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# 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

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## Abstract

Background: Hand hygiene is the leading measure for preventing the spread of antimicrobial resistance and reducing healthcare-associated infections, but health care worker compliance with optimal practices remains low in most settings. Objective: The main aim of this paper is to determine findings and start drafting policies in implementing them into practice after finding out nurses' opinions, beliefs and attitudes toward hand hygiene (HH). Methodology and methods: A cross sectional descriptive and observational study during November 2009. Results: From the total number of 175 health care workers employed in this unit, 67 (38.3%) were observed regarding adherence to hand hygiene. Regarding the knowledge, practices and attitudes of the nurses, data were collected from 54 (50.0%) among 108 nurses in four intensive care units within the University Clinical Centre of Kosovo (UCCK). From research findings, it was concluded that hand hygiene compliance in the intensive care units was low (51.3%). Conclusion: Research results show the necessity of organizing multimodal programs with intensive care units of University Clinical Centre of Kosovo (UCCK) on increase of knowledge level on health-care associated infections (HAI).

## Keywords

Health-Care Associated Infections, Hand Hygiene, Intensive Care Units

## 1. Introduction

Kosovo is a country with a surface of 10.877 km$^2$ and over 2.5 million population with an average age of 24 and with a gender structure slightly in a favor of males (50.5%).

More than half of the population (53%) is younger than 25 [1]. Kosovo declared its independence in February 2008 and it is one of the poorest countries of Europe. Communicable diseases in Kosovo are still the largest ongoing healthcare problem. The annual per-capita government expenditure on healthcare is only 45$ [2].

University Clinical Centre of Kosovo (UCCK) is the only centre of tertiary care in Kosovo. It has got 2400 beds. Three most frequent groups of diseases recorded in the UCCK during 2005 were as following: respiratory system diseases with 11.84% of the cases, bloodstream infections with 9.80% and the third in range were infectious diseases with 8.03% [3].

Kosovo is part of the International Nosocomial Infection Control Consortium (INICC) through participation in the project: prospective, multi-centre study evaluating costs, risk factors, and rates of Hospital-acquired infections (HAI) in UCUs, which includes 75 hospitals in 24 countries from four continents [4].

## 2. Literature Review

The infection has to be differentiated from colonization that means continuance of the presence of microorganism in the skin, body fluids and bodily tissues however, without clinical repercussions [5]. HAIs are called those infections that a patient caught while hospitalized, while being cured for any other disease [6]. Hospital-acquired infections are called also Nosocomial Infections. In 1843 a Hungarian obstetric established foundations of the discipline of infection control and hospital epidemiology by recommending hand washing method by chlorinated water in order to prevent and reduce incidence of puerperal fevers [7]. While, in 1867 Joseph Lister, by conducting a study on the role of bacteria in infectious of surgical wounds and use of antiseptic sprays in the surgery theatres, established principles of sepsis and antisepsis [8].

Many studies have shown a positive correlation between increase of hand hygiene and reduction of hospital acquired infections [9]. Proper hand hygiene is an efficient method of prevention against spreading microorganism among health staff and the patients [10]. The risk of HAI is 2 to 20 times higher in developing than in developed countries [11]. While reviewing published reports on impact of infection control programs 1990-2002, was found that HAI can be prevented from 10% to 70% [12]. Thus, in the Intensive Care Unit in San Paulo Clinic, Brazil, was noticed a decline of 71% of all HAI following the implementation of HAI Infections Control Program, whereby were saved 2 million dollars [13].

High rate of incidence of bacterial infections in the intensive care unit might be a consequence of improper facility where is located this unit, as well as failure to meet criteria envisaged by SCCM (the society of critical care medicine) for architecture of intensive care unit. According to the criteria, intensive care unit must be a special unit within the hospital with safeguarded access. There shouldn't be allowed any possible access through this unit to the other ones [14]. In Kosovo, all microbiological tests and analysis are performed in the National Institute of Public Health that is located in a remote facility away from intensive care unit. Therefore, the great possibility for con-

tamination enhancement exists.

