Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Hayat et al - 2026

COMPARATIVE ANALYSIS OF KNOWLEDGE, ATTITUDE AND PRACTICE OF INFECTION CONTROL AMONG DENTAL HEALTH CARE PROFESSIONALS IN DENTAL SETTINGS OF PESHAWAR

Shah Zeb[1]
[1] Lecturer at City University of Science and Information Technology
Sheikh Muhammad Hammad[2]
[2]Student at City University of Science and Information Technology
Umer Khayam Ahmed[3],
[3]Student at City University of Science and Information Technology
Fatima Fayaz[4]
[4]Lecturer at City University of Science and Information Technology
Talha Musharaf[5]
[5] Student at City University of Science and Information Technology
Khadija Rehman[6]
[6]Lecturer at City University of Science and Information Technology
Ruqia Hayat[*7]
[*7] Lecturer at City University of Science and Information Technology
[*7]ruqiahayat48@gmail.com

Author Details

Keywords:
Infection control, dental healthcare professionals, knowledge attitude practice, personal protective equipment, needle-stick injuries.

Received on 11 November, 2025
Accepted on 21 January, 2025
Published on 10 February 2026

Corresponding E-mails & Authors*:
Ruqia Hayat[*7]
[*7]ruqiahayat48@gmail.com

Abstract

Infection control is a fundamental component of safe dental practice and plays a critical role in preventing the transmission of infectious diseases between patients and dental healthcare professionals (DHCWs). Dental professionals are frequently exposed to blood, saliva, aerosols, and sharp instruments, placing them at increased risk of occupational infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Although international guidelines for infection control are available, adherence remains inconsistent, particularly in developing regions. This study aimed to assess the knowledge, attitude, and practices

(KAP) related to infection control among DHCWs in Peshawar, Pakistan. A descriptive cross-sectional study was conducted among 245 dental healthcare professionals, including dentists, dental technologists, and dental technicians, working in public and private dental institutions in Peshawar. Data were collected using a structured, validated, self-administered questionnaire covering demographic information and KAP related to infection control. Data analysis was performed using IBM SPSS version 24. Descriptive statistics were presented as frequencies and percentages, and the Chi-square test was used to assess associations between education level and KAP variables. A p-value of <0.05 was considered statistically significant. While many participants showed awareness of infection control measures, practical compliance was inconsistent. Awareness of N95 mask use and advising patients for HIV/HBV/HCV testing was relatively high; however, adherence to practices such as mask change after each patient, use of sterilized drapes, and appropriate response to needle-stick injuries was inadequate. Vaccination coverage against HBV was suboptimal. Educational level significantly influenced infection control practices, with BDS professionals demonstrating better knowledge and safer practices compared to diploma holders and dental technologists ($p < 0.001$). The study highlights a clear gap between knowledge and practice of infection control among dental professionals in Peshawar. Targeted training programs, strict implementation of standard protocols, and continuous monitoring are essential to improve compliance and ensure patient and practitioner safety.

INTRODUCTION

Infection control, consequently, represents a comprehensive set of measures specifically designed to minimize the transmission of pathogenic microorganisms between patients

and healthcare providers. Failure to implement these measures properly not only endangers patient safety but also creates significant occupational risks for the practitioners themselves. Within the dental environment, where numerous potential pathways for disease transmission exist, the rigorous application of established sterilization and disinfection protocols becomes absolutely essential. Nevertheless, questions have arisen regarding the sufficiency of infection control practices, with particular attention being drawn to the practices of dental students. Recent investigations have increasingly focused on evaluating both the theoretical knowledge and practical application of appropriate sterilization techniques among this specific group of future dental professionals. (Samad et al., 2024)

Healthcare workers are among the most vulnerable to contracting serious illnesses when they neglect to adhere to proper infection control measures. The transmission of infections has escalated in this era of eco-epidemiology, marked by the global emergence of various pathogens. Blood- borne infections, in particular, are becoming increasingly prevalent due to exposure to numerous blood-borne pathogens through multiple transmission routes. To mitigate these infection risks in healthcare environments, standard precautions have been established, including the use of eye protection with side shields, facemasks, and appropriate protective attire. Dental graduates worldwide are expected to possess extensive clinical expertise and comprehensive knowledge of infection control protocols. Despite the numerous guidelines and protocols developed by medical and dental associations, as well as government health organizations, research indicates that many dental undergraduates still lack sufficient understanding and practical skills in infection control, leading to suboptimal infection management in certain dental facilities. Consequently, this study was conducted to evaluate the knowledge, attitudes, and

practices of dental undergraduate students regarding infection control measures. (Girotra et al., 2021)

