

## KNOWLEDGE OF NURSING PROFESSIONALS REGARDING HAND HYGIENE

Flávia Maria Derhun<sup>1</sup>, Verusca Soares de Souza<sup>2</sup>, Maria Antônia Ramos Costa<sup>3</sup>, Kelly Cristina Inoue<sup>4</sup>, Laura Misue Matsuda<sup>5</sup>

**ABSTRACT:** This quantitative analytical study, performed in January 2014, aimed to analyze the knowledge of nursing professionals regarding hand hygiene. Participants were 267 employees of two hospitals in the northwest of Paraná, who filled out an adapted questionnaire of the Ministry of Health, entitled Knowledge Test Regarding Hand Hygiene for Health Professionals, which contains eight questions. The data were processed using the Statistical Package for the Social Sciences 20 (SPSS) and Epi Info™ 7.1.3. A high percentage of correct responses to the questions was found, except for those that referred to the Route of infection and Minimum rubbing time of hands with an alcohol preparation. It was concluded that 86.52% of the investigated professionals did not fully know the instructions for hand hygiene. It is suggested that the hand hygiene issue be addressed with the teams investigated through permanent educational processes, guided by active methods.

**DESCRIPTORS:** Health personnel; Patient safety; Infection control; Hand hygiene; Nursing.

### CONHECIMENTO DE PROFISSIONAIS DE ENFERMAGEM SOBRE HIGIENIZAÇÃO DAS MÃOS

**RESUMO:** Estudo analítico, de abordagem quantitativa, realizado no mês de janeiro de 2014 e que teve como objetivo analisar o conhecimento de profissionais de enfermagem sobre higienização das mãos. Participaram 267 trabalhadores, de dois hospitais da região noroeste do Paraná, que preencheram um questionário adaptado do Ministério da Saúde, intitulado Teste de Conhecimento a Respeito da Higienização das Mãos para Profissionais de Saúde, contendo oito questões. Os dados foram tratados por meio dos programas Statistical Package for Social Sciences 20 (SPSS) e Epi Info™ 7.1.3. Constatou-se percentual elevado de acertos das questões, exceto naquelas que se referiam à Rota de infecção e Tempo mínimo de fricção das mãos com preparação alcoólica. Concluiu-se que 86,52% dos profissionais investigados não conheciam na íntegra as instruções para higienização das mãos. Sugere-se que o tema higienização das mãos seja abordado com as equipes investigadas, por meio de processos educativos permanentes, pautados em metodologias ativas.

**DESCRIPTORIOS:** Pessoal de saúde; Segurança do paciente; Controle de infecções; Higiene das mãos; Enfermagem.

### CONOCIMIENTO DE PROFESIONALES DE ENFERMERÍA ACERCA DE LA HIGIENIZACIÓN DE LAS MANOS

**RESUMEN:** Estudio analítico, de abordaje cuantitativo, realizado en el mes de enero de 2014 cuyo objetivo fue analizar el conocimiento de profesionales de enfermería acerca de la higienización de las manos. Participaron 267 trabajadores, de dos hospitales de la región noroeste de Paraná, que completaron un cuestionario adaptado del Ministerio de la Salud, intitulado Test de Conocimiento Acerca de la Higienización de las Manos para Profesionales de Salud, con ocho cuestiones. Los datos fueron sometidos a los programas Statistical Package for Social Sciences 20 (SPSS) y EpiInfo™ 7.1.3. Se constató percentual elevado de aciertos de las cuestiones, excepto las que se referían a la Ruta de infección y Tiempo mínimo de fricción de las manos con preparación alcohólica. Se concluyó que 86,52% de los profesionales investigados no conocían integralmente las instrucciones para higienización de las manos. Se sugiere que el tema higienización de las manos sea abordado con los equipos investigados, por medio de procesos educativos permanentes, basados en metodologías activas.

**DESCRIPTORIOS:** Personal de salud; Seguridad del paciente; Control de infecciones; Higiene de las manos; Enfermería.

<sup>1</sup>Registered Nurse. MSc in Nursing. State University of Maringá. Maringá, PR, Brazil.

<sup>2</sup>Registered Nurse. MSc in Nursing. Professor of the State University of Paraná. Paranavaí, PR, Brazil.

<sup>3</sup>Registered Nurse. PhD in Nursing. Professor of Nursing at the State University of Paraná. Paranavaí, PR, Brazil.

