

## Assessment of compliance to hand hygiene in a coronary unit

### *Avaliação da adesão à higiene de mãos em unidade coronariana*

### *Evaluación del cumplimiento de la higiene de manos en una unidad de cuidados coronarios*

#### ABSTRACT

**Objective:** To analyze the compliance of health professionals to the technique of hand hygiene in a Coronary Unit. **Method:** Cross-sectional study. All health professionals working in the unit participated in the research. The observation was guided by an instrument of the World Health Organization that is in the public domain and that was adapted in order to allow the verification of which moments the professionals performed hand hygiene. All opportunities for hand hygiene were computed and a ratio of compliance percentage was elaborated. **Results:** Thirty health professionals were assessed: six nurses, 18 nursing technicians, two physical therapists and four physicians. A total of 498 hand hygiene opportunities were observed, with 190 actions performed, resulting in 38.2% compliance. **Conclusion:** The low compliance rates found showed the need to invest in awareness programs on the importance of hand hygiene.

**Keywords:** Hospital Infection; Hand Washing; Intensive Care Units; Patient Safety.

#### RESUMO

**Objetivo:** Analisar a adesão dos profissionais da saúde à técnica de higienização de mãos em uma Unidade Coronariana. **Método:** Estudo transversal. Participaram da pesquisa todos os profissionais de saúde que atuam na unidade. A observação foi guiada por instrumento da Organização Mundial da Saúde que é de domínio público e que foi adaptado de forma a permitir a verificação de quais momentos o profissional realizou a higienização das mãos. Todas as oportunidades para higiene de mãos foram computadas e uma relação do percentual de adesão foi elaborada. **Resultados:** Foram avaliados 30 profissionais de saúde, sendo seis enfermeiros, 18 técnicos de enfermagem, dois fisioterapeutas e quatro médicos. Foram observadas 498 oportunidades de higiene de mãos, com 190 ações realizadas, resultando em 38,2% de adesão. **Conclusão:** As baixas taxas de adesão encontradas evidenciam a necessidade de investir em programas de conscientização sobre a importância da higienização das mãos.

**Descritores:** Infecção Hospitalar; Lavagem de Mãos; Unidades de Terapia Intensiva; Segurança do paciente.

#### RESUMEN

**Objetivo:** Analizar la adherencia de los profesionales de la salud a la técnica de higiene de manos en una unidad de cuidados coronarios. **Método:** Estudio transversal. Todos los profesionales de la salud que actúan en la unidad participaron de la investigación. La observación fue guiada por un instrumento de la Organización Mundial de la Salud que es de dominio público y que fue adaptado para permitir verificar en qué momentos el profesional realizaba la higiene de manos. Se computaron todas las oportunidades para la higiene de manos y se preparó una relación del porcentaje de cumplimiento. **Resultados:** Fueron evaluados 30 profesionales de la salud, siendo seis enfermeros, 18 técnicos de enfermería, dos fisioterapeutas y cuatro médicos. Se observaron 498 oportunidades para la higiene de manos, con 190 acciones realizadas, resultando en 38,2% de adherencia. **Conclusión:** Las bajas tasas de adherencia evidenciaron la necesidad de invertir en programas de concientización sobre la importancia de la higiene de manos.

**Descriptores:** Infección Hospitalaria; Desinfección de las Manos; Unidades de Cuidados Intensivos; Seguridad del paciente.

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## INTRODUCTION

Healthcare-Associated Infections (HAI) are infections that affect the patients during the provision of health care and constitute a risk to their safety, since they generate an increase in morbidity and mortality rates, thus affecting the quality of health services. According to the World Health Organization (WHO), 5 to 15% of hospitalized patients acquire some infection, and 20 to 30% could be avoided with preventive actions<sup>(1)</sup>. A study on the prevalence of HAI conducted in several American states identified that these infections affected 3.2% of hospitalized patients in 2015<sup>(2)</sup>.