Dentists face a heightened risk of contracting HBV and HCV infections. In dental practices, transmission can occur through percutaneous injuries, contact of mucous membranes with contaminated blood, and exposure to carrier body fluids, which can transmit HIV. Research indicates that the risk of disease transmission in dental clinics is 6-30% for HBV, 10% for HCV, and 0.4% for HIV (Tahir et al., 2018).Globally, approximately two billion people have been infected with HBV, with around 350 million becoming chronic carriers. The World Health Organization reports the highest HBV prevalence in the Western Pacific and African regions at 6.2% and 6.1%, respectively, while the Americas show the lowest rate at 0.7%. In Saudi Arabia, HBV prevalence among blood donors in the adult population ranges between 1.5% and 2.6%. (Al-Hindawy et al., 2021). Elevated prevalence rates have been documented across several Southeast Asian nations, including Thailand, Malaysia, and India. The pathogenic microorganisms present in the oral cavity serve as significant contributors to upper respiratory tract infections in these populations. Consequently, maintaining proper oral hygiene emerges as a critical component of healthcare services, playing a vital role in preventing potential complications among affected individuals (AL Khalifah et al., 2023)

MATERIALS AND METHODS

This study employed a non-probability convenience sampling technique to include dental healthcare professionals from various professional roles, including dentists, dental technologists, and dental technicians, working in public hospitals, private clinics, and academic institutions. The study was conducted over a six-month period in Peshawar,

Pakistan. The study population comprised male and female dental healthcare professionals, and a sample size of 245 participants was included.

Only dental healthcare professionals, including dentists, dental technologists, and dental technicians, were included in the study, while individuals unwilling to participate were excluded. Data were collected using a self-administered questionnaire consisting of 17 questions, designed in English. Participants were provided with instructions on completing the questionnaire and were informed about the purpose of the study.

Ethical approval was obtained from the Research Committee of City University of Science and Information Technology (CUSIT), Peshawar. Written and verbal informed consent was obtained from all participants prior to data collection, and confidentiality of the information was strictly maintained.

Data were analyzed using IBM SPSS version 24. Descriptive statistics were used to summarize demographic characteristics and assess knowledge, attitude, and practices (KAP) related to infection control, presented as frequencies and percentages. The Pearson Chi-square test was applied to assess associations, and a p-value ≤ 0.05 was considered statistically significant.

RESULT

The study demonstrated a statistically significant association between education level and multiple aspects of infection control knowledge, attitude, and practices among dental healthcare professionals ($p < 0.001$). BDS participants consistently showed better compliance and awareness regarding recommended infection control measures, including the use of nitrile gloves, awareness of mandatory N95 mask usage, sterilized drape use, appropriate response to needle-stick injuries, hepatitis vaccination, and

disinfection of the dental unit after each patient. In contrast, diploma holders and BS dental technology participants exhibited variable and often inadequate compliance, particularly in hand hygiene practices, use of sterilization indicators, and correct needle recapping techniques.

Protective practices such as wearing eye protection, maintaining safe working distance, advising HIV/HBV/HCV screening, and attending infection-control workshops were also significantly influenced by education level. While most participants acknowledged that every dental patient should be considered potentially infectious, misconceptions persisted, especially among diploma holders and dental technologists, regarding handwashing replacement by gloves and appropriate post-exposure management. Overall, the findings highlight critical gaps in infection control practices among non-BDS dental personnel, emphasizing the need for targeted training programs, continuous professional education, and strict enforcement of standard infection control protocols. Details regarding results are given in table 1.

