

Assessment of Knowledge and vaccination status towards Hepatitis B Virus among health care workers in private clinics of Addis ketema sub-city, Addis Ababa, Ethiopia.

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Abstract

Background: Hepatitis B Virus is a DNA virus of the hepadnaviridae family of viruses. It replicates within infected liver cells (hepatocytes) and may cause acute and chronic hepatitis. The hepatitis B vaccine is the mainstay of hepatitis B prevention. Since 1982, safe and effective hepatitis B virus vaccines have been commercially available. Health care workers who have a reasonable expectation of being exposed to the virus on the job should be offered hepatitis B vaccine. The aim of this study was to assess knowledge towards Hepatitis B Virus among health care workers in relation to their vaccination status in private clinics of Addis ketema sub-city, Addis Ababa, Ethiopia.

Methods (design): A cross-sectional study was conducted and multi-stage sampling technique was used and in total 231 healthcare workers were enrolled in the study, which was conducted in private clinics of Addis ketema sub-city. After taking informed consent from the department of medical laboratory and from the respondents, self-administered questionnaires were distributed to the health care workers. The collected data was entered into Epi-data and analyzed using Statistical package for social sciences version 25.

Results: Two hundred thirty one healthcare workers completed and returned the questionnaires giving an overall response rate of 97%. Only 66 (28.6%) respondents reported that they received one or more doses of Hepatitis B vaccine. From these, 43 (65.2%) received three doses which was only 18.6% of the total Workers. Participants with poor and moderate knowledge had equal proportion 92 (39.8%), while only 47 (20.3%) were found to have high-level of knowledge. Having high-level of knowledge was not a statistically significant predictor of vaccination uptake.

Conclusions: Hepatitis B Virus vaccination coverage and knowledge were poor among health care workers. Therefore: educational intervention and provision of vaccinations recommended for these vulnerable workers of Addis-ketema sub city, Addis Ababa, Ethiopia.

Key words: Hepatitis B virus, knowledge, health care workers, vaccination status

1. Introduction

In 1976, Dr. Baruch S. Blumberg won the Nobel Prize in Medicine for his discovery of the hepatitis B virus (HBV). His discovery of the virus in 1967 is considered one of the greatest medical achievements of the 20th century. The story started in the early 1960s when he was examining blood samples from diverse populations in an attempt to determine why the members of different ethnic and national groups widely varied in their responses and susceptibility to disease. In 1963 he discovered a mysterious protein in the serum of an Australian aboriginal, which he later (1967) determined to be part of a virus that caused hepatitis. In 1969 he developed a blood test to detect the virus and was involved in the development of the first hepatitis B vaccine (1).

Hepatitis B Virus is a DNA virus of the hepadnaviridae family of viruses. It replicates within infected liver cells (hepatocytes). The hepatitis B virus particle (virion), also known as the Dane Particle, consists of an inner core and an outer surface coat (2). HBV may cause acute and chronic hepatitis. Acute hepatitis can either resolve spontaneously (acute self-limited hepatitis), lead to liver failure (fulminant hepatitis) or become chronic. Patients with long-standing active liver disease are prone to develop end-stage liver disease and hepatocellular carcinoma (HCC) (3).

HBV is spread predominantly by percutaneous or mucosal exposure to infected blood and various body fluids, including saliva, menstrual, vaginal, and seminal fluids, which have all been implicated as vehicles of human transmission (4). Sexual transmission of hepatitis B may occur, particularly in unvaccinated men who have sex with men and heterosexual persons with multiple sex partners or contact with sex workers. Transmission of the virus may also result from accidental inoculation of minute amounts of blood or fluid during medical, surgical and dental procedures, or from razors and similar objects contaminated with infected blood; use of inadequately sterilized syringes and needles; intravenous and percutaneous drug abuse, tattooing, body piercing, and acupuncture (5).

