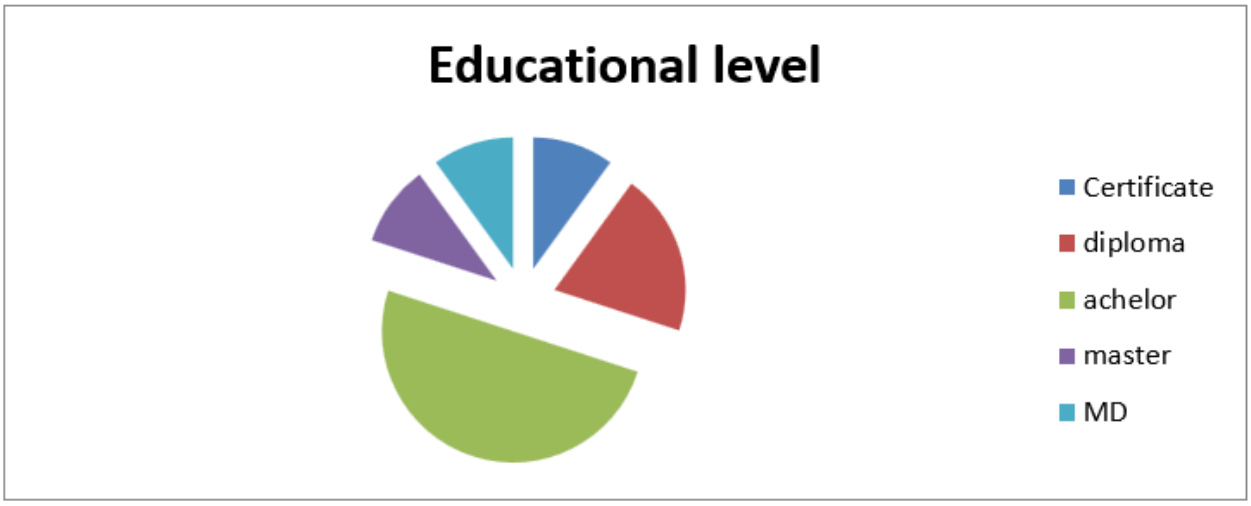

Figure 4. ***Distribution of included population according to educational level (n 1200).***

As regard to occupation, 75% were nurses, 10% physician, 5% midwife, 5% lab technician and 5% dentist as shown in table 5 and figure 5.

Variable	Frequency	Percentage

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Occupation		
Physician NurseMidwifeLab technicianDentist	120900606060	10%75%5%5%5%

Table 5. ***Distribution of included populatio n according to o ccupation (n 1200)***

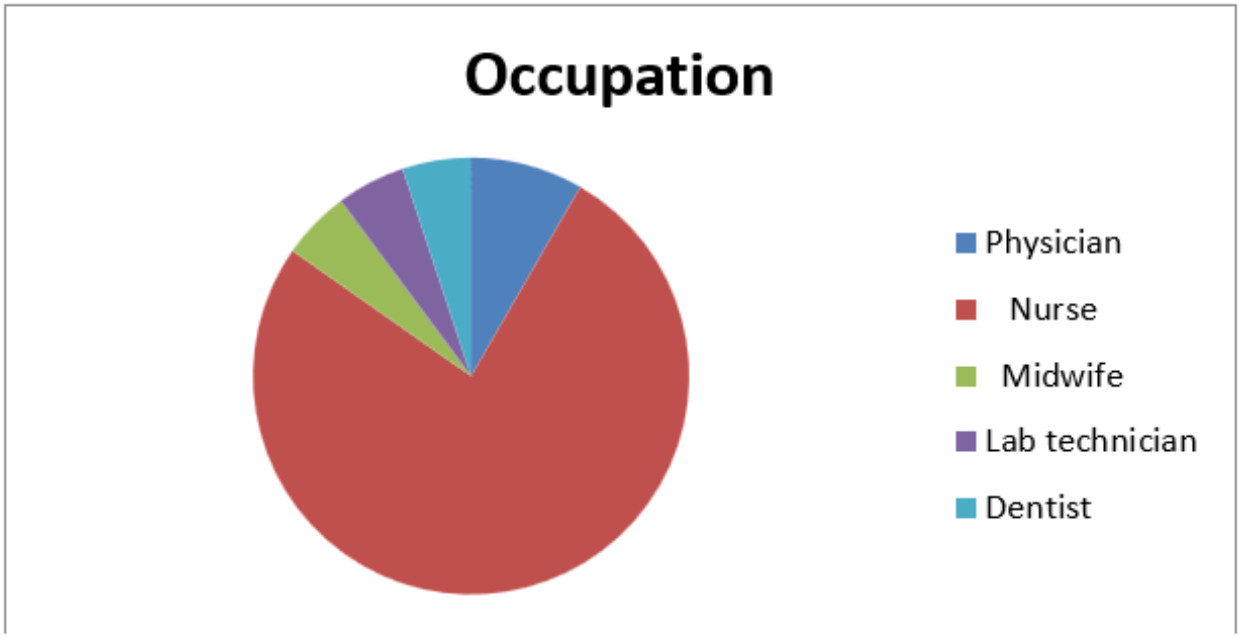

Figure 5. ***Distribution of included population according to occupation (n 1200).*** *Most participants were nurse (75%).*

Majority of participants working at gyn-obs department 50%, 20% at pediatric department, 10% at internal medicine department, 10% at surgery department and 10% at administration department as shown in table 6 and figure 6 below.

Variable	Frequency	Percentage
Working department		
Internal MedicinePediatricGyn–ObsSurgeryAdministration	120240600120120	10%20%50%10%10%

Table 6. ***Distribution of included population according to Working department (n 1200)***

