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Evaluation of handwashing technique held by medical interns in the educational and medical centers of Guilan university of medical sciences in Rasht

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Abstract

Introduction: Hand hygiene is a significant strategy in preventing and controlling infections with a great impact on nosocomial infections and preventing microbial resistance.
Objectives: The main goal of this study was to investigate the performance of medical interns in handwashing in the educational and medical centers of Guilan University of Medical Sciences.
Patients and Methods: This is a cross-sectional study, which was conducted in 2020 in Rasht city. The study population consisted of all medical interns. The handwashing was observed in medical interns after obtaining their permission and separately at a suitable time and place. They were given a grade based on a poster approved by the Ministry of Health of Iran.
Results: A total number of 147 medical interns were enrolled in this study. We also found out that the mean score of study population in handwashing steps was 7.11± 1.97. The lowest rate of correct performance was for 5th (tying the fingertips and washing them) (32%), 8th (washing around the wrist) (49.7%) and 7th (washing the palm lines with the fingertips) (53.1%) steps. The performance score of female interns had a higher average than male interns (7.4 versus 6.8) ($P=0.028$).
Conclusion: Considering the importance of handwashing in preventing the transmission of diseases, especially in the COVID-19 pandemic and the repeated recommendations to wash hands properly as a simple and accessible way to prevent further transmission of the virus, the review of the awareness and practice of medical interns about the handwashing seems to be critical.

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Introduction

Infections are associated with long-term morbidity, increased length of hospitalization, financial losses for hospitals and patients and increased mortality. Pathogens and diseases are transmitted to the patient through the hands of healthcare stuff (1). Based on different studies, patients' skin may be colonized by transient pathogens. Then, it is possible to spread these pathogens in the surrounding areas of the patients (2). Hand hygiene is a crucial strategy in preventing and controlling infections with a great impact on nosocomial infections and preventing microbial resistance (3, 4). There are fundamental differences in hand health education in different countries among health workers.

Numerous efforts were conducted in all parts of the world to increase compliance with the principles of hand hygiene. In 2005, the World Health Organization (WHO) launched the "Cleaner care is safer care" campaign to improve patient safety (5). The campaign continued in 2009 with the slogan "save lives; clean your hands", which is the main program that is being promoted in the world (6). Due to these programs, health organizations around the world are targeting healthcare personnel to improve their hand hygiene, which in turn increases patient safety and reduces the incidence of complications such as nosocomial infections (7). The "five minutes to hand wash" method introduced in the Swiss Health Campaign was an attempt to create a standard criterion for comparing the performance of hand hygiene by health care workers in different locations (8).

Key point

Handwashing has great importance, especially during the COVID-19 pandemic. Here we showed that medical interns should be further trained about this issue in educational hospitals.

Studies have indicated that the correct hand washing technique is as follows: 1) Wet hands with water and use soap or water and alcohol based solutions. 2) First, rub the palms together and wash. Then wash the fingers on the back and then face to face. 3) Wash the thumbs in a circular motion. Tie the fingertips together and wash well. 4) Wash for at least 20 seconds. 5) If the hands are washed with soap, rinse with water after conducting the steps (9, 10).

Hospital-borne infections cause many problems for the health system throughout the world. They have a multifactorial origin, but proper hand washing by stuff can prevent the spread (11). In addition, due to the prevalence of COVID-19 and its lethality and also high transmission rate, hygiene in healthcare centers has become an important issue (12). The main transmission method of COVID-19 is through respiratory organs but as studies have indicated, transmission can also occur through direct contact with an infected person or indirect contact with surfaces in the environment or objects such as a thermometer employed by an infected patient. According to the literature, the WHO has a special emphasis on standard and principled hand washing as one of the ways to prevent the transmission of COVID-19, especially in medical stuff, which should be accompanied by professional training for this personnel (4, 13).

Objectives

Unfortunately, few studies were conducted on staff training and their use of proper handwashing recommendations all over the world, while we know that this issue has a significant impact on preventing the transmission of infections in hospitals. The main goal of this study was to investigate the performance of medical interns in handwashing in educational and medical centers of Guilan University of Medical Sciences located in Rasht city.

Patients and Methods

Study design

This cross-sectional study was conducted in 2020 in educational and medical centers of Guilan University of Medical Sciences in Rasht city. The study population consisted of all medical interns in University of Medical Sciences.

