

KNOWLEDGE OF NURSING AND PHYSIOTHERAPY STUDENTS ON HAND HYGIENE

CONHECIMENTO DE ACADÊMICOS DE ENFERMAGEM E FISIOTERAPIA SOBRE HIGIENE DAS MÃOS EL CONOCIMIENTO DE LOS ESTUDIANTES DE ENFERMERÍA Y FISIOTERAPIA SOBRE LA HIGIENE DE LAS MANOS

Carine Feldhaus¹
Marli Maria Loro²
Thays Cristina Berwig Rutke²
Priscila da Silva Matter³
Adriane Cristina Bernat Kolankiewicz²
Eniva Miladi Fernandes Stumm²

¹ Universidade Estadual do Oeste do Paraná – UNIOESTE. Cascavel, PR – Brazil.
² Universidade Regional do Noroeste do Estado do Rio Grande do Sul – UNIJUÍ. Ijuí, RS – Brazil.
³ UNIJUÍ. Santa Rosa, RS – Brazil.

Corresponding author: Carine Feldhaus. E-mail: carine0212@hotmail.com
Submitted on: 2017/06/25 Approved on: 2018/03/26

ABSTRACT

Objective: to analyze the knowledge regarding Hand Hygiene (HH) from the perspective of Nursing and Physiotherapy students from a private university. **Method:** cross-sectional and quantitative study conducted at a private university of the State of Rio Grande do Sul, Brazil, with nursing and physiotherapy students. We used as instrument of data collection or Knowledge Test on HH for Health Professionals and a questionnaire to identify the sociodemographic profile. Data insertion and descriptive analysis were performed by PASW Statistics®. Pearson's Chi-square test was used to verify the association between variables. **Results:** participants were 126 academics, with prevalence of females and age up to 27 years. Participants affirmed that the hands are the main means of transmission of pathogenic microorganisms. Academics of physiotherapy were mostly unaware of the minimum time required for the alcohol solution to be effective. All participants stated that HH is required before contact with the patient. Nursing students demonstrate greater knowledge regarding the need for HH after contact with surfaces close to the patient and surfaces that can contaminate the hands, demonstrating a statistically significant difference between knowledge. **Conclusion:** there have been gaps in the knowledge of academics, with emphasis on the five moments of HH, which points to the need for the academic training to reinforce this theme, with a view to patient safety.

Keywords: Nursing; Physical Therapy Specialty; Hand Hygiene; Knowledge; Patient Safety.

RESUMO

Objetivo: analisar o conhecimento em relação à higienização das mãos (HM) na perspectiva de acadêmicos de Enfermagem e Fisioterapia de uma Universidade Privada. **Método:** estudo transversal, quantitativo, realizado em uma Universidade Privada do interior do estado do Rio Grande do Sul, com acadêmicos de Enfermagem e Fisioterapia. Utilizou-se como instrumento de coleta de dados o teste de conhecimento a respeito da HM para profissionais da saúde e questionário para identificar o perfil sociodemográfico. A inserção e análise descritiva dos dados foram realizadas pelo programa PASW Statistics®. Utilizou-se o teste qui-quadrado de Pearson para verificar a existência de associação entre as variáveis. **Resultados:** participaram 126 acadêmicos, prevaleceu o sexo feminino e idade de até 27 anos. Os participantes afirmaram ser as mãos o principal meio de transmissão de microrganismos patógenos. Acadêmicos de Fisioterapia, em sua maioria, desconhecem o tempo mínimo necessário para a preparação alcoólica ter efetividade. A totalidade dos participantes afirmou que é necessária a HM antes do contato com o paciente. Acadêmicos de Enfermagem demonstram conhecimento superior no que se refere à necessidade de HM após contato com superfícies próximas do paciente e superfícies que podem contaminar as mãos, demonstrando diferença estatisticamente significativa entre saberes. **Conclusão:** evidenciaram-se lacunas no conhecimento dos acadêmicos, com destaque para o que se refere aos cinco momentos da HM, o que realça a necessidade de que na formação acadêmica seja reforçada esta temática, com vistas à segurança do paciente.

