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Educability in hand hygiene: comparing knowledge and attitude of medical students and specialist assistants after short training course

Background: Hand hygiene (HH) is assumed the most important action to reduce the healthcare associated infections. The main objective of this study was evaluating the effectiveness of an educational program among knowledge and attitude of medical students at different levels about HH at Mashhad University of Medical Sciences.

Method: Two groups of medical students including those who just passed the physiopathology course and residents of different specialties at the beginning of their course participated in this study in 2017. The Persian version of WHO questionnaire on HH knowledge and attitude were completed by each individual before, immediately, and three months after attending an educational workshop. Data were analyzed using SPSS version 18.

Results: A total of 277 medical students entered the study and about 71% completed the study. The mean knowledge level of the residents was significantly higher than the externs at the beginning of the study ($p < 0.0001$). There was a significant difference between pre-test and the immediate post-test scores on HH knowledge and attitude of all attendees ($P < 0.0001$). The average knowledge level of specialist assistants was significantly higher than that of medical students immediately after training and also over time. ($P < 0.0001$)

Conclusion: Based on the results of the study, the level of knowledge and attitude of the participants was higher after educational workshop. In addition, specialist assistants had higher knowledge level after the workshop compared to medical students. It is necessary to plan frequent training courses to consolidate knowledge of HH.

Keywords: Hand hygiene, Education, Medical students, Knowledge, Attitude

آموزش پذیری در بهداشت دست: مقایسه دانش و نگرش دانشجویان پزشکی و دستیاران تخصصی پس از دوره آموزشی کوتاه مدت

زمینه و هدف: بهداشت دست مهمترین اقدام برای کاهش عفونت های مرتبط با مراقبت های بهداشتی فرض می شود. هدف اصلی این مطالعه بررسی اثربخشی یک برنامه آموزشی در بین دانش و نگرش دانشجویان پزشکی مقاطع مختلف در مورد بهداشت دست دانشگاه علوم پزشکی مشهد بود.

روش: دو گروه از دانشجویان پزشکی شامل دانشجویان پزشکی که به تازگی دوره فیزیوپاتولوژی را گذرانده بودند و دستیاران رشته های مختلف در ابتدای دوره خود در این مطالعه در سال ۱۳۹۶ شرکت کردند. نسخه فارسی پرسشنامه سازمان جهانی بهداشت در مورد دانش و نگرش بهداشت قبل، بلافاصله و سه ماه پس از شرکت در کارگاه آموزشی وسط شرکت کنندگان تکمیل شد. داده ها با استفاده از نرم افزار SPSS نسخه ۱۸ تجزیه و تحلیل شد.

یافته ها: در مجموع ۲۷۷ دانشجوی پزشکی وارد مطالعه شدند که حدود ۷۱ درصد مطالعه را تکمیل کردند. میانگین سطح آگاهی دستیاران در ابتدای مطالعه به طور معنی داری بالاتر از دانشجویان پزشکی بود ($P < 0.0001$). بین نمرات پیش آزمون و نمرات بلافاصله پس آزمون در میزان آگاهی و نگرش تمام شرکت کنندگان تفاوت معنی داری وجود داشت ($P < 0.0001$). میانگین سطح دانش دستیاران تخصصی بلافاصله بعد از آموزش و نیز در طول زمان بطور معنی داری بالاتر از دانشجویان پزشکی بود ($P < 0.0001$).

نتیجه گیری: بر اساس نتایج پژوهش انجام شده سطح دانش و نگرش شرکت کنندگان پس از ورود به مرحله بالینی بالاتر بود. به علاوه دستیاران تخصصی پس از کارگاه، نمره دانش بالاتری نسبت به گروه دانشجویان پزشکی داشتند. برنامه ریزی دوره های آموزشی مکرر جهت تثبیت دانسته های مربوط به بهداشت دست، ضروری است.