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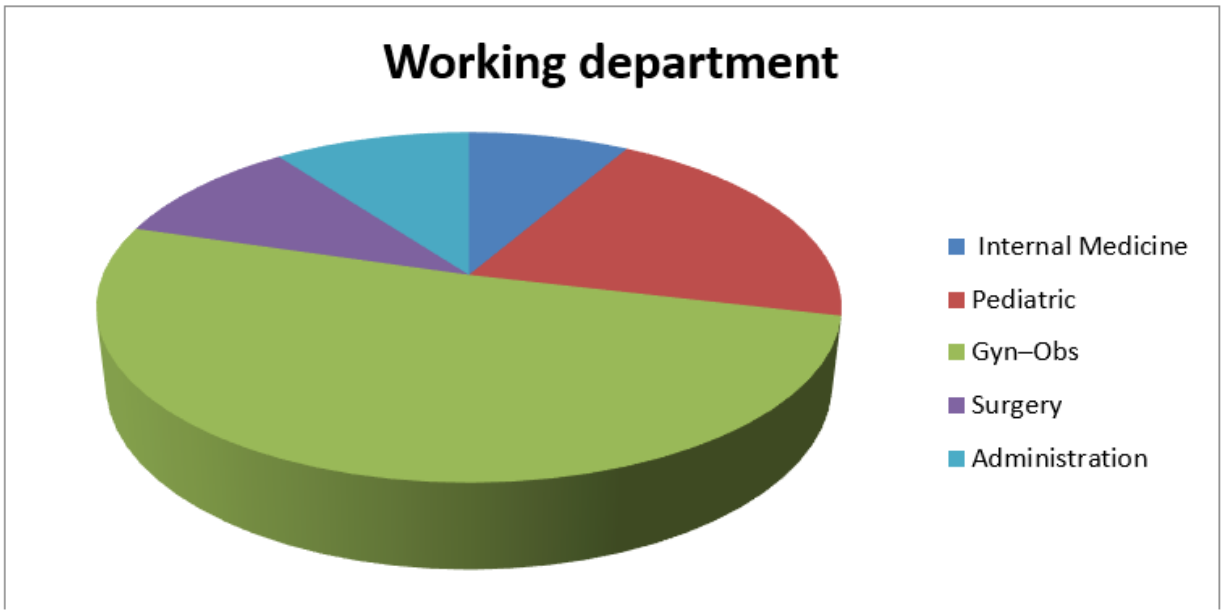

Figure 6. ***Distribution of included population according to Working department (n 1200).*** *Most participants were working in gyn-ops department (50%).*

Majority of participants 75% were working in a public hospital and 25% in a private hospital as shown in table 7 and figure 7.

Variable	Frequency	Percentage
Hospital ownership		
Public hospitalPrivate hospital	900300	75%25%

Table 7. ***Distribution of included population according to Hospital owne r ship (n 1200)***

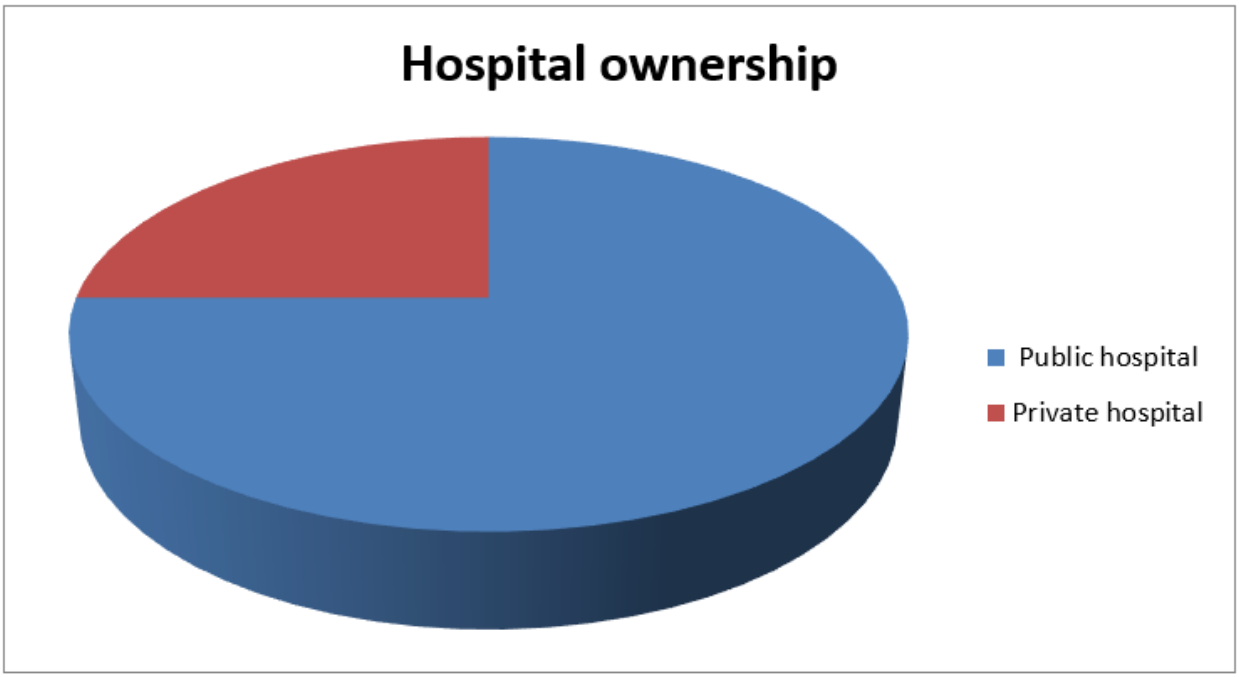

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Figure 7. ***Distribution of included population according to Hospital ownership (n 1200).***

Majority of participants have a work experience of 4-9 years , 10% for >9 years and 10% for < 4 years as shown in table 8 and figure 8.

Variable	Frequency	Percentage
Work experience		
<4 years 4-9 years >9 years	120960120	10%80%10%

Table 8. ***Distribution of included population according to Work experience (n 1200)***

