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# Assessment of Awareness and Knowledge of Blood Borne Infection Control among Undergraduates in the C.S.M.S.S Dental College & Hospital, Chh. Sambhajinagar - A Questionnaire-Based Cross Sectional Study

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## ABSTRACT:

**Introduction:** Centers for Disease Control and Prevention (CDC) reports enlighten us about the cardinal fact that around 5.6 million healthcare providers globally are put at risk of occupationally contracting blood borne pathogens namely human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and others. Focus of this study is to determine the cognizance level of blood-borne infection control (IC) amidst C.S.M.S.S undergraduate dental students.
**Materials and methods:** A survey using a questionnaire with 18 questions was conducted from July to September 2024. This was a cross-sectional survey.
**Aim:** The aim of the study was to evaluate the knowledge and awareness of blood borne infection among undergraduates, postgraduates & clinical practitioners of C.SM.S.S Dental College, Chhatrapati Sambhajinagar.
**Objectives:** To assess the knowledge, attitude and awareness regarding blood borne infection among Third year, Final year & interns of C.S.M.S.S Dental College.
**Results:** The research group comprised of 300 students, both male and female, in their third and fourth years as well as interns of C.S.M.S.S Dental college., aged between 20 and 25. Most of the participants were devoid of understanding with respect to the effectiveness of the one-hand needle covering technique, the persistence of HBV, HCV, or HIV, the availability of rapid tests, post-exposure prophylaxis (PEP), the optimal timing for accessing PEP, or the indirect method of infection control (IC).
**Conclusions:** There is lack of awareness about diseases that are transmitted through blood, such as HIV and hepatitis. This shows that there is need for better education on these diseases in the medical field.

***Keywords:*** cross sectional survey; blood borne pathogens; medical education

## 1. INTRODUCTION

A blood-borne disease is a disease that can be spread through contamination by blood and other body fluids. Blood can contain pathogens of various types, chief among which are microorganisms, like bacteria and

parasites, and non-living infectious agents such as viruses. Three blood-borne pathogens in particular, are cited as of primary concern to health workers: Human immunodeficiency virus (HIV), hepatitis B (HBV), & hepatitis C (HCV).[1]

According to CDC estimates, 30.6 million people working in healthcare are at risk of contracting blood-borne pathogens like HIV, HBV, HCV, and others. Various studies in the medical literature delve into blood-borne pathogens. In dental settings, percutaneous injuries from needles or sharp objects pose the highest risk of transmission, with up to one-third of injuries occurring during waste disposal. Using safer medical devices could prevent 62 to 88% of these injuries.[1]

Hepatitis B vaccines have been available since 1981 and remain the primary prevention method. However, the risk of contracting hepatitis B increases depending on the concentration of the virus at the source, ranging from 6 to 30%. The risk of HCV transmission through exposure to infected blood is 1.8%, and there is currently no vaccine or specific post-exposure prophylaxis (PEP) for HCV. However, direct-acting antivirals (DAAs) have significantly increased sustained viral response rates to approximately 90–95% for chronic hepatitis C.[2]

The risk of percutaneous HIV transmission is estimated to be around 0.3%, which is the lowest compared to HBV and HCV. Post-exposure prophylactic drugs are highly effective in preventing HIV if administered within the first 72 hours following exposure. Numerous studies have emphasized the importance of HIV infection control. [3]

The training of dental staff in infection control protocols and safe handling of sharp instruments is crucial. Compliance with OSHA regulations can help decrease the dangers of contact to blood-borne pathogens. Health officials should develop and implement measures to minimize occupational exposure to these pathogens. [4]

Post-exposure prophylaxis (PEP) involves a series of measures to minimize the risk of infectious disease transmission among healthcare professionals. Prompt initiation of PEP is essential following potential exposure to blood-borne pathogens. Initiating antiretroviral therapy within 1-2 hours of a percutaneous injury with a needle contaminated with HIV-positive blood can reduce the risk of transmission by 81%, when exposed to HBsAg-positive blood, the risk can be reduced by nearly 75%. In the case of hepatitis C, even though there isn't a specific PEP available, prompt treatment can help prevent chronic infection.[5]

According to CDC guidelines, post-exposure assessment should occur immediately after exposure, as well as at one week, three months, six months, and twelve months thereafter. The post-exposure protocol plan should be incorporated into the patient's medical record to ensure it is followed. Identifying and mitigating risks to patient safety is a fundamental objective.[6]

The study aimed to evaluate the knowledge of blood-borne infection control among undergraduate dental students in C.S.M.S.S Dental College, Chh. Sambhajinagar, Maharashtra, India.