واژه های کلیدی: بهداشت دست، آموزش، دانشجویان پزشکی، آگاهی، نگرش

قابلیت‌های آموزش در نظافت‌های دست: مقایسه‌ی دانش و نگرش دانشجویان پزشکی و دستیاران متخصصین بعد از دوره‌ی آموزشی کوتاه مدت

الخلفية: تعتبر نظافة اليدين أهم إجراء للحد من العدوى المرتبطة بالرعاية الصحية. كان الهدف الرئيسي من هذه الدراسة هو تقييم فعالية برنامج تعليمي بين معرفة واتجاهات طلاب الطب على مستويات مختلفة حول الصحة في جامعة مشهد للعلوم الطبية.

الطريقة: شاركت مجموعتان من طلاب الطب بما في ذلك أولئك الذين اجتازوا لتو دورة علم وظائف الأعضاء والمقيمين من تخصصات مختلفة في بداية الدورة في هذه الدراسة في عام ۲۰۱۷. تم إكمال النسخة الفارسية من استبيان منظمة الصحة العالمية حول المعرفة والمواقف الصحية من قبل كل فرد من قبل، على الفور، وبعد ثلاثة أشهر من حضور ورشة عمل تعليمية. تم تحليل البيانات باستخدام SPSS الإصدار ۱۸.

النتائج: دخل الدراسة ما مجموعه ۲۷۷ طالب طب وأكمل حوالي ۷۱٪ منهم الدراسة. وكان متوسط مستوى المعرفة للمقيمين أعلى بكثير من الخارجيين في بداية الدراسة. ($P < 0.0001$) كان هناك فرق كبير بين درجات الاختبار القبلي والاختبار البعدي المباشر في معرفة الأسرة واتجاهاتها لجميع الحاضرين. ($P < 0.0001$) كان متوسط مستوى المعرفة للمساعدین المتخصصین أعلى بكثير من مستوى طلاب الطب بعد التدريب مباشرة وكذلك مع مرور الوقت ($P < 0.0001$).

الاستنتاج: بناء على نتائج الدراسة، كان مستوى المعرفة والاتجاهات لدى المشاركين أعلى بعد ورشة العمل التعليمية. بالإضافة إلى ذلك، كان لدى المساعدين المتخصصین مستوى معرفة أعلى بعد ورشة العمل مقارنة بطلاب الطب. من الضروري التخطيط لدورات تدريبية متكررة لتعزيز المعرفة بأسرته.

الكلمات المفتاحية: نظافة اليدين، التعليم، طلاب الطب، المعرفة، الموقف

پایه کی حفظان صحت میں تعلیم: مختصر تربیتی کورس کے بعد طبی طلباء اور ماہر معاونین کے علم اور رویے کا موازنہ

پس منظر: ہاتھ کی صفائی (HH) کو صحت کی دیکھ بھال سے منسلک انفیکشن کو کم کرنے کے لیے سب سے اہم اقدام تصور کیا جاتا ہے۔ اس مطالعے کا بنیادی مقصد مشهد یونیورسٹی آف میڈیکل سائنس میں ایچ ایچ کے بارے میں مختلف سطحوں پر طبی طلباء کے علم اور رویے کے درمیان تعلیمی پروگرام کی تاثیر کا جائزہ لینا تھا۔ سائنسز۔

طریقہ: طبی طلباء کے دو گروپس بشمول وہ لوگ جنہوں نے ابھی ایچ ایچ فیزیوپاتولوجی کورس پاس کیا ہے اور اپنے کورس کے آغاز میں مختلف اسپیشلائز کے رہائشیوں نے ۲۰۱۷ میں اس مطالعہ میں حصہ لیا۔ HH علم اور رویہ پر WHO کے سوالنامے کا فارسی ورژن ہر فرد کے ذریعے مکمل کیا گیا۔ تعلیمی ورکشاپ میں شرکت سے پہلے، فوری طور پر، اور تین ماہ بعد۔ SPSS ورژن ۱۸ کا استعمال کرتے ہوئے ڈیٹا کا تجزیہ کیا گیا۔