<sup>4</sup>Registered Nurse. PhD in Nursing. Professor of Nursing and Medicine of the Ingá Faculty. Maringá, PR, Brazil.

<sup>5</sup>Registered Nurse. PhD in Fundamental Nursing. Professor of Undergraduate and Graduate Nursing, State University of Maringá. Maringá, PR, Brazil.

#### Corresponding author:

Verusca Soares de Souza  
Universidade Estadual do Paraná  
Av. Gabriel Espiridião, S/N – 87700-000 – Paranavaí, PR, Brasil  
E-mail: veruscasoares@gmail.com

Received: 29/02/2016

Finalized: 18/09/2016

## ● INTRODUCTION

Hand hygiene is a simple action that is fast and easy to perform. Moreover, it is an individual, primary and indispensable measure for the prevention and control of Healthcare-Associated Infections (HAIs).

The importance of hand hygiene came to light in 1846, when the Hungarian doctor Ignaz Phillip Semmelweis related the incidence of puerperal fever with poor hand hygiene<sup>(1)</sup>. Since then, advances in science and technology associated with the improvement of living conditions, have facilitated the practice of hand hygiene, which is one of the main measures to prevent HAIs<sup>(2-3)</sup>.

Hand hygiene of health professionals, conducted carefully and frequently, is directly related to patient safety by leading to the disruption of the pathogen transmission link<sup>(1,4)</sup>. This is because a lack of proper hand hygiene by professionals contributes to the development of HAIs, which constitute adverse events arising from the care process and often result in increased care costs, lengths of hospitalization and also morbidity and mortality rates<sup>(1,3)</sup>.

The hands of health professionals, especially nursing staff, due to maintaining direct and frequent contact with the patient, are sources and vehicles of pathogen dissemination. Accordingly, a study<sup>(5)</sup> with 48 health professionals of different areas that worked in a private hospital in Itumbiara, state of Goiás, found that the microbial count of the hands of the nursing staff professionals during work activity presented high indices of contamination, including multidrug resistant microorganisms.

Despite scientific evidence and legal provisions, the literature<sup>(6-9)</sup> points out that many of the professionals that provide healthcare do not adopt the recommendations. The justifications for this include forgetfulness, lack of time, the distance from the sink/bathroom, skin irritation, as well as lack of information about the impact of hand hygiene on the rates of HAIs<sup>(1,10)</sup>.

Although hand hygiene is a simple and common procedure, the lack of knowledge/information about the risks of not performing it, or doing it incorrectly, are factors that can and should be remedied. Thus, this study is justified considering that hand hygiene is one of the six measures adopted by the National Health Surveillance Agency (ANVISA) to promote patient safety. In addition, the collection and dissemination of current data can contribute to the establishment of effective actions related to the prevention and/or reduction of HAIs, specifically in the health area.

With interest directed toward patient safety and also that of the staff who work directly in the care process, the following question arises: do nursing professionals know, in full, the instructions regarding hand hygiene? To answer this question, this study aimed to analyze the knowledge of professionals of two nursing teams regarding hand hygiene.

## ● METHOD

This analytical, quantitative study was conducted in January 2014 in a public teaching hospital (hospital A) and a private hospital (hospital B) operated by a private health insurance company, both located in the northwest of Paraná.

In hospital A, the nursing staff was composed of 295 professionals, with 89 nurses and 206 nursing technicians. Hospital B had 33 nursing professionals, of whom seven were nurses and 26 nursing technicians. Only hospital A operated a Continuing Education Service.

Data collection was performed through census and all professionals that had worked in the institution for more than three months were included in the study, with the exclusion of professionals who were on vacation or medical leave during the data collection period. A total of 240 nursing professionals participated from hospital A (81.4% of the working nursing staff of the institution) and 27 from hospital B (81.8% of the working nursing staff of the institution), totaling 267 participants, which accounted for 81.6% of the total number of professionals of both institutions.

During the work shift of each professional, in a private place, after formal authorization, the participants answered a questionnaire composed of two parts. The first was designed to obtain

characterization data and the second, specific part, had eight questions, extracted from the Knowledge Test Regarding Hand Hygiene for Health Professionals questionnaire<sup>(11)</sup>.