## 2. MATERIALS AND METHODS

The questionnaire method was used to assess the degree of knowledge of infection control of blood borne pathogen among undergraduate dental students of C.S.M.S.S Dental College, Chh. Sambhajinagar, Maharashtra, India.

### 2.1. Setting and Participants

From July to September of 2024, a cross-sectional investigation was carried out. Third-year, final-year, and interns students of the C.S.M.S.S Dental College and Hospital in Chh. Sambhajinagar, Maharashtra, India were the subjects of the study. Three hundred pupils in all made up the study sample.

### 2.2. The Survey

For this study, a multiple-choice questionnaire with eighteen questions was

used. The questions centered on the students' degree of infection control understanding.

### 2.3. Study Group

Dental students (Third year, Final year & interns) from the C.S.M.S.S Dental College and Hospital were involved in this study.

Third-year students, final-year students, and interns who had consented to participate were the inclusion requirements.

The grounds for exclusion were: individuals who declined to take part. The inquiry form was finished by three hundred pupils.

### 2.4. Demographic Characteristics

Among the demographic information were age, gender, and study year.

### 2.5. Domain: Knowledge Data

The following is how the 18 infection control multiple-choice questions (3, 4, or 5 options) were distributed: five inquiries concerning the ways in which infections are spread in dentistry offices; Five questions assess knowledge about the virus's persistence on surfaces; three questions assess knowledge about the availability of the HBV vaccine and quick tests for HBV, HCV, and HIV infections; and seven questions assess knowledge about the unintentional post-exposure protocol for patients who are infected (HBV, HCV, and HIV). Some of the questions were evaluated using response options on a five-point Likert scale: For questions Q1–Q4, the Likert scale was used to measure agreement, and for questions 12–Q14 and Q16, the Likert scale was used to measure quality.

### 2.6. Data Collection

A descriptive statistic was performed for this study. Pearson's Chi-square test was used for data comparison. Symmetric measurements: nominal by nominal (phi, Cramer's V, contingency coefficient), interval by interval (Pearson's r), and ordinal by ordinal (Spearman correlation) were used. These data were analyzed using IBM SPSS version 26 (IBM, Armonk, NY, USA), with a p less than or equal to 0.05.

## 3. RESULTS

### 3.1. Demographic Data

The study comprised of 300 subjects with an average age of 22.38 years. The distribution of students by gender was female: male = 87.33%:12.67% and by year of study II: III: V = 1:1:1.

### 3.2. Assessing the Perception of the Level of Knowledge on the Modes of Infection Transmission

In a sample of 300 individuals, 73 subjects expressed strong agreement and 101 subjects expressed agreement regarding the transmission of blood-borne infections through direct contact. The differences in responses based on gender or study year were not statistically significant.

Regarding the transmission of blood-borne infections through indirect contact, 127 participants out of 300 expressed agreement. While the differences in responses based on gender were not significant, they varied significantly by study year.

In the same sample, 123 participants agreed that protective equipment is essential when the patient shows no symptoms. The differences in responses based on gender were not significant, but they varied significantly by study year.

Regarding the notification of the doctor when a patient suffers from an infectious disease, 115 participants strongly agreed and 123 agreed out of the sample of 300. The differences in responses based on gender were not significant, but they were significant by study year.

In the same sample, 32 participants strongly agreed and 119 agreed to treat all patients as potentially infected. The differences in responses based on gender were not significant, but they were significant by study year.

**Table 1. Assessing the perception of the knowledge level on the modes of infection transmission. Comparative data and Chi-square correlations.**