نتائج: مجموعی طور پر ۲۷۷ میڈیکل طلباء نے مطالعہ میں حصہ لیا اور تقریباً ۷۱٪ نے مطالعہ مکمل کیا۔ رہائشیوں کی اوسط علمی سطح اس سے نمایاں طور پر زیادہ تھی۔ مطالعہ کے آغاز میں ایکسٹرنز ($P < 0.0001$)۔ HH علم اور تمام حاضرین کے رویے پر پری ٹیسٹ اور فوری پوسٹ ٹیسٹ کے اسکورز کے درمیان ایک اہم فرق تھا ($P < 0.0001$)۔

نتیجہ: ماہر معاونین کی اوسط علمی سطح تربیت کے فوراً بعد اور وقت کے ساتھ ساتھ میڈیکل کے طلباء کے مقابلے میں نمایاں طور پر زیادہ تھا۔ ورکشاپ کے بعد معاونین کی علمی سطح میڈیکل طلباء کے مقابلے میں زیادہ تھی۔ HH کے علم کو مستحکم کرنے کے لیے متواتر تربیتی کورسز کی منصوبہ بندی کرنا ضروری ہے۔

کلیدی الفاظ: ہاتھ کی صفائی، تعلیم، طبی طلباء، علم، رویہ

INTRODUCTION

Hospital-acquired infection (HAI) is considered as a well-known global dilemma, leading to a significant mortality rate among hospitalized patients. Although HAI is mostly preventable, they still remain a major challenge for the health-care system (1). Following the WHO "clean care is safer care" campaign since 2005, a slew of countries announced their support for preventing HAI. One of the most important microbial transmissions occurs from the multiple contacts of health-care workers (HCWs) with patients and patients' surroundings. Hand hygiene (HH) is the most effective means for preventing infections associated with health-care system (2, 3). The WHO has established the five moments of hand hygiene which emphasizes to wash hands before touching a patient, before performing an aseptic or clean procedure, after body fluid exposure risk, after touching a patient, and after touching patient surroundings (4). Although this procedure is very simple and useful, the levels of acceptance and adherence among HCWs have remained unacceptably as low as 40% (5-7). Some recognized factors responsible for the level of adherence to HH include gender, HH insights among HCWs, hospital and community elective behaviors, and subjective norms of the executives of infection control (8-10). Conceivably, health system of various countries is making tremendous efforts to control HAI as a financial and life threat through HH (11). One of the major strategies implemented for HH, is educating HCWs and even the importance of HAI control and prevention to the normal population. Different strategies to improve HH include education and training on HH principles (12). A study by Zakeri et al. from Iran, examined knowledge and perception of HCWs and medical students in major educational wards of some hospitals and they reported that in spite of the appropriate knowledge, the HH compliance was still unsatisfactory (13). Another study by Nabavi et al., showed that medical residents had a moderate level of HH knowledge; however, their performance was not acceptable. Their study called attention for the urgent need to advance HH educational programs among HCWs including medical students (14).

Various studies have been conducted on hand hygiene among a range of healthcare workers. In addition, the need to teach the principles of hand hygiene in the course of medical education is discussed. This study was designed to answer a practical question: "Does a short training course affect the knowledge and attitude of medical students and medical assistants? And if yes, in which training period is it more effective? Before entering the clinical training phase or after that?"

METHODS

This interventional study was performed in two groups of medical students and specialist assistants in different fields upon entering the assistantship training course at Mashhad University of Medical Sciences in 2017. Inclusion criteria was acceptance at externship or residency while exclusion criteria were depression or other severe psychiatric diseases or using psychoactive drugs (based on the checklist completed by the

individual), complete hearing loss, and blindness. This study was verified by the local Ethics Committee of Mashhad University of Medical Sciences. In addition, informed consent was completed by all participants. All information contained in the participants' checklist was coded and recorded confidentially. Completing the questionnaire and participating in the project was completely optional, and there was no supervisor from the Vice-Chancellor of Education so that the students and assistants did not feel forced to participate in the project.

HH educational workshop was held for the externs and residents by the same faculty member specialized in HH in the conference hall of the faculty of medicine. Demographic characteristics of the participants including age, gender, marital status, history of previous diseases, smoking history, and level of education were gathered through a questionnaire.

The validated WHO HH questionnaires about the knowledge of HCWs were completed by the participants. The knowledge and attitude questionnaire of the World Health Organization, was translated into Persian and its validity and reliability were checked (14).

