

HAND HYGIENE IN HOSPITAL ENVIRONMENTS: USE OF CONFORMITY INDICATORS

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ABSTRACT

An exploratory descriptive study with a quantitative approach whose objective was to use indicators to evaluate the frequency and infrastructure for hand hygiene, as well as the nursing team's knowledge about the subject. Systematized observation was carried out at hospital in the state of São Paulo, Brazil of the routine activities of 33 participating professionals (nurses and technicians) as well as the application of an individual questionnaire about the subject. 1206 opportunities for hand hygiene were identified, though it was effected in only 481 (39.9%) of them. Alcohol solution was not used at any opportunity. The infrastructure indicator for hand hygiene was close to the ideal value (83.3%). The professionals reported a high frequency of hand hygiene, demonstrating knowledge in relation to its importance, yet contradicting the findings of the observation. It was concluded that, despite the adequate infrastructure, hand hygiene was below that expected, requiring actions and strategies to overcome these barrier and increase the use of alcohol solution.

Descriptors: Hand hygiene. Hospital infection. Nursing team.

RESUMO

Estudo descritivo-exploratório, de abordagem quantitativa, cujo objetivo foi avaliar, por meio de indicadores, a frequência e a infraestrutura para a higienização das mãos, além do conhecimento da equipe de enfermagem sobre o tema. Realizou-se, em um hospital do estado de São Paulo, Brasil, observação sistematizada das atividades rotineiras dos 33 profissionais (enfermeiros e técnicos) participantes e aplicação de questionário individual sobre o tema. Foram identificadas 1206 oportunidades de higienização das mãos, sendo efetiva em apenas 481 (39,9%) delas. Em nenhuma oportunidade foi utilizada solução alcoólica. O indicador de infraestrutura para higiene das mãos esteve próximo do valor ideal (83,3%). Os profissionais relataram alta frequência de higienização das mãos, demonstrando conhecimento acerca da sua importância, porém contrariando os achados da observação. Concluiu-se que, apesar da infraestrutura adequada, a higienização das mãos esteve aquém do esperado, sendo necessárias ações e estratégias de superação dessas barreiras e ampliação do uso de solução alcoólica.

Descritores: Higiene das mãos. Infecção hospitalar. Equipe de enfermagem.

Título: Higienização das mãos em ambiente hospitalar: uso de indicadores de conformidade.

RESUMEN

Estudio exploratorio-descriptivo, cuantitativo, que objetivó evaluar, utilizando indicadores, la frecuencia y la infraestructura para la higiene de las manos y los conocimientos del equipo de enfermería acerca del tema. Ocurrió en un hospital en el estado de São Paulo, Brasil, donde se observó sistemáticamente las actividades diarias de 33 técnicos y enfermeros, y se aplicó cuestionario individual. Fueron identificadas 1206 oportunidades para la higiene de las manos, siendo efectivo en sólo 481 (39,9%) de ellos. No hubo uso de solución alcohólica. El indicador de infraestructura fue cercana al valor ideal (83,33%). Los profesionales informaron la alta frecuencia de higiene de las manos demostrando conocer su importancia, contrariamente a los datos de la observación. Se concluyó que, a pesar de una infraestructura adecuada, higiene de las manos fue menor de lo esperado, requiriendo acciones y estrategias para superar estas barreras y expandir el uso de la solución alcohólica.

Descriptores: Higiene de las manos. Infección hospitalaria. Grupo de enfermería.

Título: Higiene de las manos en el hospital: uso de indicadores de cumplimiento.

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INTRODUCTION

The nursing team is exposed to different occupational risks, with biological risk being the most frequent⁽¹⁾. Like professionals, patients are also exposed to these risks during the assistance, with the resulting infections a serious problem for public health⁽²⁾. Health care-associated infections (HCAI) may increase resistance to antibiotics, prolong hospitalization, increase costs for the health system, patients and family members, and even cause death⁽³⁾.