Table 1: Association of Infection Control Knowledge, Attitude, and Practices with Education Level

Infection control variable	Key response category	Diploma holders	BS Dental Technology	BDS	P-value
Hand hygiene with gloves	Correct practice (before & after)	23	11	0	<0.001
Most effective gloves	Nitrile gloves	46	22	71	<0.001

Infection control variable	Key response category	Diploma holders	BS Dental Technology	BDS	P-value
Awareness of N95 mask requirement	Yes	62	11	94	<0.001
Use of protective eyewear	Yes	62	11	73	<0.001
Distance from working field	About one foot	0	22	0	<0.001
Use of sterilized drape	Yes	11	11	102	<0.001
Awareness of sterilization strips	Yes	5	44	72	<0.001
Needle recapping method	Scoop method	0	11	59	<0.001
Response to needle-stick injury	Wash with soap	8	0	99	<0.001
Hepatitis vaccination status	HBV / Both	23	22	127	<0.001
Advising HIV/HBV/HCV tests	Advise all tests	46	33	106	<0.001
Infection-control workshops	Attended / willing	57	33	83	<0.001
Treat every patient as infectious	Yes	62	11	89	<0.001
Confidence treating infectious patients	Yes	57	0	88	<0.001

Infection control variable	Key response category	Diploma holders	BS Dental Technology	BDS	P-value
Disinfection after each patient	Yes	28	22	123	<0.001
Gloves replace handwashing	No (correct)	16	0	49	<0.001
Needle recapping responsibility	Operator	28	33	139	<0.001

Pearson Chi-square test applied

DISCUSSION

This study assessed the knowledge, attitude, and practices (KAP) of dental healthcare professionals toward infection control in dental settings across Peshawar. Although participants demonstrated generally adequate knowledge and positive attitudes, a notable gap between awareness and actual practice was observed, consistent with national and international findings. Most respondents (68.2%) recognized the importance of using N95 surgical masks, indicating good awareness of respiratory infection prevention. However, only 48.2% reported changing masks after each patient, reflecting poor adherence to standard infection control protocols. Similar discrepancies between knowledge and practice have been reported in previous studies, suggesting that factors such as resource limitations and habitual non-compliance may contribute to this gap. Compliance with sterilization practices, including the use of sterilized drapes and sterilization indicators, was also suboptimal, with only about half of the participants following recommended guidelines. Such deficiencies increase the risk of cross-contamination in dental clinics and highlight weaknesses in routine infection control

implementation. Educational level significantly influenced KAP outcomes. BDS professionals demonstrated superior compliance with infection control measures, including use of protective eyewear, safe needle recapping techniques, and hepatitis B vaccination, compared to diploma holders and dental technologists. These findings emphasize the critical role of formal education and structured training in improving infection control practices among dental healthcare professionals. Interestingly, while 59.2% of participants reported confidence in treating infectious patients, 40.8% did not, revealing psychological barriers and fear of occupational exposure. Prior studies (e.g., Girotra et al., 2021) have also highlighted fear and stigma as significant challenges among dental students and professionals, often rooted in a lack of training, absence of post-exposure protocols, or insufficient vaccination coverage.

On vaccination, only 52.2% were vaccinated against HBV, and 13.9% had received neither HBV nor HCV vaccinations. Given the documented risk of HBV transmission through dental procedures—reported to be as high as 30% in case of exposure (Tahir et al., 2018) these numbers are alarmingly low and highlight an urgent need for institutional policy enforcement. The CDC and WHO recommend complete immunization for all health professionals, particularly those handling blood and saliva.

The issue of needle stick injuries and their management also demonstrated considerable variation. While 43.7% washed with soap and water following an injury, 17.1% ignored the incident entirely, a finding that underlines a dangerous gap in standard precaution awareness. Aljehani et al. (2019) reported similar findings in private dental clinics in Jeddah, where nearly 27% of DHCWs lacked proper knowledge regarding needle-stick injury management.

This study also found that 73.5% of respondents believed wearing gloves could replace the need for handwashing, which is a misconception contrary to WHO and CDC guidelines. Hand hygiene remains the single most important measure to prevent infection transmission and must be practiced before and after glove use to ensure barrier effectiveness.

From a behavioral perspective, the attitude toward universal precautions (UPs) was encouraging, with 66.1% of respondents recognizing that every patient could potentially carry infectious agents. However, such awareness must be operationalized through rigorous compliance, consistent use of PPE, and proper waste disposal practices. As documented by Khan et al. (2025), compliance with UPs in Pakistan remains inconsistent due to training gaps, poor monitoring, and infrastructural challenges.