There is no specific treatment for acute hepatitis B. Therefore, care is aimed at maintaining comfort and adequate nutritional balance, including replacement of fluids lost from vomiting and diarrhea. Chronic hepatitis B infection can be treated with medicines, including oral antiviral agents these medications don't usually get rid of the virus, but they might decrease the chance of the infected person developing severe liver disease. The hepatitis B vaccine is the mainstay of hepatitis B prevention (6). Since 1982, safe and effective hepatitis B virus (HBV) vaccines have

been commercially available, first derived from plasma of HBV infected persons and later from yeast cells using recombinant DNA technology (7).

Healthcare workers (HCWs) are defined as “all paid and unpaid persons working in health-care settings who have the potential for exposure to infectious materials (e.g. blood, tissue and specific body fluids, and medical supplies, equipment, or environmental surfaces contaminated with these substances) (8). Hepatitis B is an important occupational hazard for such kind of workers. In some studies, HCWs have been shown to have an up to four-fold increased risk of acquiring HBV infection (9, 10). The main risk factor to contract HBV infection for HCWs is direct contact with infectious material, especially HBV-infected blood or via a needle stick injury with HBV-contaminated body fluids (11). Although HBV infection is completely preventable by following a simple and widely available vaccination schedule as well as other preventive measures, HCWs continue to get infected with this disease. The risk of occupational infections in developing countries is intensified by a variety of factors, comprising but not restricted to, overcrowding in hospitals, lower HCWs’ patient ratios, insufficient or absence of basic safety and protection equipment (12). Correct knowledge is vital in the control of HB infection and a number of studies have shown that, along with access to the vaccine, knowledge is one of the primary determinants of compliance in hepatitis preventive programs (13).

Hepatitis B is a global public health threat and the world’s most common serious liver infection. It is also the primary cause of liver cancer (HCC), which is the 2nd leading cause of cancer deaths in the world. 30 million people will become newly infected each year and Approximately 2 people die each minute from hepatitis B (14).

Hepatitis B is an important occupational hazard for health care worker (15). As part of occupational safety measures, the World Health Organization states that all HCWs are required to be vaccinated against HBV. Unfortunately, the World Health Organization also estimates that HBV vaccination coverage amongst HCWs is only 18–39% in low and middle income countries including Ethiopia and 67–79% in high income countries. HCWs have an increased risk of acquiring hepatitis B as they attend to infected patients and thus are exposed to blood and body secretions of patients (16). Knowledge of HCWs towards HB infection is generally inadequate in most of the developing countries (17). It is the lack of knowledge and not giving sufficient attention on part of health care providers coupled with the negligence of the risk that has led them for being incompletely vaccinated (18).

A research done in turkey, Istanbul showed that 76% of HCWs had completed their vaccination regimen. The rate of vaccination among HCWs was reported to be ,doctors(87%), followed by nurses(82.3%),then clinical staffs(70.3%),medical officers(45.2%), and others(58.3%). Finally, they find out the frequency of HBV infection in HCWs was lower and vaccination rates were higher in their study, even though they are at increased risk for acquiring HBV infection due to occupational exposure to potentially infectious body fluids (19).

An assessment conducted in Khartoum, Sudan indicated that the respondents' knowledge score was 58.3% and 20.0% of respondents thought that HB could be transmitted through contaminated food. In addition, only 9.9% of respondents scored high points on the knowledge assessment questions and more than 70.0% of the study respondents have a good level of knowledge, as assessed by the mode of transmission questions (20).

Another study conducted in DebreBerhan, Ethiopia revealed that 77.8% of study participants strongly agreed that hepatitis B is a major public health threat and more than half (51.2%) of healthcare workers strongly agreed that hepatitis B vaccine should be obligatory to take. In addition the study indicates that more than half (57.7%) of the respondents has had history of vaccination at least once. according to the study ,vaccine unavailability through government channels (36%), high cost of the vaccine for private access (41%), and not giving much concern about this issue (26%) represent the major reasons for not being vaccinated (21).