The National Sanitary Surveillance Agency (ANVISA) and World Health Organization (WHO) have joined forces for the implementation of a World Alliance for Patient Safety. This alliance, created in 2004, established six international safety targets, including the reduction of HCAI. In order to reach this target, for the 2005-2006 biennial, the First Global Patient Safety Challenge was launched, entitled "Clean care is safer care", aimed at the prevention and reduction of the incidence and seriousness of HCAI^(4,5). This proposal also presents an impact on current clinical practice in various services. In this context, hand hygiene (HH) is indicated as a strategy that should be promoted and incentivized in health services, as it is a simple and effective measure^(4,5).

The hands are bodily structures used often in direct contact with the patient, and are the main means of transmitting microorganism. Therefore, not adhering to hand hygiene compromises the quality and safety of the healthcare offered⁽⁶⁾. For there to be a break in this transmission chain it is necessary to adopt basic hygiene standards in the hospital environment, with HH having the greatest impact⁽⁷⁾. Thus, HH is recommended at different times: before and after contact with the patient, before carrying out aseptic procedures, after exposure to bodily fluids, and after contact with areas near to the patient⁽⁵⁾.

A study conducted in the southern region of Santa Catarina measured the quality of HH in nursing professionals at Basic Health Units and demonstrated that the percentage compliance with HH was 31.7% through clinical procedures, indicating low compliance with HH in these services⁽⁸⁾. A systematic review of the literature indicates an HH frequency lower than 50%, even though the impact of this on the reduction of infection is

understood⁽⁷⁾. Other studies also have also demonstrated this low compliance^(6,9).

Since 2008, in order to improve adherence to HH, the WHO has been stimulating the implementation of a multimodal or multifaceted strategy composed of: adaptation of the structure of the institution by providing washbasins, soap, paper towel and alcohol solution, training and regular education for teams, periodic evaluation of HH with feedback for professionals, use of notices acting as reminders for professionals and information for patients and visitors, and the creation of a climate of institutional safety in which the subjects of all sectors work to promote HH⁽⁵⁾.

Although there are efforts to increase the compliance of professionals with HH, it can be noted that this practice has still not been completely incorporated into work routines, a fact which leads to the transmission of microorganism and exposes nursing professionals to biological risk. Thus, this study aimed to evaluate HH using indicators to evaluate the infrastructure and process, and verify the knowledge of the nursing team in relation to HH.

METHODS

This is an exploratory descriptive study with a quantitative approach conducted at a Teaching Hospital with 32 beds, in the municipality of São Carlos, São Paulo, Brazil, at the adult and pediatric and emergency clinical hospitalization units.

33 nursing professionals and technicians working at the institutions on the day, evening and night shifts took part in the study after receiving guidance and agreeing to participate and signing the Declaration of Free and Clarified Consent.

Initially the participants were informed that the study related to preventive HCAI measures, not specifying that it related to HH alone, so that there was no change in behavior as a result of the research. At the end of the collection of data, the participants were informed of the specific objective of the study and had the option of removing their consent.

The collection of data in the period from September to December 2011 took place at two moments. First, direction and systematized observation of the nursing practice was carried out, aimed at identifying HH opportunities and effective

realization of this practice, as well as the adequacy of the physical structure offered by the institution. After the observation, an instrument was applied to identify the knowledge of the professionals about the subject.

The first moment was made up of 144 hours of observation of professional practice, so that each work shift in each sector received 12 hours of observation over three different, random days. The professionals were monitored by the observer – a nursing graduate, author of the study and capacitated for the task through a review of the literature on the subject and the method to be applied – during the execution of the procedures, so that there was no interference in them. A checklist was used from the Hospital Infection Control Practices Quality Evaluation Manual⁽¹⁰⁾. In a four hour period, a pilot study was carried out for the observer to adapt to the environment studied and the instrument used.

In relation to HH opportunities, it was considered that the professional had two opportunities for each procedure realized on the patient, one before and one afterwards, aimed at identify at which opportunity HH was effective.