Palavras-chave: Enfermagem; Fisioterapia; Higiene das Mãos; Conhecimento; Segurança do Paciente.

How to cite this article:

Feldhaus C, Loro MM, Rutke TCB, Matter PS, Kolankiewicz ACB, Stumm EMF. Knowledge of nursing and physiotherapy students on hand hygiene. REME – Rev Min Enferm. 2018[cited _____. _____.];22:e-1096. Available from: _____. DOI: 10.5935/1415-2762.20180026

RESUMEN

Objetivo: Analizar el conocimiento sobre la higienización de las manos (HM) desde la perspectiva del estudiante de enfermería y fisioterapia de una universidad privada. **Método:** Estudio transversal, cuantitativo, realizado en una universidad privada del interior del estado de Rio Grande do Sul, con estudiantes de Enfermería y Fisioterapia. Los datos se recogieron mediante la prueba de conocimiento sobre HM para profesionales de la salud y un cuestionario para identificar el perfil sociodemográfico. Se utilizó el programa PASW Statistics® para la inserción y análisis descriptivo de datos. La prueba Chi-cuadrado de Pearson se empleó para determinar la existencia de asociación entre variables. **Resultados:** participaron 126 estudiantes, prevaleció el sexo femenino y edad hasta 27 años. Los participantes afirmaron que las manos eran el medio principal de transmisión de microorganismos patógenos. El estudiante de fisioterapia, en general, desconoce el tiempo mínimo necesario para que la preparación alcohólica tenga efectividad. La totalidad de los participantes afirmó que la HM es necesaria antes del contacto con el paciente. El estudiante de enfermería demuestra conocimiento superior en lo que se refiere a la necesidad de HM después del contacto con superficies cerca del paciente y de aquéllas que puedan contaminar las manos, demostrando diferencia estadísticamente significativa de conocimiento entre ambos cursos. **Conclusión:** se evidenciaron algunas lagunas, sobre todo en lo referente a los cinco momentos de la HM, lo que indica la necesidad de reforzar este tema en la formación académica, con vistas a la seguridad del paciente.

Palabras clave: Enfermería; Fisioterapia; Higiene de las Manos; Conocimiento; Seguridad del Paciente.

INTRODUCTION

Concern about the quality of care and patient safety in health institutions has had a global emphasis, with greater relevance after the publication of the report from the Institute of Medicine "Erring is human", in 1999. It pointed out that each year, 98,000 hospitalized people die as a result of medical errors.¹ Previously, in 1991, the "Results of the Harvard Medical Practice Study I" was published, which pointed out that 4.70% of the patients attended in hospitals in New York suffered adverse events due to hospitalization.²

In understanding patient safety as a priority issue, the World Health Organization (WHO) launched in 2004 the Global Alliance for Patient Safety with a view to stimulating actions to qualify health care.³ In this sense, the Brazilian Ministry of Health (MoH), in order to follow the global goals established in 2004, implemented the National Program for Patient Safety (PNSP in Portuguese) in 2013 with the aim of contributing to the qualification of health care in all the health facilities of the national territory.⁴

Among the strategies to implement the PNSP, we highlight the inclusion of the topic patient safety in the curricula of training health courses at the technical, higher and post-graduate levels. In addition, the Brazilian MoH, in partnership with the National Agency of Sanitary Surveillance (ANVISA), has encouraged the implementation of patient safety protocols, guides and manuals, among which those related to health care-related infections (HCRI) stand out.⁴ In this context, the importance of hand hygiene (HH), which is evaluated as relevant and efficient, is emphasized due to its easiness to adhere, low cost and, above all, cost-effectiveness for prevention and control of HCRI.⁵