Most research studies conducted in Ethiopia focuses only on assessing the vaccination status of HCWs, but our study also evaluated knowledge as well as association between the variables.in addition most studies assesses knowledge and vaccination status among HCWs that are working in public health facilities, in contrast, our study has concerned on HCWs that are working in private clinics.

The objectives of this study were to determine HBV vaccination status of health care workers, to assess Knowledge of health care workers towards HBV and to determine association between knowledge and vaccination status towards HBV among health care workers in private clinics of Addis ketema sub-city, Addis Ababa, Ethiopia. Most research studies conducted in Ethiopia focuses only on assessing the vaccination status of HCWs, but our study also evaluated knowledge as well as association between the variables.

2. Materials and Methods

2.1. Study area and period

The study was conducted in Addis Ababa which is the capital city of Ethiopia. Addis ketema sub-city is one of the ten sub cities found in Addis Ababa with an area of 7.41km² and is located in the northwestern area of the city, not far from its center (22).Currently 69 health facilities are serving the people of Addis ketema; 10 health centers, 2 private hospitals, 10primary clinics, 21 medium clinics and 26 specialty clinics. Totally, more than 500 HCWs were working in the 57 private clinics in different positions (23).The study was conducted from March- June 2019 G.C.

2.2. Study design and participants

Cross-sectional study was conducted for the assessment of Knowledge of health care workers towards Hepatitis B Virus in relation to their vaccination status. All health care workers who were working at private clinics of Addis ketema sub city during the study period and who agreed to participate were included in the study.

2.3. Sampling technique and sample size determination

Multi-stage sampling technique was used to select our study participants by making the 10 sub-cities of Addis Ababa as primary sampling unit (PSU) by which Addis-Ketema sub city was selected by simple random sampling technique/lottery method from the list of the 10 sub cities. The 57 private clinics found in Addis-Ketema sub city had become our secondary sampling unit (SSU) and convenience sampling technique proportion to size was used for selecting the private clinics from the three categories (primary, medium and specialty) as well as the HCWs so as to achieve the required sample size.

Sample size was calculated using single population proportion formula assuming the prevalence of HBV vaccination among health professionals as 50% in order to get larger sample size. Correction formula was used because the source population was less than 10, 000.finally 239 HCWs were included in the study.

2.4. Data collection and management

A self-administered structured questionnaire was prepared and the questions were designed after performing a wide range of literature review (24, 25).The data was collected in respondents working place during their convenient time. In order to check any inconsistency the data collection tool was pretested on HCWs working in nearby private clinic and necessary

adjustments were done before the actual period of data collection. The data was collected by the four principal investigators who were 4th year medical laboratory students at Addis Ababa University in 2019 G.C.

2.5. Data processing and analysis

The data was checked for incompleteness and internal inconsistency and then it was cleaned, edited, and was entered in Epi-Data 3.1 and processed and analyzed by using statistical package for social science(SPSS)version 25 window version with the supervision of the advisors.

2.6. Ethical consideration

Approval of the proposal was obtained from department research and ethical review committee (DRERC) of school of medical laboratory technology and legal permission paper to carry out the study was secured to go to the target site and start data collection.

The expenses required for the study were fully covered by the principal investigators.

3. Results

A total of 239 questionnaires were distributed to the private clinic Health Care workers and 231 were completed and returned giving a response rate of 97%. Specialty clinics comprised larger proportion 109 (47.2 %) of the respondents; followed by medium clinics which encompassed 88 (38.1%). The minimum numbers of participants were from primary clinics which comprised 34 (14.7%).

3.1. Socio demographic characteristics of health care workers

The age of the study participants ranged from 15 to 70 years with the median age of 30 years. 133(57.6%) of the study participants were female. With regards to their professional characteristics, 88 (38.1%) were nurses, followed by laboratory technologists/technician 51 (22.1%) and health officer 27 (11.7%) (Table 1).