| | **Gender** | | | | **Study Year** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **F** | **M** | **p** | **r** | **Third year** | **Final year** | **Interns** | **p** | **r** |
| | **N%** | **N%** | | | **N%** | **N%** | **N%** | | |
| **Q1 = Do you consider that blood-borne infections can be transmitted through direct contact?** | | | | | | | | | |
| Strongly agree | 67 (22.33%) | 6 (2%) | 0.66 | 0.99 | 31 (10.33%) | 25 (8.33%) | 17 (5.66%) | 0.008 | 0.85 |
| Agree | 85 (28.33%) | 16 (5.33%) | | | 21 (7%) | 32 (10.66%) | 48 (16%) | | |
| Undecided | 23 (7.66%) | 4 (1.33%) | | | 11 (3.66%) | 11 (3.66%) | 5 (1.66%) | | |
| Disagree | 66 (22%) | 9 (3%) | | | 30 (10%) | 25 (8.33%) | 20 (6.66%) | | |
| Strongly disagree | 21 (7%) | 3 (1%) | | | 7 (2.33%) | 7 (2.33%) | 10 (3.33%) | | |
| **Q2 = Do you consider that blood-borne infections can be transmitted through indirect contact?** | | | | | | | | | |
| Strongly agree | 15 (5%) | 0 (0%) | 0.26 | 0.99 | 6 (2%) | 4 (1.33%) | 5 (1.66%) | 0.06 | 0.95 |
| Agree | 110 (36.66%) | 17 (5.66%) | | | 35 (11.66%) | 43 (16%) | 49 (16.33%) | | |
| Undecided | 51 (17%) | 5 (1.66%) | | | 25 (8.33%) | 16 (5.33%) | 15 (5%) | | |
| Disagree | 74 (24.66%) | 12 (4%) | | | 33 (11%) | 31 (10.33) | 22 (7.33) | | |
| Strongly disagree | 12 (4%) | 4 (1.33%) | | | 1 (0.33) | 6 (2%) | 9 (3%) | | |
| **Q3 = Do you consider that protection equipment is mandatory if the patient has no symptoms?** | | | | | | | | | |
| Strongly agree | 71 (23.66%) | 13 (4.33%) | 0.28 | -0.02 | 25 (8.33%) | 24 (8%) | 35 (11.66%) | 0.001 | 0.09 |
| Agree | 112 (37.33%) | 11 (3.66%) | | | 55 (18.33) | 39 (13%) | 29 (9.66%) | | |
| Undecided | 57 (19%) | 7 (2.33%) | | | 20 (6.66%) | 22 (7.33) | 22 (7.33) | | |
| Disagree | 16 (5.33%) | 7 (2.33%) | | | 0 (0%) | 12 (4%) | 11 (3.66%) | | |
| Strongly disagree | 6 (2%) | 0 (0%) | | | 0 (0%) | 3 (1%) | 3 (1%) | | |
| **Q4 = Do you consider that the patient is obliged to announce to the doctor if he/she is suffering from an infectious disease?** | | | | | | | | | |
| Strongly agree | 103 (34.33%) | 12 (4%) | 0.9 | -0.08 | 35 (11.66%) | 37 (12.33%) | 43 (16%) | 0.003 | 0.11 |
| Agree | 109 (36.33%) | 14 (9%) | | | 56 (18.66%) | 37 (12.33%) | 30 (10%) | | |
| Undecided | 27 (9%) | 7 (2.33%) | | | 8 (2.66%) | 13 (4.33%) | 13 (4.33%) | | |
| Disagree | 17 (5.66%) | 4 (1.33%) | | | 1 (0.33) | 10 (3.33%) | 10 (3.33%) | | |
| Strongly disagree | 6 (2%) | 1 (0.33) | | | 0 (0%) | 3 (1%) | 4 (1.33%) | | |
| **Q5 = Do you consider that, in general, all patients should be treated as infected?** | | | | | | | | | |
| Strongly agree | 30 (10%) | 3 (1%) | 0.74 | 0.99 | 7 (2.33%) | 7 (2.33%) | 19 (6.33%) | 0.002 | 0.92 |
| Agree | 104 (34.66%) | 15 (5%) | | | 41 (13.66%) | 41 (13.66%) | 37 (12.33%) | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Undecided | 73 (24.33%) | 10 (3.33%) | | | 39 (13%) | 26 (8.66%) | 18 (6%) | | |
| Disagree | 42 (14%) | 9 (3%) | | | 12 (4%) | 20 (6.66%) | 19 (6.33%) | | |
| Strongly disagree | 13 (4.33%) | 1 (0.33) | | | 1 (0.33) | 6 (2%) | 7 (2.33%) | | |

**N = count; * p = significance level; r = Pearson's correlation.**

### 3.3. Assessing the Perception of the Knowledge Level about the Persistence of HBV, HCV, and HIV on Surfaces

Most of the participants, 226 of them, lacked knowledge about the ability of HBV to persist for a minimum of 16 hours on surfaces. The disparity in responses based on gender was not notable, but it was significant based on study year.

The assessment of awareness regarding HCV's persistence on surfaces indicated that 236 participants were unaware of its ability to endure for at least 16 hours. There was no significant difference in responses based on gender, but there was a significant variation based on study year.