In relation to the infrastructure of the institution, the conditions of the washbasins was evaluated, as well as the presence of liquid soap dispensers, dispenser working appropriately, the availability of paper towels and the absence of other irregularities (cloth towels, dirty dispensers, lack of water, broken faucets, visible dirt on the washbasins etc.). The washbasin was considered adequate when it complied with all of the items above⁽¹⁰⁾. The availability of alcohol solution at the institution was not evaluated by systematized observation, therefore, the structure of the institution was only evaluated in relation to hand washing and not hand disinfection.

The procedures were organized in Microsoft Excel® spreadsheets and grouped into: risk of exposure to bodily fluids, contact with patient, invasive procedures, contact with inanimate objects and surfaces and other procedures based on the Health Service Hand Hygiene Manual proposed by AN-VISA⁽¹¹⁾. The data was analyzed using descriptive statistics (average, relative and absolute frequency).

After the observation the Hand Hygiene Compliance Evaluation Indicators and the Hand Washing Infrastructure Evaluation Indicators were calculated using the formulas in the said Manual⁽¹⁰⁾.

The first is calculated by dividing the number of HH opportunities used, i.e. where the professional washed their hands by the total number of opportunities identified multiplied by 100. The second is calculated by dividing the number of adequate evaluations by the total number of evaluations and multiplying by 100⁽¹⁰⁾.

In the second moment, an individual, closed questionnaire was applied to the nursing professionals participating in the observation to identify their knowledge of the subject. This was composed of six multiple choice questions and responded to during the work process immediately after delivery, and covered the supply of inputs required for HH, the situations in which it should be carried out, the products to be used and the factors that impede this practice.

The study was approved by the Ethics and Research with Human Beings Committee at the Centro Universitário Central Paulista (UNICEP) (Report N° 038/2011), as per Resolution 196/96 from the National Health Council in force at the time of the study.

RESULTS

33 (64.7%) nursing professionals participated in the study, including 8 (24.2%) nurses and 25 (75.8%) technicians with an average age of 34.7 years and average professional training time of 10.4 years.

603 procedures were observed, meaning 1206 HH opportunities, with compliance in 481 (39.9%) of opportunities. Of these, 208 (104 procedures) were realized at the two moments, before and after the procedures. This indicates a correct hand hygiene rate of 17.2%.

Of the 603 procedures observed, 35 only included HH before the procedure, demonstrating a rate of 5.8%. In 238 procedures, HH was only realized after the procedure, obtaining a rate of 39.5%. In 226 procedures there was no HH at any time, totaling 452 missed opportunities.

Table 1 presents the relative frequencies of HH compliance before and after, only before or after the procedures, as well as the HH Compliance Indicators for each group of procedures.

In relation to the HH structure, 10 washbasins were evaluated over three random days, totaling 30 observations in which 83.3% were in conformity

with the items predetermined by the indicator used⁽¹⁰⁾. Inadequacies were found in five observations in which the paper towel dispenser was empty.

According to the evaluation by professionals, paper towel (27%), 70% alcohol (21%) and liquid soap (15%) were indicated as insufficient (Table 2).

In relation to the produces used for HH, all of the professionals informed that they always used liquid soap; 11 (33.3%) always used 70% alcohol, 19 (57.6%) use it sometimes and three (9.1%) rarely use the product.

Figure 1 shows the procedures mentioned by the team for HH, according to predetermined situations based on ANVISA recommendations in relation to the product to be used in each situation⁽¹¹⁾.

In all of the HH observed, soap and water was used, without the use of alcohol solutions or other substances.

In relation to the predetermined situations, the participants informed the frequency with which they carry out HH (Figure 2).

In relation to aspects that impede the practice of HH, 60.6% of the professionals indicated that hastiness is a contributing factor to non-compliance, followed by lack of time (30.3%), forgetting (21.1%), distance from the washbasin (18.2%), lack of example from other professionals (15.2%), dryness of the skin (15.2%), lack of personnel (12.1%), lack of knowledge of the need for HH (12.1%), poor distribution of dispensers (12.1%) and allergy to the product available (9.1%).

