Hand Washing Practice Among Military Dentists in Jordan

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ABSTRACT

Background: Despite the concerns and the importance of hand washing to reduce the risk of healthcare-associated infections, noncompliance with hand washing guidelines is still a universal problem.

Objectives: To evaluate the compliance with hand washing guidelines among a group of Jordanian military dentists and, to assess factors influencing compliance.

Methods: Cross-sectional study based on self-administered questionnaire was conducted on 100 military dentists working in the Dental Corps of the Royal Medical Services – Jordan Armed Forces. The questionnaire comprised four categories: (1) general information; (2) assessment of hand washing compliance; (3) availability of hand washing supplies; (4) awareness of taking medical history and reviewing the infection control policy.

Results: All dentists in the study washed their hands for a minimum of 15 seconds. Washing hands before and after contact with each patient, before donning and after removing gloves comprised 78% and 53%. During dental treatment, only 14% of dentists wore jewelry, and 59% considered the type of hand lotion they used. With increased dental experience, dentists significantly washed their hands before donning and after removing gloves (P value 0.01), and significantly scrubbed their hands before surgery (P value 0.04). Dental supplies and surgical scrubs were deficient. 67% of dentists routinely obtained medical history of infectious diseases, while only 18% reviewed the infection control policy.

Conclusion: The overall compliance with hand washing guidelines among military dentists in Jordan was 65.7%. While gender and scientific rank had no effect on hand washing compliance, increasing dental experience significantly improved some items (list them: washing hands bofore donning and after removing gloves and, hand scrubbing before surgery) of hand washing practice.

Keywords: Hand washing; compliance, hand hygiene, dentists, infection control.

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Introduction

Hand hygiene is defined as a general term that applies to hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis[(1)].

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The skin harbors resident and transient microorganisms, transient flora that colonize the superficial layers of the skin, are easier to remove by routine hand washing, and are most frequently the cause for health care-associated infections, while resident flora that is attached to deeper layers of the skin is more resistant to removal, and less likely to be associated with such infections[2]. Dental health care workers are known to be at increased risk of health care-associated bacterial and viral infections, and the pathway of transmission can be bidirectional[3]. Such transmission is very likely in dental settings due to the presence of a large numbers of bacteria and viruses in the mouth and the pharynx, with the potential for aerosolization of blood and saliva during dental procedures[4,5].

According to the Centers for Disease Control and Prevention[6], hand hygiene is considered the single most critical measure for reducing the risk of transmitting microorganisms to patients and health care providers. The key recommendations for hand washing in a dental setting include the following: (1) washing hands when they are visibly soiled, after touching of instruments, equipments, materials, and other objects likely to be contaminated by blood, saliva, or respiratory secretions, and before and after contacting each patient; and (2) using soap and water when hands are visibly soiled by blood or body fluids; otherwise, an alcohol-based hand rub may be used[7]. Surgical hand antisepsis are aimed to eliminate transient flora and reduce resident flora for the duration of a procedure to prevent the introduction of microorganisms in the operative wound, if gloves become punctured or torn[8].
Despite all concerns regarding the importance of hand hygiene to reduce the risk of health care-associated infections, noncompliance with hand hygiene guidelines is a universal problem, which calls for standardized measures for research and monitoring [9,10]. In Jordan, the compliance with infection control programs was investigated among dentists and dental nurses working at the teaching centers of the University of Jordan and the Jordan University of Science and Technology Dental Teaching Center, as well as among dentists and dental technicians working in private dental clinics. Most of these studies concluded that there was a great need to provide formal and obligatory infection control courses to dentists in order to improve their compliance to infection control guidelines [11, 12, 13, and 14]. The objective of this investigation was to evaluate the knowledge and compliance with hand washing among a group of Jordanian military dentists.

MATERIAL AND METHODS

A cross-sectional study comprised of 100 dentists working in different hospitals and field military units belonging to the dental corps at the Royal Medical Services- Jordan Armed Forces were asked to complete a self-administered questionnaire.
The first part of the questionnaire included three general questions about the duration of dental experience, gender and professional rank.
The second part included six questions about compliance with hand washing knowledge and practice. The first two questions dealt with the frequency of hand washing between patients, and before donning and/or after removing gloves. The second two questions included the duration of hand washing, and its method used prior to surgical dental treatment. The last two questions included whether the dentists used jewelry during dental treatment, and if any considered using hand lotions.
The third part included two questions about the availability of hand washing supplies, including antimicrobial soap, single-use hand drying materials, surgical hand scrubs in the clinic.
The fourth part included two additional questions about the dentists' awareness of recording the medical history for each patient, and reviewing the infection control policy in their departments.

