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Anti Hbs Titre Level and Awareness and Safety against Hepatitis B Virus among Dental Students in a Dental College in Kolkata - A Cross Sectional Study

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Abstract: ***Objective: It is known that health care specialist and dental surgeons are an increased risk of hepatitis B virus infection because of their direct communication with the infected patients, vaccination plays a pivotal role in arresting the transmission of HBV infection. So, to know the immune status against HBV transmission among the dental students were evaluated through Anti - Hbs titre values. Methods: 250 candidates were enrolled in the study out of which 113 were reported to receive full or booster dose of Hepatitis B vaccination in their recent past. So a total of 117 candidates who were under clinical training in dental college, were tested for anti - HBs titre. Depending on their result the subjects with titre level less than 10 m IU/ml are considered as low and are susceptibility to get infected, were given full course of dose of hepatitis vaccination. Another group with titre level more than 10 m IU/ml are considered as high titre level and are thus immune to the disease, but since the subjects are unsure about their vaccination past records and are more prone to infection because of their work area, so they were preferred to give only a booster dose. Results: Out of 117 subjects 58.9% and 41.1 % were given full dose and booster dose respectively from their titre values. It has been seen that 66.5% among males and 53.5% among females were given full dose vaccination. Similarly, 33.5% among males and 46.5% among females were given booster dose respectively. Awareness about Hepatitis B vaccination was around 53.2 % who reported to have an idea about the infectious nature of the virus and were vaccinated. Another 46.8% were not vaccinated indicating the need of awareness programs regarding the virus and they were unaware about the vaccination status even the family member have no idea about the virus. Conclusion: Females are either immune to the disease or are more frequent to exposure to the infected blood through various injuries in needle prick injuries than males.***

Keywords: HBV vaccination, HBs antibody, Anti Hbs

1. Introduction

Hepatitis B is potentially infectious and causes serious health problems among worldwide which is problematic nowadays in which almost four hundred million people are chronic carriers and about one third of the world population becomes infected (1) . Among the total worldwide health care workers poses a most potential risk to get infected by HBV. According to WHO, 5.9% of the health care workers mainly the doctors are exposed to blood borne HBV infections each year (2) . Of them 70% of health specialists in endemic countries have been reported to have needle - stick injuries. Risk of Hepatitis infection is also related to HBe antigen status. The use of contaminated needles and blood transfusion, sexual contact of infected person and vertical transmission from mother to fetus are the most common routes of transmission. HBV infection the health care workers are two to ten times at high risk than the normal general population. Health care workers and medical or dental students in clinical years who come directly to the infectious materials are at higher risk (3).

Health specialists who are prone to needle injuries contaminated with blood containing HBV, the risk of developing hepatitis increases. HBV infections without any history of exposure might have caused from direct or indirect blood or fluids exposure which ledto inoculation of HBV into the mucosal surfaces. Recently guidelines published by the American College of Physicians and the centers for disease for Disease Control and Prevention that healthcare providers are classified as adults at risk because they are more prone to get contaminated for their work nature. With proper knowledge they can take precautions to check the disease about HBV (4) .

2. Materials and Methods

Study design: It was a descriptive cross sectional study conducted at Gurunanak Institute of Dental Sciences and Research, Kolkata (GNIDSR) during May to August 2023.

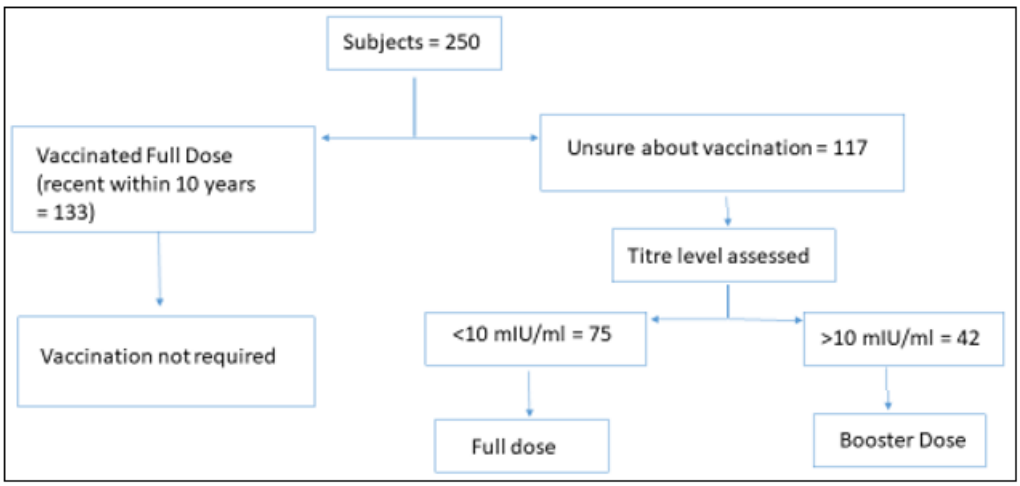
The study group included all the clinical year students of the institution and was conducted after approved by Institutional research and ethics committee and with informed consent form from the participants.