3.2. Vaccination status

Only 66 (28.6%) respondents reported that they received one or more doses of hepatitis B vaccine. From these, 43 (65.2%) received three doses which was only 18.6% of the total HCWs. Among 165(71.4%) respondents who were not vaccinated, vaccine unavailability 98(42.4%), high cost of the vaccine for private access 25(10.8%), and lack of information about the vaccine 24(10.4%) represent the major reasons stated for not being vaccinated (Table 2).Analysis of vaccination status showed that those aged 25-34 years had the highest proportion of those

vaccinated; 41(62.1%).The vaccination status was also found to be higher among HCWs working at specialty clinics 38(57.6%), as compared to those who were working at primary clinics 7(10.6%). 25(28.4%) nurses were vaccinated with only 2(7.4%) vaccination coverage among cleaners .

3.3. Knowledge of HCWs towards HBV

As per Bloom's cut off point the score of the study participants fall into three categories ;Poor knowledge was defined as having knowledge score below 60% , Moderate levels as having knowledge score between 60%-79% and High levels as having knowledge score 80% and above.

3.3.1. Knowledge towards HBV infection and treatment

49(21.2%) had poor knowledge while 88(38.1%) had high-level of knowledge about HB infection and treatment. About 77.1% agreed that hepatitis B infection is lethal. Even though most 122(52.8%) of the participants know that there is no medication to cure HB infection, 68(29.4%) of participants believed HB infection can be cured (Table 3).

3.3.2. Knowledge towards HBV transmission modes

Most respondents reported that hepatitis B virus may be transmitted from one person to the other through blood transfusion 202 (87.4%) followed by sexual intercourse with infected person 200 (86.6%) and through sharps injury 179(77.5%). But few HCWs wrongly reported that hepatitis B can be transmitted through contaminated food and water 52(22.5%) and through hand shake and hugging 62 (26.8%). Overall half 117(50.6%) of respondents had high level of knowledge regarding HBV transmission (Table 4).

3.3.3. Knowledge towards HBV vaccination

131(56.7%) of respondents had poor knowledge while only 8(3.5%) of HCWs had high level of knowledge towards HBV vaccination.143(61.9%) of the respondents wrongly responded that HBV vaccination can increase risks of complication and 57(24.7%) of the participants reported that the vaccine can be given for the purpose of treatment to acutely infected patients. (Table 4).

3.3.4. Overall knowledge score

Overall, participants with poor and moderate knowledge had equal proportion 92(39.8%) while only 47 (20.3%) were found to have high-level of knowledge score (Table 5).

3.4. Association between knowledge and vaccination status

A logistic regression analysis was performed to measure association between vaccination status and level of knowledge but as it is depicted in table 7.7 there was not a significant association between having high-level of knowledge and being vaccinated. Therefore having high-level of knowledge was not a statistically significant predictor of vaccination uptake among HCWs (Table.6).

4. Discussion

This study assessed the knowledge of health care workers towards HBV in relation to their vaccination status in private clinics of addis-ketema sub city Addis Ababa, Ethiopia. An overall response rate of 97% (231/239) was achieved in the study of this respondents nurses 88(38.1%) and laboratory technologist/technicians 51(22.1%) took the larger proportion. IN similar study carried out at Tanzania nurses comprised the larger proportion 124 (35.6%) among the respondents (26).

Our study showed that only 43 (18.6%) of participants were completely vaccinated, whereas 23 (10%) were incompletely vaccinated, and 165(78.4%) had not received any HBV vaccine. The finding in the study done at bahirdar Ethiopia revealed even a much lower rate of vaccination among the participants with only 37(10%) of respondents received one or more doses of hepatitis B vaccine of which only 20 (54%) received three or more times which was only 5.4% of the total health care workers (24).