From the perspective of the epidemiology of HCRI transmission, hands are considered the main route of dissemination, since effective HH reduces or even avoids the possibility of infections, although adherence of health professionals to the recommended practices is still below the recommended.⁶ Research has shown that the low adherence to HH is related to the increase of hospi-

tal infection rates, in around 50 to 60%.⁷ However, a study showed that professionals sometimes ignore its importance and do not understand the basic mechanisms of transmission of microorganisms that cause infections, posing a risk to patient safety.⁸

When considering the difficulties of adherence of health professionals to HH, the WHO proposed five moments for its performance: before and after contact with the patient, before aseptic procedures, after contact with surfaces close to the patient and after risk of exposure to body fluids. It also emphasizes that, when the hands are visibly dirty, the hygiene process must be carried out with soap and water, compulsorily.^{5,9}

This theme needs to be addressed in the professional training process. It is essential for students to enter health care services and develop practices based on biosafety measures and patient safety. Thus, the approach to HH should occur early, that is, before the first practice. This links to the responsibility and commitment of educational institutions, responsible for the formation and transmission of scientific knowledge essential for the recognition of the relevance of this theme, with a view to promoting the crucial adherence in order to prioritize patient and professional safety.

Based on the evidence presented, this study is justified by the importance of the theme and by the need for greater adherence by health professionals in relation to this practice. Based on data searches, it was found that there are few studies that address the academic population in order to identify the knowledge of future professionals about HH, which represents a knowledge gap.

In addition, the results may constitute indicators for professors to alert and raise awareness of students about this aspect, which should go through the effectiveness of care and transcend the subsequent professional practice, since hands are directly responsible for the transmission of pathogenic microorganisms.

In view of this, the guiding question of this study is: what is the knowledge of nursing and physiotherapy students about hand hygiene?

The general objective of the present study was to analyze knowledge about hand hygiene from the perspective of nursing and physiotherapy students from a private university. And the specific objectives were: to know the sociodemographic profile of the academics and to compare the knowledge between the students of nursing and physiotherapy courses regarding hand hygiene.

METHOD

This is a cross-sectional, descriptive and quantitative study conducted at a private university in the interior of the state of Rio Grande do Sul with nursing and physiotherapy students. The participants were students of the above-mentioned courses who had attended the first academic practice, which totaled 141 individuals. Of these, 51 were in the third year of graduation (27 nursing and 24 physiotherapy students); 40 the fourth year (21 nursing and 19 physiotherapy students); and 50 were in the last year (23 in nursing and 27 physiotherapy students). It is noteworthy that in the studied training institution the content that contemplates the study subject is discussed in the second half of the first year of both courses through lectures and HH practice in the skills laboratory.

In order to select the research participants, the following inclusion criteria were established: being a nursing and physiotherapy student, having attended the first academic practice and being 18 years old or older. The exclusion criteria were: students withdrawn from curricular activities in the collection period, being member of the research group on patient safety and not answering to the questionnaire after three contact attempts.

After applying the aforementioned criteria, two students were excluded because they were withdrawn from the curricular activities in the period, nine because they participated in the research group to which the project is linked and four because they were not found in three contact attempts, which resulted in 126 participants and a response rate of 89.36%.

The data collection took place in the months of June to September of 2016, by a nursing academic. Initially, we requested a list of the students who had attended practical activities at

the course office. Through this list we identified the students and addressed them in the classroom and practice fields. We presented the survey and delivered the questionnaires to those who met the established criteria. Those who agreed to participate in the study signed the Informed Consent Term (ICT) in two copies, of which one stayed with the participant and the other with the principal main researcher. As a research instrument, we used the Knowledge Test on Hand Hygiene for Health professionals, validated by the World Health Organization.¹⁰

The instrument is a self-administered multiple-choice questionnaire that assesses technical and scientific knowledge about aspects of HH during care. There are also sociodemographic characterization questions in the instrument.¹⁰

The data insertion and descriptive analysis were performed in the PASW Statistics® (Predictive Analytics Software, SPSS Inc., Chicago – USA) 18.0 for Windows program. The variables are described in numbers and percentages. Pearson’s chi-square test was used to verify the existence of association between the studied variables, considered statistically significant if $p < 0.05$.

