

Knowledge, Attitudes, and Perceptions of Dental Assistants
regarding Dental Asepsis and Sterilization in the Dental Workplace

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Summary of Article

Syed Sarosh Madhi, Zohaib Ahmed, Raheel Allana et al. undertook a cross-sectional study to evaluate dental assistants in Pakistan on their knowledge, attitudes, and perceptions of dental asepsis and sterilization. It was conducted at Jinnah Medical and Dental College in Karachi, Pakistan; and was published in the *International Journal of Dentistry* on June 17th 2021 (<https://pubmed.ncbi.nlm.nih.gov/34221016/>).

70 dental assistants voluntarily participated in a 27-item, pre-pilot-tested, closed-ended online questionnaire to evaluate their knowledge of asepsis, sterilization, instrument handling, hand-hygiene practices, disinfection, dental practice, education, age and experience level. 44.30% of the 70 participants were between the ages of 21 and 29; 85.41% worked in a hospital; 14.29% worked in private clinics; 7.1% obtained a diploma in the dental assistant program; and 74% had more than 2 years of practice experience. Dental assistants in private practice (76.30) had a higher mean knowledge score than those in hospitals (74.25), and assistants with less than 2 years' experience (73.96).

Based on the findings of this research, this will lead to the development of continuing education initiatives that can increase dental assistants' awareness of and familiarity with hazardous waste management procedures.

Article information

The '*Knowledge, Attitudes, and Perceptions of Dental Assistants regarding Dental Asepsis and Sterilization in the Dental Workplace*' was written by Syed Sarosh Mahdi, Zohaib Ahmed, Raheel Allana, et al. This article was published in the *International Journal of Dentistry* in June 17th, 2021 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8225430/>), (<https://pubmed.ncbi.nlm.nih.gov/34221016/>), DOI: (10.1155/2021/5574536). The authors' list of study sponsor/s did not disclose any conflict of interest.

Study Analysis:

Type of Study

This study type is a cross-sectional study. This study was carried out at Jinnah Medical and Dental College in Karachi, Pakistan, from March to June 2020.

Study purpose

The purpose of this study was to assess dental assistants' knowledge, attitudes, and perceptions regarding dental asepsis and sterilization in Karachi, Pakistan. From what is known, dental practitioners are exposed to several occupational dangers daily, especially given their proximity to patients. Exposure to microbiological and chemical dangers is an example of a risk factor. If any employee in the dental office lacks information about infection control protocols and practices inadequate infection control, the risk of occupational exposure to infectious diseases in practice increases. With this in mind, the dental team may be vulnerable to blood-borne infections such as HIV, HCV, or HBV if not cautious. Bacterias, such as streptococci, and a variety of other viral and bacterial diseases that can colonize the mouth and respiratory tract are highly susceptible in the dental office. Disease transmission can occur through blood, droplets, needle-stick injuries, or even contaminated water from dental units, as well as through aerosols that can be conveyed indirectly, such as from the surface of a table. Given the number of different ways that diseases can be transferred, there have been concerns about infection control and cross-infection protocols in the dental profession.

To prevent and limit disease transmission, infection control measures, and safeguards must be appropriately implemented. To offer a safe environment for patients and personnel, infection control regulations must be in place since it is vital to prevent disease transmission. In 1993, The Centers for Disease Control and Prevention (CDC) published infection control guidelines, and the standards have been developed but are still in use over the years. During the 1980s, there was an outbreak of HIV, a human immunodeficiency virus epidemic, and preventive infection control regulations were formed as a result of this outbreak, and they have been updated daily since the event. Continuous safeguards were established and have expanded globally, and guidelines on universal precautions to avoid the spread of possible blood-borne illnesses such as HBC, HBV, and HIV have been set upon acceptance from the Occupational Safety and Health Administration (OSHA). The standards were expanded to require that all surfaces, equipment, and instruments contaminated with blood, saliva, or potentially infectious materials be cleansed and disinfected. Each work surface should be disinfected before and after each patient's procedure. Previously, the reuse of syringes, vials, and saline solution caused an outbreak of Hepatitis B, which is now severely forbidden. It was also made essential for all dental office staff to obtain their vaccines since some exposures are inevitable and they need to

be protected from vaccine-preventable diseases. All of these guidelines have escalated compliance with aseptic methods of parenteral medication administration.

Despite the publication of such comprehensive infection control guidelines, many studies have revealed low compliance with infection control protocols. Furthermore, in developing countries where such guidelines and protocols have not been well documented and established, this issue is of greater concern. Infection control training programs are lacking in many hospitals, and some have reported a lack of awareness among allied health personnel. This study focuses on dental assistants' knowledge of infection control, specifically chair-side dental assistants working in private clinics and hospitals. Dental assistants play an important role in cross-infection prevention, and the majority of dental assistants in developing countries are not certified to perform such tasks. The authors of this study intend to evaluate dental assistants' knowledge, attitudes, and beliefs about dental asepsis and sterilization.