Another study conducted in Republic of Georgia clearly point outs the vaccination coverage is only 12% which is much similar to that for other developing countries (e.g., Uganda [5%], Kenya [13%], and Egypt [16%]) (27).Such like our study the study executed in debrebirhan Ethiopia depicted that vaccine unavailability (36%) was the major reason for not getting the vaccine (21), which in our case comprised about (42.4%). This is an input for stakeholders to establish an effective program that focuses on vaccine availability at affordable cost to meet the demand of healthcare workers.

Results of the current study revealed that 49(21.2%) of HCWs have poor knowledge towards HB infection and treatment ,this was also indicated in a study conducted in bahirdar Ethiopia where Only about 52% of the respondents scored above the mean knowledge score about hepatitis B infection (24). Our research had also showed that 68(29.4) of HCWs wrongly believed that HBV

could be cured this phenomenon was also indicated in a similar study carried out in bantama, Ghana (28).

The alarming phenomenon in our study was majority 131(56.7%) of the study participants fall under the poor knowledge category regarding HBV vaccination with only 8(3.5%) HCWs had high-level of knowledge. Particularly 129(55.8) of respondents didn't know that HBV has a post-exposure prophylaxis which was also showed on the study conducted in Gondar, Ethiopia with (67.1 %) of similar wrong assumption (29).

Overall knowledge score for this study was found to be with in an equal range of poor 92(39.8%) and moderate 92(39.8%) knowledge for the study participants. This is agreeable to the finding showed in Kaduna State, Nigeria where Less than 47% of participants scored above the mean knowledge scores for HBV.

Regarding the association between vaccination status and knowledge a study conducted in Kuwait indicated no significant association between knowledge score and practice of vaccination.in our study also high-level of knowledge was not a statistically significant predictor of vaccination uptake. This finding is nearly similar to a study done in Kaduna state, Nigeria (30).

True vaccination status of the HCWs is questionable because vaccination certificates were not being produced and the cross-sectional nature of the study does not confirm the definitive cause-and-effect relationship between vaccination status and knowledge score. Furthermore inadequate financial resources and time constraints limited the scope of the study from embracing other sub-cities of Addis Ababa.

It can be concluded from this cross-sectional survey that though hepatitis B virus infection is preventable disease through HBV vaccine, low rate of HBV vaccine coverage among health care workers at private clinics of Addis-ketema sub-city was observed with vaccine unavailability as a major reason. This is an alarming scenario and challenge for a country with high prevalence of Hepatitis B infection. Even though Knowledge of HCWs about hepatitis B infection and treatment as well as its mode of transmission is adequate, HCWs knowledge regarding the HBV vaccine is very devastating. This study also revealed that there is not a significant association between having high-level of knowledge and being vaccinated. Additionally this study also showed that large proportion of the respondents hadn't ever attended any training related to hepatitis B. Therefore, there is a need for sustained training and awareness as well as wider

uptake of the vaccine if HBV is to be minimized to the lowest level among HCWs in private clinics of Addis-ketema sub-city, Addis Ababa Ethiopia.

Way forward for researchers

- Since the research findings cannot be generalized to the whole population of HCWs in Addis Ababa. We recommend conducting more research in other sub-cities with large sample size.

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7. List of Tables

Table.1.Socio demographic characteristics of health care workers (n=231)

Variable	Frequency	Percentage (%)
Gender		
Male	98	42.4
Female	133	57.6
Age		
15-24	50	21.6
25-34	111	48.1
35-44	41	17.7
45-54	16	6.9
55-64	10	4.3
≥65	3	1.3
Education		
Diploma	96	41.6
Bachelor degree	94	40.7
Master's degree	9	3.9
PHD degree	2	9
Primary school	15	6.5
Secondary school	14	6.1
No formal education	1	4
Marital status		
Single	116	50.2
Married	107	46.3
Widowed	3	1.3
Divorced	5	2.2
Occupation		
Physician	26	11.3
Health officer	27	11.7
Nurse	88	38.1
Lab technologist/technician	51	22.1
Cleaners	27	11.7
Others	12	5.2
Duration of employment		
<5 year	115	49.8
5-10 year	85	36.8
>10 year	31	13.4
Monthly income		
<1000	11	4.8
1000-1999	38	16.5
2000-4999	103	44.6
5000-10000	67	29
>10000	12	5.2

Table.2.Vaccination status, reason for not being vaccinated and not taking full dose.

