

# Knowledge, Attitude, and Practice of Iranian Dental Students of the Standard Hand Washing Technique: an Interventional Study

Baharvand M, DDS, MS<sup>1</sup>; Maleki Z, DDS, MS<sup>2</sup>; Mohammadi S, MD<sup>3\*</sup>; Pouri I, GDP<sup>4</sup>

<sup>1</sup> Department of Oral Medicine, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup> Department of Radiology, School of Dentistry, Azad University, Tehran, Iran

<sup>3</sup> School of Dentistry, Azad University, Tehran, Iran

<sup>4</sup> Dental School, Shahid Beheshti University of Medical Sciences, Tehran, Iran

## Abstract

**Background and purpose:** Hand contamination is an important factor of infection transmission from dental staff to patients and vice versa. The aim of this study was to determine the effect of hand washing training on dental students' knowledge, attitude, and clinical practice at the Shahid Beheshti University of Medical Sciences Dental School in 2010.

**Methods:** This quasi-experimental study was conducted on 100 volunteers studying in the 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup> semesters in the Shahid Beheshti Dental School. A standardized questionnaire was used after confirmation of its content validity and reliability as the study tool. All students were assessed twice: once before (pretest) and once after the training (post-test) of hand washing techniques. The scores of pretest and post-test were compared and analyzed by paired T test and by repeated measured analysis of variance test (RMA) by means of SPSS-15 program.

**Results:** A total of 100 students (38 boys and 62 girls) participated in this study. The difference between the mean scores of dental students' knowledge before (13.73±2.76) and after training (19.64±2.53) was found to be significant ( $p < 0.001$ ). With regard to their attitudes, the mean scores related to before (25.21±2.31) and after training (26.63±2.08) were significantly different ( $p < 0.001$ ). Meanwhile, the participants showed significantly improved hand washing technique after training ( $p < 0.001$ ). RMA scores showed no significant difference between the male and female students in terms of their knowledge and attitudes, although the clinical practice of boys was better than that of girls ( $p = 0.017$ ). However, the academic grades of the students (semesters) had no effect on their attitude, knowledge, and hand washing techniques.

**Conclusions:** Training about hand washing techniques can improve the knowledge, attitude, and clinical practices of dental students, regardless of their grade.

**Keywords:** INFECTION CONTROL, HAND CONTAMINATION, HAND SANITATION, HAND WASHING TRAINING, INFECTION TRANSMISSION, KNOWLEDGE, ATTITUDE

*Journal of Medical Education Spring 2015; 14(2):64-8*

## Introduction

Despite the extensive progression in the field of infection control in recent years, several mistakes have been registered in this regard in different medical centers. Therefore, improving the level of knowledge, attitude, and performance of healthcare workers is

important to achieve standard measures of infection control (1).

Human immunodeficiency virus (HIV) is the most important risk factor among dentists, students, healthcare workers, and dental patients, because they often get in contact with blood and oral secretions (2-8). Most of these contacts occur accidentally and are preventable by optimum adherence to hygienic principles (9).

Hand contamination is an important factor of infection transmission from dental staff to patients and vice versa. Viral, fungal, and drug-resistant bacterial infections are among

**Corresponding author:** Sahar Mohammadi, MD. Post Graduate Student, Department of Dermatology, Department of Radiology, School of Dentistry, Azad University, Tehran, Iran.  
Email: Drsaharmohammadi88@gmail.com

the numerous diseases that may be transmitted through contaminated hands (10). Some researches reports that nurses pay more attention to sanitary principles than do doctors (10-14).

Hand washing can decrease 47% of gastrointestinal and 16% of respiratory infections. It also diminishes the mortality rate due to infections (15). A study conducted in the endodontics department of The Shahid Beheshti Dental School reported that the students' knowledge, attitude, and performance in different fields of sanitation was undesirable, confirming the necessity of training in different fields of infection control (1).

Until date, no special or separate training on hand washing technique has been presented to the dental students in their curriculum at the Shahid Beheshti University of Medical Sciences; instead, this technique has been included only as a part of the theoretical course of infection control in the 5<sup>th</sup> semester. Accordingly, we hypothesized that the presentation of an effective model of standard hand washing technique would improve the dental students' knowledge and behavior in this regard.

The aim of this study was to determine the effect of hand washing training on the changes in the dental students' knowledge, attitude, and clinical performance at the Dental School of Shahid Beheshti University of Medical Sciences in Iran.

## Methods

This quasi-experimental study was performed on 100 volunteers studying in the 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup> semester at the Dental School of Shahid Beheshti University of Medical Sciences. The infection control course was introduced in the 5<sup>th</sup> semester, in the 6<sup>th</sup> and 7<sup>th</sup> semester (preclinical, immediately after the course), the 8<sup>th</sup> semester (at the beginning of clinical courses), and the 11<sup>th</sup> (final) semester to cover all students at different levels of knowledge. The sample size of each

semester was proportional to its total population.