Experimental design

This cross-sectional study was conducted with the use of a sample drawn from an accessible population using nonprobability convenience sampling. To protect participants' privacy and confidentiality, the survey was kept anonymous, with no identifiable information. Participation in the study was voluntary and without remuneration, and all participants were provided with information about the study's goals and objectives before their participation.

This study's questionnaire included questions about asepsis and sterilization procedures. The questionnaire was split into subcategories based on the procedure. The first set of questions concerned pre-sterilization; the second, the verification of biological processes involved in sterilization cycles; the third, the use of autoclaves; and the category 4 questions concerned documentation of the sterilization process. Twenty-seven questions were developed, with the majority of them tailored to the standard precautions advocated by the World Health Organization's (WHO's) health governing standards and recommended guidelines for dental practitioners in the local disinfection and decontamination unit (LDU) HSE, 2012 (revised edition 2014). This study was performed over four months, from the beginning of March 2020 and ending in June 2020.

A convenience sample of 24 dental assistant trainees ($n = 24$) was used to validate the questionnaire. Expert opinion was used to assess the content's validity, and additional analysis

was performed. In addition, the ethical committee proposed a few minor changes to the questionnaire. The final questionnaire had an average internal consistency (Cronbach's alpha 0.68) and took an average of 9.3 (2.4) minutes to complete. The results of the pilot survey questionnaire were not included in the major report. The principal investigator requested assistance from several dental associations in having dental assistants complete the research questionnaire. The questionnaire was distributed in English because it is the official language of Pakistan. The questionnaire was administered in person, and an online link was forwarded to various dental establishments in Karachi via referrals. The research team received 70 responses from 105 dental assistants approached during this period. The overall response rate was 66.6%.

The dependent variable of knowledge was measured as a continuous composite score using 24 close-ended questions on a Likert scale (1 = not at all/never, 2 = very little/rarely, 3 = /sometimes, 4 = to a great extent/always), yielding a 24 minimum and 96 maximum scores. There were four independent categorical variables: four levels of age, two levels of health system affiliation (private practice or hospital), a dichotomous (yes or no) diploma in the dental assistant program, and three levels of years of practice experience. IBM SPSS version 24.0 was used to analyze the data, which had a 95% confidence interval and a 5% margin of error. The observed sample size was 70 people. SPSS was used to code and enter all variables (descriptive statistics comprising frequency and percentages to evaluate the responses). A factorial analysis of variance (ANOVA) was used to identify significant differences in knowledge scores among different demographic groups, with a p-value of "0.05" considered significant.

Results

The displayed results were organized into three tables: dental assistant demographics; knowledge, attitudes, and perceptions of dental asepsis and sterilization among dental assistants; and analysis of variance for age, health system affiliation, diploma, and years of experience centered on the mean knowledge score. With the information gathered, a histogram (knowledge score with normal distribution) and a box plot were created (knowledge score by health system affiliation and experience).

The majority of participants (44.30%) were between the ages of 21 and 29. 85.41% of the dental assistants had worked in a hospital setting. Whereas only 7.14% had a diploma in the dental assistant program, despite having more than two years of practice experience. According

to the knowledge questions given, only 58% of dental assistants understood the proper use of alcohol-based hand rubs; however, only a few (17.1%) indicated using them at the proper times. There were 33% of dental assistants who had reported having trained in safe practices and were able to handle sharp objects, while 24.3% ensured that all instruments were washed and disinfected per the practice protocol. Overall, 91.4% maintained and updated their knowledge of infection prevention and prevention strategies regularly. In terms of practical implications, only 5% of them cleaned and dried reusable items regularly. Although 92.9% of dental assistants remarked they ensured proper validation and annual performance recertification for each sterilizer, only 11.4% said they always ensured that critical instruments were labeled with batch control identification information before sterilization.

To find statistically significant knowledge score differences across independent groups (age, practice type, having a diploma, and years in practice), a factorial ANOVA was carried out. The Shapiro-Wilk test of normality was used to determine whether a parametric test ANOVA was appropriate, and the results were insignificant ($p > 0.05$). The mean (74.54), median (75.00), and mode (75.00) were also determined to be equal, further validating the assumption of using a parametric test. The histogram showed a normal distribution of knowledge score distribution. Dental assistants in private practice had a higher knowledge score (76.30) than those employed in hospitals. There was a significant difference in knowledge scores based on practice experience level; those with less than two years of experience (75.61%) had a higher mean knowledge score than those with two to five years of experience. According to the box plot, it was showcased that dental assistants who had less than two years of experience working in private clinics had the highest knowledge score and the lowest variability. Dental assistants with 2-5 years of experience working in hospitals had the lowest knowledge score, but the highest variability.