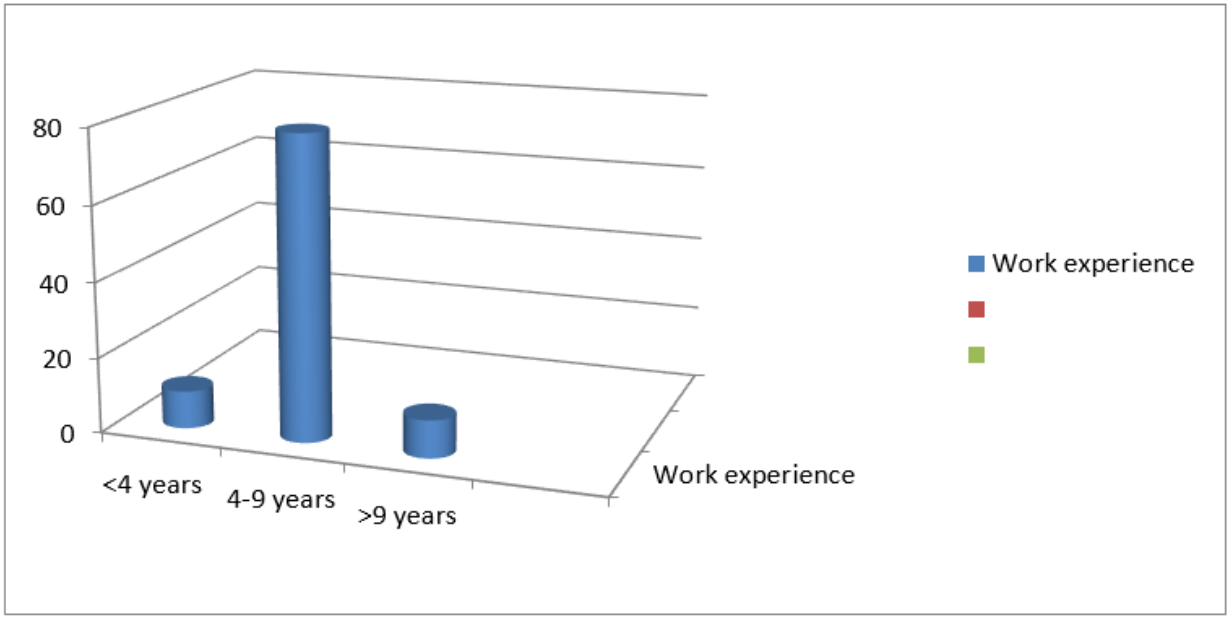

Figure 8. ***Distribution of included population according to work experience (n 1200)***

Majority of participants did not have HBV test 58.5% and only 41.5% had the test as shown in table 9 and figure 9.

Variable	Frequency	Percentage
Do you have HBV testing?		
YesNo	500700	41.5%58.5%

Table 9. ***Distribution of included population according to h aving HBV testing (n 1200)***

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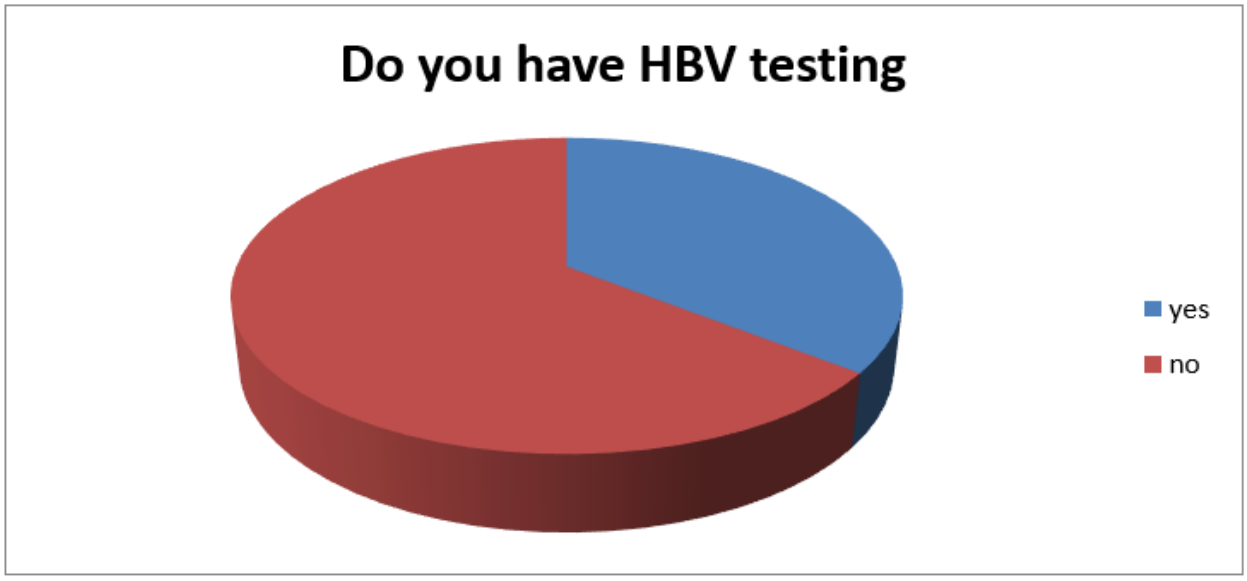

Figure 9. ***Distribution of included population according to Having HBV testing (n 1200).***

Majority of participants making the test due to institutional obligation 50% 20% due to know their HBV status, 10% due to donating blood, 10% due to being in labor an 10% due to marriage reason as shown in table 10 and figure 10.

Variable	Frequency	Percentage
What's HBV testing reason?		
I was donating blood I just wanted to know my HBV status.It was an institutional obligationI was in laborMarriage reason	501002505050	10%20%50%10%10%

Table 10. ***Distribution of included population according to HBV testing reasons (n 5 00)***

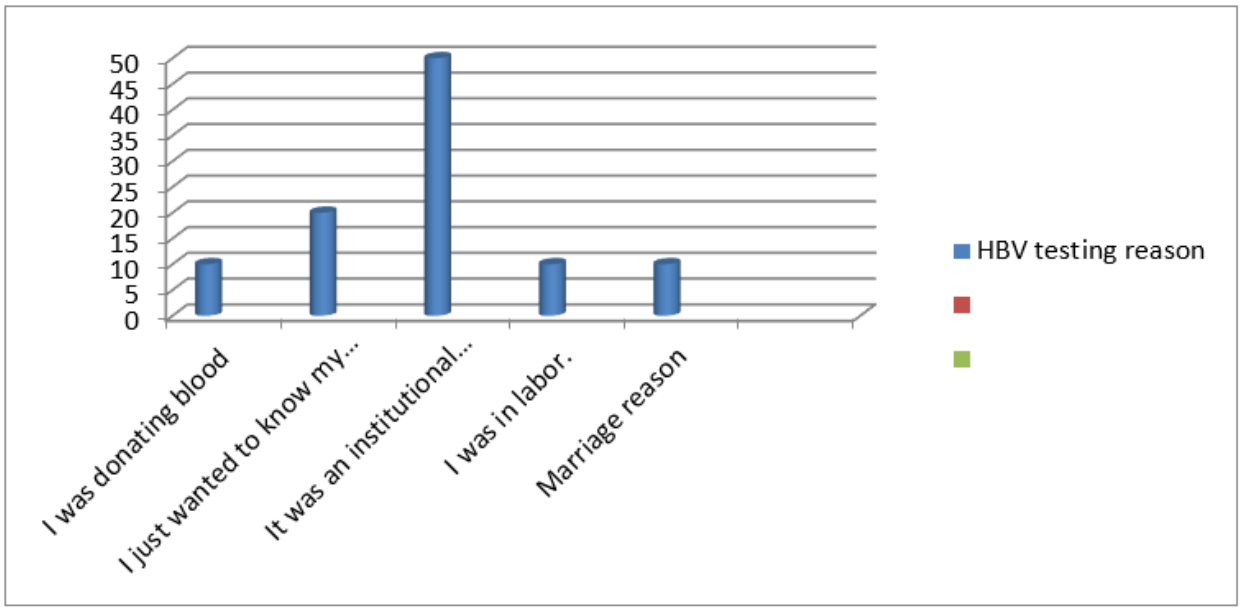

Figure 10. ***Distribution of included population according to HBV testing reasons (n 1200).***

Percentage of HBV vaccination was 25% among included health care workers in the current study and 75% had no vaccine as shown in table 11 and figure 11.

