

Evaluation of Knowledge, Attitude and Awareness among Dental Students Regarding Management of HIV Patients and Post Prick Protocols

Priyanka Jadhav¹, Dr. Madhura Mahajan², Dr. Ashwini Rani S.R.³, Dr. Kamala K.A.⁴

¹Intern, School of Dental Sciences, Krishna Vishwa Vidyapeeth, Karad

²Assistant Professor, Department of Oral Medicine & Radiology, School of Dental Sciences, KVV, Karad

³Associate Professor, Department of Oral Medicine & Radiology, School of Dental Sciences, KVV, Karad

⁴Associate Professor, Department of Oral Medicine & Radiology, School of Dental Sciences, KVV, Karad

Corresponding Author: Priyanka Jadhav, Email id- jadhav20priyanka.2001@gmail.com

ABSTRACT

Purpose: The purpose of this study is to evaluate the level of knowledge, attitude, and awareness among dental students regarding the management of patients living with HIV and the protocols to be followed after needle stick or sharp injuries. This research aims to identify gaps in understanding and preparedness, with the goal of informing curriculum development and improving infection control practices and patient care in dental settings.

Methods: A cross-sectional questionnaire-based survey was conducted among dental students who have done clinical postings across different academic years in a dental college. The structured questionnaire assessed knowledge of HIV transmission and management, attitudes toward treating HIV-positive patients, and awareness of post-exposure (post-prick) protocols. Data were analysed using descriptive and inferential statistics.

Results: A study of 350 participants explored their knowledge, attitudes, and practices around HIV/AIDS. Most (88.9%) correctly identified blood and body fluids as main transmission routes, though some misconceptions remained—7% believed saliva, and 0.9% sweat, could transmit HIV. Just over half (56%) rejected airborne transmission, but 11.4% still believed HIV could survive in air.

While 80.3% recognized T-helper cells as the main immune targets, confusion about other immune cells persisted. Awareness of institutional post-exposure protocols was low (45.1%), though 70.9% knew to wash with soap after a needle-stick, and 61.4% knew PEP should start within 72 hours—only 33.7% knew the ideal window is 24 hours. Attitudes varied: 59.7% were comfortable treating HIV-positive patients, but stigma remains—12.3% felt uncomfortable, 28% supported segregation, and 25.1% showed treatment avoidance. Fear of infection was a barrier for 64.9%, and 32.6% had experienced a needle-stick injury. Academic year was significantly linked to knowledge and attitudes ($p < 0.05$), underscoring the need for earlier, structured HIV/AIDS education.

Conclusion: While overall knowledge and attitudes were encouraging, gaps remain in awareness of post-exposure protocols. Targeted educational interventions and clinical training are essential to equip future dental professionals with the competence and confidence to manage HIV-positive patients safely and ethically.

Keywords: HIV, AIDS, Dental students, post-exposure prophylaxis (PEP), Needle-stick injury, Infection control, Knowledge, attitude, and awareness.

INTRODUCTION

Infection with Human Immunodeficiency Virus Type 1 (HIV-1) and the resulting Acquired Immunodeficiency Syndrome (AIDS) continue to pose a major global public health challenge.[1] Since its emergence in 1981, HIV/AIDS has become a persistent and serious disease.[2] While new infections have declined over the past two decades, there were still 1.3 million new HIV cases in 2023—far exceeding the 2025 target of fewer than 370,000—and prevalence is projected to rise until 2050.[3]

Healthcare workers, including dentists, face a constant risk of occupational exposure to HIV. The estimated risk of transmission after a single percutaneous exposure to infected blood is 0.30% .[4] In dental settings, the possibility of contact with blood puts practitioners at heightened risk. [5,6] Despite this, the World Health Organization emphasized in 1998 that denying dental care to people living with HIV/AIDS is both unethical and professionally unacceptable.[7] Dentists and dental students are therefore ethically obligated to treat all patients regardless of HIV status.