DISCUSSION

Adequate HH by professionals working in health services is considered as the main measure in the prevention and control of HCAI, as well as being a cheap and simple method, and should occur before and after the health care provided, regardless of the use of gloves⁽¹⁾. This study corroborated the literature^(9,13) by revealing that this practice has still

Table 1 – Distribution of the hand hygiene compliance rate by nursing team professionals at a teaching hospital, and hand hygiene compliance rate per procedure group. São Carlos, SP, Brazil, 2011.

Procedure group	HH before and after (%)	HH before (%)	HH after (%)	No HH (%)	HH compliance indicator (%)
Risk of exposure to bodily fluids	40.6	3.1	46.9	9.4	65.6
Contact with the patient	21.9	5.0	25.6	47.5	37.2
Handling of invasive devices	17.1	6.5	46.9	29.5	43.8
Contact with inanimate objects and surfaces near to the patient	6.0	6.0	42.2	45.8	30.1
Other procedures	7.5	5.7	34.0	52.8	27.4

Source: research data.

Table 2 – Evaluation by professionals as to the availability of HH inputs. São Carlos, SP, Brazil, 2011.

Inputs	Sufficient		Insufficient		Inexistent	
	N*	%	N	%	N	%
Washbasins	30	91	3	9	-	-
Liquid soap	28	85	5	15	-	-
Paper towel	24	73	9	27	-	-
Common waste	33	100	-	-	-	-
70% alcohol	26	79	7	21	-	-

Source: Research data. *n33

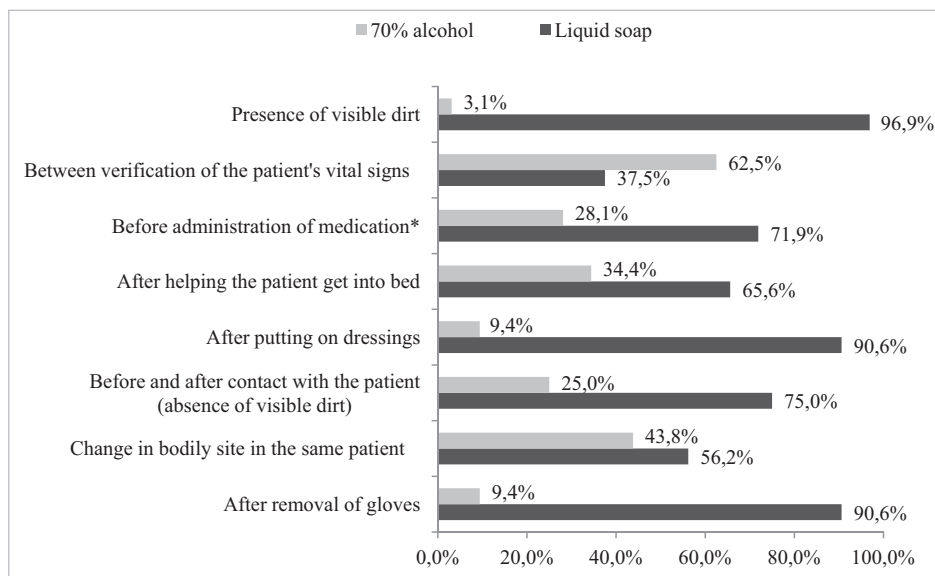


Figure 1 – Distribution of the responses of nursing professionals in relation to product type (liquid soap or 70% alcohol) chosen for HH in relation to predetermined situations. São Carlos, SP, Brazil, 2011.

*Routes of administration: oral, sublingual, intravascular, intramuscular and subcutaneous.