Conclusions

Based on the results of the questionnaire, Pakistani dental assistants have limited knowledge in most areas of infection control, sterilization, waste disposal, and other aspects of dental apesis. Data on the actual number of practicing and registered dental assistants are difficult to obtain and difficult to trust because the majority of dental assistants employed in dental clinics and hospitals are not certified. In Pakistan, there is a scarcity of education and training programs for dental assistants and nurses, and the industry is unregulated. The majority

of dental assistants and nurses in Pakistan receive on-the-job training in clinics or hospitals. Those with less than two years of experience outperformed those with greater experience. This finding may be consistent with the increased emphasis on infection control protocols and standards in recent years. We found no significant differences based on age or having completed a dental assistant diploma program. One possible explanation for this finding is that the majority of dental assistants were under the age of 40, and only a small percentage (7%) had a dental diploma from a dental assistant program. It is difficult to detect a difference in knowledge scores when there is such little variation across age, health system affiliation, and having a dental diploma. A hospital-based cross-sectional study conducted in Japan discovered a significant correlation between infection control protocol adherence and age, dental department, patient frequency, knowledge, and openness to treating HIV/AIDS patients. Together with this study, such studies may provide a direction/base for future research in this area. The discussed topic regarding relevant testing and maintenance is still currently unknown as there is a clear absence of direction and understanding on the subject. To ensure good value for money and health protection, the dental team should be given quality guidelines on how to improve this aspect of their practice.

Because of the convenience sample, the generalizability of this study is questionable, and the results cannot be generalized to all dental assistants working in Pakistan. Another significant limitation of the study is the disparity in sample sizes among various independent groups, particularly those working in private clinics and hospitals. Control of confounders is another limitation, and many other factors affect perception, attitude, and knowledge of asepsis and sterilization, such as educational content, standardization of dental facilities, organizational culture, stress, anxiety, and economic status. None of these factors were taken into account in the current study. The survey assesses self-reported knowledge scores based on dental assistant perceptions and attitudes, but it does not predict actual behavior. It was reported to be more subjective than objective based on the knowledge score.

Among the statistics received, there were noticeable differences in the pre-disinfection, sterilization, and waste management protocols. In the pre-disinfection stage, elimination of particles, debris, and microorganisms, research revealed that dental assistants' knowledge and application of pre-disinfection remained unsatisfactory, with only 7.1% of survey participants responding that they always cleaned and dried contaminated instruments before reuse. Cleaning

and decontamination, packaging, sterilization, and storage should all be separated in the instrument processing area. There was an indication that 11.4% of participants in the study admitted that all critical items are labeled and packaged with batch control identification before sterilization, and only 5% of them regularly cleaned and dried the reusable items. In the sterilization stage, the most commonly used method for eradicating all active microorganisms is steaming under pressure at 121°C for 15-30 minutes. According to recent research on infection control protocol, the implementation of sterilization protocols is still very limited. According to the study, nearly 90% of dental assistants update their infection control, prevention, and sterilization knowledge every year. Lastly, in the waste management stage, allied dental workers should be adequately trained in hazardous waste handling, storage, and disposal. Waste containing human tissue, blood, or bodily fluids, such as swabs or dressings, must be clearly labeled as "clinical waste" and separated from nonclinical waste. In this study, only half of the dental assistants indicated that they fully ensure the safe handling of hazardous waste. All dental personnel, including dentists who are at risk of occupational exposure, should receive initial and annual refresher training, according to the Occupational Safety and Health Administration (OSHA). It is also stated that sharp materials and instruments used can be potentially hazardous, as they can lead to needle-stick injuries and disease transmission among untrained dental assistants. That being said, these types of waste should be placed in a labeled box that is rigid and leak-proof, puncture-proof, and labeled "sharp box" and kept separate from other containers. According to the study, 32.9% of respondents stated that they had received training in handling and disposing of such sharp materials. However, the study's findings in this domain and most of the research were found to be inadequate. According to the findings, there is room for improvement in the study through the use of a device methodology that can record infection control and decontamination protocols.

Your impression

Based on the study's findings and objectives, I believe that it is necessary because proper knowledge of dental asepsis and sterilization in the dental workplace can help prevent major problems, such as disease transmission. As providers and educators, we want the best for our patients and want to avoid cross-infection, which could harm any member of the dental office. Even though the study was conducted in Pakistan, I believe it provided a solid foundation for

what dental assistants currently know and what their offices may be implementing. It is critical to reduce the risk of pathogenic microorganism transmission to maintain patient and clinician health and safety. Based on what I've learned in this article, I'm curious how much other dental assistants in other countries understand infection control practices. There appears to be a lot more to learn about this study and how we can improve our methods of teaching infection control practices to not only dental assistants but all faculty.