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Infection control Knowledge, Attitude and Practices among Undergraduate Dental Students- A Cross Sectional Questionnaire Based Study

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Abstract

Background - The field of dentistry shows high prevalence of bloodborne and airborne infection transmission . In previous studies a link has been established between the clinical injury to the operator and the knowledge regarding infection control and prevention . **Method** - A questionnaire based cross sectional study was carried among students working in clinics . It contained both open and close end questions . **Result** - The collected data was statistically analysed. Students were assessed based on KAP (Knowledge, Attitude, and Practices) score . **Conclusion** - There is a need to fill the gap between the knowledge of the students and the standard practices of infection control . This can be done by arranging awareness programs and practical workshops before students start with their clinical posting

Keywords: Infection control , infectious diseases , clinical practices , knowledge

I. INTRODUCTION

Infection control and its Prevention has emerged as a crucial aspect of dentistry as it is pivotal in balancing effective patient care with safety and protection of healthcare professionals¹ . The dental profession has been at the centre of infection control due to high risk of cross-contamination between patients and the health care personnel² .

The right knowledge, a positive attitude, and good practices altogether form the basic framework to guide dental students as well as dentists in treating and serving their patients³ . According to the latest report of UNAIDS approximately 40.8 million people globally were living with HIV at the end of 2024⁴ . Despite India has shown 48.7% decline in annual new infections since 2010 (National AIDS Control Organisation) it is of utmost importance to consider the possibility of patient to be a potential risk for HIV . According to the latest WHO Global Hepatitis Report , India holds the second highest global burden of Hepatitis C cases . The patients with blood borne infections are often asymptomatic , it is stated by the Centres For Disease Control And Prevention that all blood as well as body fluids contaminated by blood should be treated to be infectious⁵ .

University education regarding this topic plays an important role in spreading public health awareness among future practitioners⁶ . This study aims to

assess the awareness of dental students regarding infection control and evaluate their adherence to recommended infection control practices .

II. MATERIALS AND METHOD

A cross -sectional study design was employed to conduct this study . A questionnaire comprising of closed end as well as open end questions was circulated through google form among the target population . The target population for this study were third year students , final year students , and interns . They were selected due to their clinical exposure , which increases their vulnerability to healthcare associated infections . The first year students , and second year students were exempted from this study . The data collected was analysed statistically and studied for the results .

III. ETHICAL CONSIDERATION

The aim of the study as well as the type of questions and their format was explained to the participants . The participation record was kept anonymous . People who refrained from participating were excluded from the study . The confidentiality of the

responses to open end and closed end questions was maintained.

IV. RESULTS

Total of 130 students participated in the study . Third year undergraduate dental students comprised the highest proportion of the study population, followed by interns, while final year students constituted the lowest proportion .

Basic Analysis :-

Distribution of survey respondents by Academic year

The responses are from 3rd,4th year students and Interns. Out of 130 participants 77 were 3rd year students, 37 were 4th year students and 16 were interns.

