Hand hygiene rate in a Neonatal Intensive Care Unit

Taxa de higienização das mãos em uma Unidade de Terapia Intensiva Neonatal

Índice de higienización de las manos en una Unidad de Cuidados Intensivos Neonatales

Edcarla da Silva de Oliveira[1] https://orcid.org/0000-0001-6773-0330
Maria Vera Lúcia Moreira Leitão Cardoso[1] https://orcid.org/0000-0002-0481-6440
Carolina Martins Bezerra[1] https://orcid.org/0000-0003-3250-4732
Lorena Pinheiro Barbosa[1] https://orcid.org/0000-0002-8006-7515
Keline Soraya Santana Nobre[1,2] https://orcid.org/0000-0002-9834-9715
Thaís Aquino Carneiro[1] https://orcid.org/0000-0002-0546-6139

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Corresponding author
Edcarla da Silva de Oliveira
E-mail: edcarla2401@gmail.com

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Monica Taminato
(https://orcid.org/0000-0003-4075-2496)
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, SP, Brazil

Abstract

Objective: To evaluate hand hygiene compliance by health professionals working in a Neonatal Intensive Care Unit and verify the association of compliance between the five moments recommended by the World Health Organization.

Methods: This is cross-sectional research, carried out between November/2017 and April/2018, with a multidisciplinary health staff from a Neonatal Intensive Care Unit, in the morning and afternoon shifts, on weekdays, through direct observation of opportunities for cleaning the hands. Data were analyzed using Odds Ratio and Fisher's exact test ($p<0.05$).

Results: A total of 304 hand hygiene opportunities were observed in 71 health professionals, showing an overall compliance rate of 79.9%. The highest hand hygiene compliance was by physical therapists (91.9%), followed by physicians (82.4%) and nursing technicians (82%). Opportunities with greater hand hygiene compliance were "before and after touching a patient" with 94.4 and 93.9%, respectively. The chance of washing hands before touching a patient was 60 times greater than after touching patient surroundings ($p < 0.00001$).

Conclusion: Hygienizing hands after touching patient surroundings had lower compliance. Hygiene hands before touching a patient obtained greater compliance by the professionals observed.

Resumo

Objetivo: Avaliar a adesão à higienização das mãos dos profissionais da saúde atuantes em uma Unidade de Terapia Intensiva Neonatal e verificar a associação da adesão entre os cinco momentos preconizados pela Organização Mundial de Saúde.

Métodos: Pesquisa transversal realizada entre novembro/2017 e abril/2018, com equipe multiprofissional de saúde da Unidade de Terapia Intensiva Neonatal, nos turnos matutino e vespertino, nos dias úteis da semana, por meio de observação direta das oportunidades de higienização das mãos. Os dados foram analisados utilizando-se a Razão de Chance e o Teste Exato de Fisher ($p<0,05$).

Resultados: Foram observadas 304 oportunidades de higienização das mãos em 71 profissionais da saúde, mostrando uma taxa de adesão global de 79,9%. A maior adesão à higiene de mãos foi dos fisioterapeutas (91,9%), seguido dos médicos (82,4%) e dos técnicos de enfermagem (82%). As oportunidades com maior adesão à higiene de mãos foram "antes e após tocar o paciente" com 94,4 e 93,9%, respectivamente. A chance de higienizar as mãos antes de tocar o paciente foi 60 vezes maior do que após tocar superfícies próximas ao paciente ($p < 0,00001$).

Conclusão: Higienizar as mãos após tocar superfícies próximas ao paciente obteve menor adesão. Já higienizar as mãos antes de tocar o paciente obteve maior adesão por parte dos profissionais observados.

[1]Universidade Federal do Ceará, Fortaleza, CE, Brazil.
[2]Maternidade Escola Assis Chateaubriand, Fortaleza, CE, Brazil.
Conflicts of interest: nothing to declare.

Resumen

Objetivo: Evaluar la adherencia a la higienización de manos de los profesionales de salud que actúan en una Unidad de Cuidados Intensivos Neonatales y verificar la asociación de la adherencia en los cinco momentos preconizados por la Organización Mundial de Salud.

Métodos: Investigación transversal realizada entre noviembre/2017 y abril/2018, con un equipo multiprofesional de salud de la Unidad de Cuidados Intensivos Neonatal, en los turnos matutino y vespertino, en días hábiles de semana, por medio de observación directa de las oportunidades de higienización de manos. Se analizaron los datos utilizando la Razón de Oportunidades y la Prueba exacta de Fisher ($p<0,05$).

Resultados: Se observaron 304 oportunidades de higienización de manos en 71 profesionales de salud, y se evidenció un grado de adherencia global del 79,9 %. La mayor adherencia a la higiene de manos fue de los fisioterapeutas (91,9 %), seguido de los médicos (82,4 %) y de los técnicos de enfermería (82 %). Las oportunidades con más adherencia a la higiene de manos fueron "antes y después de tocar al paciente" con 94,4 y 93,9 %, respectivamente. La probabilidad de higienización de manos antes de tocar al paciente fue 60 veces más alta que después de tocar superficies próximas al paciente ($p < 0,00001$).

Conclusión: Higienizar las manos después de tocar superficies próximas al paciente presentó una adherencia más baja. Por otro lado, higienizar las manos antes de tocar al paciente obtuvo una adherencia más alta por parte de los profesionales observados.