In Brazil, the estimate of the HAI rate ranges from 5 to 10%, in addition, estimates indicate that patients who acquire some infection during their stay in the hospital environment have an increase of 5 to 10 days in their hospitalization period<sup>(1)</sup>. In the United States, it is estimated that more than 30 billion dollars are spent annually for the treatment of HAI, with a mean of 1.7 million patients affected and almost 100,000 progress to death<sup>(3)</sup>. Patients admitted to Intensive Care Units (ICU) have a higher risk of acquiring such an infection due to the greater number of invasive procedures, such as mechanical ventilation, central venous catheter, invasive blood pressure monitoring and urinary catheterization, and the use of antibiotics, making these patients susceptible to HAI and even to microbial resistance<sup>(4)</sup>.

Coronary units are noteworthy for reporting high rates of HAI, as well as the use of invasive procedures. Data from the Epidemiological Surveillance Center of the State of São Paulo, referring to 54 notifying coronary units, identified a mean rate of bloodstream infection associated with the central catheter of 2.94 episodes per 1000 catheters/day; 6.48 episodes of ventilator-associated pneumonia per 1000 ventilated day and 0.98 episodes of urinary tract infection associated with the urinary catheter per 1000 probes / day, in the 50<sup>th</sup> percentile. Regarding the procedures, the rate of use of mechanical ventilation was 13%, 40.17% of central catheter and 32.55% of indwelling urinary catheter in the 50<sup>th</sup> percentile<sup>(5)</sup>.

The source of these infections may be a patient's own endogenous microbiota or may come from another patients, health care professionals, or surrounding (exogenous) environment. Hand hygiene (HH) must be performed by the professionals, between one patient and another,

in order to avoid the transmission of microorganisms among patients<sup>(6)</sup>, being the most effective measure in the prevention of HAI<sup>(7-10)</sup>. The World Alliance for Patient Safety had, in 2004, its First Global Challenge, focused on the prevention of HAI, being called "Cleaner Care is Safer Care"<sup>(11)</sup>, with the intention of promoting the practice of HH. In Brazil, the Ministry of Health instituted the National Patient Safety Program (PNPS), regulated by Ordinance 529/2013, with the objective of promoting safe care in health services<sup>(12)</sup>. This ordinance establishes that health services must prepare and implement protocols, guides and manuals aimed at patient safety in different areas, such as infections related to Health Care<sup>(13)</sup>.

The hand hygiene technique replaced the term hand washing and includes simple cleaning, antiseptic cleaning, antiseptic friction and surgical hand antisepsis, thus contemplating the use of various solutions that allow the practice, in addition to the use of traditional soap and water.

The technique for HH includes a step by step recommended by the WHO, in addition to the "five moments" indicated to proceed with this technique, being before contact with the patients, before aseptic procedures, after exposure to organic fluids, after contact with the patients and after contact with the environment in which they are<sup>(14-15)</sup>.

Although the hand hygiene technique is widespread among health professionals, studies indicate weakness in the compliance and quality of this practice<sup>(16-18)</sup>. In a study carried out in the emergency department of a University Hospital in Brazil, 59 health professionals were observed, with a HH compliance rate of 54.2%<sup>(16)</sup>. An investigation carried out in a Neonatal Intensive Care Unit (NICU) in a University Hospital in the State of Paraná with nurses and nursing technicians showed that the compliance rate to hand hygiene was 55.4%, considering 1096 opportunities<sup>(18)</sup>. On the other hand, an investigation conducted in home care pointed out that health professionals do not perform hand hygiene following the correct steps or at the correct time<sup>(17)</sup>.

In view of the above, we questioned the compliance to hand hygiene of health professionals of a Coronary Unit and hypothesized that in this unit this rate may also be close to 50%.

The development of this research is justified, because in the different scenarios of Health Care the compliance to HH may be different; and as this

practice is directly related to the prevention of HAI, these studies are of great relevance.

Therefore, the objective was to analyze the compliance of health professionals to the technique of hand hygiene in a Coronary Unit.