If implemented as it is supposed to, hand hygiene can reduce microbial pathogens and cross transmission of infections to community as well as to the health care workers [15]. Thus, it is not only the patients that are subject to hospital acquired infections however; both doctors and nurses are exposed to this risk. A research conducted in Pristine collected opinions of the nurses. Out of the total number of the respondents 78% of them stated that there exist health risk factors in their work place. 72% agreed that chemical factors are also a great risk that endangers the health of health care workers and 91% of them agreed that they were exposed to biological risk factors (bacteria, viruses, etc), while only 19% always wore gloves when dealing with body secretions [16].

To be successful in increasing compliance, a multimodal strategy should be implemented where should be included at least 5 components: education of staff; monitoring of practices; information on performance; adoption of a regulation of institutional security and finally use of alcohol based hand rub, pursuant to the new patient care [17]. Effectiveness of alcohol based hand rub compared to hands washing with soap is shown by many authors' research [18].

Data of various authors speak differently about the importance of multimodal programs on promotion of hand hygiene by measuring compliance before and after implementation of those programs. Thus "My five moments for hand hygiene" bridges the gap between scientific evidence and daily health practice and provides a solid basis to understand, teach, monitor and report hand hygiene practices [19]. Another study showed that the only motivation factor for hand hygiene compliance was training on hand hygiene [20]. Also Lam, Lee, & Lau (2004) showed that a problem based and task orientated education program can improve hand hygiene compliance [21]. Furthermore, a number of other studies have shown that educational programs can effectively increase knowledge, positive attitudes and appropriate practice to ensure compliance with international protocols and regulations for the prevention and control of NI [22] [23].

## 3. Methodology and Methods

A cross-sectional descriptive and observational study was used in order to cover all elements of research purposes. This research method was chosen because of its suitability to present information on current situation [24]. A structured questionnaire was designed to conduct this research and elicit written responses about attitudes, beliefs, opinions, compliance, barriers and motivation to comply with hand hygiene guidelines.

### 3.1. Credibility and Validity

The paper aimed implementation of a part of WHO Campaign "Clean Care is safer Care and Save Live" which so far has been implemented in 121 countries of the world, while this was the first time of such an activity to take place in Kosovo. This campaign is composed of the multimodal strategy and is split into five scopes of application as

follows:

1) Tools for System Change

2) Tools for Training/Education

3) Tools for Evaluation and Feedback

4) Tools for reminders in the workplace

5) Tools for Institutional Safety Climate.

I have chosen the third area "Tools for Evaluation and Feedback", which has in total eight questionnaires, however only five of them were selected as follows:

1) Observation Form and Compliance Calculation Form-to monitor hand hygiene.

2) Ward Infrastructure Survey-to collect data about structures and resources at ward level

3) Soap/Hand rub Consumption Survey—to capture data on usage of hand hygiene resources

4) Perception Survey for Health-care Workers—to assess perceptions of health care-associated infection and hand hygiene

5) Hand Hygiene Knowledge questionnaire for Health-Care Workers—to assess knowledge on the essential aspects of HH.

From these questionnaires was conceived a single questionnaire to synthesize sufficient information about usage of HH resources and infrastructure; about hand hygiene actions and compliance calculation; about perception and hand hygiene knowledge of health care workers.

### 3.2. Sample

Participants, as a part of the research group had enough time to fill questionnaire starting from 19-27 November 2009. There was a satisfactory response corresponding to the distributed number. 54 nurses (100%) and 4 (100%) senior managers in four intensive care units of the University Clinical Centre of Kosovo volunteered to participate in the survey during November 2009. As regards knowledge, attitudes and practices of the nurses, data were collected from a sample of 54 among of 108 nurses in four intensive care units within UCCK. Also, for implementation of hand hygiene it was conducted surveillance of infrastructure of the units and the health care workers. Out of the total number of 175 health care workers employed in the units, 67 (38.3%) were observed.

Before 2006, education level of nurses in Kosovo was mainly medical high school. But after 2006, education level changed by increasing the number of nurses with higher education (bachelor degree). The four senior managers had finished high school and they had 10 to 20 years working experience on nursing. While among 54 nurses, 30 of them had finished nursing high school and 24 high school of nursing. 15 nurses had 10 - 20 years working experience, 4 nurses had over 20 years of work and 35 nurses had less than 10 years working experience.