Ethical aspects have been respected. The study was approved by the Research Ethics Committee (CEP) of the Universidade Regional do Noroeste do Estado do Rio Grande do Sul (UNIJUI), under Approval Certificate No. 47106715.2.0000.5350.

RESULTS

Of the 126 students participating in the study, 90 (71.4%) were in the age range of 18 to 27 years, 107 (84.9%) were female, 89 (70.6%) were single, 103 (81.7%) did not have children, 86 (68.3%) lived with their families and 97 (77%) did not practice sports. In relation to academic activity, 95 (75.4%) had an hourly workload between 20 and 33 credits (301 to 500 hours) and 80 (63.5%) had no paid work.

Regarding the main route of cross-transmission of potentially pathogenic microorganisms between patients in the health services, 122 (96.8%) students said they were the hands of the practitioner, when not sanitized.

Table 1 presents the data referring to items that should be avoided for being related to hand colonization.

Table 1 - Academic knowledge on items related to hand colonization. Rio Grande do Sul, Brazil, 2016

Questions	Total – Yes N(%)	Nursing – Yes N(%)	Physiotherapy – Yes N(%)	P
Which of the following should be avoided because they are associated with the possibility of hand colonization?				
Use of jewelry	124(98.4%)	58(100%)	66(97.1%)	0.188
Damaged skin	100(79.4%)	46(79.3%)	54(79.4%)	0.989
Artificial/false nails	123(97.6%)	55(94.8%)	68(100%)	0.058
Regular use of hand moisturizer	39(31%)	16(27.6%)	23(33.8%)	0.450

Source: research data. * Significance level: $p < 0,05$.

When considering the items to be avoided for being associated with the possibility of hand colonization, Table 1 shows that the majority (79.4%) of the respondents stated that damaged skin should be avoided. All students from the nursing course assured that jewelry and moisturizing cream (27.6%) should be avoided. All physiotherapy participants reported in that false nails should be avoided and 33.8% mentioned the use of moisturizing cream. When referring to the knowledge about the items to be avoided among academics, the use of Pearson's chi-square test showed that there was no statistical significance.

The chart of Figure 1 shows the minimum time required for the alcoholic solution to destroy most of microorganisms of the hands.

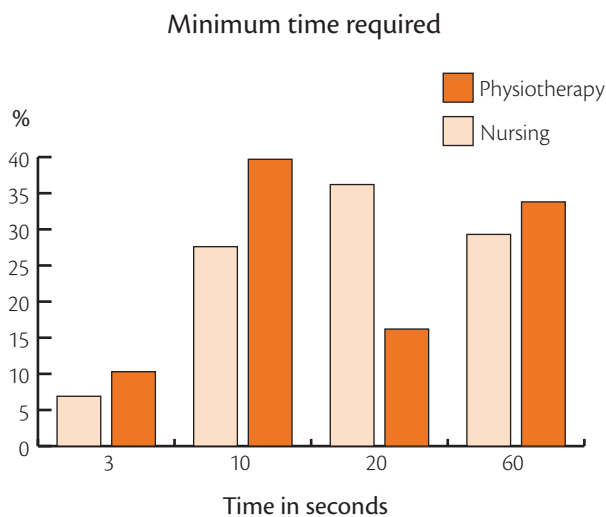


Figure 1 - Knowledge of undergraduate students of the health area regarding the minimum time required for the alcoholic solution to destroy microorganisms present in the hands. Rio Grande do Sul, Brazil. 2016. Source: research data.

Still in relation to the data in chart 1, most nursing students (36.2%) indicated that the minimum time required for the alcoholic solution to act on the skin and to destroy most of the microorganisms was 20 seconds, followed by 60 seconds. Among physiotherapy students, the time with the highest percentage of answers (39.7%) was 10 seconds.

Table 2 shows actions to avoid cross-transmission of microorganisms to the patient and surfaces that can contaminate the hands.