However, fear of infection, inadequate training, and stigma can negatively affect the quality of care provided.[8,9] Studies have shown discomfort among dentists and dental students in treating HIV-positive patients, contributing to unmet oral healthcare needs in this population. [9,10] In India, there is limited research on dental students' knowledge, attitudes, and preparedness regarding HIV/AIDS care.[11]

Need for the Study:

With the ongoing burden of HIV, dental professionals are increasingly likely to encounter HIV-positive patients in clinical practice.[3,11] Adherence to post-exposure protocols, especially after needle stick injuries, is vital for protecting both patients and providers.[12] For dental students moving from theoretical learning to clinical practice, confidence and competence in managing HIV and post-exposure responses are essential.[13,14] Yet, studies highlight gaps in knowledge and preparedness among healthcare students.[15]

Understanding dental students' awareness and attitudes is key to identifying educational shortcomings and improving training.[13] Incorporating HIV/AIDS education into dental curricula is necessary to ensure future professionals are fully equipped to provide compassionate and comprehensive care.[16,17]

This study aims to assess dental students' knowledge and attitudes toward HIV/AIDS, their understanding of HIV management, and awareness of post-prick protocols, ultimately supporting the development of more responsive dental education programs.

AIMS AND OBJECTIVES

1. To evaluate knowledge and attitude towards management of HIV positive patients among dental students and interns.
2. To evaluate knowledge, awareness and attitude about the post exposure (needle stick) protocols patients among dental students and interns.

METHOD

This observational, cross-sectional study with stratified random sampling method was conducted in School of Dental Sciences, KVV, Karad.

The sample size was estimated using the formula: $n = z^2 p q / l^2$

Where, n= sample size

z = standard normal variable at 95% CI = 1.96

p= factor of interest proportion

q= 100-p l= margin of error at 90% CI.

N= 350

The total sample size estimated is 350 patients.

Based on this formula, the required sample size was calculated to be 350 participants. All individuals who met the inclusion criteria and provided informed consent were included in the study. Data collection involved structured questionnaire, and ethical approval was obtained from the appropriate institutional review board.

Inclusion Criteria:

1. Undergraduate dental students who have attended clinical postings in all the departments, at least once are included.

Exclusion Criteria:

1. 1stYear and 2ndYear undergraduate students are excluded from the study as they were not exposed to the clinical postings.

Ethical Committee Approval

The study was approved by Institutional ethical committee of Krishna Vishwa Vidyapeeth (Deemed to be University), Karad. Participants received a detailed explanation of the study and provided written informed consent. Participation was voluntary, and confidentiality was maintained throughout.

Data Collection Sheet/ Structured Questionnaire

Dental professionals often face challenges in treating HIV-positive patients due to fear of infection—especially from needle-stick injuries—misconceptions about transmission, and inadequate training in post-exposure protocols. Stigma, such as beliefs that HIV-positive patients should be treated separately, further hinders equitable care. Addressing these

issues requires comprehensive HIV education, accurate transmission knowledge, and reinforcement of infection control. Promoting empathy and engagement with HIV-affected communities can reduce fear and stigma. Integrating clinical skills, knowledge, and attitude development in dental education will better prepare professionals to provide safe, ethical, and inclusive care.

RESULT

Table 1: Knowledge Table: HIV/AIDS Awareness and Understanding (N = 350)

No.	Topic	Response	Frequency	Percent (%)
1	Belief about saliva causing HIV/AIDS	Yes	106	30.3
		No	221	63.1
		Don't know	23	6.6
2	Perceived modes of HIV transmission	Blood and body fluids	311	88.9
		Saliva	34	9.7
		Sweat	3	0.9
		Touch	2	0.6
3	Belief about aerosol transmission of HIV	No, HIV cannot survive in aerosol form	40	11.4
		Not sure	47	13.4
		Only if aerosol contains visible blood	196	56.0
		Yes, easily through aerosolized particles	67	19.1
4	Awareness of post-exposure protocol	Yes	158	45.1
		No	192	54.9
5	First step after a needle stick injury	Apply analgesics	49	14.0
		Ignore	4	1.1
		Squeeze the wound	49	14.0
		Wash with soap and water	248	70.9
6	When PEP should be started	Within 24 hours	118	33.7
		Within 72 hours	215	61.4
		After one week	9	2.6
		Anytime	8	2.3
7	HIV affects which immune cells	B cells	28	8.0
		Macrophages	3	0.9
		Neutrophils	38	10.9
		T helper cells	281	80.3