Variable	Frequency	Percentage
HBV vaccination status?		
YesNo	300900	25%75%

Table 11. ***Distribution of included population according to HBV vaccination status (n 1200)***

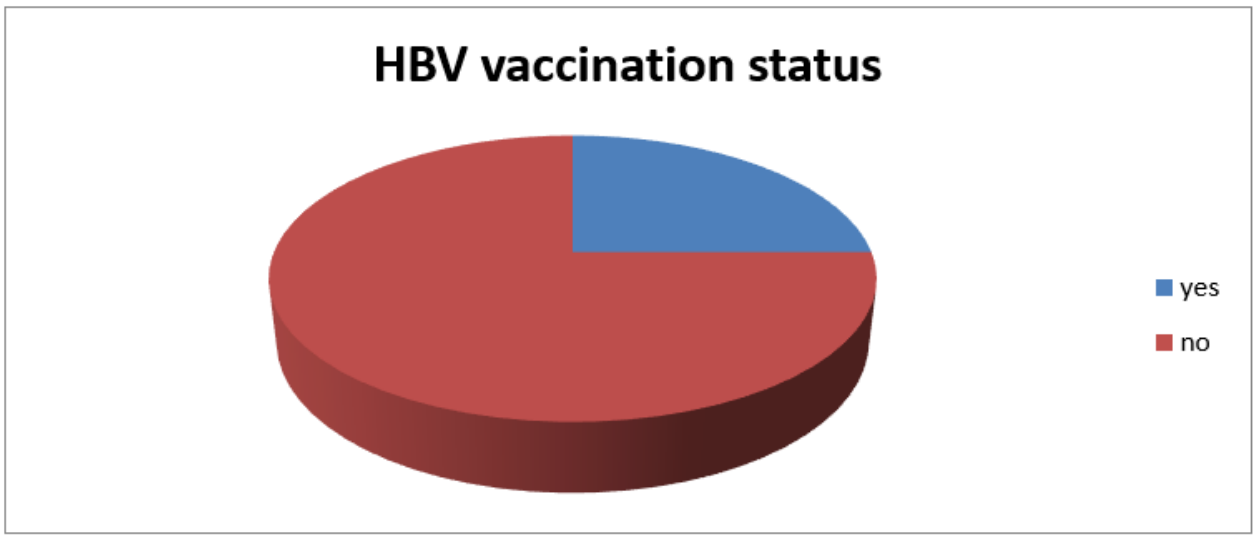

Figure 11. ***Distribution of included population according to HBV vaccination status (n 1200).***

90% of participants received vaccination provided as free and only 10% (30\300) were paid as shown in table 12 and figure 12.

Variable	Frequency	Percentage
Vaccine was free or paid?		
Self-PaidFree	30270	10%90%

Table 12. ***Distribution of included population according to HBV vaccination we r e paid or free (n 300)***

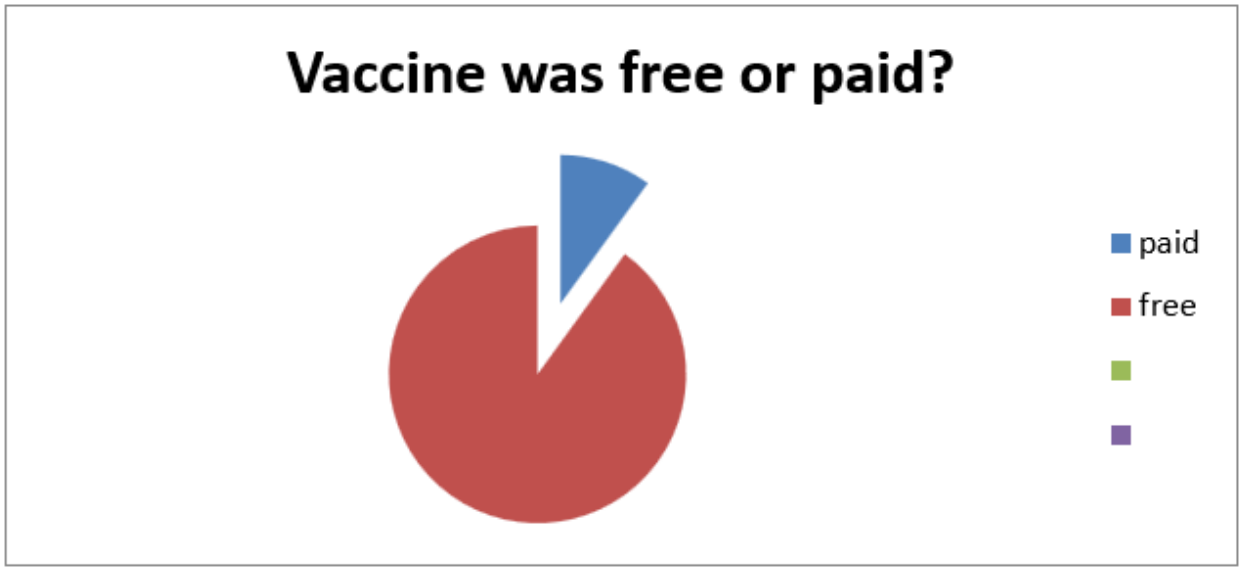

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Figure 12. ***Distribution of included population according to HBV vaccination were paid or free (n 300).****The majority of participants had taken the vaccine free of charge.*

Majority of vaccinated participants had two doses of vaccine 50%, where 30% had three doses, 10% had 1 dose and 10% had multiple as shown in table 13 and figure 13.