According to the data in Table 2, all participants are aware that the hands must be sanitized before contact with the patient. With regard to sanitizing them after contact with the patient and with body fluids, physiotherapy students obtained lower answers, when compared to those of the nursing course. Results showed a statistically significant relationship between the participants' understanding. However, door handle and the patient's chart were not statistically significant ($p = 0.910$ and $p = 0.253$), respectively.

DISCUSSION

The results show that the female gender predominated among the participants, which is in agreement with another study with undergraduate students in nursing and medicine, in which the practice of HH with alcoholic solution was evaluated and found that 69.8% of participants were women.¹¹ Still the same study¹¹ had a mean age of 21.4 years \pm 3.73 years, similar to this study, in which the age group between 18 and 27 years was 71.1%.

Concerning the main route of cross-transmission of microorganisms, 96.8% of the participants stated that they were the hands of practitioners, when not sanitized. In this sense, a bibliographic review study showed a correlation between HH and HCRI reduction.¹²

Table 2 - Distribution by academic category of issues related to the cross-transmission of microorganisms and contaminating surfaces. Rio Grande do Sul, Brazil, 2016

Questions	Total – Yes N(%)	Nursing – Yes N(%)	Physiotherapy – Yes N(%)	p
Which of the following hand hygiene actions prevent cross-transmission of microorganisms to the patient?				
Hand hygiene before contact with the patient	126(100%)	58(100%)	68(100%)	–
Hand hygiene after contact with the patient	116(92.1%)	57(98.3%)	59(86.8%)	0.017*
Hand hygiene immediately after contact with body fluids	117(92.9%)	57(98.3%)	60(88.2%)	0.029*
Hand hygiene after exposure to the surface and objects close to the patient	109(86.5%)	55(94.8%)	54(79.4%)	0.012*
Surfaces that can contaminate hands with microorganisms that can be transmitted to patients.				
The door handle of the patient's bedroom	124(98.4%)	57(98.3%)	67(98.5%)	0.910
The intact skin of another patient	87(69%)	46(79.3%)	41(60.3%)	0.021*
The patient's own intact skin	63(50%)	37(63.8%)	26(38.2%)	0.004*
The patient's chart	93(73.8%)	40(69%)	53(77.9%)	0.253
The walls of the patient's bedroom	93(73.8%)	48(82.8%)	45(66.2%)	0.035*

Source: research data. * Significance level: $p < 0,05$.

From the perspective of the epidemiology of HCRI, the hands of health practitioners are considered the main route of transmission of microorganisms in the care provided to patients due to the diversity of pathogens present in the skin. This transmission can occur through direct contact (skin to skin), between different body sites of the same patient, between patients and, conversely, among them or indirectly through contact with contaminated objects and surfaces.^{9,10,13}

From this perspective, the WHO has found that between 5 and 10% of patients admitted to hospitals acquire one or more infections and considers HH as a primary measure with a view to reducing this rate when related to health care.¹⁴ In this sense, HH is a highly effective measure to prevent HCRI and bacterial resistance, since practitioners' hands may be contaminated with multi-resistant bacteria.¹⁵

In Brazil, a single national HCRI-related assessment was identified in a study by Prade *et al.*¹⁶ which in 1994 found a prevalence of 15.0% of HCRI rates in 99 Brazilian hospitals.

As for items with potential to contaminate hands and that therefore should be avoided, academics from both courses understood it is the damaged skin. They also stated that jewelry and false nails should not be used. A study in the city of Rosario, Argentina, with professionals working in the Intensive Care Unit (ICU) diverges from the present study, since 87% of the participants did not acknowledge that jewelry, long nails and skin lesions may be related to the transmission of microorganisms and thus need to be avoided in health care.¹⁷

The Ministry of Labor, in its Regulatory Norm No. 32, which aims to establish the basic guidelines for the implementation of measures to protect the health and safety of health workers, establishes that workers with upper limb injuries can only initiate their activities after mandatory medical evaluation and issuance of an authorization document to work. Another item regulated and that must be vetoed refers to the use of jewelry in the work units.¹⁸

Concerning the HH actions that avoid cross-transmission, participants of both courses stated that sanitizing hands before contact avoids transmission. However, after contact with the patient, 98.3% of Nursing students and 86.8% of physiotherapy students affirmed that HH was required, with a statistically significant difference ($p < 0.017$).