Due to lack of parameters for the evaluation of the knowledge of health professionals with the use of the instrument referred to above, the Positivity Index (PI) was adopted, which is interpreted from the number of positive (correct) responses, as follows: Desirable (100% positivity); Adequate (99% to 90% positivity); Safe (89% to 80% positivity); Borderline (79% to 71% positivity); and Tolerable (70% or less positivity)<sup>(12-13)</sup>.

The data were compiled in spreadsheets and descriptive and inferential statistical analysis was performed using the Statistical Package for the Social Sciences 20 (SPSS) and Epi Info™ 7.1.3 programs.

For the continuous variables (age, time working in nursing and time working in the institution), the minimum, maximum, mean and standard deviation (SD) were verified. For the categorical variables (gender, professional category, correct responses to each question), frequencies and percentages were calculated.

Considering statistical significance when  $p \leq 0.05$ , the test was performed (corrected chi-squared test ( $\chi^2$ ) and Fisher's exact test) for the association between the number of correct answers to each question and the following variables of interest: professional category and time of working in nursing. For this, the time working in nursing variable was dichotomized according to its median.

This study adhered to the current ethical standards<sup>(14)</sup> and its research project was approved by the Ethics Committee for Research Involving Human Subjects of the State University of Maringá, under authorization No. 462.941/2013.

## ● RESULTS

Participants were 31 (11.6%) men and 236 (88.4%) women, whose ages ranged from 21 to 70 years (mean=41.5 years, SD=10.2 years). The time working in nursing was between one and 26 years (mean=16.6 years, SD=9.4 years) and the time working in the hospital, from one month to 30 years (mean=9.9 years; SD=7.9 years).

Of the professionals, 241 (90.3%) said they had received some training in hand hygiene. Regarding the alcohol preparation for hand rubbing, 262 (98.1%) reported knowing of its availability/existence in the institution.

Table 1 shows the distribution of correct responses, their association with the professional category and time of work in nursing, as well as the classification of the degree of knowledge according to the PI.

Table 1 - Association between correct responses to questions about hand hygiene, professional category and length of service. Paranavaí-PR, Maringá-PR, Brazil, 2014

Question	Professional category			Time working			Total	PI
	N	NT	p-value	<7 years	>7 years	p-value		
	%	%		%	%			
Cross-transmission route	98.9	93.7	0.0631 <sup>a</sup>	98.5	92.7	<b>0.0352<sup>a</sup></b>	95.5	Adequate
Most frequent source for HAIs	39.1	48.3	0.1792 <sup>b</sup>	41.5	48.9	0.2776 <sup>b</sup>	45.3	Tolerable
Minimum rubbing time with alcohol preparation	45.7	31.4	<b>0.0306<sup>b</sup></b>	43.8	29.2	<b>0.0183<sup>b</sup></b>	36.3	Tolerable
Coverage of hands with alcohol preparation	100	94.9	<b>0.0298<sup>a</sup></b>	97.7	95.6	0.5017 <sup>a</sup>	96.6	Adequate
Dry hands before use of alcohol preparation	88	82.9	0.3480 <sup>b</sup>	81.5	87.6	0.2295 <sup>b</sup>	84.6	Safe
Use paper towel after rubbing with alcohol preparation	93.5	88.6	0.2855 <sup>b</sup>	87.7	92.7	0.2407 <sup>b</sup>	90.3	Adequate

NT = Nursing Technician; N = Nurse; <sup>a</sup> Fisher's exact test; <sup>b</sup>  $\chi^2$  corrected test.

Table 2 contains the distribution of frequencies and percentages of the multiple-choice questions that addressed the hand hygiene technique of the participants.

Table 2 - Distribution of frequencies and percentages of the responses to the multiple-choice questions. Paranaíba-PR, Maringá-PR, Brazil, 2014

Questions and response alternatives	n	%
What is the main route of cross-transmission of potentially pathogenic microorganisms among patients in health services?		
a) Hands of the health professional when they are not sanitized	255	95.5
b) Air circulation in the hospital	10	3.7
c) Exposure of the patient to colonized surfaces	0	0.0
d) Sharing noninvasive objects	2	0.8
What is the most common source of microorganisms responsible for healthcare-associated infections?		
a) Microorganisms in the hospital water system	1	0.4
b) Microorganisms in the hospital air	3	1.1
c) Microorganisms already present in or near the patient	121	45.3
d) Microorganisms in the hospital environment	142	53.2
What is the minimum time required for the alcohol preparation to destroy most of the microorganisms on your hands?		
a) 3 seconds	14	5.2
b) 10 seconds	75	28.1
b) 20 seconds	97	36.3
d) 1 minute	81	30.4