Lastly the strong desire expressed by 70.6% of participant to attend more workshop reflect a positive outlook and readiness to improve. These supports finding from Asiri et al. (2024), who emphasized the role of continuing education program in enhancing infection control practices in both public and private health sectors.

nearly 70% of dental students knew about how it starts and affects the entire periodontium. Comparatively speaking to dental students, less medical students in the current study were aware of the effects of fluoride on teeth. There was no discernible difference between medical and dentistry students' practices in this study, and the findings are consistent with a study conducted in Mongolia Tseveenjay *et al.*

CONCLUSION

This study aimed to assess the knowledge, attitude, and practice (KAP) of infection control among dental healthcare professionals (DHCWs) in various dental settings of Peshawar.

The findings revealed a 5reasonable level of knowledge and generally positive attitudes, but significant gaps remain in actual clinical practice. This disparity suggests that while professionals are aware of infection control guidelines, their implementation is inconsistent and inadequate in many areas.

REFERENCES

AlAhdal, A., Aljehani, W., Ali, G., & Bayoumi, A. (2019). Knowledge, attitude and practice of infection control measures in private dental clinics in Jeddah, Saudi Arabia. Int J Dent Oral Health, 5(1), 1-6.

Al-Hindawy, G. E., Attia, N. M., & Hegazy, S. A. (2021). Evaluation of Knowledge, Attitude, and Practice of Infection Control principles Among a Sample of Egyptian Dental Students. Mansoura J of Dentistry, 8(29), 10-16

Al-Hindawy, G. E., Attia, N. M., & Hegazy, S. A. (2021). Evaluation of Knowledge, Attitude, and Practice of Infection Control principles Among a Sample of Egyptian Dental Students. Mansoura J of Dentistry, 8(29), 10-16

Arif, S., Janjua, O. S., & Qureshi, S. M. (2019). Knowledge, attitude and practice of dental students against infection control in allied Hospital Faisalabad. Pakistan Armed Forces Medical Journal, 69(1), 130-5.

Arif, S., Janjua, O. S., & Qureshi, S. M. (2019). Knowledge, attitude and practice of dental students against infection control in allied Hospital Faisalabad. Pakistan Armed Forces Medical Journal, 69(1), 130-5.

Asiri, A. A. M., Al-Rafdan, T. A., Asiri, A. A., Alsawaih, F. N. M., Al-Qahtani, A. M. M., Albishi, N. N. M., ... & Al-Ammer, A. M. (2024). Knowledge, Attitudes and practices Towards Infection Control among health care staff in Saudi Arabia. Journal of International Crisis and Risk Communication Research, 7(S10), 450

Assiri, K. I., Kaleem, S. M., Ibrahim, M., Alam, T., & Asif, S. M. (2018). Knowledge, attitude and practice of infection control among dental students in King Khalid University, Abha. journal of international oral health, 10(2), 83-87.

Babar, F. R. (2017). Knowledge, attitude and practice regarding Hepatitis B & C among dental surgeons of Khyber College of Dentistry (KCD) Peshawar and Bolan Medical College (BMC) Quetta. Biomed J Sci Tech Res, 1(6), 1569-73.

Bains, R., Tikku, A. P., Bains, V. K., & Verma, P. (2021). Knowledge, attitudes, and practices of dental patients toward cross-infection and economic implications in view of covid-19: An online survey. Journal of Advanced Oral Research, 12(1), 95-102.

Butt, Arshad Kamal, and Ayyaz Ali Khan. "A Pilot study of Knowledge, Attitudes and Practices (KAP) of Barbers and Unqualified Dentists in Transmission of Hepatitis Band C in an Urban and Rural Setting in Punjab." Proceeding SZPGMI" IOI 21.2 (2017): 75-81.

Deogade, S. C., Suresan, V., Galav, A., Rathod, J., Mantri, S. S., & Patil, S. M. (2018). Awareness, knowledge, and attitude of dental students toward infection control in prosthodontic clinic of a dental school in India. Nigerian journal of clinical practice, 21(5), 553-559.

El-Saaidi, C., Dadras, O., Musumari, P. M., Ono-Kihara, M., & Kihara, M. (2021). Infection control knowledge, attitudes, and practices among students of public dentalschools in Egypt. International Journal of Environmental Research and Public Health, 18(12), 6248

Girotra, C., Acharya, S., Shetty, O., Savla, S., Punjani, M., & Shah, T. (2021). Assessment of knowledge, attitude and practice towards infection control among dental

undergraduate students-A cross-sectional survey. Journal of Indian Association of Public Health Dentistry, 19(1), 65-70.