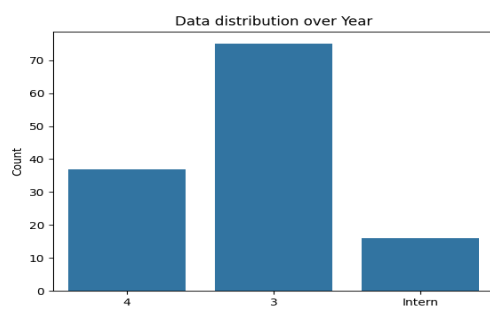


Table 1: Distribution of survey respondents by Academic year

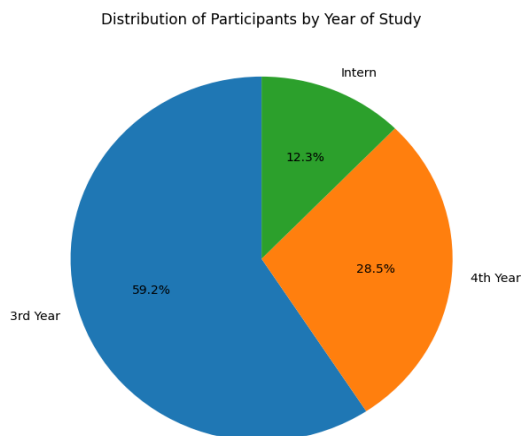


Table 2: Participant Distribution

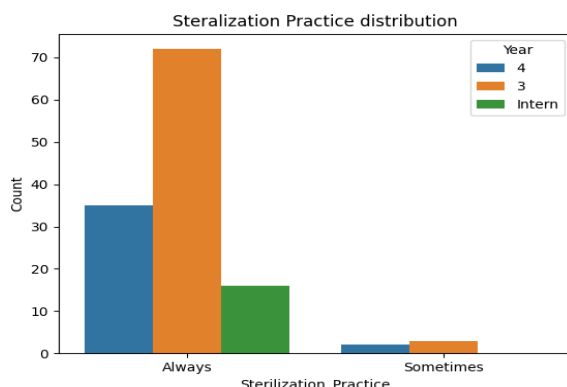


Table 3 -Distribution over frequency of students who properly sterilize dental instruments

Table number 3 shows that 94.81% of 3rd year students , 94.59% of 4th year students, and 100% of interns always sterilise the dental instruments before and after use . P value 0.7 indicates that there is no significant statistical association between the disinfection of instruments and the infection control .

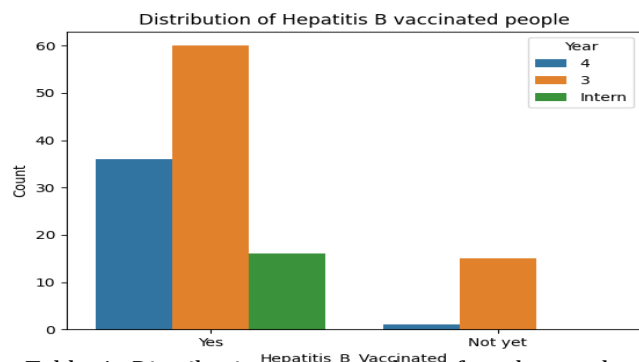


Table 4 -Distribution over number of students who have got the Hepatitis B Vaccine.

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Response/Opti on	3rd Year	4th Year	Intern	Chi squar e value	P squar e
Not yet	15 (19.48%)	1 (2.7%)	0 (0.0%)	26.418	0.00 (S)
Yes	62 (80.52%)	36 (97.3%)	16 (100.0%)		

Table 5 - Graph showing the answers for the question - What type of waste is common generated in clinics

Response/Opti on	3rd Year	4th Year	Intern	Chi squar e	P Valu e
Anatomical.	2 (2.6%)	0 (0.0%)	1 (6.25%)	9.0334	0.43 (NS)
Contaminated sharps.	15 (19.48%)	12 (32.43%)	2 (12.5%)		
Infectious.	59 (76.62%)	24 (64.86%)	13 (81.25%)		
Radioactive.	1 (1.3%)	1 (2.7%)	0 (0.0%)		

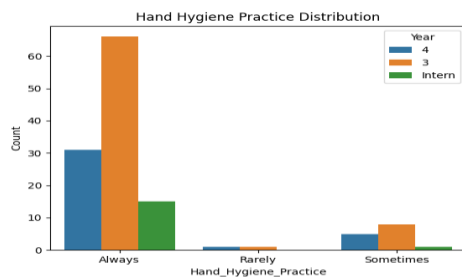


Table 6 - Distribution over hand hygiene practice between clinical procedures

Response /Option	3rd Year	4th Year	Intern	Chi square	P value
Always	67 (87.01 %)	31 (83.78 %)	15 (93.75 %)	1.718	0.944 (NS)
Rarely	1 (1.3%)	1 (2.7%)	0 (0.0%)		
Sometimes	9 (11.69 %)	5 (13.51 %)	1 (6.25 %)		

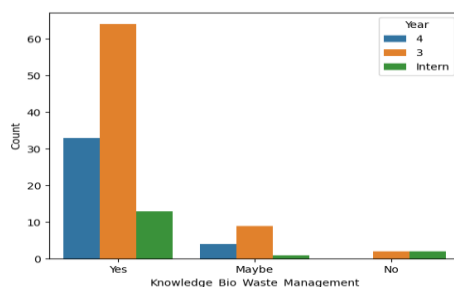


Table 7 - Distribution over Knowledge of disposal of the Biomedical waste.