## ● DISCUSSION

The percentage of correct responses was “adequate” with regard to the cross transmission route (95.5%), coverage of hands with an alcohol preparation (96.6%) and use of paper towel after rubbing with alcohol preparation (90.3%). This was “safe” for the question about the need for hands to be dry before using the alcohol preparation (84.6%). These results were positive, however, there is still room for improvement of nursing professionals regarding these issues, as cleaning is one of the most efficient strategies for controlling HAIs; and therefore it should be carried out as correctly as possible<sup>(1-2,4,6)</sup>.

Conversely, a percentage related to “tolerable” was obtained of the correct responses to the questions related to the most frequent source of HAIs (45.3%) and minimum time for destruction of microorganisms with an alcohol preparation (36.3%). Regarding the most frequent source for HAIs, it was found that more than half of the participants mentioned, mistakenly, that this was represented by microorganisms present in the hospital environment (53.2%). Although the microorganisms present in the hospital can cause HAIs, the most common source is the microorganisms hosted on or near the patient<sup>(3,11)</sup>.

Given the importance of the nursing team in the control and prevention of the transmission of microorganisms with a greater potential for the occurrence of HAIs, such as those present on the patient, the approach to this theme, although generating disbelief in many professionals, should be a key element in planning and establishing preventive measures<sup>(3)</sup>.

Regarding the minimum time of antiseptic hand rubbing, 81 (30.3%) subjects said one minute would be the time necessary to destroy most microorganisms with the alcohol preparation. It should be noted that antiseptic hand rubbing is recommended for, at least, 20 to 30 seconds<sup>(1-2,15)</sup>. In this sense, it was considered that despite one minute not being the minimum time recommended, if during the care routine, these professionals rub their hands for this period they will be exerting a positive influence on the control of HRIs.



Conversely, the fact is highlighted that a significant portion of the professionals (33.3%) indicated periods less than the minimum rubbing time recommended. By assuming that the hands must be rubbed, in accordance with the basic hygiene technique, until complete drying of the alcohol-based preparation, the professionals may be acting incorrectly due to the use of an insufficient amount of the product for total coverage of the hand<sup>(1)</sup>.

By comparing the amount of correct responses with the professional category, a significant difference was found between nurses and nursing technicians in matters of minimal rubbing time with an alcohol preparation ( $p = 0.0306$ ) and the need for total coverage of the hands with an alcohol preparation ( $p = 0.0298$ ). This result confirms the fact that the difference between these categories is the theoretical foundation required for the professional practice. Furthermore, these data are in agreement with the results of a study<sup>(6)</sup> developed through the observation of 369 health professionals in primary health units of ten municipalities of the southern region of Santa Catarina state. It was found that, in relation to hand hygiene, the higher-level professionals possessed more knowledge than those of the mid- or technical levels.

Although not of statistical significance, this draws attention to the result of the question that referred to the most common source for HAIs, in which the frequency of correct responses was higher among the nursing technicians. This is worrying because the nurse, as the team leader, must have skills for the supervision of the nursing care, taking into account actions that contribute to patient safety<sup>(16)</sup>.

From this perspective, it is emphasized that nurses should guide and monitor the hand hygiene practices of the healthcare team, of the patients and also of the family members, however, if their knowledge is limited, the procedure tends to be ignored and/or misunderstood by all. To minimize this type of situation, it is suggested that nurses of the hospitals investigated take responsibility for the guidance relevant to hand hygiene and provide this correctly, in line with what is recommended by the official bodies<sup>(1-2,15)</sup>.

Regarding the number of correct responses to specific questions according to the time of work in nursing, there were significant differences in the question related to the main route of cross-transmission in healthcare ( $p = 0.0352$ ) and in the one that refers to the minimum time required for the alcohol preparation to destroy most microorganisms on the hands ( $p = 0.0183$ ). These two questions had more correct responses among those who had less time of professional practice. In this sense, it appears that among those with less time working, knowledge tends to be more up to date due to the recent training in graduate courses, as in Brazil, hand hygiene with an alcohol preparation has gained momentum in recent years, with its availability only becoming mandatory in health services in 2010<sup>(17)</sup>.