The knowledge questionnaire contained 25 items in the form of yes/no, true/false or multiple-choice answers. The attitude questionnaire contained 19 questions on a 7-point Likert scale. Questionnaires were scored as zero or one for each incorrect or correct answer for each item of knowledge question or attitude. Finally, the questionnaire was scored as a number and also as three levels of good, moderate, and poor for both knowledge and attitude. After that, a training workshop was held. Immediately after the workshop and three months later, the questionnaires were completed again by the participants.

The content of the training workshop was based on the guidelines of the World Health Organization regarding hand hygiene in the form of PowerPoint presentations, training videos, and the practice of acquired skills with the leadership of the workshop organizer.

The instructors were two professors of Mashhad University of Medical Sciences who had a history of holding similar workshops and the accuracy of the skills acquired by them was monitored with the help of a trained and experienced nurse.

Data were analyzed using t-test and chi-square test as appropriate. Generalized estimating equation (GEE) was used to test for differences between the mean levels of knowledge and attitude among externs and residents at different times affected by the HH education. Sample size was estimated according to similar studies. Sampling was done by convenience sampling among medical students entering the internship stage art 2017 and specialist assistants admitted to Mashhad University of Medical Sciences at the same time. Statistical analysis was conducted via SPSS software, version 18. P-value < 0.05 was considered statistically significant in this study.

RESULTS

A total of 116 medical externs and 161 medical residents were recruited in this study. From these, 196 individuals

including 100 (51%) residents and 96 (49%) externs participated in the study until the last level. Participants included 129 women (65.8%) and 67 (34.2%) men and the mean age of the externs and residents were 22.50±1 and 32.54±9 years. Ninety-one (49.4%) of the participants were married and 105 (53.6%) were single.

The participants' knowledge and attitude level toward HH was evaluated at the beginning of the study and before the education. Table 1 summarized this data among two groups of the study. As noted in this table, the attitude level of the medical residents is significantly higher than that of the medical students.

The knowledge level toward HH was different among various age categories. It improved by increasing the age. (P-value: 0.001) The highest level was in participants aged 35-40 years old. The attitude level correlated with the gender. (P-value: 0.01). Women had a higher attitude level compared to the men.

Also, the comparison of the HH knowledge level of externs and residents at different times was evaluated using the paired t test. The mean knowledge level of externs and residents increased significantly at immediate and delayed (three months later) post-tests compared to the pre-test (P value<0.0001). Moreover, the comparison of the immediate and delayed post-test demonstrated that the mean knowledge level decreased significantly three months following the education (P value<0.001 in externs and P value<0.004 in residents).

The comparison of the two groups was assessed using the independent t test (Figure 1). Based on the evaluations performed on the pre-tests, the mean knowledge level of residents was significantly higher than the externs (P value<0.001). On the other hand, no significant differences were observed between the immediate and delayed post-tests (P value= 0.979 and P value= 0.123).

The HH attitude level of externs and residents was also assessed at different times using the paired t test. Accordingly, the mean attitude level of externs and residents increased significantly at the immediate and delayed post-tests compared to the pre-test (P value<0001). However, no significant difference of attitude levels was observed between the immediate and delayed post-tests of externs (P value= 0.567) and residents (P value= 0.726).

The comparison of the two groups regarding the level of attitude was assessed using the independent t test (Figure 2). The evaluation of pre-tests, immediate post-tests, and delayed post-tests demonstrated that the mean level of attitude among residents was significantly higher than the externs at every phase (P value<0.0001).

GEE statistical approach showed that the mean knowledge level affected by education was significantly different among externs and residents over time (P value=0.005). Consequently, the trend of knowledge was not parallel in the two groups over time, meaning that education had a more persistent effect on the knowledge of residents (Figure 1). On the other hand, the mean attitude level affected by education was not significantly different between the two groups over time (P value= 0.466). According to the Figure 2, although there is a significant difference between the two groups at each time, but over time, the trend of attitude is parallel between externs and residents. As a result, education has affected attitude the same between the two groups over time.