Response /Option	3rd Year	4th Year	Intern	Chi square	P value
Maybe	9 (11.69 %)	4 (10.81 %)	1 (6.25 %)	15.032	0.020 (S)
No	2 (2.6%)	0 (0.0%)	2 (12.5 %)		
Yes	66 (85.71 %)	33 (89.19 %)	13 (81.25 %)		

Table number 7 shows that 85 % of 3rd year students , 33% of 4th year students , and 13% of interns are confident in their knowledge about biomedical waste . P value 0.02 indicates that there is a significant statistical association between the knowledge of biomedical waste disposal and infection control.

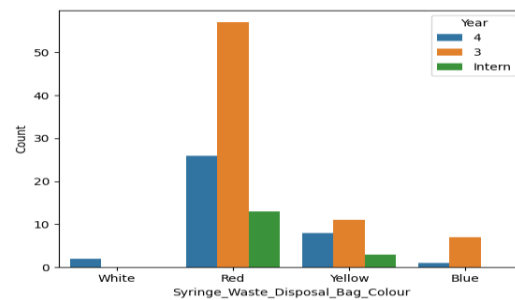


Table 8 - Distribution over the answer of question - which colour bag should be used to dispose needleless syringes?

Response/Option	3rd Year	4th Year	Intern	Chi square	P value
Blue	7 (9.09%)	1 (2.7%)	0 (0.0%)	41.988	0.000 (S)
Red	58 (75.32%)	26 (70.27%)	13 (81.25%)		
White	0 (0.0%)	2 (5.41%)	0 (0.0%)		
Yellow	12 (15.58%)	8 (21.62%)	3 (18.75%)		

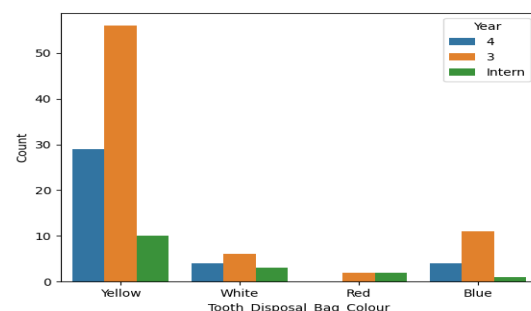


Table number 8 shows that 75.32% of 3rd year students , 79.27% of 4th students , and 81.25% of interns answered the question correctly , that is " Red " . P value is less than 0.001 which indicates the significant statistical association between the knowledge of biomedical waste container and the infection control .

Table 9 -Distribution over answer of the question - In which colour bag the extracted tooth should be disposed?

Response/Option	3rd Year	4th Year	Intern	Chi square	P value
Blue	11 (14.29 %)	4 (10.81 %)	1 (6.25%)	18.857	0.026 (S)

Red	2 (2.6%)	0 (0.0%)	2 (12.5%)		
White	6 (7.79%)	4 (10.81%)	3 (18.75%)		
Yellow	58 (75.32%)	29 (78.38%)	10 (62.5%)		

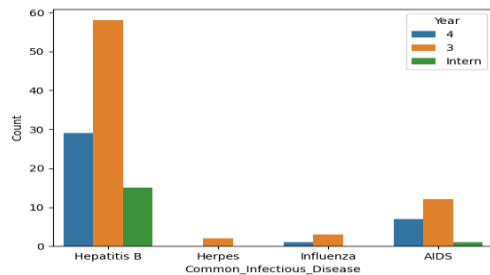


Table 10 - Distribution over answer of question- Most common infectious disease among dentist

Response /Option	3rd Year	4th Year	Intern	Chi square	P value
AIDS	12 (15.58%)	7 (18.92%)	1 (6.25%)	45.751	0.000 (S)
Hepatitis B	60 (77.92%)	29 (78.38%)	15 (93.75%)		
Herpes	2 (2.6%)	0 (0.0%)	0 (0.0%)		
Influenza	3 (3.9%)	1 (2.7%)	0 (0.0%)		

Table 10 shows that 77.92% of 3rd year students , 78.38% of 4th year students , and 93.75 % of interns answered the question correctly that is " Hepatitis B ". P value is less than 0.01 which indicates the significant statistical association between the knowledge of most common infectious disease and the infection control .