The assessment of knowledge regarding HIV's persistence on surfaces revealed that most participants were unaware of its duration. The discrepancy in responses based on gender and study year was significant.

**Table 2. Assessing the perception of the knowledge level about the persistence of HBV, HCV, and HIV on surfaces. Comparative data and Chi-square correlations.**

| | **Gender** | | | | **Study Year** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **F** | **M** | **p** | **r** | **Third year** | **Final year** | **Interns** | **p** | **r** |
| | **N%** | **N%** | | | **N%** | **N%** | **N%** | | |
| **Q6 = What is the persistence time of HBV on a surface?** | | | | | | | | | |
| A few minutes | 17 (5.66%) | 3 (1%) | 0.87 | 0.99 | 5 (1.66%) | 5 (1.66%) | 10 (3.33%) | 0.28 | 0.95 |
| A few hours | 79 (26.33%) | 9 (3%) | | | 23 (7.66%) | 30 (10%) | 35 (11.66%) | | |
| Less than 3 days | 102 (34%) | 16 (5.33%) | | | 43 (16%) | 40 (13.33%) | 35 (11.66%) | | |
| More than 7 days | 64 (21.33%) | 10 (3.33%) | | | 29 (9.66%) | 25 (8.33%) | 20 (6.66%) | | |
| **Q7 = What is the persistence time of HCV on a surface?** | | | | | | | | | |
| A few seconds | 16 (5.33%) | 0 (0%) | 0.39 | 0.99 | 5 (1.66%) | 4 (1.33%) | 7 (2.33%) | 0.02 | 0.92 |
| A few minutes | 68 (22.66%) | 12 (4%) | | | 14 (9%) | 31 (10.33) | 35 (11.66%) | | |
| At most 10 h | 121 (40.33%) | 19 (6.33%) | | | 57 (19%) | 42 (14%) | 41 (13.66%) | | |
| At least 16 h | 57 (19%) | 7 (2.33%) | | | 24 (8%) | 23 (7.66%) | 17 (5.66%) | | |
| **Q8 = What is the persistence time of HIV on a surface?** | | | | | | | | | |
| A few seconds | 6 (2%) | 5 (1.66%) | 0.005 | 0.99 | 2 (0.66%) | 4 (1.33%) | 5 (1.66%) | 0.02 | 0.94 |
| Less than 30 min | 67 (22.33%) | 11 (3.66%) | | | 15 (5%) | 27 (9%) | 36 (12%) | | |
| Less than 60 min | 126 (42%) | 17 (5.66%) | | | 55 (18.33) | 48 (16%) | 40 (13.33%) | | |
| More than 90 min | 63 (21%) | 5 (1.66%) | | | 28 (9.33%) | 21 (7%) | 19 (6.33%) | | |

**N = count; * p = significance level; r = Pearson's correlation.**

### 3.4. Assessing the Perception of the Knowledge Level about the Existence of the HBV Vaccine and Rapid Tests for HBV, HCV, and HIV Infections

The survey results revealed that 207 respondents claimed to have knowledge about the HBV vaccine, while 83 were unaware of its existence. There was no significant difference in responses based on gender or study year.

Furthermore, 195 participants were informed about the availability of rapid detection tests for HBV, with no significant difference based on gender or study year.

Only 133 individuals were knowledgeable about the rapid tests for HCV detection, and there was no significant gender difference, but the variation was significant based on study year.

Out of 300 respondents, 206 were informed about the existence of rapid tests for HIV detection, with no significant gender difference, but the variation was significant by study year.

**Table 3. Assessing the perception of the knowledge level about the existence of the HBV vaccine and rapid tests for HBV, HCV, and HIV infections. Comparative data and Chi-square correlations.**