Relevant articles, experts' opinion, and clinical guidelines were used to design a 4-sectioned questionnaire, including queries about demography, knowledge, attitude, and practice aspects.

Initially, 59 questions were include on the definition of hand hygiene, hand microbial flora, routes of infection transmission, disinfection instructions, the aim of hand washing and disinfection, time required for effective hand washing, disinfectants to be used before surgery, anti-septic selection, factors influencing the effectiveness of antiseptics, how to use and preserve hand hygiene products, hygienic lotions and creams, liquid soaps, advantages and disadvantages of alcohol-based hand solutions, the preferable sink for hand washing, hand drying, and hygienic substances suitable for different type and amount of hand contamination. A total of 10 professors from the Oral Medicine Department were requested to assess the content validity of the questionnaire by grading each question from a scale of 1–5. Queries with scores >3.5 were selected. Finally, 27 questions were approved and 32 questions were deleted.

The attitude-gauging section, including 8 queries and a total score of 40, addressed the students' beliefs about hand washing during dental procedures. This section was graded according to the Lickert scale, such that higher scores showed a positive attitude and greater adherence to the subject.

Based on Centre of Diseases Control (CDC) guidelines (16), a checklist (including 27 items) was designed to assess the dental students' method of hand washing.

To determine the reliability of the questionnaire, 20 students were asked to answer it twice within a one-week interval. Questions with Cronbach's Alpha coefficient <0.7 were disapproved.

The training content was prepared according to the CDC guidelines (16). The questionnaires were distributed among the

students to assess their knowledge and attitude. Later, each participant was asked to demonstrate his/her technique of hand washing in the Oral Medicine Department. This session was assessed through direct observation by a senior dental student and a supervising professor. The results were recorded in the checklists.

In the second phase of the study, instructive pamphlets were issued among the students, and 2 weeks later, the students were tested.

Paired T test and Repeated Measures Analysis (RMA) test were employed to compare and analyze the scores of pretest and post-test by SPSS-17 program.

**Ethical considerations.** The volunteers were assured that their data would be maintained confidential and each person was assigned a three-digit code for this purpose. Any volunteer was free to quit the study at any time. The Ethics Committee of the Dental School approved the study protocol.

## Results

A total of 100 students (38 boys and 62 girls) participated in this study, with a mean age of  $21.89 \pm 2$  year. Among these students, 28 were in the 6<sup>th</sup>, 22 in the 7<sup>th</sup>, 23 in the 8<sup>th</sup> and 27 in the 11<sup>th</sup> semester.

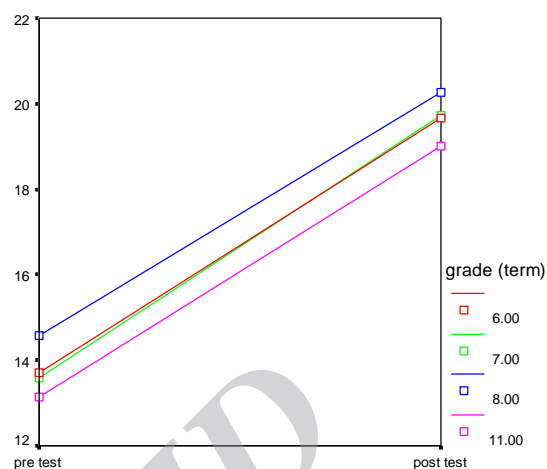
As shown in Table 1, the knowledge, attitude, and clinical practice of the students significantly improved after training (Table 1).

The lowest mean score of knowledge in the pre-test was obtained by students in the 11<sup>th</sup> semester and highest by those in the 8<sup>th</sup> semester. The results in the post-test were similar.

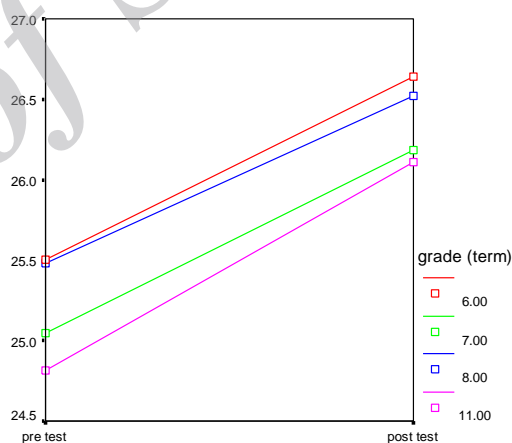
Score related to attitude in the pretest was lowest for students in the 11<sup>th</sup> semester and highest for those in the 6<sup>th</sup> semester. On the other hand, the highest mean score of attitude in the post-test was obtained by students in the 7<sup>th</sup> semester and lowest by those in the 11<sup>th</sup> semester.