In one investigation<sup>(6)</sup> conducted in Primary Health Units, which aimed to evaluate the quality of hand hygiene prior to surgical procedures, there was no significant difference between higher and lower training time in the area of practice. However, the age variable, which may reflect the training time, showed that 47.4% of the professionals over 35 years of age performed it correctly, while among the younger professionals the percentage was only 36.6%.

Hand hygiene is the most important measure for cross infection control<sup>(9)</sup> and this has long been divulged among health professionals. Nevertheless, with regard to the route of cross-transmission, it was again observed that the professionals with more time in the practice demonstrated lower levels of knowledge ( $p = 0.0352$ ) than the other team members, showing the importance of implementing a process of continuing education in the health institutions, in order to keep staff constantly updated about the routines and procedures necessary for the performance of their functions<sup>(1,18)</sup>.

The knowledge gaps presented regarding the use of an alcohol preparation can be justified in part by the fact that simple cleaning with soap and water is still the means preferred by health professionals<sup>(7,18)</sup>. Despite hand hygiene with alcohol preparation being a quick and easy procedure, indicated for when hands are not visibly soiled, before and after touching the patient or after removing gloves<sup>(15)</sup>, it was observed that this behavior might not be systematically performed, due to a lack of awareness and/or knowledge of the professionals.

The results obtained highlight the need to establish and/or intensify educational and indicator monitoring strategies, to expand the hand hygiene knowledge of nursing teams and encourage correct practice, either in terms of frequency and/or technique. This is because, although the nursing

professionals recognize the importance of hand hygiene to control HAIs, the discourse does not always align with the practice.

As an example of the previous statement, a study<sup>(19)</sup> conducted in an adult Intensive Care Unit (ICU), with 49 health professionals, including nurses, physicians and physiotherapists, highlighted that after the provision of care, the moment that professionals performed the procedure more was when they had contact with the patient, giving preference only to their own safety.

It is considered necessary to implement hand hygiene strategies<sup>(11)</sup> such as: easy access to alcohol preparations and other consumables intended for this purpose; education of the professional; fixing visual reminders at strategic points; and monitoring of hand hygiene practices with feedback on the performance for the professionals. Actions of this nature tend to improve the overall adherence to the practice<sup>(18-19)</sup>. From this perspective, it is emphasized that there is an electronic guide to the implementation of the multimodal strategy, prepared by the World Health Organization<sup>(11)</sup> for the improvement of hand hygiene.

Key elements of the strategy include, staff education and motivation programs; adoption of alcohol based products as the gold standard; use of performance indicators; and the strong commitment of all stakeholders, such as staff from the front line, managers and health leaders<sup>(1,3)</sup>. Such measures should be encouraged because, in this study, while 241 (90.3%) participants had received training in hand hygiene, the results indicate that there were gaps in the knowledge about this theme in the teams investigated, especially in relation to the time of rubbing hands with an alcohol preparation.

## ● CONCLUSION

The nursing professionals presented a high percentage of correct responses to the questions regarding hand hygiene. However, 86.5% of the investigated professionals did not fully know the instructions for hand hygiene. For there to be improvements in some questions, it is suggested that institutions implement measures aimed at continuing education of its employees, and that hand hygiene be considered a matter of the highest priority.

Further observational studies should be conducted to assess the quality and the adherence rate of the workers to the hand hygiene procedure, since, in this study, the goal was to analyze the knowledge of professionals, which does not mean that the knowledge is applied to the care practice. It is hoped that this study, in the scientific field, provides support for further studies with more robust designs; and in the practical field, produces reflections and perhaps increases the adherence of health professionals to the practice of systematic and correct hand hygiene.

The main limitations of this study relate to the fact that other categories of health professionals were not included and the knowledge of the participants was not evaluated through observation of the technique. Thus, it is suggested that further studies be carried out, including other health professionals and focused on theoretical knowledge, but mainly, on its application in the care practice.

## ● ACKNOWLEDGEMENTS

CNPq for the Scientific Initiation scholarship awarded.

