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Role of Education level in Developing Awareness Among Dental Assistants pertaining Cross Infection Control in Clinical Settings

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[1]Idea, Data Collection
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Funding Source: None
Conflict of Interest: None

Received: Sept 25, 2025
Revised: Feb 11, 2026
Accepted: Mar 04, 2026

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ABSTRACT

Objective: This study aimed to evaluate the role of education level in developing awareness among Dental Assistants pertaining cross infection control in clinical settings.

Methodology: A total of ninety-eight (98) dental surgery assistants working in Dental hospitals of Multan were recruited from 1st April 2022 to 31st July 2022. The procedure of Data collection was done by using structured, self-administered four sectioned questionnaire via simple random sampling. The Dental assistants working for over 01 year were included in the study. Outcome variables such as Knowledge, Attitude and Practice were assessed in relation to educational level. The statistical analysis of the collected data was then conducted with SPSS. The Results were displayed in graphs and tables by keeping the significance level at P<0.05.

Results: Out of 98 participants, females were 21.4% (21) whereas males were 78.6% (77). Majority 75 (76.53%) participants received higher secondary education from school. Chi square test depicted a significant association between knowledge and educational level of the participants (p-value = 0.016). There was an insignificant association of attitude with educational level (p-value = 0.292) and gender (p-value= 0.285). There was also an insignificant association of practice revealed with educational level (p-value = 0.073) and gender (p-value = 0.103).

Conclusion: The current study concluded significant association between knowledge and educational level of dental assistants. There exists a strong association between knowledge, practice and usage of PPE for controlling the cross infection among dental assistants.

Key Words: Cross infection, Dental assistants, Educational status, Health care Professionals, Personal Protective Equipment.

Cite this article as: Javaid MM, Batool SM, Ahmad M, Nasim H, Mansoor E, Langrial RZ, Mansoor E[7], Mansoor A[8] Role of Education level in Developing Awareness Among Dental Assistants pertaining Cross Infection Control in Clinical Settings. Ann Pak Inst Med Sci. 2026; 22(2):154-160. doi. 10.48036/apims.v22i2.1599.

Introduction

Health care Professionals are at the greater risk of getting infection if recommended self-control measures against contamination are not followed properly during various oral treatments especially by dentists, technicians and other dental workers.[1] The vital objective of the dental treatment is to prevent the cross infection spread that might occur as result of blood borne ailments during these procedures.[2] Basically, various dental treatments and surgical interventions are the major causative agents in the transmission of infection specifically equipment's and instruments contaminated with blood that are utilized in the medical and dental field.[3] It became necessary for

the dental pertained professionals to follow the rules and regulations available in the evidence based practices for the prevention of infection.[4]

A study conducted in Saudia Arabia had reported a link between educational level and awareness of cross-infection control among dental nurses. [5] Health care workers should comply with certain infection prevention control precautions, strategies, and procedures, to ensure that chances of infections are reduced in healthcare settings. [6] Moreover, training programs and educational have an imperative role in surging healthcare workers' knowledge and abilities, resulting in lesser risks of the infection transmission and higher healthcare quality. According to studies, continual education and regular training are highly associated with the lower rates of acquired illnesses. [7, 8]

There are certain methods used to prevent the cross infection in the health care delivery systems and their personnel including immunization, routine precaution, and personal protective equipment (PPE) etc.[9, 10] The personal protective equipment is the major cross infection preventer utilized by the dental practitioners that incorporates the disposable hand gloves, eyes goggles, sterilizable shoe covers, facial mask, and professional apparel.[10] The application of personal protective equipment (PPE) during dental treatments is crucial for both the healthcare workers (HCWs) and patients as well because it not only reduces the likelihood of cross infection transmission but also ensures safety and security.[2] Currently, it has become a necessary prerequisite for the safety of healthcare workers and patients on the greater extent. [11] Thus, it is the dire need to ensure the safety and security of both the healthcare workers and patients in this era because of increased risk of exposure to different communicable infections such as Hepatitis B, Hepatitis C and AIDS. [12]