Variable	Frequency	Percentage
Vaccine doses?		
One dose Two dosesThree doses More than three doses	301509030	10%50%30%10%

Table 13. ***Distribution of included population according to HBV vaccination dose (n 300)***

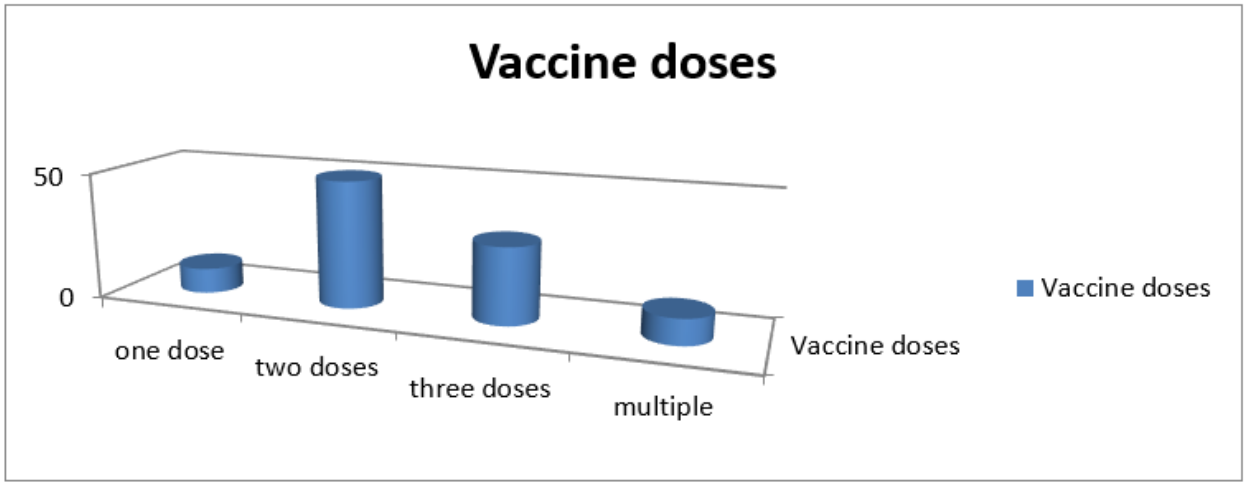

Figure 13. ***Distribution of included population according to HBV vaccination dose (n 300).***

Majority of participants their workplace had HBV testing policy but 25% had not as shown in table 14 and figure 14.

Variable	Frequency	Percentage
HBV testing policy at workplace?		
YesNo	900300	75%25%

Table 14. ***Distribution of included population according to HBV vaccination policy at workplace (n 1200)***

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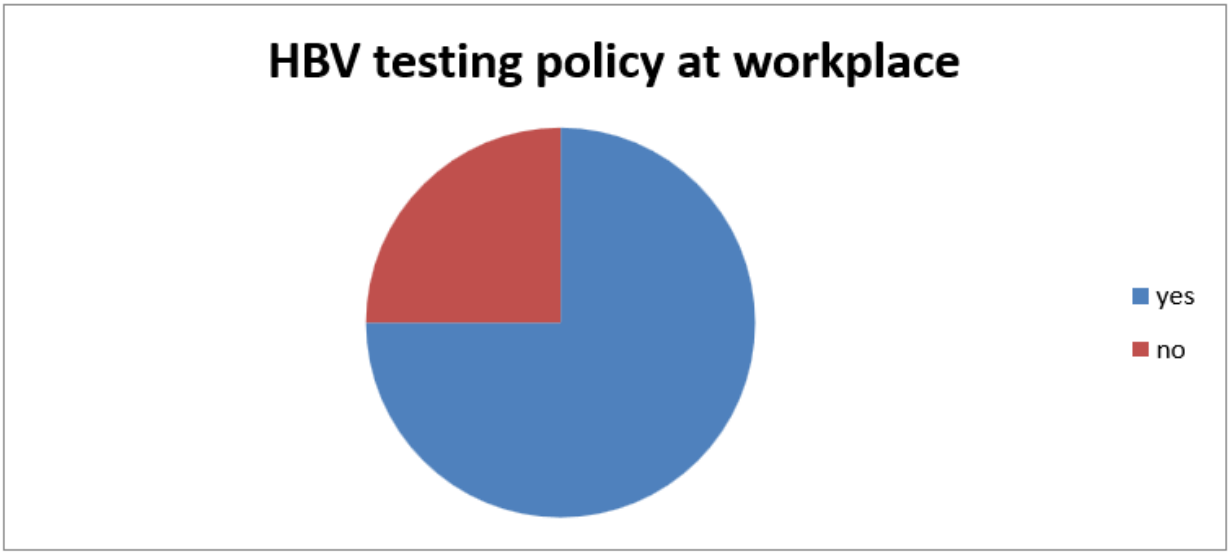

Figure 14. ***Distribution of included population according to HBV vaccination policy at workplace.***

Majority of participants had available vaccine at their workplaces 75% but 25% had not, as shown in table 15 and figure 15.

Variable	Frequency	Percentage
Availability of HBV vaccine at workplace?		
YesNo	900300	75%25%

Table 15. ***Distribution of included population according to HBV vaccination availability at workplace (n 1200)***

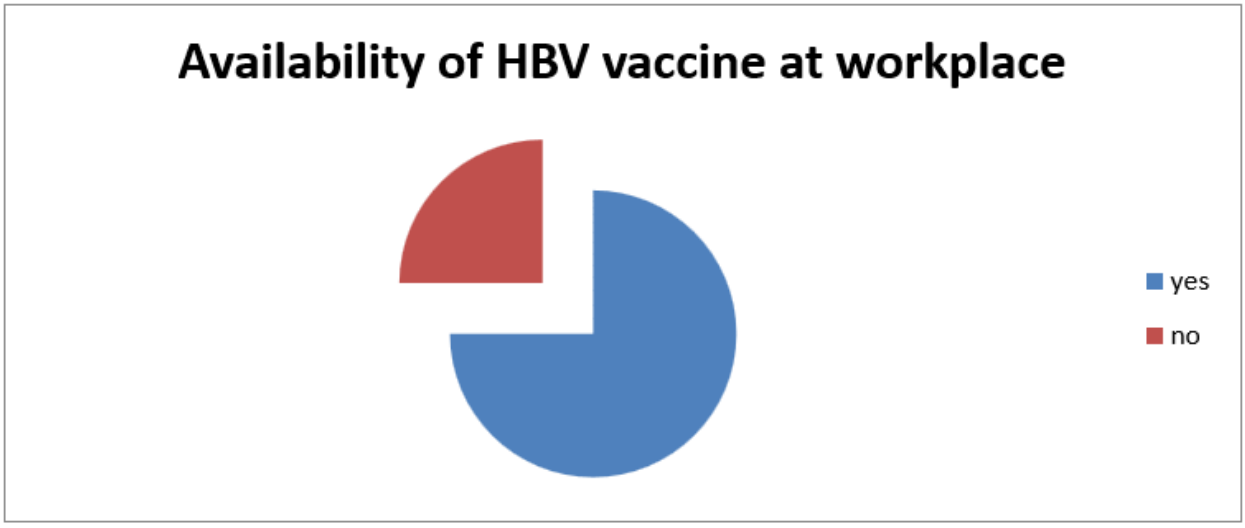

Figure 15. ***Distribution of included population according to HBV vaccination availability at workplace (n 1200).***

30% of non-vaccinated participants not being vaccinated due to high vaccine cost, 30% due to think it is not important, 20% due to afraid from vaccine side effects, 10% think that vaccine not easy and 10% lack of time as shown in table 16 and figure 16.

