

ORIGINAL PAPER

doi: 10.5455/medarch.2017.71.16-19

Med Arch. 2017 Feb; 71(1): 16-19

Received: DEC 11, 2016 | Accepted: JAN 26, 2017

© 2017 Idriz Sopjani, Patrick Jahn, Johann Behrens

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Training as an Effective Tool to Increase the Knowledge About Hand Hygiene Actions. An Evaluation Study of Training Effectiveness in Kosovo

Idriz Sopjani¹, Patrick Jahn², Johann Behrens³

¹AAB College, Fushe Kosove, Republic of Kosovo

²University Clinical Center Halle Saale, Germany

³University of Martin, Luther Halle, Wittenberg, Germany

Corresponding author: Idriz Sopjani, Msc. PhD candidate. Dean of Nurse at AAB College, Pristine, Kosovo. ORCID ID <http://orcid.org/0000-0003-4936-1475>. Tel: +377 44 112 582. E-mail: idriz.sopjani@universitetiaab.com

ABSTRACT

Introduction: Hand hygiene (HH) compliance with World Health Organization (WHO) guidelines is essential to prevent bacterial transmission and infections acquired from hospital settings. **Aim:** The aim of this study was to evaluate the impact of training tool of World Health Organization's (WHO's) Hand Hygiene multi modal campaign at all public hospitals and at the University Clinical Center in Kosovo (UCCK). **Method:** During February 2016, 691 questionnaires were distributed to health care workers. The data collection was conducted through a questionnaire distributed before and after training. Measurement of questions was realized through a 5 point Likert scale. **Results:** The gender structure of participants turned out to be greater for women (n=571, 85%). The knowledge of health care workers differed significantly before and after the training (p<0.001), emphasizing that the impact of the training was important to improve the knowledge of participants. Thus, the average value of improvement of HCW' knowledge was about 41.66 %. **Conclusion:** The findings emphasized the role of the training to improve the knowledge of participants about hand hygiene as well as prevention from infection.

Keywords: Hand hygiene, educational training, multi modal intervention, WHO Hand Hygiene campaign.

1. INTRODUCTION

Hand hygiene (HH) compliance with World Health Organization (WHO) guidelines is essential to prevent bacterial transmission and infections acquired from hospital settings. Although many factors contribute to the development of Health-care Associated Infections (HAIs), the consistent performance of hand hygiene prior to physical contact with patients, has been reported to be the single most effective preventive strategy of these infections (1). Compliance with HH can be associated with at least a 20% reduction in the risk of developing HAIs (2).

Education and training, the tool adapted for this paper, is important and critical for success. At the same time, it is an essential component of

WHO multi modal HH' improvement strategy together with other elements since an educational program aims to increase awareness, knowledge, and helps with critical issues and to focus on them (3).

According to WHO guideline, factors of non HH' compliance are lack of access to HH facilities at points of care; time constraints; skin irritation from frequent hand washing; lack of knowledge about the potential risk of the microorganisms transmission to patients, etc (3). In Kosovo, the communicable diseases are a major problem and the main challenges in this field are the financial and political aspect, inadequate number of trained personnel and insufficient equipments (4). A study of hand hygiene' compliance in Intensive Care

Unit (ICU) in Kosovo, showed the alarming rate of only 19% (5). A similar study was conducted in Albania and it was concluded that for effective control of NI is needed infection control personnel for the implementation of appropriate procedures, and microbiologists to advice on antibiotics policy (6). Through different methods, many other authors, tried to evaluate the impact of implementing the updated World Health Organization (WHO) multi modal HH guidelines on HH compliance and HAIs (7-11).

The aim of this study was to evaluate the impact of training tool of World Health Organization's (WHO's) Hand Hygiene multi modal campaign at all public hospitals and at the University Clinical Center in Kosovo (UCCCK).

2. METHODS

The study design was focused on the training in the entire population of the public health care delivery. The data collection was conducted through a questionnaire distributed before and after training.

During February, 691 HCW underwent the training in February 2016, for one week. Training to health care workers was provided through the theoretical part (lectures), visual (video) and practical (cleaning hands with antimicrobial soap and rubbing them with alcohol solutions) for all seven hospitals in Kosovo and UCCCK, in eight cities of Kosovo: Pristine, Gjakova, Peja, Mitrovica, Prizren, Vushtri, Gjilan, and Ferizaj.