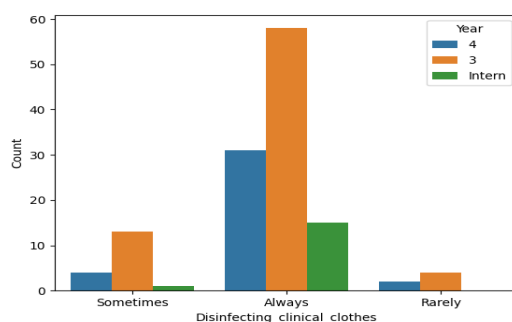


Table 11 - Distribution over Disinfecting clinical clothes after work

Response/Option	3rd Year	4th Year	Intern	Chi square	P value
Always	59 (76.62%)	31 (83.78%)	15 (93.75%)	4.052	0.670 (NS)
Rarely	4 (5.19%)	2 (5.41%)	0 (0.0%)		
Sometimes	14 (18.18%)	4 (10.81%)	1 (6.25%)		

Table 11 shows that 76.62% of 3rd year students , 83.78 % of 4th year students , and 93% of interns always disinfect their clinic clothes after their clinical work . P value is 0.6 which indicates no significant statistical association between the disinfection of clinic clothes and infection control .

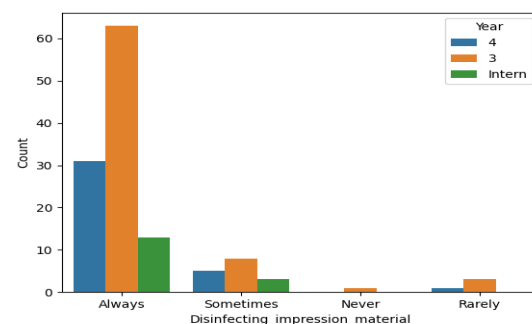


Table 12 - Distribution over disinfecting impression material

Response/Option	3rd Year	4th Year	Intern	Chi Square	P value
Always	65 (84.42%)	31 (83.78%)	13 (81.25%)	3.429	0.945 (NS)
Never	1 (1.3%)	0 (0.0%)	0 (0.0%)		
Rarely	3 (3.9%)	1 (2.7%)	0 (0.0%)		
Sometimes	8 (10.39%)	5 (13.51%)	3 (18.75%)		

Table number 12 shows that 84.42% of 3rd year students , 83.78% of 4th year students , and 81% of interns always disinfect the impression material after used in patient's oral cavity . P value is 0.945 which indicates that there is no significant statistical association between the impression disinfection and the infection control .

Table 13 - Distribution over solution used to disinfect impression material

Response/Option	3rd Year	4th Year	Intern	Chi square	P value
1% sodium hypochlorite	15 (19.48 %)	8 (21.62 %)	4 (25.0%)	6.089	0.731
1%peracetic acid	1 (1.3%)	1 (2.7%)	1 (6.25%)		
2% gluteraldehyde	58 (75.32 %)	27 (72.97 %)	9 (56.25 %)		
2%chlorhexidine	3 (3.9%)	1 (2.7%)	2 (12.5%)		

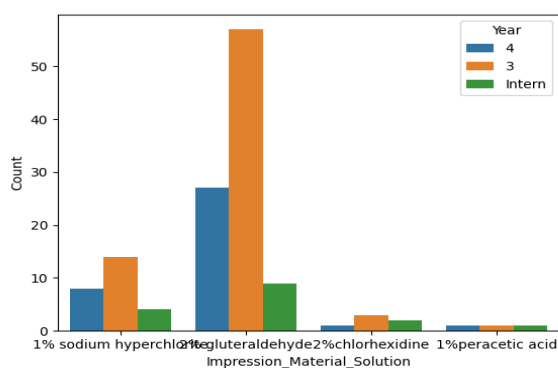


Table number 13 shows that 75% of 3rd year students, 72% of 4th year students, and 56% of interns have answered the question correctly, that is "2% gluteraldehyde". The second correct option for this question is "1% sodium hypochlorite". P value is 0.731 which indicates that there is no significant statistical association between the knowledge of solution used for disinfection of impression and infection control.