Girotra, C., Acharya, S., Shetty, O., Savla, S., Punjani, M., & Shah, T. (2021). Assessment of knowledge, attitude and practice towards infection control among dental undergraduate students-A cross-sectional survey. Journal of Indian Association of Public Health Dentistry, 19(1), 65-70.

Ibrahim, N. K., Alwafi, H. A., Sangoof, S. O., Turkistani, A. K., & Alattas, B. M. (2017). Cross-infection and infection control in dentistry: Knowledge, attitude and practice of patients attended dental clinics in King Abdulaziz University Hospital, Jeddah, Saudi Arabia. Journal of infection and Public Health, 10(4), 438-445.

Iyer, K., AL Khalifah, K., Alshahrani, B. N., Alghamdi, S. S. I., Albishi, S., Alsheraihi, A. A. A., & Al Sudairy, N. (2023). Assessment of Knowledge, Attitude, and Practice (KAP) Among Nurses on Oral Care for Intensive Care Unit Patients in Riyadh, Saudi Arabia: A Cross-Sectional Study. Cureus, 15(12).

Iyer, K., AL Khalifah, K., Alshahrani, B. N., Alghamdi, S. S. I., Albishi, S., Alsheraihi, A. A. A., & Al Sudairy, N. (2023). Assessment of Knowledge, Attitude, and Practice (KAP) Among Nurses on Oral Care for Intensive Care Unit Patients in Riyadh, Saudi Arabia: A Cross-Sectional Study. Cureus, 15(12).

Joshi, P., Tank, B., Maniar, D., & Kothari, V. S. (2023). A Study to Assess Knowledge, Attitude, and Practice of Dental Undergraduate Students toward Infection Control. International Journal of Medical and Oral Research, 8(2), 55-59.]

Joshi, P., Tank, B., Maniar, D., & Kothari, V. S. (2023). A Study to Assess Knowledge, Attitude, and Practice of Dental Undergraduate Students toward Infection Control. International Journal of Medical and Oral Research, 8(2), 55-59.

Khan, A., Ali, H., & Sultan, S. (2025). Adherence to Universal Precautions Among Nurses at Lady Reading Hospital, Peshawar: A Cross-Sectional Study on Infection Control Practices. medtigo Journal of Medicine, 3(1).

Khan, A., Ali, H., & Sultan, S. (2025). Adherence to Universal Precautions Among Nurses at Lady Reading Hospital, Peshawar: A Cross-Sectional Study on Infection Control Practices. medtigo Journal of Medicine, 3(1).

Mohamed, R. A. E. H., Khan, Y., Alzahrani, K. J., Alzahrani, F. M., Alsharif, K. F., Khan, A., ... & Chen, C. C. (2025). Knowledge, attitudes, and practices regarding dengue and its vectors among medical professionals: a cross-sectional study. Frontiers In Cellular and Infection Microbiology, 15, 1560054.

Mohamed, R. A. E. H., Khan, Y., Alzahrani, K. J., Alzahrani, F. M., Alsharif, K. F., Khan, A., ... & Chen, C. C. (2025). Knowledge, attitudes, and practices regarding dengue and its vectors among medical professionals: a cross-sectional study. Frontiers In Cellular and Infection Microbiology, 15, 1560054.

Naji, A. T., Abu-hadi, T., Abu-hadi, B. A., Al-Yemeni, S. A., Al-dhobhani, R., Al- deen, B. A. M., & Jaber, A. A. (2022). Assessment of knowledge, attitude, and practice toward infection prevention and control among diagnostic radiographers in yemen. Journal of Radiology Nursing, 41(4), 339-346.

Qamar, M. K., Shaikh, B. T., & Afzal, A. (2020). What Do the Dental Students Know about Infection Control? A Cross-Sectional Study in a Teaching Hospital, Rawalpindi, Pakistan. BioMed Research International, 2020(1), 3413087.

Samad, A. A., Ahmed, J. M., Izzat, K. Z., Abdulqadir, S. S., Muhammed, M. Q., & Bakir, M.

(2024). Knowledge, Attitude and Practice of Infection Control Among Dental Students at College of Dentistry-Hawler Medical University. Erbil Dental Journal (EDJ), 6(3), 283-289

Tahir, M. W., Mahmood, A., Abid, A., Ullah, M. S., & Sajid, M. (2018). Knowledge, attitude, and practices of cross infection control among dental students of Punjab Pakistan. PJMHS, 12(1), 238-42