Data collected through questionnaires were analyzed by using statistical program SPSS version 17.0. Some of them were coded from 1 to 7 point rating of Liker scale. Study design is shown in Figure 1.

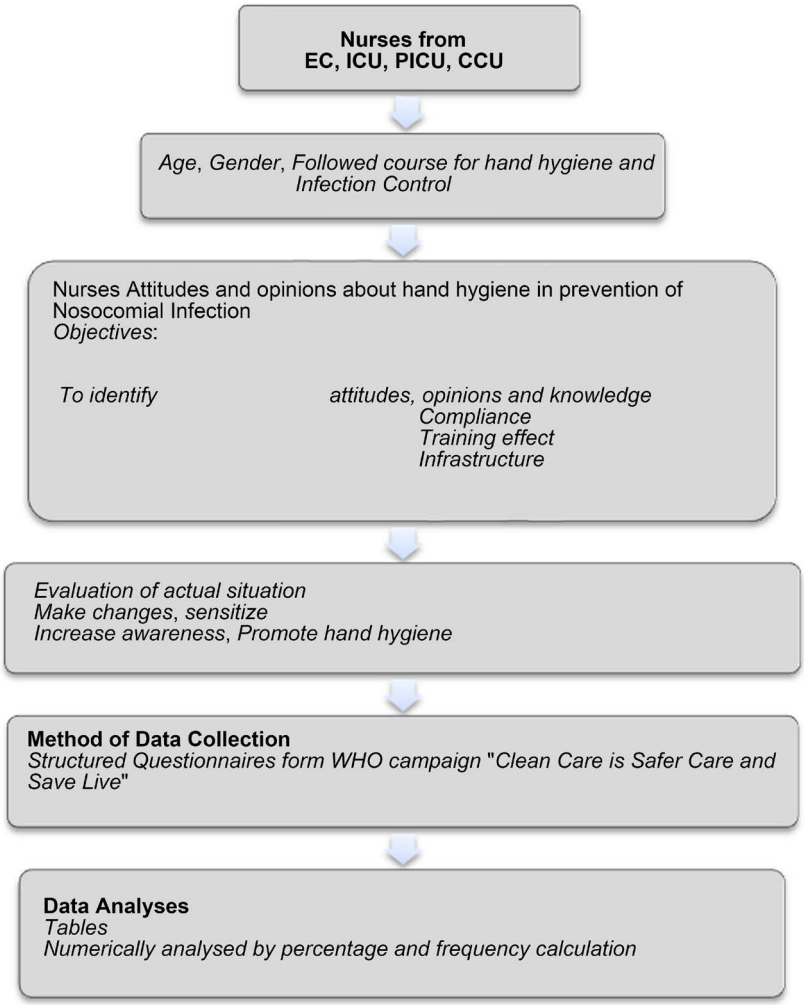


**Figure 1.** Design of the study.

### 3.3. Ethical Issues

In order to implement those questionnaires, I have asked for permission and addressed to WHO Europe Office in Copenhagen. After obtaining the approval from WHO on 10/26/2009, I have proceeded with translation of questionnaires from English into Albanian and vice versa in order to measure validity of the questionnaire and preserve comprehensiveness of the questions. Permission for conducting this research was obtained from nursing director prior starting with collection of data since Kosovo hospitals had no ethical committees until then. Together with UCCK Nursing Director, we assigned units where to implement and conduct observation of the questionnaires.

The participants were guaranteed complete discretion. Each and every participant was informed about the aim of the research through a cover letter. Also, my signature and contact address was included in the cover letter. The questionnaire was anonymous and with instructions how to fill it out. Participants were promised that the questionnaires would be destroyed after the data analysis.

## 4. Results

Four intensive care units within University Hospital Pristine were included in the observation: main intensive care unit, coronary unit, post intensive unit and emergency center. In the post intensive care observation were four beds; 14 nurses and 4 doctors. During observation there were observed 6 practitioners. In the main intensive care were 14 beds; 40 nurses; 17 doctors and 4 assistants; and there were observed 16 health care workers. Emergency center had 17 beds; 40 nurses; 10 doctors and 25 assistants; and there were observed 41 health care workers. While in the coronary unit were 13 beds, 14 nurses, 5 doctors and there were observed 4 health care workers.