Construction of the questionnaire is largely inspired from WHO guidelines. The questionnaire consists of many questions regarding evaluation of HCW' knowledge. Initially, before collecting the data required to analysis, the first part of the questionnaire focuses on a collection of general demographic information about HCW profession, gender, age and so on. The main structure of the questionnaire was focused on: measurement of knowledge of health care workers about hand hygiene. For the measurement of knowledge before and after, to each employee have been distributed two questionnaires before training and after training. Cronbach alpha resulted 0.653. In consultation with the chairman of the Chamber of nurses in Kosovo, we have compiled a strategy for initiating the delivery of hand hygiene training for healthcare workers. Also, there were distributed posters and leaflets for hand hygiene as a mean of information to provide hand hygiene training and in the same time as a reminder for health care workers for the application of hand hygiene in their workplace.

The approval request for research within Kosovo hospitals was taken by the ethical committees of the respective hospitals after research context was reviewed in the Ministry of Health of Kosovo from the National Ethics Committee. Health care workers were informed about the research aim and given time to be able to decide whether to participate in the research study or not. They were ensured that the data will remain anonymous.

Measurement of questions was realized through a 5 point Likert scale. The questions were encoded in binary variables and then for the whole group of coded ques-

tions, it was created a new variable "Total index Score", which took into account only the correct answers (coded by 1) and incorrect (coded by 0). This new variable helped to compare the HCW knowledge before and after training.

Statistical analysis

Data were presented as mean ± SD or proportions (% of patients). A significant difference was defined as P value <0.05 (2-tailed). Continuous data were compared with paired t-test. Statistical analysis was performed with SPSS (Version 21).

3. RESULTS

The overall geographic distribution of health care workers who underwent training was: 243 (43.1 %) participants from Pristine, 27 (4.8 %) from Gjakova, 60 (10.6 %) from Peja, 75 (13.3 %) from Mitrovica, 41 (7.3 %) from Prizren, 89 (15.8 %) from Gjilan and 29 (5.1 %) from Ferizaj (Table 1).

Cities	n (%)
Prishtina	243 (43.1 %)
Gjakova	27 (4.8 %)
Peja	60 (10.6 %)
Mitrovica	75 (13.3 %)
Prizren	41 (7.3 %)
Gjilan	89 (15.8 %)
Ferizaj	29 (5.1 %)

Table 1. The geographic distribution of health care workers

Only 66 (10.6 %) aged between 18-25 years; 207 (33.2 %) aged between 26-35 years; 176 (28.2%) aged between 36-45 years; 135 (21.6%) aged between 46-55 years and 40 (6.4 %) aged more than 56 years. The gender structure of participation turned out to be greater for women. Women participated with 571 (85%) respondents. The structure of the profession of respondents consists of a majority of 431 (68.5%) nurses, 43 (6.8 %) midwife, 53 (8.4 %) anesthesia technician and 102 (16.3%) other profession (Table 2).

Profession of participants	n (%)
Nurse	431 (68.5%)
Midwife	43 (6.8 %)
Anesthesia technician	53 (8.4 %)
Other profession	102 (16.3%)

Table 2. The structure of the profession of respondents

Regarding the formal training received in hand hygiene in the last three years, 312 (45.4%) answered yes while 375 (54.6 %) didn't received formal training in the last three years. From the analysis it was reported that 475 (73.5%) used an alcohol-based hand rub for hand hygiene while 171 (26.5%) respondents didn't use.

When HCW were asked about the main route of germs transmission in a health-care settings, 492 (73.2%) gave the right answer before training, HCWs' hands when not clean, and 550 (83.2%) after training. Meanwhile regarding the most frequent source of germs, 359 (54.5%) answered correctly on germs already within the patient, before training and 464 (69.5%) after training. In the Table 3, it is shown the comparison before and after training

of correct answers given for hand hygiene actions that prevent transmission of germs to the patient.