| | **Gender** | | | | **Study Year** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **F** | **M** | **p** | **r** | **Third year** | **Final year** | **Interns** | **p** | **r** |
| | **N%** | **N%** | | | **N%** | **N%** | **N%** | | |
| **Q9 = Does a vaccine against hepatitis B virus exist?** | | | | | | | | | |
| Yes | 185 (61.66%) | 22 (7.33) | 0.21 | 0.70 | 86 (28.66%) | 63 (21%) | 58 (19.33%) | 1 | 0.81 |
| No | 9 (3%) | 1 (0.33) | | | 1 (0.33) | 2 (0.66%) | 7 (2.33%) | | |
| I do not know | 68 (22.66%) | 15 (5%) | | | 13 (4.33%) | 35 (11.66%) | 35 (11.66%) | | |
| **Q10 = Do you know that quick tests exist for detecting HBV infection?** | | | | | | | | | |
| Yes | 175 (58.33) | 20 (6.66%) | 0.08 | 0.99 | 66 (22%) | 62 (20.66%) | 67 (22.33%) | 0.75 | 0.99 |
| No | 15 (5%) | 1 (0.33) | | | 4 (1.33%) | 5 (1.66%) | 7 (2.33%) | | |
| I do not know | 72 (24%) | 17 (5.66%) | | | 30 (10%) | 33 (11%) | 26 (8.66%) | | |
| **Q11=Do you know that quick tests exist for detecting HCV infection?** | | | | | | | | | |
| Yes | 118 (39.33%) | 15 (5%) | 0.24 | 0.99 | 39 (13%) | 43 (16%) | 51 (17%) | 0.05 | 0.93 |
| No | 32 (10.66%) | 2 (0.66%) | | | 9 (3%) | 9 (3%) | 16 (5.33%) | | |
| I do not know | 112 (37.33%) | 21 (7%) | | | 52 (17.33%) | 48 (16%) | 33 (11%) | | |
| **Q12 = Do you know that quick tests exist for detecting HIV infection?** | | | | | | | | | |
| Yes | 182 (60.66%) | 24 (8%) | 0.61 | 0.99 | 72 (24%) | 73 (24.33%) | 61 (20.33%) | 0.07 | 0.98 |
| No | 28 (9.33%) | 6 (2%) | | | 6 (2%) | 10 (3.33%) | 18 (6%) | | |
| I do not know | 52 (17.33%) | 8 (2.66%) | | | 22 (7.33) | 17 (5.66%) | 21 (7%) | | |

**N = count; * p = significance level; r = Pearson's correlation.**

### 3.5. Assessing the Perception of the Knowledge Level Regarding the Accidental Post-Exposure Protocol for HBV-, HCV-, and HIV-Infected Blood

The assessment of how the subjects perceive their knowledge of the accidental post-exposure protocol for patients with HBV, HCV, and HIV indicated that the number of students who felt confident in their

understanding of the protocol was as follows: for HBV, 180; for HCV, 215; and for HIV, 195. There was no significant difference in responses based on the study year relation to knowledge of the accidental post-exposure protocol for patients with HBV, HCV, and HIV. There was a significant difference in responses based on gender in relation to knowledge of the post-exposure protocol for individuals exposed to HBV and HCV. There was no significant difference in responses based on gender in relation to knowledge of the post-exposure protocol for individuals exposed to

**Table 4. Assessing the perception of the knowledge level regarding the accidental post-exposure protocol for HBV-, HCV-, and HIV-infected blood. Comparative data and Chi-square correlations.**

| | **Gender** | | | | **Study Year** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **F** | **M** | **p** | **r** | **Third year** | **Final year** | **Interns** | **p** | **r** |
| | **N%** | **N%** | | | **N%** | **N%** | **N%** | | |
| **Q13 = Do you consider that you know the post-exposure protocol in the case of existence of contact with a HBV-infected person?** | | | | | | | | | |
| Strongly agree | 71 (23.66%) | 5 (1.66%) | 0.02 | 0.99 | 26 (8.66%) | 24 (8%) | 18 (6%) | 0.12 | 0.98 |
| Agree | 128 (42.66%) | 17 (5.66%) | | | 50 (16.66%) | 50 (16.66%) | 45 (15%) | | |
| Undecided | 39 (13%) | 9 (3%) | | | 21 (7%) | 12 (4%) | 15 (5%) | | |
| Disagree | 12 (4%) | 1 (0.33) | | | 3 (1%) | 5 (1.66%) | 5 (1.66%) | | |
| Strongly disagree | 12 (4%) | 6 (2%) | | | 0 (0%) | 9 (3%) | 9 (3%) | | |
| **Q14 = Do you consider that you know the post-exposure protocol in the case of existence of contact with a HCV-infected person?** | | | | | | | | | |
| Strongly agree | 64 (21.33%) | 3 (1%) | 0.006 | 0.99 | 29 (9.66%) | 21 (7%) | 17 (5.66%) | 0.27 | 0.98 |
| Agree | 131 (43.66%) | 17 (5.66%) | | | 49 (16.33%) | 48 (16%) | 51 (17%) | | |
| Undecided | 39 (13%) | 13 (4.33%) | | | 15 (5%) | 17 (5.66%) | 20 (6.66%) | | |
| Disagree | 21 (7%) | 2 (0.66%) | | | 7 (2.33%) | 8 (2.66%) | 8 (2.66%) | | |
| Strongly disagree | 7 (2.33%) | 3 (1%) | | | 0 (0%) | 6 (2%) | 4 (1.33%) | | |
| **Q15 = Do you consider that you know the post-exposure protocol in the case of existence of contact with a HIV-infected person?** | | | | | | | | | |
| Strongly agree | 56 (18.66%) | 7 (2.33%) | 0.5 | 0.99 | 25 (8.33%) | 19 (6.33%) | 19 (6.33%) | 0.25 | 0.97 |
| Agree | 116 (38.66%) | 15 (5%) | | | 47 (15.66%) | 46 (15.33%) | 38 (12.66%) | | |
| Undecided | 52 (17.33%) | 9 (3%) | | | 17 (5.66%) | 17 (5.66%) | 27 (9%) | | |
| Disagree | 31 (10.33) | 4 (1.33%) | | | 11 (3.66%) | 11 (3.66%) | 12 (4%) | | |
| Strongly disagree | 7 (2.33%) | 3 (1%) | | | 0 (0%) | 5 (1.66%) | 4 (1.33%) | | |