Statistical analysis: The data were entered into a web-based database using a data entry form. Frequency and percentage were used for initial descriptive statistical analysis. Comparison of hand washing knowledge and compliance queries related to dental experience, gender, and scientific rank was performed by using the chi-squared test. All statistical analyses were performed with SPSS version 23. P value less than, or equal to 0.05 was considered as significant.

RESULTS

This study showed that the overall compliance with hand washing guidelines among military dentists was 65.7%.

Table I shows dentists' gender, duration of dental experience, and professional rank, which revealed that the majority of the dentists were male general practitioners with a dental experience of less than 10 years.

Compliance with hand washing guidelines among military dentists was 78% of those who washed their hands before and after contact with each patient, while 22% didn't. None of the dentists washed their hands only prior to wearing gloves, 46% washed their hands only after removing their gloves, while 54% washed their hands before donning gloves and after removing their gloves. The majority of dentists (82%) never performed surgical hand scrubbing prior to surgical procedures. All of the dentists washed their hands for a minimum of 15 seconds.

Table II shows those wearing jewelry during dental treatment was reported by only 14% of the dentists, and more than half (59%) were aware when choosing the type of hand lotion to be used during dental practice.

The results of this study also showed that only 18% of the dentists were aware of reviewing the infection control policy in their departments, while the medical history of patients was recorded routinely by 67% and occasionally by 33% of the dentists.

Deficiency in the availability of hand washing supplies and surgical scrubs was reported by 23% and 78% of the dentists.

None of the questions regarding knowledge and compliance with hand washing had a significant effect on gender, dental experience or scientific rank, except for two questions about dental experience. It was found that only 18% of dentists scrubbed their hands before surgery, and this was significantly better with increasing dental experience (P value 0.04). As dental experience increased, dentists significantly washed their hands before donning and after removing gloves (P value 0.01). **Table III**

Table I: Distribution of dentists' gender, dental experience and scientific rank.

Dental experience (Total 100 dentists)	**Number and Percentage**
1–5 years	32
6–10 years	36
> 10 years	32
Scientific Rank (Total 100 dentists)	
GDP	60
Residents & specialists	40
Gender (Total 100 dentists)	
Male	66
Female	34
Total	100

Table II: Data of hand washing knowledge and compliance.

Hand washing before and after contact with each patient	**Number and Percentage**
Yes	78
No	22
Washing hands in relation to wearing gloves	
Before donning only	0
After removing only	47
Before and after	53
Surgical scrubbing prior to surgery	
Yes	18
No	82
Minimum duration of hand washing prior to routine dental treatment	
10 seconds	0
15 seconds	45
30 seconds	55
1 minute	0
Wearing jewelry during dental treatment	
Yes	14
No	86
Considerations when choosing type of hand lotion	
Yes	59
No	41

Table III: The statistical results that have been used to determine whether there is a significant relation between hand washing knowledge and compliance questions with dental experience, scientific rank, and gender.

*The p-value of ≤ 0.05 was considered significant.

	Hand washing before and after each patient	Washing hands in relation to wearing gloves	Surgical scrubbing prior to surgery	Wearing jewelry during dental treatment	Considerations when choosing type of hand lotion	Duration of hand washing
Dental Experience	0.482	0.010*	0.045*	0.937	0.311	0.966
Scientific Rank	0.115	0.368	0.524	0.410	0.135	0.682
Gender	0.439	0.201	0.086	0.884	0.687	0.766

DISCUSSION

As the novel corona-virus, i.e. COVID-19 Pandemic is becoming a major public health challenge throughout the world, current strict and effective infection control protocols are urgently needed[15]. Hand washing as one aspect of infection control necessitates dentists to refine preventive strategies to protect themselves, their staff and their patients from the COVID-19 infection.

The overall compliance with hand washing guidelines among military dentists in this research was 65.7%. This result was more than that observed by other studies conducted in university dental teaching schools in both Taiwan and Brazil, where the rate of compliance did not exceed 35% and 50%[10,16]. However, these two studies were based on direct observation while our study was a questionnaire-based study. Nevertheless, Barlean et al.[17] found in their questionnaire-based study in Romania a better compliance rate (77%) than our study.