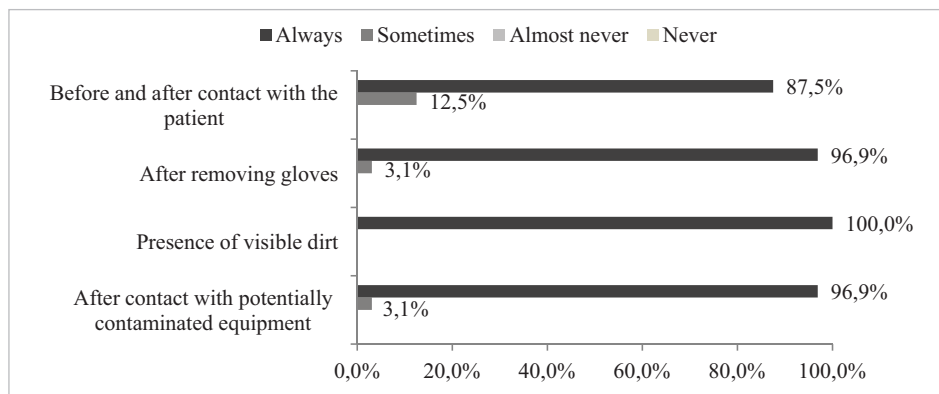


Figure 2 – Distribution of the responses by nursing professionals to the frequency of HH in predetermined situations. São Carlos, SP, Brazil, 2011.

not been completely indicated into the work routine of these professionals. M

It was noted that in all procedure groups (Table 1), the HH index obtained was well below 100% foreseen by the reference manual⁽¹⁰⁾. Similar studies demonstrate HH rates below 50%^(6,7), and identify a discrepancy between the knowledge of the professionals and the practice observed⁽⁷⁾.

In this study, in relation to the risk of exposure to bodily fluid there was a compliance rate of over 50% (65.6%). However, there was low utilization of total HH opportunities (39.9%), similar to that found in other studies⁽⁶⁾.

We can highlight that the not only the frequency of HH is insufficient for reduction the dissemination of pathogens, but the HH technique needs to be carried out adequately for it to guarantee adequate compliance with HH. However, the execution of the technique was not foreseen in the indicators used, and not covered in this study.

As indicated by the literature⁽¹⁴⁾ a discrepancy was observed between compliance with HH observed and that referred to by the nursing team at the hospital studied, whose compliance index was lower than that reported by the professionals.

It was noted that HH occurs with greater frequency after the realization of procedures (39.5%), data corroborated by the literature^(6,9). This fact could indicate that the concern of professionals with their own protection prevails when compared to the safety of the patient⁽⁶⁾.

This situation is concerning, as noncompliance with HM before the procedure, especially invasive ones, may be an important source of contamination for the patient. On the other hand, contact by unwashed hands with inanimate objects and surfaces near to the patient may stimulate the colonization of these locations, transforming them into reservoirs of microorganisms⁽¹¹⁾, situations found in 45.8% of the observations in the study.

In these situations in which HH is not conducted, the safety of the patient is compromised, as the probability of cross infection occurring is high, given that the hands of the professional act as disseminators of microorganisms, including multiresistant microorganism, which are the target of intense concern at hospitals. Such microorganisms present to two or more classes of antimicrobials, which makes treatment of infection difficult and leads to the patient suffering and generates a burden for the health system⁽¹²⁾.

Given that microorganisms are disseminated by direct contact between people or through contaminated surfaces and equipment, it can be seen that not only HH is important but also the cleaning and disinfection of inanimate objects and surfaces near to the patient⁽¹²⁾.

It is worth reiterating that the visual inspection of the objects and surfaces is not a reliable method of evaluating cleaning. One study found that 80% of the materials were approved by this method⁽¹⁵⁾. However, after an analysis, 81% and 26% of these were rejected for containing adenosine triphosphate – which is derived from organic material and microorganisms – and *Staphylococcus aureus* bacteria, respectively, even after cleaning being carried out by the hospital sanitation team. It has therefore been demonstrated that surfaces and objects can act as reservoirs of pathogens, contributing to their dissemination, even when apparently clean.

In relation to the products used for HH the preference for the use of soap and water is evident to the detriment of alcohol solution. One study⁽¹⁶⁾ demonstrated the effectiveness of alcohol based

products on hands dirtied by blood and contaminated with *Serratia marcescens* when verifying that the three products tested (62% alcohol gel, 70% alcohol gel and 70% liquid alcohol with 2% glycerin) produced a bacterial reduction of around 99.9%, more effective than degerming solutions. However, hand washing is still recommended as the first option in situations in which the hands are visibly dirty⁽¹²⁾, with alcohol being recommended in other situations⁽¹⁶⁾.