Other data with a statistically significant difference were the lowest values obtained by physiotherapy students, when compared to those of nursing, in which 88.2% of them answered that the hands should be sanitized after contact with body fluids and 79.4% after contact with surfaces and objects.

Studies with physicians, nurses, nursing technicians and physiotherapists in ICUs evaluating adherence to HH concluded that it was performed more as an individual protection measure, when compared to those related to patient protection, insofar as adherence was greater after contact with the patient.^{19,20}

Research indicated that health practitioners are exposed to the risk of infection through direct contact with patients and their environment. However, when contact involves bodily fluids, such as potentially contaminated regions, adherence to HH increases, which is related to the pursuit of self-care by the practitioners.²¹ Nevertheless, the failure to perform HH procedures "before" patient contact or as an aseptic procedure is an additional risk factor for patient safety.²²

In the analysis of the hands rubbing time with alcoholic solution, it was observed that 50.1% of the participants of the physiotherapy course stated a minimum time below that recommended by the MoH, which denotes ineffective knowledge. On the other hand, 65.5% of nursing students correctly stated the minimum or higher time, however, the total rate remains below the expected. This fact makes it possible to infer the need to extend this theme in the academic training with a view to its qualification. In this sense, it should be noted that, according to the Protocol for the Practice of HH in Health Services, hand rubbing should last at least 20 to 30 seconds. It is recommended when hands are not visibly dirty, before and after touching the patient, after removing gloves and before handling medication or food preparation.²³

Regarding the indication, according to the classification of the five HH moments, a study carried out in a Southern Brazil ICU with physicians, physiotherapists, nurses and nursing technicians obtained significant value ($p < 0.001$) in adherence to the actions classified as "before" (contact with patient or aseptic procedure) versus those referred to as "after" (contact with patient, patient's environment or risk of exposure).²² This same study reinforced that the physiotherapists (53.5%) were those with the highest adherence to HH practice and 11 (5.5%) used spray alcohol and 95 (48%) water and soap. Nurses, nursing technicians and physicians had adherence below 50% in the observed conducts.²² And this differs from the study presented here.

A research carried out with a multidisciplinary and academic team in a school hospital in the Central-West region of Brazil, in the nursing category, which included academics, nurses, nursing assistants and teachers. When evaluating the HH opportunities, 79.3% of participants indicated them incorrectly. This evidence is worrying, since when the nursing team does not perform HH effectively, it interferes with the patient safety, insofar as this category provides direct and continuous patient care.²⁴

A study that analyzed the knowledge on HH with physicians, nurses and other professionals (radiology technician, laboratory technician and psychologist) in the public health system of Andalucía, Spain, pointed out that, even though the professionals of the third group do not maintain direct contact with the patients, this does not exempt them from the need to know about risk situations that compromise patient safety.²⁵

Evidence shows that HH inefficiency negatively impacts the occurrence of HCRI. Thus, in the training process, these as-

pects need to be addressed with more emphasis and it is still necessary that this theme be developed with the use of active methodologies in order to emphasize the importance of HH. A teaching that emphasizes the primordality and responsibility for HH practice will train professionals with a broader view of patient safety.

CONCLUSION

The present study allowed identifying and comparing the knowledge of nursing and physiotherapy academics of a private teaching institution about HH. Gaps in knowledge were evidenced, with emphasis on the five moments of HH.

Nursing students, when compared to physiotherapy, obtained results that were statistically significant, especially in relation to HH actions that avoid cross-transmission of microorganisms to the patient.

Thus, it is important to reinforce that the educational and training process plays a unique role, because when the student understands the importance of HH in care, as well as in his/her self-care as a future health worker, he/she will incorporate this knowledge into his/her practices. In addition, it is necessary that teachers reinforce and care for this aspect, so that these future professionals assume, in the care of the patient, the responsibility of providing qualified care, without causing harm and giving priority to patient safety.