Advanced Analysis:-

Creation Of KAP Score -

KAP Score stands for Knowledge, Attitude, and Practice Score.

K,A,P score is calculated individually. This is done by dividing the data in three segments.

Knowledge- Data which provides the information regarding the knowledge of participants in the following area -

BMW Management, Syringe Disposal bag colour, Common Infectious Disease, Common Waste Type, Impression Material Solution.

Attitude- Data which provides the information regarding the attitude of participants towards safety -

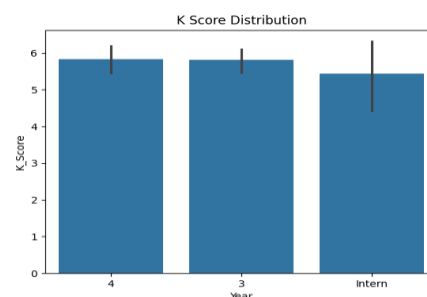
Hepatitis B Vaccination, needle stick injury.

Practice- Data which provides the information regarding practical habits of participants -

Sterilization Practice, Hand Hygiene Practice, Disinfect Clinic Clothes, Disinfect Impression Material

Knowledge Score (K Score):

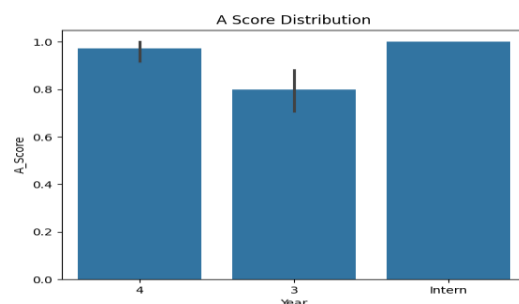
A set of dentistry related questions was included in the questionnaire to assess the knowledge of participants. The responses from participants were scored to quantify their level of knowledge. For each correct answer they will get +1 K Score. Some questions had two correct answers for which the 1st priority answer will get +2 score and 2nd priority answer will get +1 score and wrong answer will get 0.



Attitude Score (A Score):

There was a single closed end question to check the attitude of the student, that being the Hepatitis B vaccination status of the participants. The open end question regarding the techniques to prevent needle stuck injury also comes under this category. This question reflects attitude of an individual towards his/her safety and how well they follow the guidelines.

The person who is vaccinated will get +1 A Score.

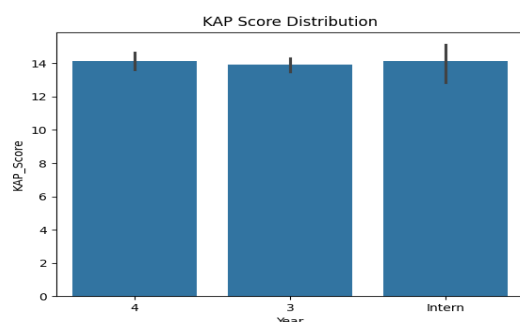


P Score Distribution -

Knowledge, Attitude, and Practice Score (KAP Score):

$$\text{KAP Score} = \text{K Score} + \text{A Score} + \text{P Score}$$

Let's see the final KAP Score Distribution-



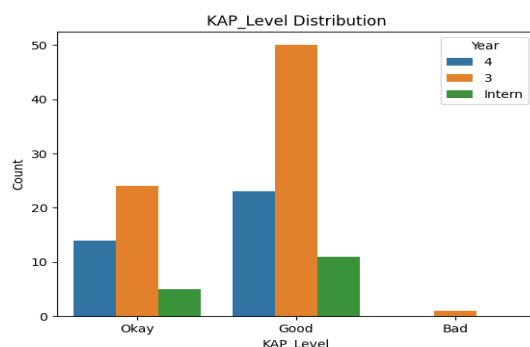
Now we assign a level to each student based on their scores like grading. "Good", "Okay", "Bad".