A notification regarding the study was circulated through proper media and were make them participate voluntarily. A self - questionnaire was prepared regarding to his or her knowledge and awareness regarding hepatitis.

The data were all collected and tabulated and analyzed statistically using excel sheet and spss software.

A total sample size of 250 participants were tabulated and of them 133 were reported to have hepatitis vaccination in the last 10 years, so they did not turned up for vaccination.

Another 117 participants were unsure about their immunological status therefore the authority had decided to check the humoral immunity status anti Hbs antibody titre level. Based on the anti HBs titre into following groups 1) non responder (<10 mIU/mL), low (10 - 100 mIU/mL), and sufficient responder (>100 mIU/mL). So based on their titre, participants who were <10 mIU/ml were given full three doses of vaccination. They received three doses of HBV vaccination by injection subcutaneously according to the following recommended doses at 1 - 2 months and 6 - 12 months after the first dose, and for titre level >10mIU were given only booster dose.



3. Results

A total of 250 subjects participated voluntarily in the study and their questionnaire dates were collected and sorted. Those who were unsure about their vaccination, anti Hbs titre were measured. The age and gender distributions are given in figure 1. Based on their titre levels full dose and booster doses are determined. Subjects with titre level less than 10 mIu/ml are considered as low and are susceptibility to get infected, were given full course of dose of hepatitis vaccination. Another group with titre level more than 10 m IU/ml are considered as high titre level and are thus immune to the disease, but since the subjects are unsure about their vaccination past records and are more prone to infection because of their work area, so they were given only a booster dose. Studies shown that no side effects (5) .

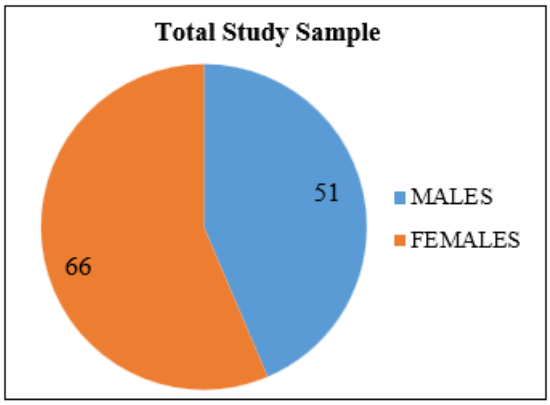


Figure 1: Gender distribution chart

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Chart 2 shows the male and female distribution of full dose and booster dose.35 females were given full dose while 34 males were given full dose as of their low titre level. Similarly for high titre level we found out that 31 females and 17 males were given booster dose.

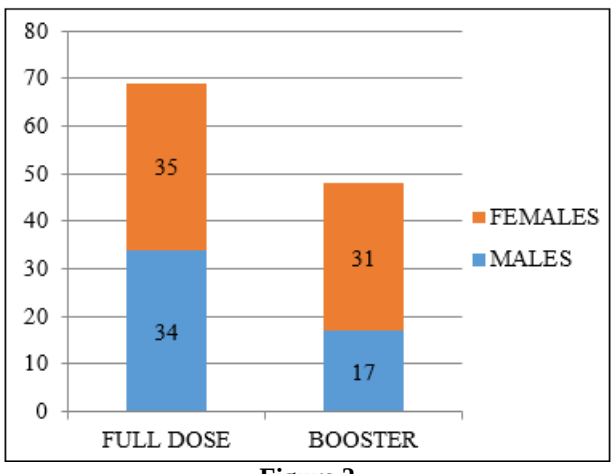

Figure 2

Table 1

	Average Anti Hbs	S. D	P Value
Males	82.7811	224.0012	0.75
Females	71.80435	140.2131	

It was seen that there were no statistical significant difference seen in terms of gender p value > 0.01

Chart show the distribution of full dose and booster dose given among females and it was seen that there is a statistical significance difference seen among female participants

The average Anti Hbs for male and female were found to be 82.78 and 71.80 respectively.

Among female 35 were given a full dose vaccination and 31 were given booster dose. Where average anti - HbAg for full dose vaccinated eligible cadidates were 7 and 178.8 for booster dose.