The main factor that might become an obstacle in providing the dental treatment properly is the socio-economic status (SES) that includes the educational accomplishment, subjective perceptions of social class & rank, financial security, other than wage.[13] Few studies have revealed that HCWs belonging to 'middle or high' socioeconomic status complied greatly with infection control measures in comparison to the HCWs of the lower socio-economic status ([14]) but it is equally practiced among both the male and female HCWs. [15, 16] That might have become possible as a result of the significant association between the qualification and the compliance of PPE usage during the health care systems.[17] Pakistan is a developing country where SES plays a significant role in providing the ideal health care delivery in the medical and dental settings in order to prevent the cross infection both among the HCWs and the patients. Still, there is lack of data available regarding the educational awareness of the PPE utilization among the dental technicians in the health care provision because they might be unaware of basic PPE concept and knowledge about its usage as a result of training dearth. [18]

Education is crucial for improving awareness and adherence to cross-infection control protocols among dental care professionals. At present and in future, enhanced knowledge and training signifies the role of education in healthcare setting, as it can mitigate the risk of disease transmission in clinical environments, safeguarding the well-being of both patients and healthcare staff, ultimately leading to an establishment of safer dental care settings. So, this study aimed to evaluate the role of education level in developing awareness among Dental Assistants pertaining cross infection control in clinical settings.

Methodology

The ethical approval was taken from the Health Services Academy, concerned hospitals, and then after taking an informed consent from all the participants included in the study, the data collection procedure was started. A total of about ninety-eight (98) dental surgery assistants working in the tertiary care Dental hospitals of Multan were recruited in this study for four months with effect from April 2022 to July 2022. The Open-Epi online calculator was used to determine the sample size with a 5% level of significance and 95% confidence interval.[10] The estimated number of dental assistants in Multan city were approximately 250, after adjustment by the Cochrane-correction formula, the final sample size calculated was 98. The Simple random sampling methodology was employed to get the desired sample size.

"Dental assistants are the health professionals who work closely with patients, under the guidance of a dental surgeon" [10]. The Dental assistants working for over 01 year irrespective of formal or informal education were included in the study, while those having less than 01-year experience at the time of survey were excluded from this research. Categorization of education level was no formal education, school level (Primary- Higher secondary), then bachelor's and master level. Outcome

variables such as Knowledge, Attitude and Practice were assessed in relation to educational level.

The procedure of Data collection was done by using structured, self-administered four sectioned questionnaire comprising sociodemographic data, knowledge related questions, attitude and practices of study participants. First section consisted of 06 questions, 2nd & 3rd sections also comprised of 06 relevant questions each, pertaining to knowledge and attitudes of dental care professionals. The last section had 09 questions related to practice regarding PPE. Likert scale 3 was used for the questions related to attitudes, whereas, likert scale 2 was used for the questions of 1st and 3rd sections.

In the domain of knowledge there were 6 items. The smallest score recorded was 0, while the greatest point achieved was 6. The score of "4" was established as the cutoff value, indicating that scores less than or equal to 4 were deemed to reflect suitable knowledge, whilst values over 4 indicated inappropriate knowledge of the assistants regarding PPE. In the category of attitude, there were five items. The smallest score recorded was 0, while the greatest point achieved was 5. The score of "3" was established as the cutoff value, indicating that values less than or equal to 3 were deemed positive, whilst score over 3 indicated a negative attitude among the assistants towards PPE. There were six items in the section of practices. The smallest score recorded was 0, while the greatest point achieved was 6. The score of "4" was established as the cutoff number, indicating that scores less than or equal to 4 were deemed indicative of acceptable PPE practices, and scores over 4 were seen as indicative of poor PPE practices.

A pretest was conducted on a random sample of 10 dental assistants (n=10) working in other similar setting that were excluded from the current investigation for the pilot run purpose. This pilot run guaranteed that all questions were clear and relevant with feasibility and applicability of tools. The Cronbach's alpha (0.8) was utilized to check the general reliability of the tool utilized in this study. The statistical analysis of the collected data was then conducted with SPSS where Descriptive statistics were displayed in percentages and frequencies for questions of knowledge, attitude & practices. The Results were displayed in graphs and tables by keeping the significance level at $P \leq 0.05$.

Results

Out of 98 participants, females were 21.4% (21) whereas males were 78.6% (77). The educational level of the study participants revealed that just 1participant was without any formal education while 1 participant was having master's degree. On the other hand, 75 (76.53%) participants received higher secondary education from school but 21 assistants were having bachelor's degree. The marital status revealed that the 65.3% (64) subjects were married but 34.7% (34) participants were unmarried (Table I).