The lowest mean score for hand washing technique in the pretest was noted for students in the 7<sup>th</sup> semester and highest for

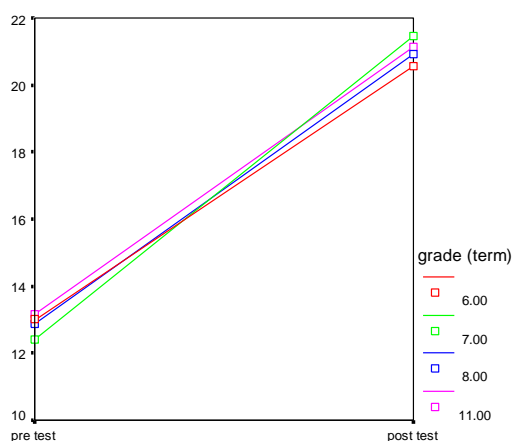
those in the 11<sup>th</sup> semester. In post-test, the lowest mean score of practice was noted in



**Figure 1.** Students' knowledge of hand washing by semester.



**Figure 2.** Students' attitude of hand washing by semester.



**Figure 3.** Students' hand washing practice by semester.

**Table 1.** Knowledge, attitude, and practice of students before and after training about hand washing technique

		mean	standard deviation	p value
knowledge	Pre test	13.73	2.6	<0.001
	Post test	19.64	2.53	
attitude	Pre test	25.21	2.31	<0.001
	Post test	26.37	2.08	
practice	Pre test	12.88	2.55	<0.001
	Post test	21	2.26	

**Table 2.** Correlation values of knowledge, attitude, and practice scores of dental students' hand washing

	Correlation	Score of knowledge	Score of attitude	Score of practice
Score of knowledge	Pearson Correlation (p value)		.228* (0.023)	.018 (.860)
Score of attitude	Pearson Correlation (p value)	.228* (0.023)		-.011 (0.913)
Score of practice	Pearson Correlation (p value)	.018 (0.860)	-.011 (0.913)	

students in the 6<sup>th</sup> semester and the highest was noted for those in the 7<sup>th</sup> semester.

According to the RMA test, no significant difference was noted between the boys and girls in terms of their knowledge and attitude, although the male students performed hand washing better than their counterparts ( $p=0.017$ ).

RMA test showed no significant difference in the knowledge, attitude, and practice of students in different semesters (Figures 1–3). Pearson's correlation coefficient among the scores of knowledge, attitude, and practice showed little or no correlation in this study (Table 2).

## Discussion

In this study, a researcher-made questionnaire was used. The content validity was confirmed by senior professors of infection control course in the Oral Medicine Department. The

reliability of the questionnaire was determined by a test- retest procedure (Cronbach's Alpha coefficient  $>0.7$ ).

Overall, the scores of students' knowledge, attitude, and practice improved significantly after the training.

Our results are in concordance with those of several studies that addressed training and its effects on the knowledge, attitude, and practice of hand washing (11-13, 17-22).

No significant difference was noted in the knowledge and practice between boys and girls before and after the hand washing training; therefore, in both the groups, the intervention was effective. However, with respect to the attitude, the male students expressed more concern about efficient hand sanitation than girls, which contradicted the common belief that women are more adherent to practicing of hygienic principles. This comparison between the two sexes has not been performed previously.

Meanwhile, going through the program had no effect on the attitude, knowledge, and practice of hand washing.

In contrast to our results, Jabari's (18) showed that highest and least scores of knowledge, attitude, and practice was gained by the 12<sup>th</sup> and 10<sup>th</sup> semester students, respectively, while the 8<sup>th</sup> semester students gained the least score of practice (18). This result is important as it highlights that senior students, who are soon going to deliver care in the community, scored the least in both the pretest and post-test of training. The departments that are involved in teaching the infection control course should consider this critical weak point and attempt to compensate it through revising the current curriculum.

The results of this study confirms the importance of hand washing training in healthcare workers and the necessity of training in students belongs to different levels of education and gender.

## Conclusions

Training of hand washing technique improves the knowledge, attitude, and efficiency of clinical practice of dental students regardless of their academic level.

## Acknowledgement

This paper was based on a dissertation which was a part of requirement to receive DDS degree by Isen Pouri from Shahid Beheshti University of Medical Sciences Dental School, under the supervision of Dr. Ziba Maleki and Dr. Maryam Baharvand.

The authors are greatly thankful to the Deputy of Research and Audiovisual Department of the Shahid Beheshti Dental School for their cooperation and technical aids.