DISCUSSION

The findings of the current study demonstrated that the mean knowledge level among externs and residents increased significantly at the immediate and delayed post-test following HH education compared to the pre-test. The



Figure 1. Comparing the mean knowledge level of externs and residents at each phase

Table 1. The knowledge and attitude level toward HH among two groups				
Variable	Level	Study Groups		P value
		Medical students	Medical residents	
Knowledge level	Poor	34 (%35.4)	27 (%27)	0.1
	Moderate	60 (%62.5)	66 (%66)	
	Good	2 (%2.1)	7 (%7)	
Attitude level	Poor	15 (%15.6)	5 (%5)	0.001*
	Moderate	32 (%33.3)	20 (%20)	
	Good	49 (%51)	75 (%75)	

*Significant

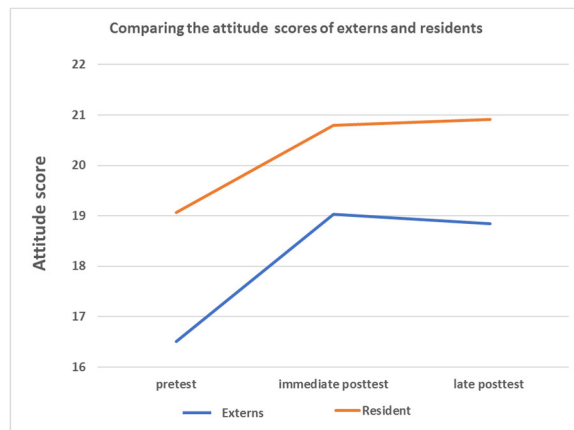


Figure 2. Comparing the mean attitude level of externs and residents at each phase

significant decrease of the mean knowledge level among the two groups three months after education compared to the education time highlights the importance of persistent education in improving HH among HCWs. Due to the present results, the educability of residents was more than externs over time.

The evaluation of the mean attitude level of externs and residents showed a significant increase at immediate and delayed post-tests compared to the pre- tests, while no significant differences were seen between the immediate and delayed post-tests. Hence, the aforementioned result takes into account the more important role of increased information and education on attitude compared to knowledge. This is explainable with the psychological theory "People who attach personal importance to an attitude are especially knowledgeable about the attitude object" (15). In addition, the mean attitude level of externs and residents affected by education was not significantly different over time.

In a study conducted by Rezaee et al., HH education was assessed among medical students who spent a one-day workshop on the importance of HH. A significant difference was shown between the scores of pre- and post-tests relating to HH data classification and function of individuals which was consistent with the present results (16). The primary level of knowledge and attitude in pre-tests before the intervention was reported low in most studies (17, 18). However, in a study performed in Tabriz Children Hospital in Iran the baseline level of knowledge among HCWs was 72.5% before intervention (19). None of the before mentioned studies evaluated the educability at different

times. Most of the studies were performed among HCWs including nurses and doctors or among medical students with the same level of education.

In the present study the attitude level toward HH was better among the women. Lorna et al., evaluated HH behavior in 1002 HCWs of the general hospitals and reported that being female and middle- aged are protective factors for improved HH knowledge (9). Our results showed the best knowledge score is among 35-40 years old. This fact is in parallel with the higher knowledge score among the medical residents who have the more clinical experience compared with the younger medical students.

In a study, Arianpoor et al., designed an effective model for learning hand hygiene, which included the integration of different methods and could be used to improve learning in health personnel (20).

LIMITATIONS

The data collection in the present study was based on self-administered questionnaire which might influence the results of attitude. Also, the present researchers could not evaluate the association between specialized field and the knowledge or attitude level due to the low number of participants in each group.

CONCLUSION

Organizing HH educational courses is necessary for the medical community to control HALs considering the significant role of the physicians in the health systems. In view of the high workload in some wards of hospitals, it is crucial to persistently educate HH principles to the personnel. To accomplish this goal, educational courses with regular timing are required for HCWs. This study recommends the more serious courses for male and younger physicians.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. The ethics committee of Mashhad University of Medical Sciences approved this study with the ethics code: IR.MUMS.fm.REC.1396.542.

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Conflict of interest: There was no Conflict of interest in this study.

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