## ● REFERENCES

1. Agência Nacional de Vigilância Sanitária (BR). Manual de Segurança do Paciente: Higienização das mãos. Brasília (DF): ANVISA; 2010.
2. World Health Organization. WHO guidelines on hand hygiene in health care. First global patient safety challenge: clean care is safe care. Geneva (SUI): WHO; 2009.
3. Agência Nacional de Vigilância Sanitária (BR). Segurança do Paciente e Qualidade em Serviços de Saúde:

Medidas de Prevenção de Infecção Relacionada à Assistência à Saúde. Brasília (DF): ANVISA; 2013.

4. Krummenauer EC, Adam MS, Muller LB, Machado JAA, Carneiro M. Are awareness strategies effective in improving adherence to hand hygiene in health care?. *J Infect Control*. 2013; 2(2): 126-7.
5. Custódio J, Alves JF, Silva FM, Dolinger EJO, dos Santos JGS, de Brito DVD. Avaliação microbiológica das mãos de profissionais de saúde de um hospital particular de Itumbiara. *Rev. ciênc. méd.* 2009; 18(1): 7-11.
6. 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.
7. Borges Primo MG, Ribeiro LCM, Figueiredo LFS, Sirico SCA, de Souza MA. Adesão à prática de higienização das mãos por profissionais de saúde de um Hospital Universitário. *Rev. Eletr. Enf. [Internet]* 2010; 12(2) [acesso em 05 set 2014]. Disponível: <http://www.fen.ufg.br/revista/v12/n2/v12n2a06.htm>.
8. Martinez MR, Campos LAAF, Nogueira PCK. Adesão à técnica de lavagem de mãos em Unidade de Terapia Intensiva Neonatal. *Rev. paul. pediatr.* 2009; 27(2): 179-85.
9. Rezende KCAD, Tipple AFV, Siqueira KM, Alves SB, Salgado TA, Pereira MS. Adesão à higienização das mãos e ao uso de equipamentos de proteção pessoal por profissionais de enfermagem na atenção básica em saúde. *Ciênc Cuid Saude*. 2012; 11(2): 343-51.
10. Oliveira AC, Cardoso CS, Mascarenhas D. Precauções de contato em Unidade de Terapia Intensiva: fatores facilitadores e dificultadores para a adesão dos profissionais. *Rev. esc. enferm. USP*. 2010; 44(1): 161-5.
11. Organização Mundial da Saúde (OMS). Guia Para Implementação: Um Guia para a implantação da estratégia multimodal da OMS para a melhoria da higienização das mãos a observadores: estratégia multimodal da OMS para a melhoria da higienização das mãos. Brasília (DF): Organização Pan-Americana da Saúde, Agência Nacional de Vigilância Sanitária; 2008.
12. Haddad MCL, Évora YDM. Qualidade da assistência de enfermagem: a opinião do paciente internado em hospital universitário público. *Cienc Cuid Saude*. 2008; 7(Suppl 1): 45-52.
13. Nonino EAPM, Anselmi ML, Dalmas JC. Qualidade do procedimento curativo em pacientes internados em um hospital universitário. *Rev Latino-am Enfermagem. [Internet]* 2008; 16(1) [acesso em 2 nov 2014]. Disponível: <http://dx.doi.org/10.1590/S0104-11692008000100010>.
14. Ministério da Saúde (BR). Conselho Nacional de Saúde. Diretrizes e normas regulamentadoras de pesquisa envolvendo seres humanos. Resolução n. 466, de 12 de dezembro de 2012. Brasília; 2012.
15. Ministério da Saúde (Brasil). Portaria n. 1.377, de 9 de julho de 2013. Aprova os protocolos de segurança do paciente. Brasília (DF); 2013. [Anexo 01: Protocolo para a prática de higiene das mãos em serviços de saúde].
16. Inoue KC, Matsuda LM. Segurança do paciente: abordando um antigo problema. *Cienc Cuid Saude*. 2013; 12(2): 208-9.
17. Agência Nacional de Vigilância Sanitária (Brasil). 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. Brasília (DF): Diário Oficial União, 2010. Seção 1.
18. do Prado MF, Oliveira ACJ, do Nascimento TMB, de Melo WA, do Prado DB. Estratégia de promoção à higienização das mãos em unidade de terapia intensiva. *Cienc cuid saude*. 2012; 11(3): 557-64.
19. Bathke J, Cunico PA, Maziero ECS, Cauduro FLF, Sarquis LMM, Cruz EDA. Infraestrutura e adesão à higienização das mãos: desafios à segurança do paciente. *Rev. Gaúcha Enferm.* 2013; 34(2): 78-85.