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Variable	Frequency	Percentage
Reasons for not being vaccinated?		
High vaccine costAfraid from vaccine side effects Vaccine is not easily available Not importantLack of time	2701809027090	30%20%10%30%10%

Table 16. ***Distribution of included population according to Reasons for not being vaccinated (n 900)***

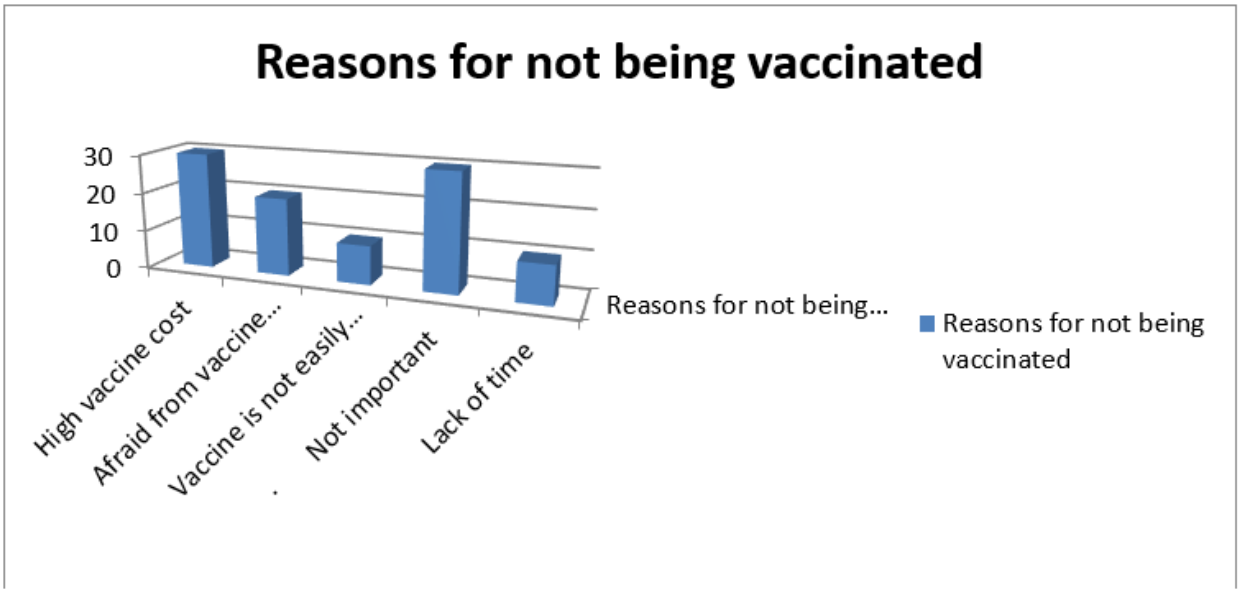

Figure 16. ***Distribution of included population according to Reasons for not being vaccinated.***

Half of participants had training on hepatitis B as shown in table 17 and figure 17.

Variable	Frequency	Percentage
Do you Attended training on hepatitis B ?		
YesNo	600600	50%50%

Table 17. ***Distribution of included population according to attendance of training on HBV (n 1200)***

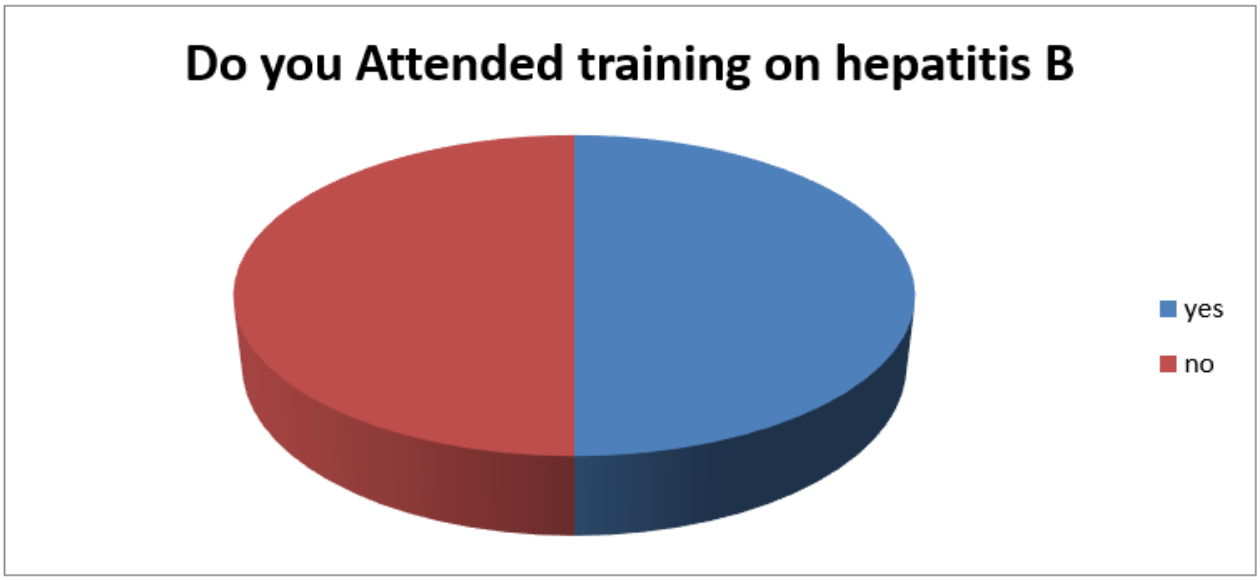

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Figure 17. ***Distribution of included population according to attendance of training on HBV.***

75% of participants taking extra protection during contact with hepatitis B patient as shown in table18 and figure 18.