Hand hygiene actions	Before training N (%)	After training N (%)
Before touching a patient (yes)	603 (89.9)	655 (96.2)
Immediately after a risk of body fluid exposure (no)	245 (36.4)	333 (48.5)
After exposure to the immediate surroundings of a patient (no)	292 (43.5)	336 (48.9)
Immediately before a clean/aseptic procedure (yes)	521 (79.2)	614 (90.3)

Table 3. Hand hygiene actions which prevents transmission of germs to the patient

Only 301 (46.1 %) gave the right answer (20 seconds) regarding the minimal time needed for alcohol-based hand rub to kill most germs on hands before training and 495 (72.9 %) after training. Improvement of knowledge on hand rubbing and washing was rather high. 369 (56.6 %) gave the right answer (true) before training agreeing that hand rubbing is more rapid than hand washing to clean hands and 529 (78 %) after training; 233 (35.6 %) gave the right answer (false) before training related to the statement hand rubbing causes skin dryness more than hand washing and 372 (54.7 %) after; 219 (33.5 %) gave the right answer (true) before training agreeing that hand rubbing is more effective than hand washing against germs and 424 (62.4 %) after; 88 (13.7 %) gave the right answer (false) before training as regards the statement hand washing and hand rubbing are recommended to be performed in sequence, while 314 (46.6%) after training. In the Table 4, it is given the comparison before- after training of the correct answers about the type of HH method required in each of the following situations.

HH methods	Before training n (%)	After training n (%)
Before palpation of the abdomen (Rubbing)	190 (29.5)	438 (63.6)
Before giving an injection (Rubbing)	171 (26.8)	424 (62)
After emptying a bedpan (Rubbing)	77 (12.2)	442 (64.6)
After removing examination gloves (Rubbing)	112 (16.9)	446 (65.3)
After making a patient's bed (Rubbing)	128 (19.5)	505 (74.3)
After visible exposure to blood (Washing)	537 (82.7)	620 (92.7)

Table 4. Which type of hand hygiene method is required in the following situations?

The average value of improvement in % of HCW' knowledge was about 41.66% (p<0.001). Thus, Total Score Index Pre-training was 12.65±2.47, and Total Score Index Post-training increased to 17.91±2.59 (Table 5).

Once confirmed that the training played a critical role in improving the knowledge of health care workers, another t-test about the knowledge was developed to prove whether there is any significant difference in improvement of the knowledge among those employees who had received trainings before and those employees who had not received trainings. HCW who had not received formal trainings during the last three years benefited from

Variable	Before training Mean (SD)	After training Mean (SD)	P value <0.001
Total score	12.65±2.47	17.91±2.59	

Table 5. T-test for the variable Total Score Pre and Post training

training more than those who had received trainings before (p<0.001). This was demonstrated by significant net improvement between two groups around 11.36%.

On the other hand, improvement of knowledge among men and women did not differ significantly. Both of them had the same benefit from the training and the difference of 1.65% in the improvement of knowledge after training was not statistically significant (p= 0.525). Also, knowledge of health care workers did not differ significantly between those who used alcohol-based hand rub and those who did not use alcohol-based hand rub. Therefore, both groups benefited equally from training and 0.45% difference before- after training was not statistically significant (p>0.05). HCW of different professions benefited equally from the training (p=0.853).

4. DISCUSSION

From the analysis was understood that improve on the level of knowledge for each question made before and after training was rather high. Definitely, training was an effective intervention since the level of knowledge of HCW raised on average about 41.66%. A low level of knowledge on hand washing techniques was demonstrated by a low HH compliance (51.3 %) and one recommendation was that education of nurses should be implemented continuously on an annual basis in order to promote HH among HCW (12).

HCWs compliance improved substantially and AHR consumption increased after an educational campaign of hand hygiene emphasizing the influential role on improved knowledge (13). Similarly, another study reported high scores on the baseline hand hygiene questionnaire (data were not shown) (14). While, Thakker & Jadhav, (2015) evaluated the knowledge regarding hand hygiene and documented an unsatisfactory level of knowledge (15). Less than 50% undergraduate participants knew that unhygienic hands of HCW were the main route of transmission of potential harmful germs while in our study 73.2 % knew it. Less than 35% participants were aware that the main source of germs in HAI was from patients, while in this study 54.5% knew that germs already present on or within the patient were the source of germs. Only a few (32.5%) knew that 20s is the minimum time required for effective AHR, while in our study 46.1 % in pre-training knew the right answer and 72.9 % after training. A similar survey through questionnaire concluded that many (65%) had a good knowledge of indications and 67% perceived hand hygiene as difficult task (16). Improvement of the knowledge of HCW about HAI and HH principles contributes to achievement of best practices (17). From our statistical analysis was shown that doesn't exist any difference as regards the gender (1.65% difference between males and females was not significant, p>0.05) similar to other studies (18). According to Hynes (2015) HCW knowledge was improved in

a modest way by educational program (19). In his study 10% participants had not previously received mandatory training while in our study 54.6% had not received any formal training for the last three years. The pre training assessment showed that 17 % of participants did not routinely use hand rub while in our study 26.5 % didn't use AHR. Poor hand hygiene performance is related with lack of knowledge. Education and training, itself is a key constituent of effective hand hygiene performance (19).