### 4.1. Infrastructure and Usage of HH Resources

Supply of those four units by hygiene products is carried out by central level on regular basis. Alcohol based hand rub (liquid) was used in all units. In the emergency center and in the main intensive center was used medical soap (average use of 100 L); in the post intensive unit and in the coronary unit was used liquid (respectively average use of 10 L and 13 L). There was available tap water in all units on regular basis. According to the senior managers, single use towels and alcohol based hand rub were available time after time, and not all rooms were equipped with them. Next to every washbasin were displayed posters of hand washing technique.

### 4.2. Observation Results of Hand Hygiene Actions and Compliance Evaluation

Out of 175 health care workers, 67 (38.3%) were observed during their performance. There were observed 312 actions out of which vast majority of 100 (31%) after body fluid exposure risk, 65 (21%) before touching a patient, 59 (19%) after touching a patient, 54 (18%) after touching patient surroundings and 34 (11%) before clean/aseptic procedure.

Compliance of 67 observed nurses for hand hygiene was 51.3%; the highest compliance was after body fluid exposure risk (93.0%) and gloves were used most frequently after body fluid exposure risk by 35 (53.0% of respondents). In other cases, the compliance was much lower than 50.0%. Thus, compliance after touching a patient was 44.1%; after touching patient surroundings 38.9%; before clean/aseptic procedure 23.5% and the lowest before touching a patient 18.5% (Table 1). To evaluate compliance was used the following formula:

*Compliance = Hand hygiene actions performed/hand hygiene action required*

### 4.3. Results Regarding Perception Survey

In this survey were involved 54 nurses as sample. Out of them 44 (81.5%) were females and 10 (18.5%) males. Average age of the involved nurses in the survey was 25.3 years old (SD ± 5.4 yr), median 25 years. The youngest nurse was 19 years old and the oldest one was 47 years old. Intensive care unit sample of nurses was 10 (18.5%), coronary unit 9 (16.7%), post intensive unit 4 (7.4%), emergency center 10 (18.5%) and nurse

students 21 (38.9%). 19 (35.2%) nurses had taken formal training on hand hygiene. 39 (72.2% of respondents) answered positively when they were asked if they used routinely an alcohol based hand rub for hand hygiene.

Out of all the actions on improving hand hygiene mentioned in Table 2, 35 (64.8%) nurses agreed with hand hygiene performing as recommended (being a good example for your colleagues) as the most effective action to improve hand hygiene in institution. This is shown by the highest average of a point rating scale 5.6. Then as the second most effective action for 29 (53.7% of respondents) was "Hand hygiene posters are displayed at point of care as reminders", followed by other actions as shown in Table 2.

**Table 1.** Compliance evaluation.

| | Compliance |
|---|---|
| Before touching a patient | 18.5% |
| Before clean/aseptic procedure | 23.5% |
| After body fluid exposure risk | 93.0% |
| After touching a patient | 44.1% |
| After touching patient surroundings | 38.9% |
| Total | 51.3% |

**Table 2.** Effective actions to improve HH.

| How effective would the following actions be to improve HH permanently in your institution? | | 1-Not effective | 2 | 3 | 4 | 5 | 6 | 7-Very effective | mean |
|---|---|---|---|---|---|---|---|---|---|
| Leaders and SM at your institution support and openly promote HH | N | 6 | 6 | 8 | 10 | 3 | 5 | 16 | 4.4 |
| | % | 11.1 | 11.1 | 14.8 | 18.5 | 5.6 | 9.3 | 29.6 | |
| The HCF makes AHR always available at each point of care | N | 5 | 4 | 7 | 15 | 6 | 2 | 15 | 4.5 |
| | % | 9.3 | 7.4 | 13 | 27.8 | 11.1 | 3.7 | 27.8 | |
| HH posters are displayed at point of care as reminders | N | 1 | 5 | 7 | 5 | 5 | 2 | 29 | 5.4 |
| | % | 1.9 | 9.3 | 13 | 9.3 | 9.3 | 3.7 | 53.7 | |
| Each HCW receives education on HH | N | 6 | 3 | 10 | 10 | 5 | 5 | 15 | 4.5 |
| | % | 11.1 | 5.6 | 18.5 | 18.5 | 9.3 | 9.3 | 27.8 | |
| Clear and simple instructions for HH are made visible for every HCW | N | 3 | 3 | 9 | 5 | 4 | 5 | 25 | 5.2 |
| | % | 5.6 | 5.6 | 16.7 | 9.3 | 7.4 | 9.3 | 46.3 | |
| HCW regularly receive feedback on their HH performance | N | 6 | 1 | 15 | 9 | 2 | 4 | 17 | 4.5 |
| | % | 11.1 | 1.9 | 27.8 | 16.7 | 3.7 | 7.4 | 31.5 | |
| You always perform HH as recommended (being a good example for your colleagues) | N | 3 | | 9 | 5 | 2 | | 35 | 5.6 |
| | % | 5.6 | | 16.7 | 9.3 | 3.7 | | 64.8 | |
| Patients are invited to remind HCW to perform HH | N | 15 | 4 | 11 | 9 | 1 | 1 | 13 | 3.6 |
| | % | 27.8 | 7.4 | 20.4 | 16.7 | 1.9 | 1.9 | 24.1 | |