Variable	Frequency	Percentage
Took extra protection during contact with hepatitis B patient?		
YesNo	900300	75%25%

Table 18. ***Distribution of included population according to taking extra protection during contact with hepatitis B patient (n 1200)***

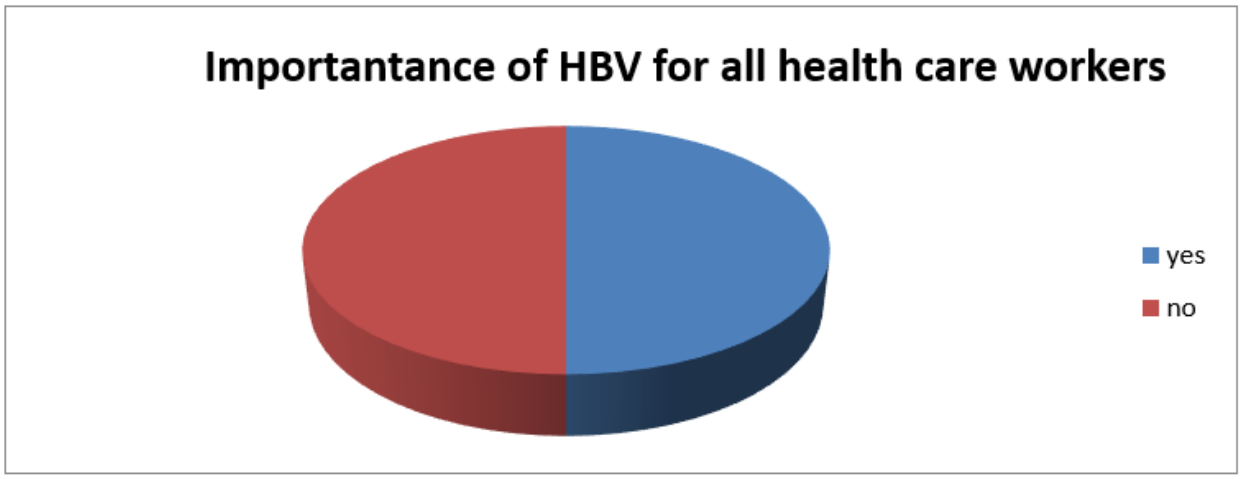

Figure 18. ***Distribution of included population according to taking extra protection during contact with hepatitis B patient.***

Half of participants stated that hepatitis B vaccine are essential for HCWs and another half stated that influenza vaccine is more essential as shown in table 19 and figure 19.

Variable	Frequency	Percentage
Key recommended vaccines are essential for HCWs?		
Hepatitis BInfluenza	600600	50%50%

Table 19. ***Distribution of included population according to Key recommended vaccines are essential for HCWs (n 1200)***

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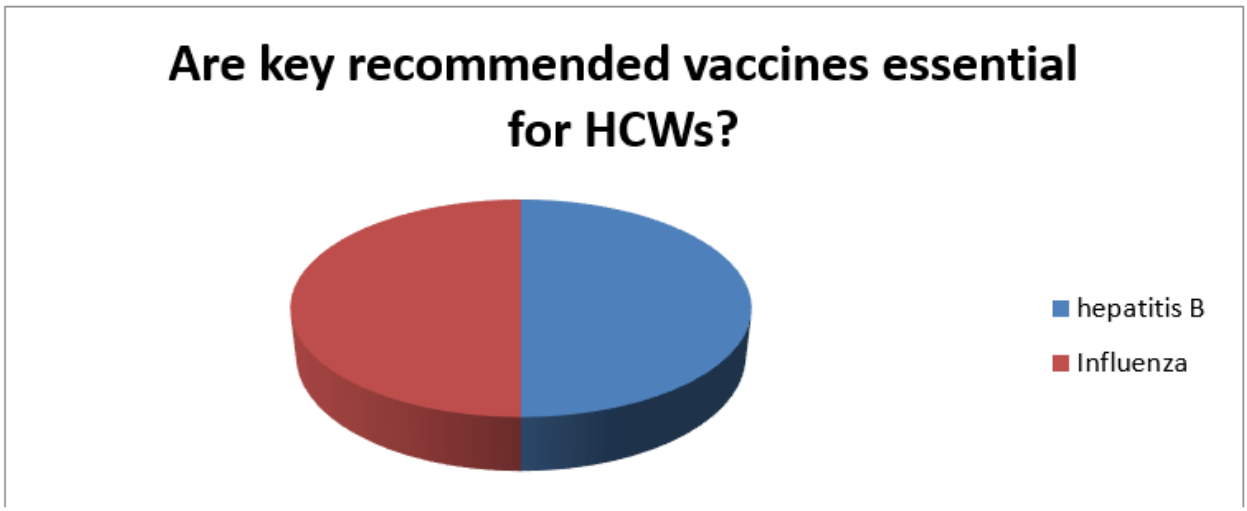

Figure 19. ***Distribution of included population according to Key recommended vaccines are essential for HCWs (n 1200).***

50% of participants think that it important for all health care workers to receive HBV immunization as shown in table 20 and figure 20.

Variable	Frequency	Percentage
Is it important for all health care workers to receive HBV immunization?		
YesNo	300900	25%75%

Table 20. ***Distribution of included population according to it important for all health care workers to receive HBV immunization (n 1200)***

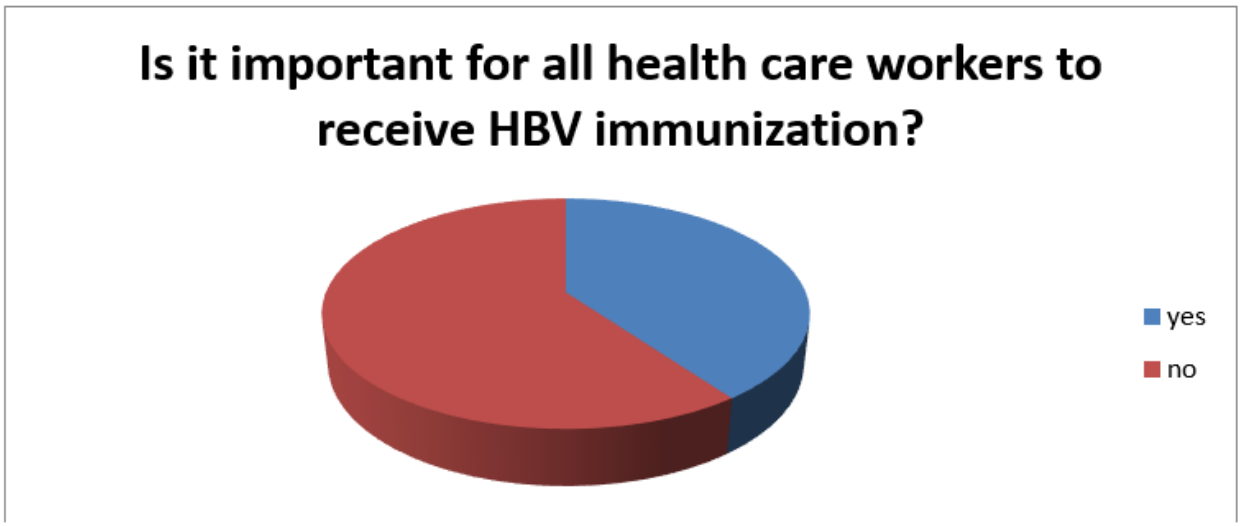

Figure 20. ***Distribution of included population according to it important for all health care workers to receive HBV immunization.***