5. CONCLUSIONS

These findings emphasized the role of the training to improve the knowledge of participants about hand hygiene as well as prevention from infection. It was registered a high improve in the knowledge of health care workers after the training ($p < 0.001$), emphasizing the critical role of trainings on improving the knowledge and education of health care workers in order that they adhere with guidelines. That's why it is important to develop a successful strategy to ensure that health care workers are aware of the guidelines and their use.

Despite the novelties that study brought, it is accompanied with some limitations. This study was designed only on the basis of an experimental group where the focus was the development of training and assessment of its effect on the same group. In the future, studies may be extended further into the private sector, to gain a full perspective about hand hygiene culture or it can be undertaken a comparative study with neighboring countries in this field.

Clinical implication: Training hygiene for hands increased the quality of medical work due to protect the patients from the infection.

- **Funding sources:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
- **Conflict of interest:** All authors report no conflicts of interest relevant to this article.

REFERENCES

1. Pittet D, Allegranzi B, Sax H, Dharan S, Pessoa-Silva CL, Donaldson L, Boyce JM. Evidence-based model for hand transmission during patient care and the role of improved practices. *The Lancet infectious diseases*. 2006 Oct 31; 6(10): 641-52. doi: [http://dx.doi.org/10.1016/S1473-3099\(06\)70600-4](http://dx.doi.org/10.1016/S1473-3099(06)70600-4)
2. Harbarth S, Sax H, Gastmeier P. The preventable proportion of nosocomial infections: an overview of published reports. *Journal of Hospital infection*. 2003 Aug 31; 54(4): 258-66. doi: [http://dx.doi.org/10.1016/S0195-6701\(03\)00150-6](http://dx.doi.org/10.1016/S0195-6701(03)00150-6)
3. World Health Organisation. 'First Global Patient Safety Challenge Clean Care is Safer Care'. 2009, Geneva: WHO. Retrieved September 1, 2014, from http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf?ua=1
4. Raka L, Zoutman D, Mulliqi G, Krasniqi S, Dedushaj I, Raka N, Ahmeti S, Shala M, Vishaj A, Elezi Y. Prevalence of nosocomial infections in high-risk units in the university clinical center of Kosova. *Infection Control*. 2006 Apr 1; 27(04): 421-3. doi: <http://dx.doi.org/10.1086/503387>
5. Rosenthal VD, Maki DG, Mehta A, Álvarez-Moreno C, Leblebicioglu H, Higuera F, Cuellar LE, Madani N, Mitrev Z, Dueñas L, Navoa-Ng JA. International nosocomial infection control consortium report, data summary for 2002-2007, issued January 2008. *American journal of infection control*. 2008 Nov 30; 36(9): 627-37. doi: <http://dx.doi.org/10.1016/j.ajic.2008.03.003>
6. Faria S, Sodano L, Gjata A, Dauri M, Sabato AF, Bilaj A, Mertiraj O, Llazo E, Kodra Y, Schinaia N, Prevalence Study Group. The first prevalence survey of nosocomial infections in the University Hospital Centre 'Mother Teresa' of Tirana, Albania. *Journal of Hospital Infection*. 2007 Mar 31; 65(3): 244-50. doi: [10.1016/j.jhin.2006.11.007](http://dx.doi.org/10.1016/j.jhin.2006.11.007)
7. Chen JK, Wu KS, Lee SS, Lin HS, Tsai HC, Li CH, Chao HL, Chou HC, Chen YJ, Huang YH, Ke CM. Impact of implementation of the World Health Organization multi modal hand hygiene improvement strategy in a teaching hospital in Taiwan. *American journal of infection control*. 2016 Feb 1; 44(2): 222-7. doi: <http://dx.doi.org/10.1016/j.ajic.2015.10.004>