Table I: Sociodemographic of the participants involved in the study.

Variable name with category		n (%)
Gender	Female	21 (21.4)
	Male	77 (78.6)
Marital status	Married	64 (65.3)
	Un-married	34 (34.7)
Educational Level	No formal education	01 (1)
	Primary- Higher secondary	75 (76.53)
	Bachelor's	21(21.4)
	Masters	01 (1)

The Chi square test was performed to investigate the association between different variables of the study. The Chi square test depicted a significant association between knowledge and educational level of the participants involved in the study which was statistically significant (p-value = 0.016). On the other hand, there was an insignificant association between the male and female participants gender wise (p-value = 0.561) (Table II).

Table II: Cross tabulation of Knowledge with Gender and educational status of respondents involved in the study.

		Knowledge		p-value
		good	poor	
Gender	Male	46(59.7%)	31(40.3%)	0.561
	female	14(66.7%)	7(33.3%)	
Educational Level	No formal education	0(0%)	1(100%)	**0.016**
	primary	12(70.6%)	5(29.4%)	
	middle	1(11.1%)	8(88.9%)	
	Secondary/higher secondary	32(65.3%)	17(34.7%)	
	Bachelors	14(66.7%)	7(33.3%)	
	Masters	1(100%)	0(0%)	

There was also found to be an insignificant association of attitude with educational level (p-value = 0.292) and gender (p-value= 0.285) (Table III).

There was an insignificant association of practice with educational level (p-value = 0.073) and gender (p-value = 0.103) (Table IV).

Table III: Cross tabulation of attitude with educational status and gender of dental assistants that participated in the study.

		Attitude		p-value
		good	poor	
Gender	Male	57(74.0)	20(26.0)	0.285
	female	13(61.9)	8(38.1)	
Education	No formal education	1(100)	0(0)	0.292
	primary	9(52.9)	8(47.1)	
	middle	5(55.6)	4(44.4)	
	Secondary/higher secondary	38(77.6)	11(22.4)	
	Bachelors	16(76.2)	5(23.8)	
	Masters	1(100)	0(0)	

Table IV: Cross tabulation of practice with gender and educational status of participants.

		Practice		p-value
		good	poor	
Gender	Male	44(57.1%)	33(42.9%)	0.103
	female	16(76.2%)	5(23.8%)	
Education	No formal education	0(0%)	1(100%)	0.073
	primary	7(41.2%)	10(58.8%)	
	middle	4(44.4%)	5(55.6%)	
	Secondary/higher secondary	36(73.5%)	13(26.5%)	
	Bachelors	12(57.1%)	9(42.9%)	
	Masters	1(100%)	0(0%)	

Discussion

Current generation is highly concerned about the cross infection control because social media has played a pivotal role in enhancing the awareness of both the general population and patients on the greater extent.[19] The HCWs face numerous challenges after coming in direct contact with infectious patients during handling their samples for diagnostic purposes and treatment procedures. [20] In the healthcare setting, PPE is used mainly to protect the mouth, nose, face, eyes, feet and head [10] where it provides protection against the infectious splashes from body fluids and blood.[10] The usage of PPE including respirators, gloves, clothing could be possible solution for providing the protection and safety.[21] against the entry of microbes in the bodies of both the HCWs and patients respectively. [22] These steps of utilizing PPE should be included in the standard protocol of any healthcare setting in order to avoid the cross infection occurrence in both the HCWs and the patients as well. Eventually, the HCWs and patients would be totally free from any fear of cross infection in the hospitals in turn enhancing the standards of the health care delivery systems worldwide.