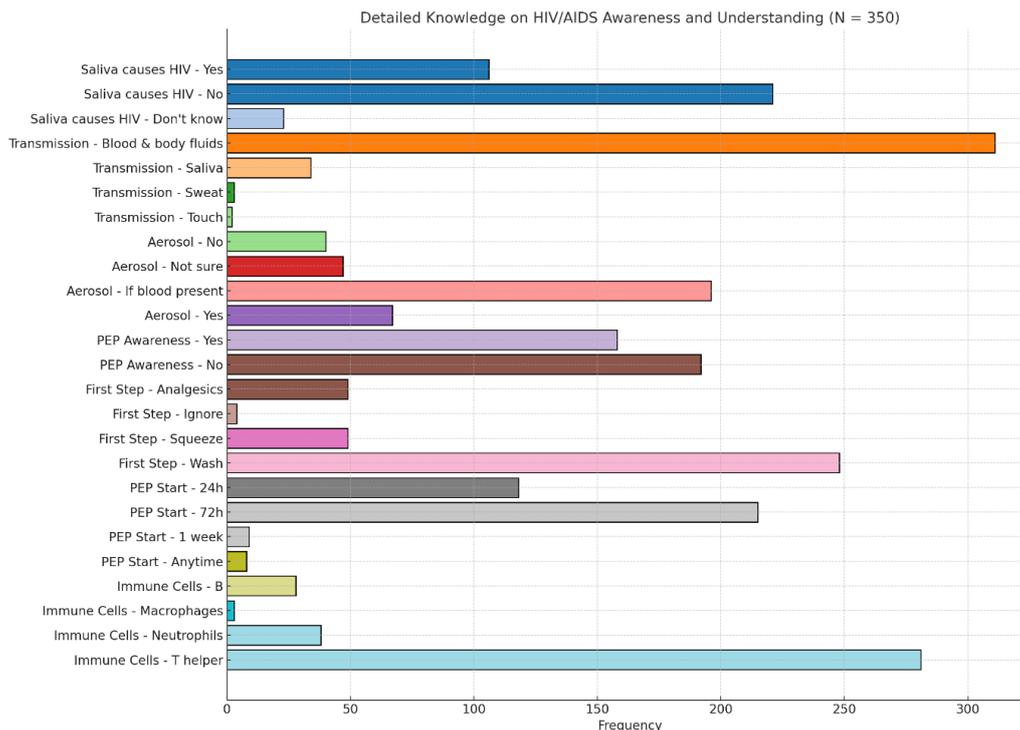


Figure 1: Detailed Knowledge on HIV/AIDS Awareness and Understanding Among Participants (N = 350)

The above figure 1 is a bar chart that provides a comprehensive overview of participants' knowledge regarding HIV/AIDS transmission, post-exposure prophylaxis (PEP), and affected immune cells. A majority of respondents correctly identified blood and body fluids as the primary mode of HIV transmission (88.9%), while misconceptions persisted—9.7% believed saliva could transmit HIV and 0.9% believed sweat could do so. Regarding the risk of transmission through aerosols, more than half (56.0%) appropriately identified that only aerosols with visible blood pose a risk, although a notable proportion were unsure (13.4%) or incorrectly believed HIV cannot survive in aerosol form (11.4%).

Awareness of institutional post-exposure protocols was split, with 45.1% reporting awareness. Encouragingly, 70.9% correctly identified washing with soap and water as the first step following a needle stick injury, reflecting good knowledge of immediate response protocols. In terms of PEP timing, 61.4% knew it should be started within 72 hours, while 33.7% believed it must begin within 24 hours.

When asked about the immune system, a vast majority (80.3%) correctly identified T helper cells as the primary targets of HIV, showing a strong grasp of basic virology. However, some confusion remained, with 10.9% citing neutrophils and smaller proportions selecting B cells or macrophages.

Overall, the chart highlights that while core knowledge areas are generally strong among participants, there remain significant knowledge gaps and misconceptions that need to be addressed through targeted educational initiatives.