8. Mohammed SA, Wehieda SM. Effectiveness of Teaching Modules about Hand Hygiene on Staff Knowledge, Compliance and Controlling Health Care Related Infection Rate. *Journal of Nursing and Health Science*. 2015 Sep; 4(5): 46-55. doi: [10.9790/1959-04534655](http://dx.doi.org/10.9790/1959-04534655)
9. Mestre G, Berbel C, Tortajada P, Alarcia M, Coca R, Gallemi G, Garcia I, Fernández MM, Aguilar MC, Martínez JA, Rodríguez-Baño J. "The 3/3 strategy": a successful multifaceted hospital wide hand hygiene intervention based on WHO and continuous quality improvement methodology. *PloS one*. 2012 Oct 22; 7(10): e47200. doi: [10.1371/journal.pone.0047200](http://dx.doi.org/10.1371/journal.pone.0047200)
10. Sakihama T, Honda H, Saint S, Fowler KE, Kamiya T, Sato Y, et al. Improving Healthcare Worker Hand Hygiene Adherence Before Patient Contact: A Multi modal Intervention of Hand Hygiene Practice in Three Japanese Tertiary Care Centers. *Journal of Hospital Medicine*. 2016 Mar; 11(3): 199-205. doi: [10.1002/jhm.2491](http://dx.doi.org/10.1002/jhm.2491)
11. Midturi JK, Narasimhan A, Barnett T, Sodek J, Schreier W, Barnett J, Wheeler C, Barton L, Stock EM, Arroliga AC. A successful multifaceted strategy to improve hand hygiene compliance rates. *American journal of infection control*. 2015 May 1; 43(5): 533-6. doi: <http://dx.doi.org/10.1016/j.ajic.2015.01.024>
12. Sopjani I. Health Care Personnel's Attitude toward Hand Hygiene in Regard to the Prevention of Health-Care Associated Infections: A Cross Sectional Study at the University Hospital Pristine. *Open Journal of Nursing*. 2016 Oct 11; 6(10): 841. doi: [10.4236/ojn.2016.610083](http://dx.doi.org/10.4236/ojn.2016.610083)
13. Monistrol O, Calbo E, Riera M, Nicolas C, Font R, Freixas N, Garrau J. Impact of a hand hygiene educational programme on hospital-acquired infections in medical wards. *Clinical Microbiology and Infection*. 2012 Dec 1; 18(12): 1212-8. doi: <http://dx.doi.org/10.1111/j.1469-0691.2011.03735.x>
14. Chen JK, Wu KS, Lee SS, Lin HS, Tsai HC, Li CH, Chao HL, Chou HC, Chen YJ, Huang YH, Ke CM. Impact of implementation of the World Health Organization multi modal hand hygiene improvement strategy in a teaching hospital in Taiwan. *American journal of infection control*. 2016 Feb 1; 44(2): 222-7. doi: <http://dx.doi.org/10.1016/j.ajic.2015.10.004>
15. Thakker VS, Jadhav PR. Knowledge of hand hygiene in undergraduate medical, dental, and nursing students: A cross-sectional survey. *Journal of family medicine and primary care*. 2015 Oct; 4(4): 582. doi: <http://dx.doi.org/10.4103/2249-4863.174298>
16. Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V, Perneger TV. Hand hygiene among physicians: performance, beliefs, and perceptions. *Annals of internal medicine*. 2004 Jul 6; 141(1): 1-8. doi: <http://dx.doi.org/10.7326/0003-4819-141-1-200407060-00008>
17. Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML, Memish Z, Urroz O, Richet H, Storr J, Donaldson L. Global implementation of WHO's multi modal strategy for improvement of hand hygiene: a quasi-experimental study. *The Lancet Infectious Diseases*. 2013 Oct 31; 13(10): 843-51. doi: [http://dx.doi.org/10.1016/S1473-3099\(13\)70163-4](http://dx.doi.org/10.1016/S1473-3099(13)70163-4)
18. Adjuik M, Smith T, Clark S, Todd J, Garrib A, Kinfu Y, Kahn K, Mola M, Ashraf A, Masanja H, Adazu U. Cause-specific mortality rates in sub-Saharan Africa and Bangladesh. *Bulletin of the World Health Organization*. 2006 Mar; 84(3): 181-8. doi: <http://dx.doi.org/10.1590/S0042-96862006000300012>
19. Hynes N. A Hand Hygiene Education and Training Improvement Strategy in an Acute Hospital Setting [Masters dissertation]. Dublin: Royal College of Surgeons in Ireland; 2015. Retrieved on <http://epubs.rcsi.ie/cgi/viewcontent.cgi?article=1075&context=msctheses>