Variable	Frequency	Percentage (%)
Vaccination status(n=231)		
Vaccinated(1 dose)	12	5.2
Vaccinated(2 dose)	11	4.8
Vaccinated(3 dose)	43	18.6
Not vaccinated	165	71.4
Reason for not being vaccinated(n=165)		
The vaccine is not easily available	98	59.4
Cost of the vaccine	25	15.2
Lack of information about the vaccine	24	14.5
Too busy	9	5.5
Afraid of vaccine side effect	3	1.8
Afraid of needles	3	1.8
Vaccination is not necessary	1	0.6
Other reason	2	1.2
Reason for not taking full dose(n=23)		
Not available	9	39.1
Carelessness	4	17.4
Being busy	4	17.4
Started and waited	4	17.4
Assuming that it was enough	2	8.7

Table .3.Responses of HCWs about HBV infection and treatment knowledge items.

Open ended Question	frequency	percentage	
Causative agent of Hepatitis B infection(n=231)			
Virus	99	42.9	
Bacteria	4	1.7	
I don't know	128	55.4	
Yes/No question	Yes (%)	No (%)	Not sure (%)
There is a medication to cure hepatitis B	68(29.4)	122(52.8)	41(17.7)
One can get hepatitis B more than once	60(26)	114(49.4)	57(24.7)
Hepatitis B infected person may be asymptomatic for long time	170(73.6)	36(15.6)	25(10.8)
Hepatitis B virus is more infectious than HIV	172(74.5)	31(13.4)	28(12.1)
Hepatitis B infection can be lethal	178(77.1)	20(8.7)	33(14.3)

Table.4. Responses of HCWs about HBV transmission modes and vaccination knowledge item

Question	Yes (%)	No (%)	Not sure (%)
Hepatitis B virus transmission			
Sharps injury	179(77.5)	21(9.1)	31(13.4)
Blood donation from infected person	202(87.4)	6(2.6)	23(10)
Sexual intercourse with infected person	200(86.6)	5(2.2)	26(11.3)
From mother to child during pregnancy	165(71.4)	20(8.7)	46(19.9)
Contaminated food and water	52(22.5)	132(57.1)	47(20.3)
handshake or hugging an infected person	62(26.8)	123(53.2)	46(19.9)
Question	Yes (%)	No (%)	Not sure (%)
HBV vaccine can be for all people	89(38.5)	106(45.9)	36(15.6)
Aware of the appropriate intervals of the Hepatitis B vaccination	116(50.2)	99(42.9)	16(6.9)
HBV vaccination increase risks of complications	51(22.1)	143(61.9)	37(16)
Hepatitis B vaccine is effective to treat patients with acute hepatitis B infection	57(24.7)	130(56.3)	44(19)
Hepatitis B vaccine can be given as post-exposure prophylaxis	55(23.8)	129(55.8)	47(20.3)
Hepatitis B vaccine contraindicated for immune compromised patients	54(23.4)	105(45.5)	72(31.2)
HBV vaccine contraindicated in pregnancy	86(37.2)	66(28.6)	79(34.2)

Table.5. Over all knowledge score of HCWs.

Knowledge about HBV	Poor (%)	Moderate (%)	High-level (%)
Infection and treatment	49(21.2)	94(40.7)	88(38.1)
Transmission modes	37(16.0)	77(33.3)	117(50.6)
Vaccination	131(56.7)	92(39.8)	8(3.5)
Overall	92(39.8)	92(39.8)	47(20.3)

Table.6. Association of vaccination status and knowledge level of HCWs.