The inclusion criterion was; being a medical intern at Guilan University of Medical Sciences for at least two months and signing the informed consent to participate in this study. The exclusion criterion was participants who decided to exit the study.

The handwashing was observed in medical interns after getting their permission and separately at a suitable time and place. They were given a grade based on a poster approved by the ministry of health of Iran installed in these centers (14). Scoring was conducted based on the items in the image. According to the protocol, the intern should; 1) Wet his/her hands and then soak them in soap. 2) wash his/her palms together. 3) Wash between the fingers on the back. 4) Wash between the fingers face to face. 5) Tie his/her fingertips together and wash well. 6) Wash the thumbs separately and thoroughly. 7) Wash the palm lines with his/her fingertips. 8) Wash the wrists of both hands. 9) Dry his/her hands with a tissue. 10) Close the tap with the same tissue and throw that in trash bin.

Data analysis

After collecting the study information from the study checklist, data were imported to Statistical Package for the Social Sciences (SPSS) software version 24. To determine the performance score, average, standard deviation, minimum, maximum and 95% confidence interval of the average were employed. To determine the status or quality of the intern's performance in handwashing, frequency and relative frequency and also 95% frequency interval have been employed. Chi-square test was applied to compare the performance status of interns in terms of age, gender, stage of internship, completion of surgery stage and location of internship at the time of study. The significance level of tests was considered with P <0.05.

Results

Around 147 medical interns were enrolled in this study based on inclusion and exclusion criteria. Demographic data showed that the mean age of the study population was 25.8±2.7 years. The minimum age of them was 23-year-old and the maximum was 46-years-old. About 57% of the population were females and 43% were males. Furthermore, 46.3% of the study population were in the second six months of the internship.

The mean score of study population in handwashing steps was 7.11±1.97. Analysis of handwashing steps indicated that 100% of interns conducted the first and second steps correctly and the lowest rate of correct performance was in the 5th step (32%), 8th (49.7%) and 7th steps (53.1%). These data are summarized in Table 1.

Table 2 indicates the performance status based on the classification of variables. According to the data in this table, 6.8% of the interns had poor performance in the sense that their average score was less than 3.33% and

Table 1. Frequency distribution of hand washing steps in the samples

	Correct		Wrong		*P* value
	N	%	N	%	
1st step	147	100	0	0	0.001
2nd step	147	100	0	0	
3rd step	132	89.8	15	10.2	
4th step	95	64.6	52	35.4	
5th step	47	32	100	68	
6th step	95	64.6	52	35.4	
7th step	78	53.1	69	64.9	
8th step	73	49.7	74	50.3	
9th step	114	77.6	33	22.4	
10th step	115	78.2	32	21.8	

Table 2. Frequency distribution of the studied samples according to the quality of hand washing

		N	%	95% Confidence interval	
				Lower	Upper
Quality of hand washing	Poor	10	6.80	3.55	11.73
	Medium	77	52.38	44.33	60.34
	Good	60	40.82	33.11	48.88

52.38% scored between 3.33% to 6.66T and only 40.8% of interns scored above 6.66.

According to the data, the performance score of interns by gender had a statistically significant difference ($P=0.028$), therefore the performance score of female interns had a higher average than male interns (7.4 versus 6.8). Frequency distribution of handwashing quality by gender was statistically significant in borderline ($P=0.05$). The percentage of "good" handwashing quality in female interns was 18% higher than male interns (48.8% versus 30%); however, these differences were not significant in terms of age group ($P=0.436$). We also found no significant differences between handwashing scores and stage of their internship ($P=0.06$).

Discussion

Hand hygiene is recognized as a primary and important measure in preventing the spread of microorganisms. Handwashing has been shown to prevent nosocomial infections. Despite the simplicity of hand hygiene protocols, compliance by health workers is sometimes inadequate and below 40%. Pittet et al reported that the hand hygiene match between doctors and nurses at a hospital in Geneva was approximately 30-50% (15). Other studies have shown more optimistic results, with a compliance rate of 59-80% (16,1716). Here in the present study, we showed that the mean score of handwashing steps was 7.11± 1.97.