## References

1. Iqbal M J, Asnaashari M, Hosseini MR. Knowledge, attitude and practice of dental students about infection control in the Department of Endodontics, School of Dentistry, Shahid Beheshti University. *Shahid Beheshti University of Dental Journal*. 2005;61(3):377-9.
2. Angelillo IF, Nardi G, Rizzo CF, Viggiani NMA. Dental hygienists and infection control: knowledge, attitudes and behaviour in Italy. *Journal of Hospital Infection*. 2001;47(4):314-20.
3. Ciesielski C, Marianos D, Ou C. Transmission of human immunodeficiency virus in a dental practice. *Ann Intern Med*. 1992;116:798-805.
4. Gordon BL, Burke FJT, Bagg J, Marlborough HS, McHugh ES. Systematic review of adherence to infection control guidelines in dentistry. *Journal of Dentistry*. 2001;29(8):509-16.
5. Nelsing S, Nielsen TL. Noncompliance with universal precautions and the associated risk of mucocutaneous blood exposure among Danish physicians. *Infect Control Hosp Epidemiol*. 1997;1(8):692-8.
6. Chan R, Molassiotis A, Chan E, Chan V, Ho B, Lai CY. Nurses' knowledge of and compliance with universal precautions in an acute care hospital. *Int J Nurs Stud*. 2002;39:157-63.
7. Kim KM, Kim MA, Chung YS, Kim NC. Knowledge and performance of the universal precautions by nursing and medical students in Korea. *Am J Infect Control*. 2001;29:295-300.
8. AIDS/TB Committee of the Society for Healthcare Epidemiology of America, Management of healthcare workers infected with hepatitis B virus, hepatitis C virus, human immunodeficiency virus, or other bloodborne pathogens. *Infect Control Hosp Epidemiol*. 1997;18:349-63.
9. McCarthy GM, Britton JE. A survey of final-year dental, medical and nursing students: occupational injuries and infection control. *J Can Dent Assoc*. 2000;66:561-5.
10. www.CDC.guidelines for infection control in dental health-care settings. *MMWR*. 2003;52(17):1-16.
11. Hosbon D, Woller W, Anderson E. Development and evaluation of a new alcohol-based surgical hand scrub formulation with persistent anti microbial characteristic and brushless application. *Am J Infection Control*. 1998;26:507-12.
12. Mukti AG, Treloar C, Asdie AH, D'Este K, Higginbotham N, Heller R. A universal precautions education intervention for health workers in sardjito and pku hospital. *Indonesia Southeast Asian Journal of Tropical Medicine and PUBLIC HEALTH*. 2000;31(2):405-11.
13. Rosen L, Zucher D, Ordy DB, Engelhard D, Manor O. The effect of a hand washing intervention on preschool educator beliefs, attitudes, knowledge and

self-efficacy. *Health Education Research*. 2009;24(4):686-98.

14. Miller CH, Palenik CJ. Infection control and management of Hazardous Material for the dental team. Second Ed, Mosby, St. Louis, MO. 1998;109-72.

15. Bawen A, Huilaima J. A cluster- Randomized controlled trial evaluating the effect of hand washing-promotion program in Chinese primary schools. *Am J Trop Med Hyg*. 2007;76(6):1166-73.

16. CDC guidelines for hand hygiene in health-care settings. *MMWR*. 2002;51(16).

17. Muawia A, Qudeimat Y. Farrah and Arwa I. Owais. Infection control knowledge and practices among dentists and dental nurses at a Jordanian university teaching center. *American Journal of Infection Control*. 2006;34(4):218-22.

18. Jafari Z, Salimi M. Knowledge, attitude and practice of dental students regarding infection control in the prosthodontics department, School of Dentistry, Rasht University .*Iranian Journal of Infectious Diseases and Tropical Medicine*. 2008;41:71-4.

19. Suchitra JB, Lakshmi N. Impact of education o knowledge, attitudes and practices among various categories of health care on nosocomial infections.*Indian Journal of Medical Microbiology*. 2007;25(3):181-7 .

20. Creedon A. Health care worker's hand decontamination practices: compliance with recommended guide lines. *Journal of Advanced Nursing*. 2005;51(3):208-16.

21. Sarir M, Zandi-Nejad F. Training standard of infection control in dental office, Shiraz, *Journal of dentistry Shiraz university medical science*. 2006;6(11).

22. Infection control. Prevention of health care associated infection in primary and community care. *NICE clinical guide line 2*. 2003.

23. Shojaei-Zadeh D. Effect of health education on knowledge, attitude and practice of dental assisting experience in Shiraz about AIDS. *Journal of Medicine, Tehran University of Medical Science*. 1995;55(6):116-20 .

Archive of SID