Table 2: Attitude and practice Toward Treating HIV-Positive Patients (N = 350)

No.	Attitude Statement	Response	Frequency	Percent (%)
1	I am comfortable treating an HIV-positive patient	Strongly disagree	7	2.0
		Disagree	36	10.3
		Neutral	76	21.7
		Agree	209	59.7
		Strongly agree	22	6.3
2	HIV-positive patients should be treated in a separate clinic	Strongly disagree	7	2.0
		Disagree	166	47.4
		Neutral	79	22.6
		Agree	63	18.0
		Strongly agree	35	10.0
3	I would prefer to avoid treating an HIV-positive patient if possible	Strongly disagree	13	3.7
		Disagree	183	52.3
		Neutral	66	18.9
		Agree	70	20.0
		Strongly agree	18	5.1
4	Fear of contracting HIV affects my willingness to treat HIV patients	Strongly disagree	8	2.3
		Disagree	16	4.6
		Neutral	78	22.3
		Agree	227	64.9
		Strongly agree	21	6.0
5	Adequate infection control can prevent HIV transmission	Disagree	8	2.3
		Neutral	45	12.9
		Agree	236	67.4
		Strongly agree	61	17.4
6	Have you ever experienced a needle stick injury?	Yes	114	32.6
		No	236	67.4

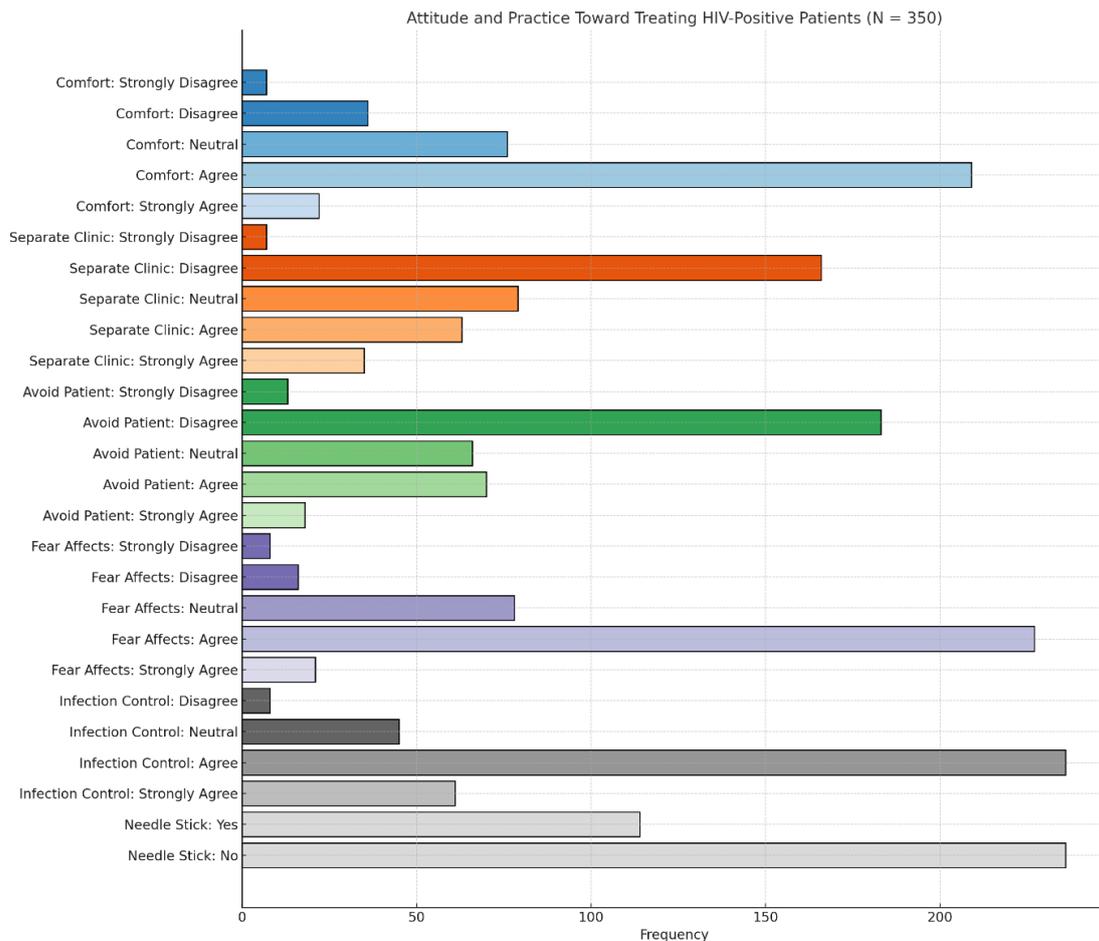


Figure 2: Attitude and Practice Toward Treating HIV-Positive Patients (N = 350)

The figure 2 represents a detailed breakdown of participants' attitudes and practices concerning the treatment of HIV-positive individuals. A significant majority (59.7%) reported feeling comfortable treating an HIV-positive patient, while only 12.3% expressed discomfort (either "disagree" or "strongly disagree"). However, responses to whether HIV-positive patients should be treated in a separate clinic were more varied—while 47.4% disagreed with segregation, 28.0% showed some level of agreement, indicating the presence of underlying stigmatizing beliefs among a subset of participants.