Vast majority of nurses, 30 (57.4%) answered that their hands tolerate very well alcohol based hand rubs. 27 (50% of respondents) perceived hand hygiene observation in their ward as a helpful tool to improve hand hygiene for themselves and their colleagues. Regarding the question "Has the fact of being observed made you paying more attention to your hand hygiene?" 26 nurses or 48.1% of respondents answered very much.

### 4.4. Results Regarding Hand Hygiene Knowledge

45 (83.3%) participants were aware that health care workers hands when not clean are the main route of cross-transmission of potentially harmful germs between patients in a health care facility. The others answered: on air circulating in the hospital only 3 (5.6%), on patients' exposure to colonized surfaces only 2 (3.7%), on sharing non-invasive objects 4 (7.4%).

Vast majority of respondents 31 (57.4%) chose hospital environment as the most frequent source of germs responsible for health care associated infections, followed by other answers as "germs already present on or within the patient" from 12 (22.2%), hospital's water system from 8 (14.8%) and hospital air only 3 (5.6%).

Regarding the hand hygiene actions that prevent transmission of germs to patient, 46 (85.2% of respondents) answered correctly "before touching a patient", 7 (13%) answered correctly "No, immediately after a risk of body fluid exposure", 44 (81.5%) answered correctly "after exposure to the immediate surroundings of a patient" and 8 (14.8%) answered correctly "No, immediately before a clean/aseptic procedure". This means that a considerable number of nurses not knew the right answer.

Level of knowledge on use of alcohol hand rubbing and hand washing was rather low. On statement "hand rubbing is more rapid for hand cleansing than hand washing" 21 (38.9%) answered correctly (True statement); on statement " hand rubbing causes skin dryness more than hand washing", 17 (31.5%) answered correctly (False statement); on statement " hand rubbing is more effective against germs than hand washing", 12 (22.2%) answered correctly (True statement) and on the last statement "hand washing and hand rubbing are recommended to be performed in sequence" only 5 (9.3%) answered correctly (False statement).

Regarding the minimal time needed for alcohol hand rubbing to kill most germs on hands, 12 (22.2%) answered correctly (20 seconds).

Level of knowledge on hand hygiene methods that should be used in different situations is not satisfactory. Only 18 (33.3%) gave the right answer regarding before palpation of the abdomen (rubbing), before giving an injection only 6 (11.1%) gave the right answer rubbing, after emptying a bedpan (rubbing) only 3 (5.6%) answered correctly, after removing examination gloves (rubbing) only 8 (14.8%) answered correctly, after making a patient's bed" (rubbing) only 3 (5.6%) answered correctly and the last one regarding "after visible exposure to blood" 33 (61.1%) answered correctly (washing).

## 5. Discussion

Another topic on the attitudes of health care workers related to hand hygiene in

prevention of intra hospital infections has not been surveyed earlier in the University Clinical Center of Kosovo. Those circumstances make impossible comparison of the research findings to the institutional preliminary data. Results of the research show that in the intensive care units within University Hospital in Pristine exists a very weak infrastructure with a very poor supply of hand hygiene maintenance products, low level of knowledge on HAI, routes and transmission possibilities of those infections associated with low scale of hand hygiene compliance.