**METHOD**

**Study type**

Cross-sectional study. Cross-sectional studies are those in which the cause and effect can be analyzed simultaneously and allow to know if there is a relationship between the exposure and the condition studied<sup>(19)</sup>.

**Study Site**

The research was conducted at the Coronary Unit of a tertiary-level University Hospital. Although the unit has 15 registered beds, at the time of data collection there were only eight active beds. Data collection occurred during the day and at night.

**Study population**

The study included all health professionals from the fixed team working in the unit (physicians,

residents, nurses, nursing technicians and assistants and physical therapists) with a minimum workload of 20 hours per week. Those who were on vacation or on leave during the execution of the study were excluded. The service team has eight nurses, 20 nursing technicians, four hired physicians and two physical therapists.

**Data collection procedure**

The observation of the actions of the professionals occurred during the routine activities in the unit and each participant was observed in at least 10 situations that required hand hygiene, and there may have been more opportunities for observation, depending on the activities that the professional was developing. The time established for the duration of each observation session was two hours, which can be extended, depending on the activity, so that all action was assisted, from beginning to end. The act of observation was guided by a WHO instrument that is in the public domain and translated into Portuguese<sup>(20)</sup> and was adapted in order to allow the verification of which moments the professionals performed hand hygiene. The instrument is shown in Figure 1.

**Figure 1 – Instrument for direct observation of hand hygiene practice**

Observer:			
Date: / /			
Start:			
The end:			
Duration:			
Unit:			
Professional category:			
	FRICION WITH ALCOHOL	WATER AND SOAP	NOT PERFORMED
BEFORE CONTACTING THE PATIENT			
BEFORE ASEPTIC PROCEDURE			
AFTER CONTACT WITH FLUIDS			
AFTER CONTACT WITH PATIENT			
AFTER CONTACT WITH SURFACES			

In this instrument, it was identified for each participant whether or not there was the hand hygiene technique, and if so, whether it was performed with soap and water or rubbing with

alcohol. The moment at which the technique was performed and whether it was among the five moments proposed by the WHO (before contact with the patients or their environment; before an

aseptic procedure; after the risk of exposure to body fluids; after contact with the patients; and after contact with areas close to the patients) were also recorded. In addition, the start and end times of the observation, the date of data collection and the category of the participating professional were recorded.

The time of two hours, established for the duration of each observation session, aimed to reduce the *Hawthorne* effect, based on the American study by Kurtz<sup>(21)</sup>. The study carried out observations in five intensive care units in four hospitals, over a period of three to five days, with sessions lasting 8 hours. The results of the study showed that after two hours of observation there was no statistically significant difference in the mean compliance to hand hygiene, compared to subsequent hours, which showed that two hours of observation are sufficient to minimize the *Hawthorne* effect.

Data collection was performed by four of the authors of this study. The main researcher trained in Geneva to apply this instrument and carried out the training of other researchers. First, there was an explanation of how to assess compliance to hand hygiene. Sequentially, the main researcher observed compliance to HH for two hours and the other researchers followed up. Subsequently, the main researcher performed the observation of 30 hand hygiene opportunities, together with the other researchers; and each observation was checked to verify the beacon among the observers. These observations were not included in the study. The percentage of uniformity of the observations was 90%. After this training, data collection began.

### Data analysis

All opportunities for hand hygiene were computed and a ratio of compliance was

elaborated. For this purpose, the indicator of public domain of Assessment of Compliance to Hand Hygiene, developed by the WHO, was used, calculated by dividing the number of opportunities for hand hygiene used and the total number of opportunities identified, multiplied by 100<sup>(20)</sup>, thus obtaining the rate of compliance to hand hygiene. These analyses were performed using the STATA SE software, version 14.

$$\text{Compliance hand hygiene (\%)} = \frac{\text{Hand hygiene actions}}{\text{Opportunities}} * 100$$

### Ethical aspects

The project was submitted to the Research Ethics Committee of the University of São Paulo at Ribeirão Preto College of Nursing, and was approved under protocol CAAE 31793620.9.3001.5440. All professionals before direct observation signed the Informed Consent Form (ICF), according to the National Research Ethics Commission (CONEP), in compliance with the ethical aspects set forth in Resolution 466 of December 12, 2012, affirming the acceptance of participation in the research.