Therefore, it is necessary that new studies of national scope be carried out in order to identify knowledge on HH and HCRI indexes, which involve health practitioners and students.

Among the limitations of the study, it was carried out in only one educational institution and with the participation of students from two health courses. Thus, it is necessary that new studies be carried out in other institutions with the inclusion of other areas of training in the health field.

REFERENCES

- Kohn LT, Corrigan JM, Donaldson MS, editors. *To err is human: building a safer health system*. Washington, DC: National Academy Press, Institute of Medicine; 1999. [cited 2017 Jan 15]. Available from: <http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20report%20brief.pdf>
- Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, et al. Incidence of Adverse Events and Negligence in Hospitalized Patients — Results of the Harvard Medical Practice Study I. *N Engl J Med*. 1991 [cited 2017 Jan 15];324(6):370-6. Available from: <http://www.nejm.org/doi/full/10.1056/NEJM199102073240604>
- World Health Organization. *World Alliance for Patient Safety: forward programme*. Geneva: WHO; 2004. 33p. [cited 2016 Nov 09]. Available from: http://www.who.int/patientsafety/en/brochure_final.pdf?ua=1
- Ministério da Saúde (BR). Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). Brasília: Ministério da Saúde; 2013. [cited 2017 Jan 15]. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2013/prt0529_01_04_2013.html
- World Health Organization. *Guidelines on hand hygiene in health care: first global patient safety challenge: clean care is safer care*. Geneva: WHO; 2009. 270p. [cited 2017 Jan 15]. Available from: http://apps.who.int/iris/bitstream/10665/44102/1/9789241597906_eng.pdf
- Ministério da Saúde (BR). Agência Nacional de Vigilância Sanitária. *Segurança do Paciente em Serviços de Saúde: Higienização das Mãos*. Brasília: Ministério da Saúde; 2009. [cited 2017 Jan 15]. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/seguranca_paciente_servicos_saude_higienizacao_maos.pdf
- Lima FDM. A segurança do paciente e intervenções para a qualidade dos cuidados em saúde. *Rev Espaço Saúde*. 2014 [cited 2017 Jan 15];5(3):22-9. Available from: http://www.uel.br/revistas/uel/index.php/espacoparasaude/article/view/18190/pdf_37
- Silva FM, Porto TP, Rocha PK, Lessmann JC, Cabral PFA, Schneider KLK. Higienização das mãos e a segurança do paciente pediátrico. *Rev Ciênc Enferm*. 2013 [cited 2017 Jan 15];XIX(2):99-109. Available from: http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0717-955320130002000100
- World Health Organization. *Patient Safety a World Alliance for Safer Health Care. Conceptual framework for the international classification for patient safety, version 1.1: final technical report*. Geneva: WHO; 2009. 154 p. [cited 2017 Jan 15]. Available from: http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf
- Organização Mundial da Saúde. *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: Organização Pan-Americana da Saúde; 2008. 63 p. [cited 2017 Jan 15]. Available from: http://www.anvisa.gov.br/servicosade/controle/higienizacao_oms/guia_de_implement.pdf
- Škodová M, Gimeno-Benítez A, Martínez-Redondo E, Morán-Cortés JF, Jiménez-Romano J, Gimeno-Ortiz A. Avaliação da qualidade da técnica de higiene das mãos em alunos de enfermagem e medicina em dois cursos de graduação. *Rev Latino-Am Enferm*. 2015 [cited 2017 Jan 15];23(4):708-17. Available from: <http://dx.doi.org/10.1590/0104-1169.0459.2607>