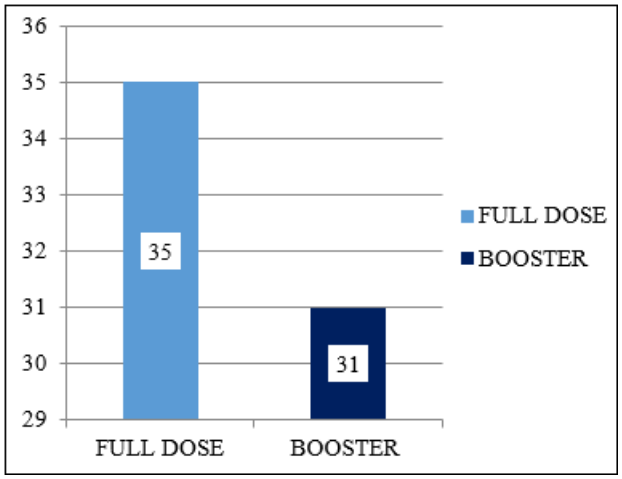

Figure 3

Table 2

Females	Average Anti Hbs	S. D	P Value
Full Dose	7	12.9	0.00017*
Booster	178.8	144	

And among males average Anti Hbs titre found to be 2.63 from 34 male patients and were given a full dose course and on the other hand Anti Hbs titre found to be 243 from 17 male patients who were given booster dose.

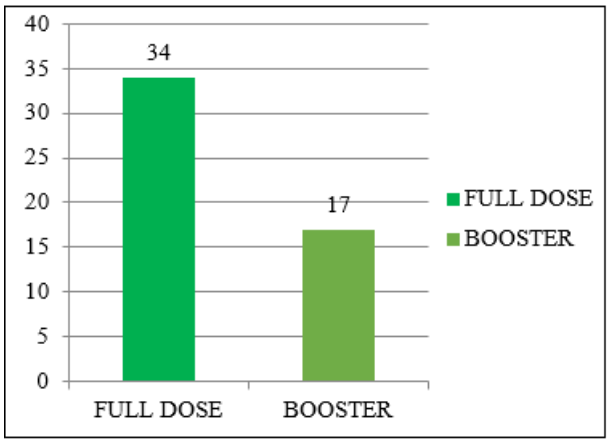

Figure 4

Table 3

Males	Average Anti Hbs	S. D	P Value
Full Dose	2.63	2.5	0.05*
Booster	243	340	

When we compared average Anti Hbs titre levels between males and females for full dose eligible candidates we found a comparable values but not statistical significance differences seen.

Similarly for booster dose candidates when we compared between male and female there were no significant differences seen where average Anti Hbs for males and females were 243 and 178.8 respectively.

Comparison between Male and Females

Table 4

	Average Anti Hbs	S. D	P Value
Males Full Dose	2.63	2.5	0.057*
Females Full Dose	7	12.9	

Table 5

	Average Anti Hbs	S. D	P Value
Males Booster	243	340	0.28
Females Booster	178.8	144	

4. Discussion

In a professional dental college, dental students mainly the clinical posted students who are in final years and interns are in higher risk of needle prick injuries while operating on patients in the department (6) and thus have a much higher risk of getting contaminated with Hepatitis Binfection. Some of the students are also not aware whether they have undergone Hepatitis B vaccination in the recent past or not. So before they operate on the patients in the department the college decided to take protective steps for then students and to get vaccinated (7) . So anAnti Hbs titre level were evaluated and based on the high and low titre levels the decision was made.

The present study reveals a crossectional data of the subjects who have shown their Anti Hbs titre level <10 mIU/mL and >10 mIU/mL. Based on that those who were low titre and high titre were given full dose and booster dose respectively. Worldwide there are almost more than 200 million people who are suffering from chronic HBV infection and more than 0.6 million people die from complications of HBV infection. So one must be vaccinated or immune from the infection. Awareness about Hepatitis B vaccination was around 53.2 % who reported to have an idea about the infectious nature of the virus and were vaccinated. Another 46.8% were not vaccinated indicating the need of awareness programs regarding the virus and they were unaware about the vaccination status even the family member have no idea about the virus.