"Good"- if scored 75% i.e. (14-18)

"Okay"- if scored between 50% to 74% i.e.(9-13)

"Bad"- if scored less than 50% (< 8)

KAP Level Distribution -



Chi Squared Analysis-

When p-value < 0.05 means the difference in knowledge between the group of participants is significant for that particular question else non significant.

V. DISCUSSION

The bedrock of this study is to assess the knowledge, attitude, and practices of the dental students. In the previous studies an association was made between the injuries that occur in the clinic to that of the infection control knowledge of the practitioner⁷.

Vaccination – vaccination is among the most successful ways to ensure prevention of infectious diseases among Clinical practitioner as well as public⁹. It constitutes a fundamental component of infection control and prevention. It is therefore advisable for all the dental students to get vaccinated for infectious diseases like Hepatitis B.

Sterilization and disinfection – It is of utmost importance to ensure proper sterilization of the instruments to prevent the cross infection. All the students should have adequate knowledge regarding sterilisation and disinfection. Even though a good proportion of students adhere to the practice of

proper sterilization, it is important for the rest to give it importance as well. Around 1% of students don't disinfection the impression taken in the oral cavity of the patient. There's a need to incorporate the practice of disinfection.

Biomedical waste - The world health organisation has laid down the goals for healthcare system with minimising and adequately maintaining the waste being an important aspect of it¹⁰. Therefore it is the first duty of the clinicians to properly dispose waste generated in the clinic making it the utmost important for them to have proper knowledge about it. It is seen from the results of this study that there are a moderate proportion of participants with less awareness about the biomedical waste disposal. This knowledge is crucial and should be incorporated in all dental students.

Knowledge of potential diseases – The operator should have proper knowledge of all the potential infectious diseases of dental setting. This includes not just HIV and Hepatitis B and C but also diseases transferred through aerosols. Contaminated surfaces of ultrasonic scalers, hand piece, air polishers should also be considered for potential infections⁸. The result of the given study depicts that the participants are well aware about the potential blood borne risks like Hepatitis B. The same should be for other infections as well.

Use of protective barriers - Dental health care personnel carries an increased risk of occupational exposure to airborne infections as well as blood borne infections¹¹. It is therefore important for students to disinfect their clinic clothes. It is also important to dispose the mask and gloves after a single use.

Potential workplace hazards – The level of workplace hazard in dentistry is found to be high worldwide¹². Out of all the types of exposure to infection in dental clinic, needle stick injury is ranked 1st in the list due to its direct interaction with the skin of the operator¹³. Care should be taken during handling and disposing of the needle. The answers by the participants to this open end question were satisfactory, where in effective ways of preventing needle stick injuries were explained.

Management of needle injuries – In case of occurrence of needle injury, the protocol given by the IDA (Indian Dental Association) should be followed. Post exposure prophylaxis for HIV and Hepatitis B should be followed in case blood is involved. This protocol should be strictly adhered to in every clinical department.

VI. CONCLUSION

The findings demonstrated variability in the knowledge, attitude, and practices regarding infection control and prevention among the participants indicative of areas of both adequate

awareness and potential improvement . While 4th-year students generally performed better in knowledge, Interns surprisingly had the most variability, reflecting gaps in theoretical reinforcement despite clinical exposure. Attitude scores are satisfactory , particularly among interns, as reflected by their vaccination status. Practice scores remain high across all years, yet concerning behaviours persist in specific areas like disinfecting impression materials and clinical clothes. To bridge these gaps, we recommend targeted awareness programs, practical workshops , and reinforcement of waste management protocols. Implementing regular assessments on infection control can ensure sustained improvements in both knowledge and practice. Also some important steps like disinfection of clothes and impression material were being taken lightly so a supervisor to see if the students are doing the tasks correctly is necessary also the lack of knowledge about handling Bio-Medical Waste is very alarming. There should be revisions classes regarding this.

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