**N = count; * p = significance level; r = Pearson's correlation.**

### 3.6. Assessing the Perception of the Knowledge Level Regarding the Post-Exposure Attitude in the Case of a Patient Contaminated with HBV, HCV, or HIV and the Knowledge on the Technique of One-Hand Needle Cover

Only 71 (60:11/25:24:23) subjects knew that in the case of accidental exposure to contaminated fluid, respectively, blood, they must perform immediate testing. The difference was not significant in responses based on gender but was significant based on study year.

The effectiveness of the one-hand needle covering technique in preventing blood-borne infections was strongly supported by 136 subjects, while 52 (17.33%) agreed with the technique. There was no significant difference in responses based on gender or study year.

The optimal time to access the epidemiological service after accidental exposure to blood-contaminated objects was considered by subjects to be at least one day; 75 subjects, at most one day; 108 subjects, not more than one hour; 60 subjects, not more than one week, and 7 (2.33%) subjects, not more than 3 months, on the occasion of performing the analyzes. The difference was not significant in responses based on gender or study year.

**Table 5. Assessing the perception of the knowledge level regarding the post-exposure attitude in the case of a patient contaminated with HBV, HCV, or HIV and the knowledge on the technique of one-hand needle cover. Comparative data and Chi-square correlations.**

| | **Gender** | | | | **Study Year** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **F** | **M** | **p** | **r** | **Third year** | **Final year** | **Interns** | **p** | **r** |
| | **N%** | **N%** | | | **N%** | **N%** | **N%** | | |
| **Q16 = The post-exposure protocol implies testing for HBV, HCV, and HIV at the following intervals of time.** | | | | | | | | | |
| Immediately, at 3 months, and at 6 months | 60 (20%) | 11 (3.66%) | 0.06 | 0.99 | 25 (8.33%) | 24 (8%) | 23 (7.66%) | 0.0001 | 0.67 |
| At 3 and at 6 months if the patient has no symptoms | 25 (8.33%) | 9 (3%) | | | 0 (0%) | 11 (3.66%) | 23 (7.66%) | | |
| At 3 months, at 6 months and at 9 months if the patient has no Symptoms | 65 (21.66%) | 7 (2.33%) | | | 25 (8.33%) | 28 (9.33%) | 19 (6.33%) | | |
| I do not know | 50 (16.66%) | 6 (2%) | | | 22 (7.33) | 21 (7%) | 13 (4.33%) | | |
| I am not testing | 62 (20.66%) | 5 (1.66%) | | | 28 (9.33%) | 17 (5.66%) | 22 (7.33) | | |
| **Q17 = Do you consider that the one-hand covering technique of the needle is efficient in preventing blood-borne infections?** | | | | | | | | | |
| Strongly agree | 118 (39.33%) | 18 (6%) | 0.67 | 0.99 | 48 (16%) | 46 (15.33%) | 42 (14%) | 0.06 | 0.97 |
| Agree | 45 (15%) | 7 (2.33%) | | | 20 (6.66%) | 12 (4%) | 20 (6.66%) | | |
| Undecided | 64 (21.33%) | 11 (3.66%) | | | 24 (8%) | 30 (10%) | 21 (7%) | | |
| Disagree | 7 (2.33%) | 0 (0%) | | | 1 (0.33) | 0 (0%) | 6 (2%) | | |
| Strongly disagree | 28 (9.33%) | 2 (0.66%) | | | 7 (2.33%) | 12 (4%) | 11 (3.66%) | | |
| **Q18 = What is the optimal time to access the epidemiological service after accidental exposure to blood-contaminated objects?** | | | | | | | | | |
| At least one day | 70 (23.33%) | 5 (1.66%) | 0.06 | 0.99 | 25 (8.33%) | 27 (9%) | 23 (7.66%) | 0.59 | 0.98 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| At most one day | 95 (31.66%) | 13 (4.33%) | | | 35 (11.66%) | 35 (11.66%) | 38 (12.66%) | | |
| Not more than one hour | 46 (15.33%) | 14 (4.66%) | | | 19 (6.33%) | 19 (6.33%) | 22 (7.33) | | |
| Not more than one week | 45 (15%) | 5 (1.66%) | | | 21 (7%) | 16 (5.33%) | 13 (4.33%) | | |
| Not more than 3 months when we perform analyzes | 6 (2%) | 1 (0.33) | | | 0 (0%) | 3 (1%) | 4 (1.33%) | | |