Compliance with hand washing recommendations was found to be influenced by many factors such as: gender; workload and type, tolerance, and accessibility of hand washing agents. The current research found no significant difference in hand washing compliance between male and female military dentists. This result is in agreement with a study conducted in Egypt[18], while it disagrees with other researchers from Taiwan, Romania and China who found that female dentists demonstrated a significantly higher compliance than male dentists to hand washing[10,17,19].

Dental experience is also considered another factor that might affect dentists' compliance toward hand washing. This study found that with increased dental experience, dentists were significantly more compliant with hand washing before donning and after removing their gloves, and with hand scrubbing before surgery.

In this study, it was found that 78% of the dentists wash their hands before and after treating each patient. This result was better than that obtained by Romanian dentists of whom 64.3% washed their hands before and after each patient. The compliance with hand washing before and after each patient among postgraduate dentists at a university dental teaching school in Taiwan was very low (29.7%) except for the aseptic procedures, when the compliance increased to 84%[10].

According to the CDC[6,7], clinicians should wash their hands before glove donning, and after removing their gloves. In this study, only 54% of the dentists were compliant with this guideline, while none of them washed their hands only prior to wearing gloves and 46% washed their hands

only after removing their gloves. Many studies revealed that the frequency of hand washing before glove donning was lower than that of after glove removal. The percentage of dentists who washed their hands before wearing gloves versus after removing gloves in Egypt and Romania were 27% vs 73.9% and 48.8% vs 52.7%, respectively, while German and Romanian dentists washed their hands in an equal percentage before and after wearing gloves (35.2% and 38.8% vs 37.7%)[17,18,20].

The minimum duration for routine hand washing with the use of plain or antimicrobial soap and water is at least 15 seconds[6]. The compliance with this aspect in our research was excellent since none of the dentists washed their hands for less than 15 seconds while more than half of them (55%) washed their hands for 30 seconds. In a study carried out among 204 practising dentists in Bangalore city, only 49% washed their hands with a duration of more than 15 seconds[21]. However, the compliance with surgical scrubbing prior to surgery in our study was very poor, with only 18% of the dentists adhered to this guideline. This was due to the unavailability of surgical scrubs, which was reported by 78% of the dentists. Hand washing requires supplies such as plain or antimicrobial soap, water, dry and clean towels,...etc depending on the type of procedure to be performed at all times[22]. Water and antimicrobial soap (chlorohexidine, iodine, iodophors, and chloroxylenol) is recommended before surgical procedures[8]. It was reported that the hand washing compliance rate was higher during work in oral surgery services (92.8%) than during work in general clinical practice (34.2%)[10].

Skin bacteria can rapidly multiply under surgical gloves if hands are washed with soap that is not antimicrobial[23].

The effectiveness of hand hygiene can be reduced by both the presence of jewellery and long or artificial nails that increase the bacterial count and make glove donning and removal more difficult and result in gloves tearing more easily[24]. Potentially, pathogenic microorganisms were found more frequent among dentists who wore finger rings under gloves[25]. Therefore, hand jewellery wearing while providing routine dental care is strongly discouraged and prohibited during surgical procedures[8]. In this study, we did not consider the artificial or long fingernail issues because they are not allowed among military personnel. However, 14% of the dentists in this study wore jewellery during dental treatment.

Maintenance of skin integrity is a key strategy for reducing health care-associated infections. Repetitive exposure to hand hygiene products and procedures is a significant factor in the development of occupational irritant hand dermatitis, therefore, lotions are often recommended to ease the dryness resulting from frequent hand washing and to prevent dermatitis from gloves use[26]. However, petroleum-based lotion formulations can weaken latex gloves and increase their permeability. For this reason, lotions that contain petroleum or other oil emollients should only be used at the end of the working day[27].

To the best of our knowledge, this is the first study conducted to evaluate the compliance with hand washing guidelines among military dentists in Jordan.

Neither gender nor scientific rank had any significant effect on hand washing compliance. However, this study showed that the more experienced dentists were significantly more compliant with hand washing prior to surgery, and washed their hands before donning and after removing their gloves.

Compliance to hand washing recommendations guidelines is not individually dependent; because the lack of hand washing supplies can negatively affect its impact. Therefore, enhancing the availability of hand washing supplies is highly recommended. In addition, continuous medical education with routine observation and feedback could be a helpful tool in improving hand washing compliance among military dentists, particularly, the junior dentists.

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