According to ANVISA Collegiate Directorship Resolution (RDC) n° 42, dated from September 2010⁽¹⁷⁾ the alcohol preparation for HH in the form of gel, foam and other products should contain a minimum final concentration of 70% with proven antimicrobial activity, while alcohol preparations for HH in the form of liquid should contain alcohol with a final concentration between 60% and 80%. Therefore, it can be inferred that 70% alcohol in any formulation may be used for HH, given that this contains the concentration recommended for its effectiveness.

It is understood that the physical structure of the health service for HH is just as important as the material resources available. In 2002, ANVISA published RDC n° 50 which governs the standards and physical projects for healthcare establishments, defining the mandatory provision of washbasins for exclusive HH use by the healthcare team, which should include one in every nursing room (when inside this) or one for every four rooms, when outside of such⁽¹²⁾.

With the ideal value of 100%, the institution analyzed presented 83.3% conformity for the HH infrastructure, which indicates that unsatisfactory conditions such as visible dirtiness of the washbasin or dispenser, cloth towels, broken faucets or lack of water were not identified. However, the lack of paper two for some periods owing to delayed replacement may reduce compliance with and the effectiveness of HH, given that drying the hands is one of the stages in the technique.

There are various factors that interfere in decisions relating to compliance with the HH practice or not: forgetting, lack of knowledge as to its importance, distance from the washbasin, irritation of the skin and lack of materials⁽¹⁸⁾. In this study hastiness (27%) and lack of time (14%) were identified as important difficulties in complying with HH.

There is an electronic guide available for implementing the multimodal strategy from the

WHO to improve HH⁽¹⁹⁾, which identified HH strategies such as: access to alcohol preparations and other inputs for this purpose and the provision of adequate and effective training.

A study undertaken in Paraná at an Intensive Therapy Unit demonstrated that after intervention with educational materials, discussion about the issue in small groups and provision of alcohol gel to the team led to a significant increase in the overall HH compliance rate, from 21.7% to 28% ($p=0.039$)⁽²⁰⁾.

The need to evaluate strategies that incentivize HH by a situational diagnostic of the institution must be reiterated, helping to change the behavior of health professionals and guaranteeing the quality of the care delivered⁽⁶⁾.

In the environment studied, it was identified that education about the use of alcohol solution for the nursing team could constitute an important strategy for HH compliance, considering factors such as haste and lack of time, given that HH with alcohol instead of soap and water reduces the time spent on the practice by half⁽¹²⁾, as the product is made available by the institution according to 79% of the participants. In addition to optimizing team's time, alcohol solution has the advantage of being able to be transported to the patient's bed, and other locations far from washbasins, which are important characteristics to increase compliance with HH⁽¹²⁾.

CONCLUSIONS

The use of indicators to evaluate conformity enable the HM rate of nursing professionals at the hospital studied to be quantified. Despite the adequate infrastructure offered, this rate is far below that expected.

Although the professionals were aware of the moments in which HH should occur and its importance, a frequency matching this fact was not identified. Furthermore, HH was most frequent after the procedures, indicating greater concern with the professional's safety than in relation to the patient.

Hastiness and lack of time were indicated by the professionals as important difficulties for complying with HH. Therefore, implementing strategies to increase the use of alcohol solution and carrying out educational actions about this product are recommended for improving the factors limiting HH.

The data obtained in this study represent the reality in a single, small sized institution, which could be considered as a limitation on the study. Furthermore, studies evaluating such issues using the same conformity indicators as those analyzed here were not found, which prevents a more precise comparison of the findings with other services.

Studies that use indicators beyond those that evaluate the correct realization of HH and interventions in relation to this practice should be stimulated, aimed at improving compliance with HH by health professionals, the safety of the patient and the reduction and control of HCAI.