As mentioned handwashing plays an important role in reducing the transmission of infections such as diarrhea, pneumonia, influenza and intestinal worms and neonatal infections. Hand hygiene also affects the control of diseases in home and commercial food preparation (18-20). Studies have shown that hand hygiene is the only effective way to reduce the costs and global burden of diseases (21). In the present study, the mean age of participants was 25.8± 2.7 years and the majority of whom were female (57%). Since, the status is assessed according to a protocol published by the ministry of health, which includes 10 steps; the lowest percentage of performance is in item 5 (tying the fingertips and washing them), 8 (washing around the wrist) and 7 (washing the palm lines with the fingertips), respectively. These results indicate that the details of hand washing should be practiced and repeated and more training should be conducted on the trainees.

In the study by Erasmus et al, 313 medical students were assessed. Adherence to handwashing was strongly influenced by students' attitudes, self-efficacy while habits were not associated with knowledge and risk acceptance (22). In the study conducted by Pitett et al in Switzerland, the extent to which adherence to the principles of hand hygiene and nosocomial infections was observed before and after the handwashing campaign. Staff compliance increased from 48% to 66% and nosocomial infections decreased from 16.9% to 9.2% (15). These data show the importance of education in handwashing in medical staff. In another study conducted to review barriers to handwashing and risk factors for non-compliance with handwashing instructions, adherence to hand hygiene principles was 48% and the average number of observed opportunities was 2834.

In the study by Albughbish et al, the rate of observance of hand hygiene in intensive care unit (ICU) staffs was 57.2% and in the study by Zandiyeh et al, the rate of adherence of the medical staff of the operating room of Hamadan educational hospitals to handwashing protocols was 53% (23,24). They explained that lack of equipment and infrastructure, lack of sufficient knowledge in the field of disease transmission, culture and religious beliefs are among the reasons reported by poor adherence to health principles by medical staff (23,24).

Likewise, Kamran et al in a study on medical and nursing students found that both groups had a positive attitude and moderate knowledge about handwashing (25). Accordingly, the study by Lawson et al examined the effect of poster training on hanwashing and showed the adherence to principled washing after the intervention increased, which was significantly higher in women (26). Our results are in line with these findings. In our study, female interns performed handwashing better than the men. To change the behavior of students, they should first be educated about the benefits and evidence of handwashing and its effect on disease prevention. These studies have explained that failure to follow the hygiene and principles of handwashing by health workers and medical students can occur for several reasons, including lack of time, cold water that shortens the washing time, underestimation of hand-transmitted diseases and forgetting the correct way of washing.

As mentioned above, factors such as forgetting the correct way of handwashing, lack of time and lack of facilities such as soap and water or antiseptic solutions and lack of sufficient training to provide accurate information can be one of the roots of non-observance of hand hygiene principles. Considering these factors and preparing, a questionnaire to assess the knowledge and attitudes of medical students can provide more information in this

regard. On the other hand, designing future studies as an intervention could be helpful.

Conclusion

Considering the importance of handwashing in preventing the transmission of diseases, especially in the COVID-19 pandemic and the repeated recommendations of the WHO to wash hands properly as a simple and accessible way to prevent further transmission of the virus, review of the awareness and practice of medical interns about handwashing seems to be critical. We indicated that the knowledge and practice of the participants is necessary.

Limitations of the study

Restricted study population and inability to perform training sessions for students before the study were the main limitations of our survey. We recommend further studies on larger populations should be conducted.

Conflicts of interest

None declared.

Ethical issues

The research followed the tenets of the Declaration of Helsinki. The Ethics Committee of Guilan University of Medical Sciences approved this study (IR.GUMS.REC.1399.141). Accordingly, written informed was consent taken from all participants before any intervention. This study was extracted from M.D., thesis of Shadi Akasteh at this university (Thesis#633325). Accordingly, ethical issues (including plagiarism, data fabrication, double publication) were completely observed by the authors.

Authors' contribution

SMZZ and PA contributed to substantial contributions to the conception or design of the work, drafting the work, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. MG and SSJ contributed to design of the work, revising the work critically for important intellectual content, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. SA and IT contributed to final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors participated in preparing the final draft of the manuscript, revised the manuscript and critically evaluated the intellectual contents. All authors have read and approved the content of the manuscript and confirmed the accuracy or integrity of any part of the work.

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