When asked whether they would prefer to avoid treating HIV-positive patients, if possible, more than half (52.3%) disagreed, suggesting a professional commitment to equitable care. Still, 25.1% showed avoidance tendencies, either agreeing or strongly agreeing with the statement. Notably, 64.9% of participants acknowledged that fear of contracting HIV affected their willingness to treat such patients, highlighting a need for emotional reassurance and risk communication training.

On a positive note, 67.4% agreed and 17.4% strongly agreed that adequate infection control measures can prevent HIV transmission, indicating a generally good understanding of clinical safety. Lastly, 32.6% of participants reported experiencing a needle stick injury, which may explain the elevated fear and hesitancy observed in earlier items. Overall, the responses suggest that while knowledge of infection control is relatively strong, a portion of healthcare trainees still harbour fear and hesitation, necessitating targeted interventions to improve both confidence and attitude toward caring for HIV-positive individual.

Table 3: Comprehensive Transposed Summary of HIV/AIDS Knowledge, Attitude, and Practice Among Dental Students by Year of Study

Question	Response	Third Year	Fourth Year	Intern	Total	Pearson Chi-Square	Likelihood Ratio
Formal training on HIV/AIDS	Yes	50	28	37	115	4.845 (df=2, p=.089)	4.961 (p=.084)
	No	82	84	69	235		

Saliva exposure causes HIV/AIDS	Yes	54	27	25	106	12.805 (df=4, p=.012)	12.679 (p=.013)
	No	68	78	75	221		
	Don't Know	10	7	6	23		
Transmission by exposure	Blood & Fluids	113	100	98	311	4.712 (df=6, p=.581)	6.162 (p=.405)
	Saliva	16	11	7	34		
	Sweat	2	1	0	3		
	Touch	1	0	1	2		
Needle stick injury	Yes	36	35	43	114	4.861 (df=2, p=.088)	4.806 (p=.090)
	No	96	77	63	236		
Post-exposure protocol awareness	Yes	63	42	53	158	4.008 (df=2, p=.135)	4.040 (p=.133)
	No	69	70	53	192		
First step after needle stick	Apply Analgesics	19	19	11	49	10.214 (df=6, p=.116)	9.891 (p=.129)
	Ignore	1	1	2	4		
	Squeeze Wound	12	14	23	49		
	Wash with Soap	100	78	70	248		
PEP should be started within	24 Hours	43	36	39	118	4.194 (df=6, p=.650)	4.279 (p=.639)
	72 Hours	83	73	59	215		
	After 1 Week	3	2	4	9		
	Anytime	3	1	4	8		
Immune cells affected	B Cells	21	6	1	28	21.661 (df=6, p=.001)	24.186 (p=.000)
	Macrophages	1	0	2	3		
	Neutrophils	13	13	12	38		
	T-helper Cells	97	93	91	281		
Comfort treating HIV+ patient	Strongly Agree	12	7	3	22	20.179 (df=8, p=.010)	22.453 (p=.004)
	Agree	74	70	65	209		
	Neutral	27	16	33	76		
	Disagree	17	16	3	36		
	Strongly Disagree	2	3	2	7		
Separate clinic for HIV+ patients	Strongly Agree	15	10	10	35	10.052 (df=8, p=.261)	10.155 (p=.254)
	Agree	27	17	19	63		
	Neutral	32	18	29	79		
	Disagree	54	65	47	166		
	Strongly Disagree	4	2	1	7		
Avoid treating HIV+ patients	Strongly Agree	7	9	2	18	27.612 (df=8, p=.001)	30.302 (p=.000)
	Agree	36	25	9	70		
	Neutral	31	12	23	66		
	Disagree	55	62	66	183		
	Strongly Disagree	3	4	6	13		
Infection control prevents HIV	Strongly Agree	18	19	24	61	13.403 (df=6, p=.037)	16.374 (p=.012)
	Agree	90	82	64	236		
	Neutral	20	7	18	45		
	Disagree	4	4	0	8		
Fear affects willingness	Strongly Agree	8	6	7	21	10.544 (df=8, p=.229)	10.242 (p=.248)
	Agree	82	80	65	227		
	Neutral	34	20	24	78		
	Disagree	3	4	9	16		
	Strongly Disagree	5	2	1	8		