REFERENCES

- 1 Almeida ANG, Tipple AFV, Souza ACS, Brasileiro ME. Risco biológico entre os trabalhadores de enfermagem. *Rev Enferm UERJ.* 2009;17(4):595-600.
- 2 Coelho MS, Arruda CS, Simões SMF. Higiene de mãos como estratégia chave en el control de infección hospitalaria: un estudio cuantitativo. *Enferm Global.* 2011;10(21).
- 3 World Health Organization. Report on the burden of endemic health care-associated infection worldwide: a systematic review of the literature. Geneva; 2011.
- 4 Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Indicador nacional das infecções relacionadas à assistência à saúde. Boletim Informativo sobre Segurança do Paciente e Qualidade em Serviços de Saúde. 2011 jan-jul;1(3).
- 5 World Health Organization. WHO guidelines on hand hygiene in health care: first global patient safety challenge: clean care is safer care. Geneva; 2009.
- 6 Primo MGB, Ribeiro LCM, Figueiredo LFS, Sirico SCA, Souza MA. Adesão à prática de higienização das mãos por profissionais de saúde de um hospital universitário. *Rev Eletr Enf.* 2010;12(2):266-71.
- 7 Cruz EDA, Pimenta F, Palos MAP, Silva SEM, Gir E. Higienização de mãos: 20 anos de divergências entre a prática e o idealizado. *Cienc Enferm.* 2009;15(1):33-8.
- 8 Locks L, Lacerda JT, Gomes E, Serratine ACP. Qualidade da higienização das mãos de profissionais atuantes em unidades básicas de saúde. *Rev Gaúcha Enferm.* 2011; 32(3):569-75.

- 9 Figueiredo RM, Maroldi MAC. Internação domiciliar: risco de exposição biológica para a equipe de saúde. *Rev Esc Enferm USP.* 2012;46(1):145-50.
- 10 Secretaria de Estado de Saúde de São Paulo (BR), Divisão de Infecção Hospitalar, Centro de Vigilância Epidemiológica. Manual de avaliação da qualidade de práticas de controle de infecção hospitalar. São Paulo; 2006.
- 11 Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Higienização das mãos em serviços de saúde. Brasília; 2007.
- 12 Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Segurança do Paciente em Serviços de Saúde: Higienização das Mãos. Brasília, 2009.
- 13 Cardoso ACM, Figueiredo RM. Situações de risco biológico presentes na assistência de enfermagem nas unidades de saúde da família (USF). *Rev Latino-Am Enfermagem.* 2010;18(3):[06 telas].
- 14 Al-Wazzan B, Salmeen Y, Al-Amiri E, Abul A, Bouhaimed M, Al-Taiar A. Hand hygiene practices among nursing staff in public secondary care hospitals in Kuwait: self-report and direct observation. *Med Princ Pract.* 2011;20(4):326-31.
- 15 Ferreira AM, Andrade D, Rigotti MA, Ferreira MVF. Condições de limpeza de superfícies próximas ao paciente, em uma unidade de terapia intensiva. *Rev Latino-Am Enfermagem.* 2011;19(3):[08 telas].
- 16 Kawagoe JY, Graziano KU, Martino MDV, Siqueira I, Correa L. Bacterial reduction of alcohol-based liquid and gel products on hands soiled with blood. *Am J Infect Control.* 2011;39(9):785-7.
- 17 Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. RDC n. 42, de 25 de outubro de 2010: dispõe sobre a obrigatoriedade de disponibilização de preparação alcoólica para fricção antisséptica das mãos, pelos serviços de saúde do País, e dá outras providências. *Diário Oficial da União, Brasília (DF)* 2010 out 26;157(205) Seção 1:27-8.
- 18 Oliveira AC, Cardoso CS, Mascarenhas D. Precauções de contato em unidade de terapia intensiva: fatores facilitadores e dificultadores para adesão dos profissionais. *Rev Esc Enferm USP.* 2010; 44(1):161-5.
- 19 Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Guia para implementação da estratégia multimodal da OMS para a melhoria da higienização das mãos. Brasília: Organização Pan-Americana da Saúde; Agência Nacional de Vigilância Sanitária; 2008.
- 20 Prado MF, Oliveira CJ, Nascimento TMB, Melo WA, Prado DB. Estratégia de promoção à higienização das mãos em unidade de terapia intensiva. *Cienc Cuid Saúde* 2012; 11(3):557-64.

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Received: 02.07.2013
Approved: 17.01.2014