- Huang GKL, Stewardson J, Grayson ML. Back to basics: hand hygiene and isolation. *Curr Opin Infect Dis*. 2014 [cited 2017 Jan 15];27(4):379-89. Available from: www.co-infectiousdiseases.com
- Silva EL. *Higienização das mãos: conhecimentos e práticas dos enfermeiros do Hospital Agostinho Neto [dissertação]*. Coimbra: Escola Superior de Enfermagem de Coimbra; 2013.
- World Health Organization. *World Alliance for Patient Safety. Guidelines on Hand Hygiene in Health Care (Advanced Draft) – Global Patient Safety Challenge 2005-2006: clean care is safer care*. Geneva: WHO; 2006. 209 p.
- Paim RSP, Lorenzini E. Estratégias para prevenção da resistência bacteriana: contribuições para a segurança do paciente. *Rev Cuid*. 2014 [cited 2017 Jan 15];5(2):757-64. Available from: <http://dx.doi.org/10.15649/cuidarte.v5i2.88>
- Padoveze MC, Fortaleza CM. Healthcare-associated infections: challenges to public health in Brazil. *Rev Saúde Pública*. 2014 [cited 2017 Jan 15];48(6):995-1001. Available from: <http://dx.doi.org/10.1590/S0034-8910.2014048004825>
- Vita V, Weisburd G, Beltramo D, Bussi E. Conocimiento actitudes y prácticas del personal de salud relacionados con el lavado de manos clínico en una unidad de cuidados intensivos. *Rev Méd Rosario*. 2014 [cited 2017 Jan 15];80(3):105-16. Available from: <http://www.circulomedicorosario.org/Upload/Directos/Revista/1a1e43De%20Vita%20Lavado%20de%20Manos.pdf>
- Ministério do Trabalho e Emprego (BR). NR 32. *Dispõe sobre a segurança e saúde no trabalho em serviços de saúde*. Brasília: Ministério da Saúde; 2008. [cited 2017 Jan 15]. Available from: <http://www.guiatrabalhista.com.br/legislacao/nr/nr32.htm>
- Prado MF, Oliveira ACJ, Nascimento TMB, Melo WA, Prado DB. Estratégia De Promoção à Higienização das Mãos em Unidade De Terapia Intensiva. *Ciênc Cuid Saúde*. 2012 [cited 2017 Jan 15];11(3):557-64. Available from: <http://dx.doi.org/10.4025/ciencucidsaude.v11i3.16366>
- 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[cited 2017 Jan 15];34(2):78-85. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1983-14472013000200010&lng=en&nrm=iso.
21. Guedes M, Miranda FMDA, Maziero ECS, Cauduro FLF, Cruz EDA. Adesão dos profissionais de enfermagem à higienização das mãos: uma análise segundo o modelo de crenças em saúde. *Cogitare Enferm.* 2012[cited 2017 Jan 15];17(2):304-9. Available from: <http://revistas.ufpr.br/cogitare/article/view/27886/18494>
 22. Souza LM, Ramos MF, Becker ESS, Meirelles LCS, Monteiro SAO. Adesão dos profissionais de terapia intensiva aos cinco momentos da higienização das mãos. *Rev Gaúcha Enferm.* 2015[cited 2017 Jan 15];36(4):21-8. Available from: <http://www.seer.ufrgs.br/index.php/RevistaGauchadeEnfermagem/article/view/49090/35654>.
 23. Ministério da Saúde (BR). Anexo 01: protocolo para a prática de higiene das mãos em serviços de saúde. Brasília: Ministério da Saúde; 2013. [cited 2016 Dec 06]. Available from: http://www.hospitalsantalucinda.com.br/downloads/prot_higiene_das_maos.pdf
 24. 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 Eletrônica Enferm.* 2010[cited 2016 Dec 06];12(2):266-71. Available from: <http://www.fen.ufg.br/revista/v12/n2/v12n2a06.htm>.
 25. Pérez-Pérez P, Herrera-Usagre M, Bueno-Cavanillas A, Alonso-Humada MS, Buiza-Camacho B, Vázquez-Vázquez M. Higiene de las manos: conocimientos de los profesionales y áreas de mejora. *Cad Saúde Pública.* 2015[cited 2016 Dec 06];31(1):149-60. Available from: <http://dx.doi.org/10.1590/0102-311X00106913>
-