In the above Table 3, the transposed summary of HIV/AIDS-related knowledge, attitudes, and practices among dental students across third year, fourth year, and internship levels reveals important insights. While a majority demonstrated awareness and comfort in managing HIV-positive patients, significant misconceptions and gaps persist. Only about one-third of the participants reported having received formal training on HIV/AIDS, with no significant differences observed

across academic years. Notably, misconceptions around transmission routes remain prevalent—particularly regarding saliva exposure—where statistically significant differences ($p = .012$) indicate the need for improved education.

Although most students correctly identified blood and body fluids as major transmission routes, a small number still incorrectly believed sweat, touch, or saliva could transmit HIV. In terms of clinical safety, over 32% had experienced a needle stick injury, but awareness of post-exposure protocols remained limited, with only 158 students acknowledging institutional knowledge. Knowledge of correct post-injury response was mixed, though the majority correctly opted for washing the area with soap and water. Similarly, while most students understood that post-exposure prophylaxis (PEP) should be initiated within 24–72 hours, a few chose incorrect responses like “anytime” or “after one week.”

When evaluating immunological understanding, most correctly identified T-helper cells as targets of HIV infection, though some confusion with other immune cells like B cells and neutrophils was statistically significant ($p = .001$). Attitudinal findings were mixed: a majority expressed comfort in treating HIV-positive patients, but around one-quarter of students either preferred to avoid such cases or believed these patients should be treated in separate clinics. These views were particularly more common in earlier academic years and showed significant association with year of study. Encouragingly, belief in the effectiveness of infection control measures increased with academic level and was statistically significant ($p = .037$). However, fear of contracting HIV still affected the willingness to treat in some respondents, although not significantly associated with academic progression.

Overall, the findings underscore the importance of early, structured HIV/AIDS education and clinical exposure to reduce fear, eliminate stigma, and improve both knowledge and professional attitudes among future dental practitioners.

DISCUSSION

This study assesses dental students’ and interns’ knowledge, attitudes, awareness, and preparedness concerning the management of HIV-positive patients as well as post-exposure (needle-stick) protocols, providing a comprehensive evaluation of clinical readiness.

Manickam P et al. (2025) identified a discrepancy between knowledge and attitudes toward HIV patients.[2] Our research expands on this by including post-exposure preparedness, offering a broader clinical perspective. Abiadh A et al. (2022) reported moderate knowledge levels accompanied by cautious attitudes.[4] While similar in scope, our study further evaluates readiness for needle-stick injuries, thereby enhancing its relevance to infection control training.

Cabbar F et al. (2016) investigated public awareness of HIV transmission.[7] Although thematically related, our focus is distinct, concentrating on professional preparedness and occupational risk management.

Alali FM et al. (2022) explored knowledge and attitudes regarding HIV’s oral manifestations.[8] Our work complements theirs by incorporating awareness of post-prick protocols, a key component of clinical safety.

The systematic review by Sufiawati and Munthe (2020) highlighted the importance of education but lacked original practical data.[9] Our study contributes fresh, actionable insights into educational impact and clinical preparedness. Oberoi SS et al. (2014) noted persistent stigma despite adequate knowledge levels.[11] Our research updates this by focusing on current student cohorts and adding evaluation of post-exposure response.

Abou El Fadl RK et al. (2019) examined knowledge and attitudes but did not assess preparedness for post-exposure situations.[10] Our study addresses this gap by adopting an action-oriented approach.

Finally, Wimardhani YS et al. (2022) assessed willingness and preparedness to treat HIV-positive patients.[16] Building upon this, our study emphasizes post-prick protocol awareness, thereby increasing practical applicability. Table 4 shows a comprehensive review of the similar articles published before.