### RESULTS

Thirty health professionals were assessed: 24 nursing professionals (six nurses and 18 nursing technicians), two physical therapists and four physicians (two hired and two residents).

Four hundred and ninety-eight (498) hand hygiene opportunities were identified, with 190 actions performed, resulting in 38.2% compliance, considering all participants assessed in this study. Concerning the professional category, there was greater compliance to hand hygiene in physiotherapy professionals, followed by nurses, as shown in Table 1.

**Table 1** – Compliance to hand hygiene according to professional category, Ribeirão Preto, 2021.

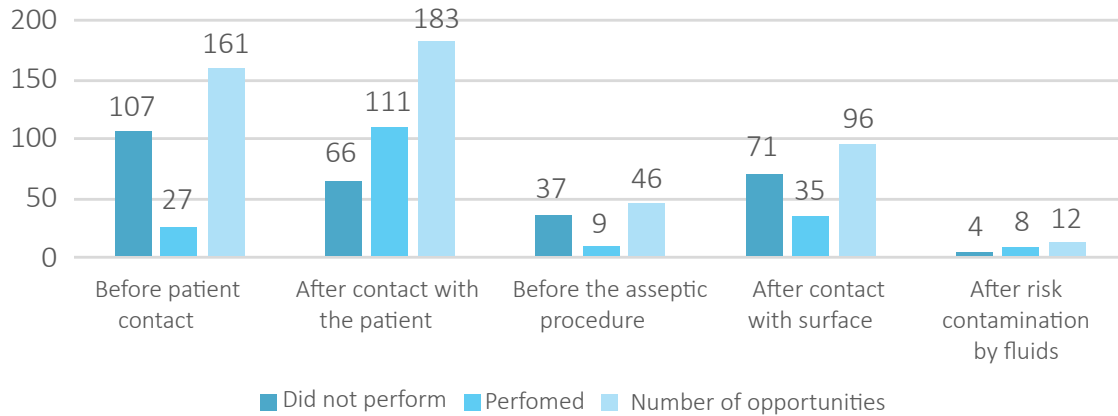
Professional category	Opportunities	Hand hygiene with water and soap	Hand hygiene with alcohol	Compliance to hand hygiene
Nurses	92	21	19	43.50%
Nurse Technicians	242	56	28	34.71%
Physical therapists	59	17	15	54.24%
Physicians	105	19	15	32.38%

Source: Research data (2021).

Regarding the five moments of hand hygiene according to the WHO<sup>(20)</sup>, which are: 1) before contact with the patient; 2) before aseptic procedures;

3) after risk of fluid contamination; 4) after contact with the patient and 5) after contact with surfaces, the results shown in Figure 2 were observed.

**Figure 2** – Opportunities and actions of hand hygiene according to the five moments of the World Health Organization, among the study participants, Ribeirão Preto, 2021.



Source: Research data (2021).

Figure 2 shows more opportunities for hand hygiene after contact with the patient and before contact with the patient, respectively.

Regarding the percentage of compliance to hand hygiene according to the five moments, the data are presented in Table 2.

**Table 2** – Compliance to hand hygiene according to the five moments of the World Health Organization, among the study participants, Ribeirão Preto, 2021.

Moments for hand hygiene	Opportunities	Actions performed	Actions not performed	Compliance to hand hygiene
Before contact with the patient	161	27	107	16.8%
After contact with the patient	183	111	66	60.7%
Before aseptic procedure	46	09	37	19.6%
After surface contact	96	35	71	36.5%
After risk of contamination by fluids	12	08	04	66.7%

Source: Research data (2021).

Table 2 shows that the lowest compliance rate was at the moment before contact with the patient (16.8%) and the highest was at the moment after risk of fluid contamination (66.7%).

The products used for hand hygiene in this study were alcohol gel or water and soap. Compliance data by product are presented in Table 3.