**N = count; * p = significance level; r = Pearson's correlation.**

## 4. DISCUSSION

Healthcare workers in the dental field face an increased risk of exposure to blood-borne pathogens such as hepatitis B virus, hepatitis C virus, and HIV, primarily from percutaneous injury during their daily activities. Accidental cuts during invasive procedures, particularly needle stick injuries, are the most common routes for blood-borne pathogens.[7]

In the assessment of the perception of knowledge about the existence of the HBV vaccine, dentists, despite implementing basic preventive measures, may still be at risk of exposure to pathogens during their clinical work. To prevent cross-infection, it is important to take additional safety precautions alongside vaccination and proper adherence to post-exposure protocols.[8]

When evaluating the perception of knowledge regarding accidental post-exposure protocol for HBV-, HCV-, HIV-infected patients and the technique of one-hand needle cover, it is crucial to administer PEP preferably within the first hour for maximum effectiveness. A delay of 24–72 hours may still be allowed, but its effectiveness in preventing infection decreases considerably after this time. In the case of HIV, administering PEP within the first hour limits the proliferation of the virus in dendritic cells or lymph nodes, thus preventing systemic infection.[9]

Higher knowledge of the pathogenesis of microorganisms and ways to prevent accidents at work should lead to more positive attitudes and practices, thereby reducing the frequency of accidents. Knowledge is an important tool in promoting adherence to protocols.[10]

Future dental professionals can prevent such incidents by strengthening adherence to standard precautions for all patients, staying vigilant about potential sources of contamination, replacing high-risk practices like needle re-capping with safer alternatives, and participating in ongoing educational programs throughout their careers.[11]

Further research is required to explore ways to enhance safety measures in dental practice, increase students' understanding of infection control, and adapt teaching approaches to align with current prevention concepts. Educational technologies such as virtual reality could help dental students improve their skills in a safe environment and learn surgical procedures using secure tools, thereby boosting their confidence in high-risk scenarios. The use of such technologies for infection control education holds great potential, as initial feedback has been positive.[12]

The risk of bloodborne infection in the dentist's office is considerable. pathogens, which are constantly exposed to blood and saliva. mixed with blood, and may even suffer needle punctures. The Key to reducing or preventing the transmission of different types Microorganisms to the dentist are strictly adherent to the infection control practices. [13]

Insufficient training in gastrointestinal hygiene could be a contributing factor in control measures, insufficient supply of personal protective devices, and negligence. [14]

In a study conducted in the year 2022 by Catalina Iulia Saveanu, Gianina Dărăbăneanu, Livia Ionela Bobu, Daniela Anistoroaei, Irina Bamboi and Alexandra

Ecaterina Saveanu among Romanian dental students revealed that only half of the participants were aware that blood-borne pathogens are transmitted solely through direct contact and were unaware of the persistence times of blood-borne pathogens on surfaces, post-exposure prophylaxis (PEP), or the availability of rapid detection tests for HBV, HCV, and HIV. Less than a quarter of the participants were unaware of the requirement for protective equipment and did not know about the availability of vaccines or the optimal timing for accessing epidemiological services following accidental exposure to blood-contaminated objects. They concluded that necessary educational measures need to be taken to minimize the risk of infection by blood borne pathogens among dental students, we've arrived on a similar conclusion. [15]

### *Study Limitations*

This study's clinical significance lies in the fact that lack of knowledge in the areas assessed exposed medical team members to a high biological risk, with insufficient control over infection transmission.