Variables	Vaccination status N (%)		P-value	Crude OR(95% CI)
	Yes	No		
Knowledge				
Poor	19(20.7)	73(79.3)	0.709	0.85(0.37-1.98)
Moderate	36(39.1)	56(60.9)	0.067	2.1(0.95-4.65)
High-level	11(23.4)	36(76.6)	-	

Figures

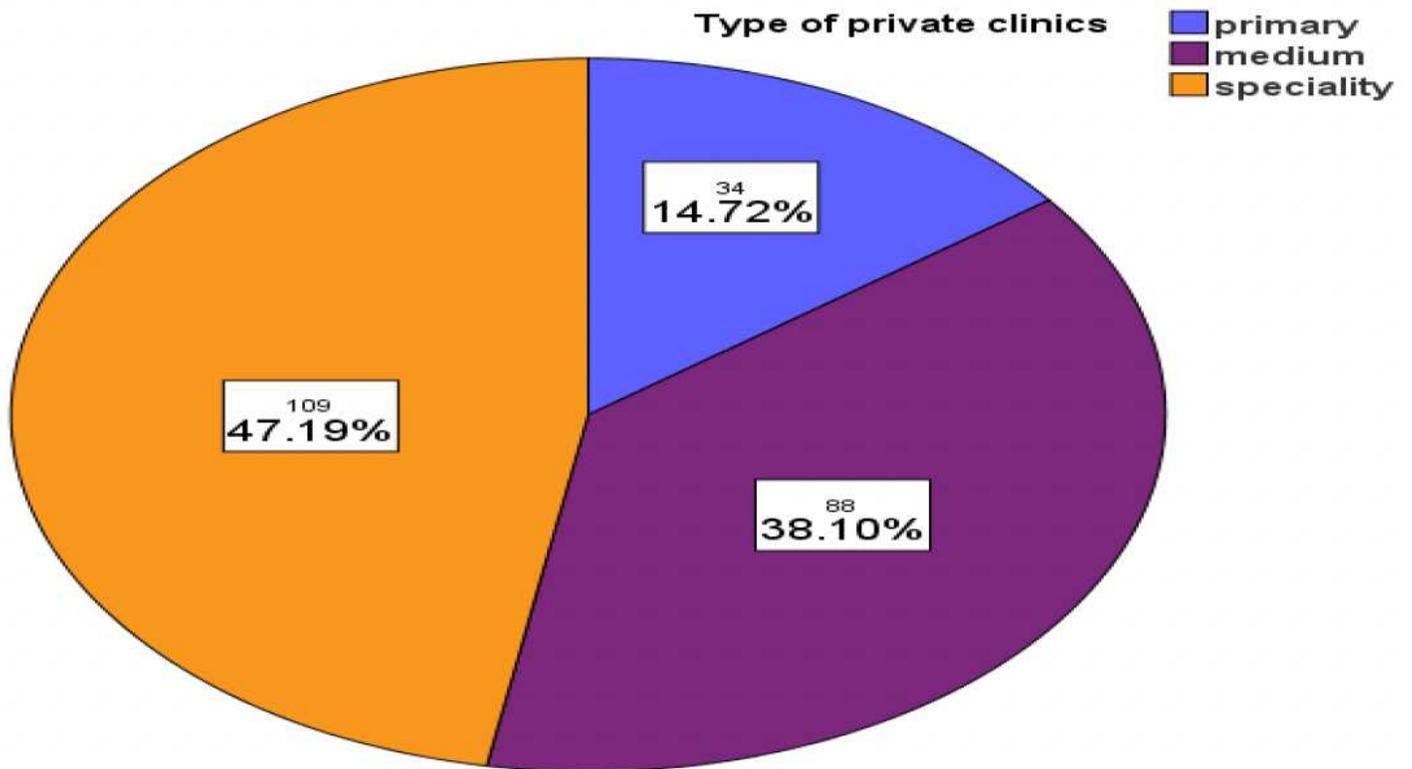


Figure 1

Figure.7.1. Response rate of HCWs from each type of private clinics

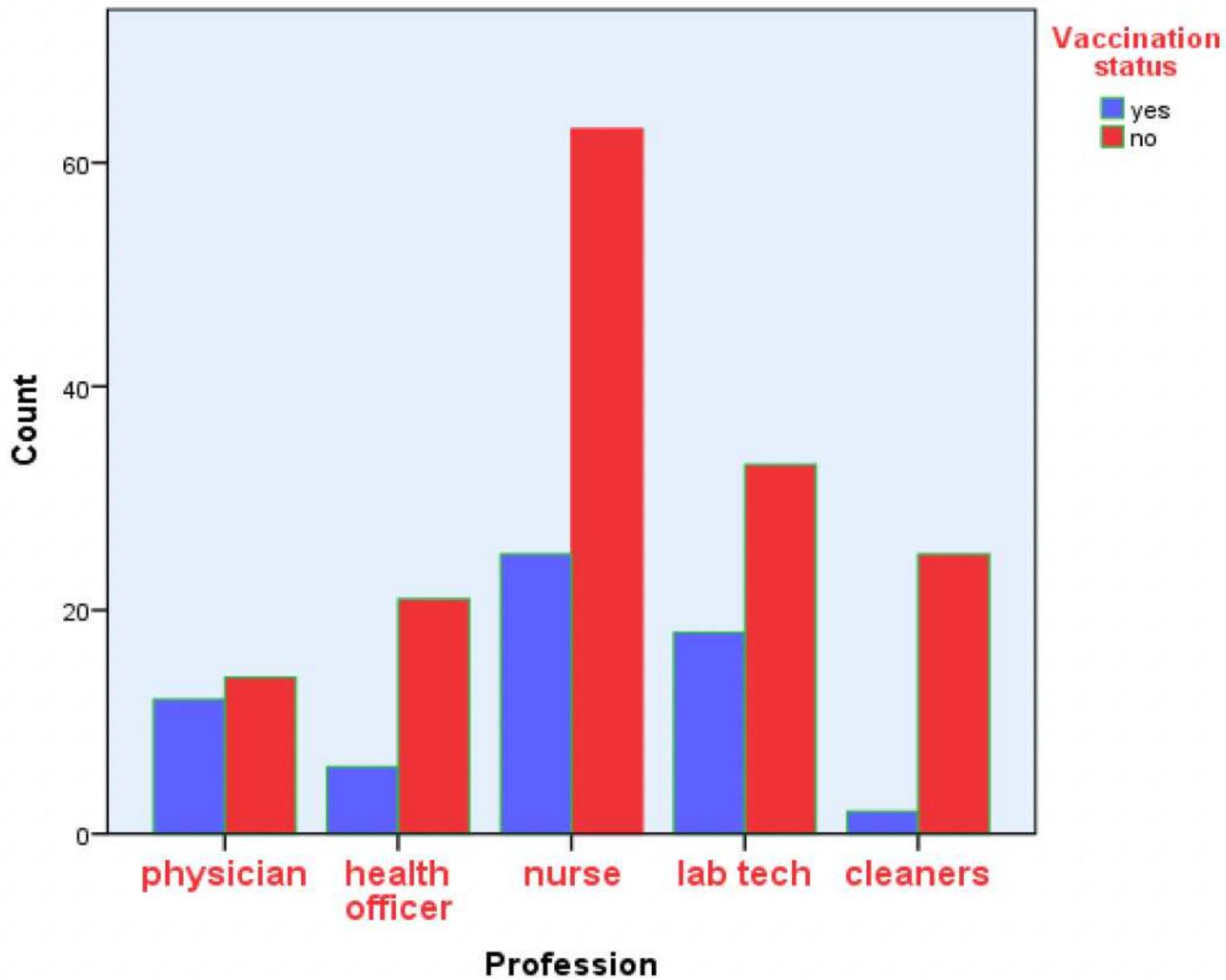


Figure 2

Figure.7.2. Vaccination status by profession