Higher educational attainment, education interventions such as specialized dental training or postgraduate qualifications, enhances infection control practices by enabling professionals to understand the scientific principles of microbiology and disease transmission rather than merely following procedural steps. This deeper understanding promotes consistent and accurate application of protocols (e.g., distinguishing between sterilization and disinfection), improves the ability to adapt to evolving evidence-based guidelines, and strengthens critical thinking for effective risk assessment in clinical scenarios such as prosthodontic procedures. Moreover, research indicates that higher educational levels are associated with better compliance with preventive measures, including vaccination (e.g., Hepatitis B), and overall greater adherence to infection control standards compared to personnel with less formal education.[23-25]

The current study revealed that 21.4% participants were educated well enough regarding cross infection control. The results in the current study were not in consistency with the study reported by Hossain et al [26] where 64.9% participants were trained against the cross infection spread. The present study depicted that 59.7% men and 66.7% women possessed good knowledge about PPE which was again less than that of another study where 76.8% males and 80.9% females had satisfactory knowledge.[27] Moreover, there was a significant association observed between knowledge and educational level of participants (p-value 0.016) but an insignificant association of practice with educational level (p-value 0.073). These findings in the current study matched the reported literature where education level showed a significant association with knowledge (p-value 0.015) [27], but an insignificant association with practice.[15]

Another study also reported better results as compared to the present study. [28] Our findings are contrary to another survey where educational level has an insignificant association with knowledge but significant association with practice (p-value 0.118 & 0.005) respectively. [29] The healthcare workers should possess completely advanced knowledge of the cross infection control with the particular type of the PPE used in the specific clinical disease scenario for not only protecting themselves but also the colleagues, patients, and other general public

accurately.[30] This could be possible only if HCWs are well trained regarding the correct utilization of the personal protective equipment (PPE) that needs effective assessment, understanding specific PPE suitability with appropriate application.[30, 31] Previously , a survey attributed to PPE usage awareness of HCWs was conducted in Pakistan which revealed that frontline health care workers have inadequate training associated with PPE or limited access to the PPE.[32] Therefore, proper trainings regarding PPE usage in different clinical scenarios are required to upgrade the awareness of HCWs because they are the sole members of the society that could play a fruitful role in protecting the entire population from cross infection which is not only a spreading problem but could induce disastrous hazardous effects in the society.[10, 33]

A past study recommended education on the infection control for the dental practitioners with lower educational levels and lesser years of practice.[34]

In this study, there was also found to be an insignificant association of attitude with educational level (p-value = 0.292), which is consistent with the result depicted by Lavanya et al (p-value=0.287) [29], but contradictory to the outcomes reported by another researcher where there was a significant association of attitude with educational level (p-value 0.02).[35]

The process of Donning and doffing plays an imperative part in the over-all acceptance of the PPE by HCWs' for the protection and safety purposes. [36] The fundamental practice of contamination control is the accurate doffing of personal protective equipment (PPE) [37] because virus transmission occurs through improper donning and doffing process especially. Additionally, other associated factors also play an important role in the cross infection spread as well. [36, 38] This shows that proper education of HCWs with respect to Donning and doffing is the requirement of this epic because cross infection spread is at its peak no doubt. [39]

Although, it's a compulsion for all the dental HCW's to adopt the entire self-protective methods, follow SOP's and get vaccinated against Hepatitis-B [1, 40] on regular intervals so as to prevent themselves as well as the general population from getting ailments. The major reasons for not using the PPE might include its non-availability, safety, shortage of time, and/or busy schedules of the health care co-workers.[41]

Recommendations and the way forward: Further research regarding attitude and practice of PPE should be carried out on the larger scale among the health care workers. The formulation and implementation of the SOP's regarding PPE employment properly is the foremost thing in order to prevent the infection transmission. It is highly recommended to stimulate the HCWs to get accustomed with the rationale of the PPE usage based on the latest scientific literature according to the international guidelines and standardized practices. The Cross-contamination control regulations require regular monitoring from time to time for bringing improvements in the health care settings. The upgraded awareness of the personal protection and sufficient PPE would play a pivotal role in declining the risk of infections.

Limitations: Small sample size and self-reported survey conducted in a single city might lead to the over-reporting.

Conclusion

The current study concluded significant association between knowledge and educational level of dental assistants. There exists a strong association between knowledge, practice and usage of PPE for controlling the cross infection among the health care workers especially dental assistants. Pakistan is developing country that needs proper training sessions in order to further improve the educational level of the participants altogether with attitude and practice. There is an excessive patient load in the public sectors that can adversely affect the health outcomes for ensuring the better compliance mainly because of non-availability of PPE's and busy schedules of HCW's. Thus, knowledge can be upgraded through continuous educational programs within the clinical settings so as to magnify the PPE practice in the health care delivery systems.

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