**Table 3** – Compliance to hand hygiene with alcohol gel or with water and soap among the study participants, according to the number of opportunities. Ribeirão Preto.

Product	Opportunities	Actions performed	Compliance to hand hygiene
Alcohol gel	498	85	17.1%
Water and soap	498	105	21.1%

Source: Research data (2021).

Table 3 shows a greater number of actions with soap and water (21.1%), although compliance were low with both products.

**DISCUSSION**

The results of the study indicate a low rate of compliance to HH, considering all professional categories; these are distant from the results obtained in other studies, where the rates of compliance to HH were 54.2%<sup>(16)</sup> and 55.4%<sup>(18)</sup>. A survey conducted in five ICUs of four hospitals in Texas assessed a total of 3,620 opportunities for hand hygiene during 18 days of observation (144 hours). The mean rate of compliance to HH was 64%<sup>(21)</sup>.

The rates of compliance to HH obtained in this study, according to professional category, show that

physicians and nursing technicians are, among the professional categories participating, those who have the lowest rate of compliance to HH. A study conducted with nursing technicians identified the rate of compliance to HH close to 30%<sup>(22)</sup>. A study conducted in three Neonatal Intensive Care Units (NICUs) in the Cariri region of Ceará showed that, as in this study, nursing technicians had more opportunities and a lower compliance rate, compared to nurses<sup>(23)</sup>.

The opportunities to perform HH occur during the “five moments” proposed by the World Health Organization. Regarding the opportunities that arose and the number of times professionals performed hand hygiene, this research indicates that the largest number of opportunities and the highest compliance rate were after contact with the patients. These data are consistent with a study conducted with nurses and nursing technicians, which identified that compliance to HH after contact with the patients represents the highest rate<sup>(24)</sup>.

As in the present study, other studies have shown that the medical category has the lowest compliance rate to hand hygiene. In a study conducted in Saudi Arabia, the rate of compliance of nurses was 60%, while the rate of physicians was 20%<sup>(15)</sup>. It is noticed that this compliance is higher after contact with the patients. This situation can be explained by the fact that professionals are more concerned with becoming contaminated at these times. Compliance rate was also identified before performing very low aseptic procedures. This fact is worrying, considering the importance of this moment in the prevention of HAI. However, it is noticed that many times, the professionals perform different care to the patients in the same approach and thus do not perform the practice of HH again.

Regarding the product used for the execution of the technique, it was obtained that of the total opportunities (498), 21.1% of them were performed with water and soap and 17.1% with alcohol gel. The greater use of soap and water was also observed in a study conducted with nursing technicians<sup>(22)</sup>. In addition to this, another study, carried out in an Emergency Care Unit of a large University Hospital, reinforces the preference of health professionals for water and soap to perform hand hygiene. In this, regardless of the moment and professional

category, the hand hygiene rates with soap and water are higher than those performed with alcoholic solution<sup>(22)</sup>. It is noteworthy that in this context of low compliance to hand hygiene by health professionals, the use of alcoholic preparations is an important strategy, as it allows rapid hygiene, promotes the rapid death of the microbiota and causes less dryness of the skin compared to water and soap<sup>(25-26)</sup>. However, its use is still low by health professionals, as evidenced in this study.

Another relevant strategy to increase compliance to HH in health professionals is health education. There was a significant increase in hand hygiene compliance rates after training in several studies identified in the literature<sup>(27-30)</sup>.

The main limitation of this study lies in the fact that it was carried out in a single center and thus restrict the extrapolation of these results.

## CONCLUSION

HAI constitute a serious risk to patients' safety worldwide, also affecting the economy, since their treatment generates more expenses for health services. In this context, hand hygiene is an effective measure to reduce the prevalence of HAI and improve the quality of care.

The main contribution of this study was to identify low rates of compliance to hand hygiene practice in a specialized care unit, such as the Coronary Unit. In addition, this study highlights the need to invest in awareness programs on the importance of hand hygiene in health services, even in units where greater compliance to this practice is expected.

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