STRENGTHS

1. The study offers a holistic view by assessing knowledge, attitude, and awareness, including the often-overlooked post-exposure protocol preparedness.
2. It adds practical value by evaluating students' readiness to handle occupational risks, helping inform curriculum and training improvements.
3. As a recent study, it reflects current educational practices and student perceptions, making the findings timely and relevant to modern clinical settings.

LIMITATIONS

1. The cross-sectional design limits the ability to assess changes in knowledge or preparedness over time, particularly after educational interventions.
2. Reliance on self-reported data may introduce bias, and findings from a single institution may not be generalizable to wider populations.
3. The study does not cover other key aspects such as HIV-related oral manifestations or patient perspectives, which could provide a more comprehensive understanding.

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Table 4- Summary of Studies Assessing Knowledge, Attitude, and Awareness Regarding HIV Management and Post-Exposure Protocols Among Dental and Healthcare Students

Sr. No.	Authors	Year	Study population	Country	Results
1.	Manickam P, Varghese T et.al,	2025	89 third- and fourth-year dental students	Malaysia	Despite excellent theoretical knowledge, student attitudes toward treating HIV/AIDS patients remained low, even after a brief educational intervention.
2.	Abiadh AAS, Jabali MA et.al,	2022	Dental students (2nd–7th year),	Saudi Arabia (Umm Al-Qura Univ., Makkah)	knowledge score was $8.32 \pm 1.60/12$; over 50% had favorable attitudes. Females and more experienced clinical-year students showed more positive attitudes
3.	Alali FM, Tarakji B, Alqahtani AS et.al,	2022	405 dental students (preclinical & clinical years)	Saudi Arabia (various universities)	Participants demonstrated low knowledge of HIV safety (~39.5%), low awareness of oral manifestations (~32.7%), and nearly 50% expressed unwillingness to treat HIV-positive patients. Many would get tested post-needle-stick (44.2%) and emphasized the importance of infection control, but ~50% believed dentists could refuse treatment
4.	Wimardhani YS, Ossa YF et.al,	2022	1,280 dental students from 23 Indonesian dental schools	Indonesia	63% scored >70% on HIV/AIDS knowledge (mean 15.02 ± 2.4). Over 80% had positive professional attitudes, but many feared occupational risk (80% worried about transmission; 70% overestimated risk). Students showed strong infection-control preparedness (mean 3.19 ± 0.4), and moderate willingness to treat (mean 2.5 ± 0.9). Willingness varied by university type, gender, age, and clinical experience. Higher knowledge strongly correlated with greater willingness to treat PLWHA.
5.	Buchbinder SP, Liu AY et.al,	2025	Global epidemiological data on HIV and STDs	Global (multi-country data)	Provides an updated overview of the global epidemiology of HIV and other sexually transmitted infections, highlighting trends in incidence, prevention strategies, and ongoing challenges in controlling the spread worldwide. The article emphasizes advancements in biomedical prevention, treatment options, and public health policies to reduce transmission rates.

6.	Habib A, Goswami K et.al,	2024	Adolescents aged 15–19 years from 7 schools	India (Assam)	52.5% had good knowledge and attitudes toward HIV/AIDS. Significant associations found with age, institution, grade, and religion. 56.7% learned about HIV/AIDS through school curricula, highlighting the role of education programs.
7.	Ahmed MM	2024	468 dental professionals including periodontists, oral medicine practitioners, dental hygienists, and students	Not specified	Overall low comprehension (33.25%) regarding HIV-related periodontal implications and management. Highest knowledge in periodontists and oral medicine practitioners; lowest in dental hygienists and students. Highlights need for enhanced education and training.
8.	Mohamud RYH, Mohamed NA et.al,	2023	Healthcare workers at Mogadishu Somalia Turkey Recep Tayyip Erdogan Training and Research Hospital	Somalia	233 needlestick and sharps injury incidents reported over 6 years. Most injuries occurred among nurses (52.4%), followed by cleaners (22.3%), physicians (18.5%), and technicians (6.9%). The majority of injuries involved hypodermic needles (81.1%). About 24.9% of the needles or sharps devices that caused injuries were contaminated with hepatitis B.
9.	Brundin M, Sjöström M	2024	Dental students at Umeå University, Sweden	Sweden	No significant change in confidence before and after a summer clinical internship, except for tooth extractions. Students felt least confident in managing acute dental trauma and treating cavities in young children, while most confident in tasks like obtaining radiographic surveys and debriding periodontally compromised dentition.