The limitations of this study stem from its nature as a cross-sectional questionnaire study. Another limitation is the small number of participants, uneven gender distribution with more female subjects, random subject and study year selection, and lack of bias assessment.

## CONCLUSION

Based on this study, it is evident that more comprehensive and individualized educational measures are essential to provide future professionals with working conditions that minimize risks.

### *Declaration by Authors*

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## REFERENCES

1. United States Department of Labor, Occupational Safety and Health Administration. Bloodborne Pathogens and Needlestick Prevention.
2. Jiménez-Pérez, M.; González-Grande, R.; España Contreras, P.; Pinazo Martínez, I.; de la Cruz Lombardo, J.; Olmedo Martín, R.
3. Treatment of chronic hepatitis C with direct-acting antivirals: The role of resistance. World J. Gastroenterol. 2016, 22, 6573–6581.
4. Li, R.; Dong, W.; He, W.; Liu, Y. Chinese dental students' knowledge and attitudes toward HIV/AIDS. J. Dent. Sci. 2016, 11, 72–78.
5. Denault, D.I.; Gardner, H. OSHA standards for blood-borne pathogens. In StatPearls; StatPearls Publishing: Treasure Island, FL, USA, 2022.
6. Fatima, A.; Alam, S.; Iftekhar, H.; Tewari, R.K.; Andrabi, S.M.; Faraz, A.A. Knowledge, practice, and awareness of dental undergraduate and postgraduate students toward postexposure prophylaxis and needlestick injuries: A descriptive cross sectional institutional dental hospital study. J. Oral Res. Rev. 2021, 13, 106–114.
7. Rodziewicz, T.L.; Houseman, B.; Hipskind, J.E. Medical Error Reduction and Prevention. In StatPearls; StatPearls Publishing: Treasure Island, FL, USA, 2022.
8. Al-Maweri, S.A.; Tarakji, B.; Shugaa-Addin, B.; Al-Shamiri, H.M.; Alaizari, N.A.; AlMasri, O. Infection control: Knowledge and compliance among Saudi undergraduate

dental students. GMS Hyg. Infect. Control 2015, 10, Doc10.
9. Maltezou, H.C.; Rahiotis, C.; Tseroni, M.; Madianos, P.; Tzoutzas, I. Attitudes toward Vaccinations and Vaccination Coverage. Rates among Dental Students in Greece. Int. J. Environ. Res. Public Health 2022, 19, 2879.
10. Garus-Pakowska, A.; Górajski, M.; Gaszy´ nska, E. Occupational Safety and Hygiene of Dentists from Urban and Rural Areas in Terms of Sharp Injuries: Wound Structure, Causes of Injuries and Barriers to Reporting-Cross-Sectional Study, Poland. Int. J. Environ. Res. Public Health 2018, 15, 1655.
11. Stone, S.; Orsini, C.; Hussain, A.; Vital, S.; Crothers, A.;Walmsley, D. Curriculum content and assessment of pre-clinical dental skills: A survey of undergraduate dental education in Europe. Eur. J. Dent. Educ. 2018, 22, 122–127.
12. Wang, D.; Li, T.; Zhang, Y.; Hou, J. Survey on multisensory feedback virtual reality dental training systems. Eur. J. Dent. Educ. 2016, 20, 248–260.
13. Ren, Q.; Wang, Y.; Zheng, Q.; Ye, L.; Zhou, X.D.; Zhang, L.L. Survey of student attitudes towards digital simulation technologies at a dental school in China. Eur. J. Dent. Educ. 2017, 21, 180–186.
14. Puri P. Tackling the hepatitis B disease burden in India. Journal of clinical and experimental hepatology. 2014; 4(4):312-9.
15. Singh, B. M. Purohit, A. Bhambal, S. Saxena, and A. Gupta, "Knowledge, attitudes, and practice regarding infection control measures among dental students in Central India," Journal of Dental Education, vol. 75, no. 3, pp. 421–427, 2011.
16. Saveanu, C.I.; D ˘ar ˘ab ˘aneanu,G.; Bobu, L.I.; Anistoroaei, D.;Bamboi, I.; Ciortescu, I.; Saveanu,A.E. A Cross-Sectional Questionnaire-Based Survey on Blood-Borne Infection Control among Romanian Dental Students. Medicina 2022, 58,1268

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