5. Conclusion

Females are either immune to the disease or are more frequent to exposure to the infected blood through various injuries in needle prick injuries than males. The awareness

for both the candidates and their family is required, Parental awareness is indeed crucial for the success of hepatitis vaccination programs. Educated parents are more likely to understand the importance of vaccinations and ensure their children receive them on time (8). Overall, increasing parental awareness and education about hepatitis vaccination can lead to higher vaccination rates, better public health outcomes, and a reduction in the prevalence of hepatitis and other vaccine - preventable diseases (9). Dental students should receive comprehensive training on hepatitis vaccination due to their increased risk of exposure to bloodborne pathogens during dental procedures. Training can enhance their understanding of the disease, its transmission, and prevention methods, including vaccination protocols. Educational programs can also emphasize the importance of following post - exposure protocols and maintaining good infection control practices (10) . This knowledge is essential not only for their safety but also for the safety of their patients. It is therefore mandatory for dental students to receive hepatitis vaccinations before commencing clinical work. This is a critical safety measure to protect both the students and their future patients from potential infections. Hepatitis vaccinations are a crucial public health tool, but there are some limitations to their use. One of the major obstacles to global hepatitis B vaccination is the poverty and scarcity of human resources in areas that need these vaccines the most (11). Despite their proven effectiveness, hepatitis B vaccines may not induce an adequate immune response in about 5 - 10% of healthy adults. Other barriers to vaccination include concerns over safety, vaccine costs, lack of insurance, and lack of provider recommendation. In developing countries, low coverage of hepatitis B vaccination is often due to the countries' inability to face the hepatitis B burden due to political and financial problems, which can substantially hinder prevention efforts (12). It's also important to note that while the World Health Organization reports no evidence of serious adverse events linked to hepatitis B vaccination, there is a very small risk of anaphylaxis, estimated at about 1.1 cases per million vaccine doses (13).

References

[1] Hepatitis B [Internet]. [cited 2024 Mar 12]. Available from: https: //www.who. int/news - room/fact - sheets/detail/hepatitis - b
[2] Nicola Coppola SDP, Caterina Sagnelli ES. Hepatitis B virus and hepatitis C virus infection in healthcare workers. World J Hepatol.2016 Feb 18; 8 (5): 273–81.
[3] Kwon SY, Lee CH. Epidemiology and prevention of hepatitis B virus infection. Korean J Hepatol.2011 Jun; 17 (2): 87.
[4] Guidelines for Environmental Infection Control in Health - Care Facilities: (545922006 - 001) [Internet].2003 [cited 2024 Mar 13]. Available from: https: //doi. apa. org/doi/10.1037/e545922006 - 001
[5] Okwen MP, Reid S, Njei B, Mbuagbaw L. Hepatitis B vaccination for reducing morbidity and mortality in persons with HIV infection. Cochrane Database Syst Rev [Internet].2014 Oct [cited 2024 Mar 13]; 2014 (10). Available from: https: //www.ncbi. nlm. nih. gov/pmc/articles/PMC4830339/
[6] Huang J, Gan Y, Xu H, Li N, An N, Cai Z. Prevalence and characteristics of needlestick injuries among dental interns during their first - year clinical training: an observational study. BMC Oral Health.2023 Apr 2; 23: 194.
[7] Graupensperger S, Abdallah DA, Lee CM. Social norms and vaccine uptake: College students' COVID vaccination intentions, attitudes, and estimated peer norms and comparisons with influenza vaccine. Vaccine.2021 Apr 8; 39 (15): 2060–7.
[8] Mora T, Trapero - Bertran M. The influence of education on the access to childhood immunization: the case of Spain. BMC Public Health.2018 Jul 18; 18: 893.
[9] Naqid IA, Mosa AA, Ibrahim SV, Ibrahim NH, Hussein NR. Hepatitis B vaccination status and knowledge, attitude, and practice towards Hepatitis B virus among medical sciences students: A cross - sectional study. PLOS ONE.2023 Nov 6; 18 (11): e0293822.
[10] Habboush Y, Yarrarapu SNS, Guzman N. Infection Control. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Mar 22]. Available from: http: //www.ncbi. nlm. nih. gov/books/NBK519017/
[11] Leroux - Roels G, Cao T, De Knibber A, Meuleman P, Roobrouck A, Farhoudi A, et al. Prevention of hepatitis B infections: vaccination and its limitations. Acta Clin Belg.2001; 56 (4): 209–19.
[12] Machmud PB, Glasauer S, Gottschick C, Mikolajczyk R. Knowledge, Vaccination Status, and Reasons for Avoiding Vaccinations against Hepatitis B in Developing Countries: A Systematic Review. Vaccines.2021 Jun 9; 9 (6): 625.
[13] Frequently asked questions on Hepatitis B vaccination in China [Internet]. [cited 2024 Mar 22]. Available from: https: //www.who. int/hongkongchina/news/detail/18 - 08 - 2014 - frequently - asked - questions - on - hepatitis - b - vaccination - in - china