Furthermore, it's been registered a low level of knowledge on hand washing techniques. Nurses involved in the study think that the managers have an important role to play as regards increase of hand hygiene compliance, observation and educational programs. Also, research results show the necessity of organizing multimodal programs with intensive care units of UCCK on increase of knowledge level on HAI and importance of hand hygiene for prevention of those infections. Data analysis yielded valuable information about the key elements like attitudes, beliefs, opinions and knowledge of the phenomenon studied. Those accomplishment are very important, because so far in Kosovo, has never been implemented the strategy "Clean hands are safer hands".

From research findings it is concluded that hand hygiene compliance in the intensive care unit was low (51.3%). Findings revealed that the highest compliance was 93.0% after body fluid exposure risk. In other cases the compliance was lesser than 50.0%. However, there is poor compliance with hand hygiene regulations by healthcare workers all over the world, and all studies conducted in hospitals suggest that the frequency of compliance is lower than 50.0% of the opportunities in which the practice is considered a priority [25]. Thus, Saint, *et al.* (2009) reported low compliance of hand hygiene (56.0%) in one region in Italy (Tuscany) similarly to my data [26]. The data highlighted that nurses were conscientious in their approach to infection prevention and control. Referring to the results, majority of the respondents 45 (83.3%) considered hand hygiene as necessary measure to prevent infection. Very small number is aware about the most frequent source of infection 12 (22.2%). Only 8 (14.8%) knew that they had to perform hand washing immediately before a clean/aseptic procedure. There are different factors contributing to low levels of hand hygiene compliance such as: lack of knowledge of the importance of preventing HAIs, heavy workload, lack of understanding the appropriate techniques involved, etc.

Research conducted in the University Hospitals are individual researches for studying purposes and are not organized by the management, therefore in most cases there is no feedback. Most of the respondents 45 (83.3%) were aware that health care workers hands when not clean are the main route of cross-transmission of potentially harmful germs between patients in a Health Care Facility. The right answer, the germs already on or within the patient was given only by 12 (22.2%). According to Boyce, (2001) hand cleansing with alcohol solutions can cause irritant and dry skin based on the products where alcohol based products did not contain emollients since products containing emollients cause less damage to the skin [27]. Thus, based on these findings, 30 (57.4%) nurses involved in the study answered that their hands tolerate quite well alcohol based

solutions. That means that UCCK health care workers either do not perform regular alcohol based hand rub or they use alcohol solution containing emollients.

Gloves were used most frequently 35 (53.0%) after body fluid exposure risk, while in a study of Nobile, Montuori, Diaco, & Villari (2002) 165 (60%) wore gloves while providing health care [28].

## 6. Conclusions

The results of this study show that we should get started with policy drafting and their implementation into practice with a scope to sensitize health care workers aiming enhancement of hand hygiene compliance in the hospital. Health care workers' hands are the most common transmission source of healthcare-associated pathogens from patient to patient and within the healthcare environment.

Moreover, research findings show that there is a shortage of regular supply with hygiene adherence means and the architectonics of intensive care units does not meet conditions according to the standards. As well would be beneficial organizing short-term trainings on hand hygiene and infection control with participation of nonmedical staff (cleaners and kitchen service).

Besides novelties that brought this paper to local literature, the study had several limitations. One of the limitations was the sample size, which was very small (54 nurses). In order for the findings to be representative of the entire population of health care workers, it is necessary to take into account a greater sample and representative. Another limitation was the time period in which observation was conducted. It would be preferable to extend the time period in order to get fruitful results.

Referred to the research data of this study one recommendation to increase hand hygiene among nurses in the hospital is drafting policies and guidelines in order to regulate the necessity of hand hygiene in medical settings. Education of nurses on promoting hand hygiene washing should be conducted consecutively each year. Health care workers should be supplied all the time with hygienic stuff in all places in the hospital. These supplies should include liquid soap, paper towels for hand drying, etc. Infection control committee should monitor nurses during their daily work. Research results showed that full implementation of WHO campaign "Clean Care is Safer Care and Save lives" is the indispensable for Kosovo. To date the campaign has been implemented over 121 countries of the world.

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