Discussion

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Infections that people get while they are in the hospital cause a lot of people to not be able to work and make it harder for hospitals to provide good care. Many healthcare workers worldwide have HBV infection, even though there is a vaccine to prevent it. Research on the usage of the HBV vaccine has mainly looked at healthcare workers in big hospitals, but we do not have much information about those who work in smaller clinics or medical centers. The objective of this research was to investigate the impact of the hepatitis B vaccination on healthcare professionals in the region of Medina.

This research involved 1200 healthcare workers from Medina. The mean age of the participants in the research was 34.9 years, with a range of 7.7 years. This means that the participants' ages mostly fell between 34.1 and 35.1. Additionally, most of the participants were between the ages of 30 and 40. Most of the people who took part in the study were women, making up 60% of the total number of participants (720 out of 1200). In table 2 and figure 2, you can find more information about this. Out of the women who participated, 75% were married and 25% were unmarried. In terms of education, 10% of people had certificates, 20% had diplomas, 50% had bachelor's degrees, 10% had master's degrees, and 10% had MD degrees. Regarding jobs, 75% of the people were nurses, 10% were physicians, 5% were midwives, 5% were lab technicians, and 5% were dentists.

Similarly, a study by Ngum *et al.* [7] discovered that out of the 280 healthcare workers they recruited, most of them (35.3%) Laboratory technicians came in second place, making up 21.2% of the total. The number of specialists and general practitioners in our sample was rather low, with each comprising just 3.9% of the total. This data bears resemblance to the numbers provided by the BHD in 2010, which indicated that 27.8% of those employed in the healthcare sector were classified as nurses, while 18.5% held positions as laboratory technicians. Additionally, the majority of participants (16. 9%) came from the local hospital. The aforementioned data aligns with the information obtained from the BHD, indicating that the regional hospital has the highest number of healthcare professionals, as per the BHD figures recorded in 2010. When we looked at the gender breakdown, we found that most of the people were females, with 180 out of the total. This accounted for 64.3% of the total. In contrast, there were 100 males, making up 35.7% of the total. This means that in Cameroon, there are more women than men in the overall population, which could make the data biased[7].

This study found that only 25% of healthcare workers got fully vaccinated, while the rest did not get vaccinated at all. These results are not the same as studies done at big hospitals in Tanzania. Those studies showed that more people finished their treatments, with rates ranging from 33% to 70% [8],[9].

The reason for the varying vaccine rates could be because the vaccine is more easily accessible in advanced healthcare centers, where it is often provided for free[9].

However, the HBV vaccine is not easily accessible at most regular health clinics. So, the Ministry of Health needs to make sure the HBV vaccine is available in clinics at all levels to help more people who do not have access to good healthcare. But, the results are similar to a study done in Somalia [10]. The aforementioned survey revealed that a mere 56% of healthcare personnel were administered the HBV vaccination. According to [10], the completion rate shown a very low value of 16.6%.

This means that healthcare workers need to be more educated and aware about finishing their vaccinations, as many of them haven't completed their vaccines.

[11] studied how well expatriate hospital workers from different backgrounds accepted and responded to the hepatitis B virus vaccine. The people who took part in the study were doctors, nurses, and medical workers. They were given free vaccines.

It seems odd and unfair that the hospital housekeeping, record-keeping, and maintenance staff are being excluded. Additionally, no information was given about whether Saudi people were included or excluded from participating in various activities at the hospital.

Despite trying very hard to keep hospital staff safe, there may still be some staff members who are vulnerable to the virus. If there are not enough staff or other restrictions, employees may need to work in different parts of the hospital [11]

Currently, most studies only look at things like: if people are sick or not and checking for diseases. They do not focus on how these diseases are connected to places where people get vaccinated for HBV. This study is an exception because it looks at that connection. Conducting more research to assess the efficacy of providing complimentary vaccinations and facilitating access to treatment clinics for healthcare professionals with HBV is of utmost significance.

We should have studies and campaigns two times in the year to encourage newly hired healthcare workers to get vaccinated. This observation stems from the findings of the present study, which indicate a notable association between individuals with a work experience of less than 2 years and a lower likelihood of having received the HBV vaccination. This will help more people get the HBV vaccine and lower the chances of transmission of HBV between healthcare workers and patients. Additionally, it is crucial to make sure that all newly employed healthcare workers receive the HBV vaccination before they start their job. This will help ensure that more people get the vaccine and

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protect themselves against hepatitis B.

Conclusion

This research found that healthcare workers are not getting the hepatitis B vaccine very often, even though they are at risk for getting the disease. Therefore, it is essential to implement campaigns and initiatives aimed at promoting HBV vaccination within basic healthcare settings, with the aim of safeguarding this crucial demographic. Additionally, it is important to offer ongoing medical training in how to prevent and control infections. The HBV vaccine should be required for healthcare workers as a condition for employment to keep them safe from getting HBV infection while they work. More research should be done on the number of healthcare workers who have been infected with HBV in primary healthcare facilities. By doing so, we can determine how many medical professionals received the HBV vaccination and to identify the incidence of HBV infection in the general population.

Limitations of the study and recommendations

This study only used questionnaires to measure the number of vaccines that healthcare workers received and their HBV (Hepatitis B virus) status. It did not check the HBV infection status or exposure to HBV among healthcare workers by assessing HBsAg or HBsAb. Additionally, the participants were asked to report their vaccine status themselves, but there was no proof or evidence to confirm whether they were actually vaccinated. It's important to give clients proof of their HBV vaccination by providing documentation as vaccination programs continue. In addition, we need more studies to check if healthcare workers have received the HBV vaccination. This can be measured by looking at the HBV antibodies they have acquired through vaccination. This will help us get more accurate data on how many people have the virus.

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