Introduction

Hand hygiene (HH) is the measure of greatest impact, of simple, quick action, with low cost and proven effectiveness in healthcare-associated infections (HAI) prevention. It is a strong indicator of quality of care, in terms of patient safety, since the hands of professionals who provide care are the most common vehicle for the transmission of microorganisms to patients.[1]

For this, the World Health Organization (WHO) indicates the five moments for HH:(1) before touching a patient; (2) before clean/aseptic procedures; (3) after body fluid exposure/risk; (4) after touching a patient; (5) after touching patient surroundings.[2]

In Brazil, HH compliance is only around 40%, that is, every ten opportunities for HH, the professional performs the action in four of them.[3] However, what is observed is that despite its effectiveness against the transmission of microorganisms and technical simplicity of performance, HH compliance rate is still not adequately consolidated in health services as reported in several studies.[4-7]

The WHO has adopted some measures to improve HH compliance in health services, among them the multimodal strategy. It encompasses five components: system change, involvement and availability of alcoholic preparation at assistance points and access to running water; staff education; evaluation of HH practices and feedback of indicators of staff compliance; reminders in the workplace; and promotion of an institutional safety climate, with the express support of managers and leaders.[8]

The priority for patient safety regarding HH in the hospital environment is essential [9,10] especially in Intensive Care Units. The Neonatal Intensive Care Unit (NICU), as it is a place of care for severe newborns or at risk of death, and therefore, high demand for care, requires professional attention regarding the act of HH. There is a greater susceptibility of newborns to HAIs, which can compromise the quality of care provided to newborns, and, therefore, cause damage to their health and greater expenses for hospital institutions.[11]

Therefore, dealing with the compliance of health professionals to HH in the neonatal risk environment is relevant, especially with regard to the five moments recommended by WHO, with a view to enhancing the quality and safety of care provided to neonates hospitalized in the NICU and reducing the risk of cross-infection between patients and professionals who assist them.

The study aimed to evaluate HH compliance by health professionals working at a NICU and to verify the association of compliance between the five moments recommended by WHO.

Methods

This is a non-participant cross-sectional and observational study carried out at a NICU of a tertiary reference maternity hospital in northeastern Brazil, between November 2017 and April 2018, with the multidisciplinary health staff in the morning and afternoon shifts, on weekdays.

The unit has an installed capacity for 21 beds arranged in two NICUs with nine and twelve beds, respectively. It has clean water with automatic taps, with a total of two sinks (one for each NICU), with continuous availability of liquid soap and paper towels, as well as posters illustrating the proper technique of HH using these products. There is also alcohol preparation in the form of a gel in each incubator and in the unit's material carts.

The sample was given for convenience, being composed of NICU multidisciplinary professionals. Professionals working in the unit for at least one year and who had already completed the institutional training offered by the Hospital Infection Control Commission (HICC) were included with themes related to patient safety, such as precautionary measures, biosecurity and HH. Those professionals who did not complete at least 75% of the training were excluded.

HH evaluation was carried out during the provision of routine care to newborns using as a reference "the five moments for hand hygiene" by direct observation of HH opportunities and acts recommended by the WHO.[1] For this task, two trained observers were introduced into the work environment according to the multimodal strategy recommendations,[8] who individually observed professionals in their daily activities for a period of 30 minutes in the morning and afternoon shifts.

As the research focus was on HH opportunities, the same professional could be observed in more than one opportunity; however, there was no simultaneous observation of more than one professional. The frequency of HH and the moment when it occurred were then observed, resulting in 304 opportunities for HH observed. For this, the Ministry of Health's Observation and Calculation Form of the Technical Reference Manual for Hand Hygiene was used.[2]

Direct observation of opportunities for HH took place as follows: observers went to the NICU and informed a nurse responsible for the shift that HICC was carrying out the internal evaluation regarding HAI control with professionals, for a period of 30 minutes, including, in addition to other factors relevant to HAIs for HH. The nurse on duty warned the other staff members that an evaluation would be carried out by the HICC during the shift. So, professionals were aware that they were being observed and by whom, however, they did not know which aspects were being evaluated.

To minimize the Hawthorne effect,[12] which consists of a change in participants' behavior and attitude due to the presence of an observer, causing possible bias in the study results, the following procedures were adopted: the observers were located in the central bench of the NICU, considered a strategic location for the observation of professionals; five pilot observations for each observer (who did not make up the study sample), for a period of 30 minutes in each shifts, so that they became familiar with the environment and with the method used, as well as participants to be accustomed with the presence of the observers. Furthermore, it was announced that this would be an internal evaluation by HICC on HAI control.

The rate of HH compliance was determined by the Positivity Index (PI) for quality of care, using: desirable (PI = 100%); adequate (90 to 99%); safe (80 to 89%); borderline (71 to 79%); and poor (<70%).[13]

Statistical analysis was performed using SPSS, version 20.0, for which the distribution of absolute and relative frequencies for categorical variables was performed. HH compliance by health professionals was calculated based on the ratio between the number of actions performed and the number of opportunities multiplied by 100 (compliance (%) = actions taken/opportunities X 100). According to the WHO, HH opportunities are given as the denominator, and the accomplishment of HH is realized as the numerator.[2]

To verify the association between the categorical variables, we used Odds Ratio (OR) with a significance level of 5% adopted in the 2x2 tables, and Fisher's exact test was significant if $p < 0.05$.

The study development complied with the precepts of research ethics with human beings, being approved by the Research Ethics Committee of the institution locus of this study, under Protocol 2,350,988 and CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 79144517.3.0000.5050.

Results

The study results include the description of the categories of 71 professionals observed (30 physicians, 9 nurses, 6 physical therapists, 21 nursing technicians, 1 psychologist and 4 laboratory technicians), arranged in 304 opportunities for HH compliance during the collection period, at the time of care for newborns in the NICU. HH was considered to be rubbing with alcohol, the use of water and neutral soap, and water and an antiseptic/degerming solution. In Table 1, it was verified that professionals who performed the most HH during newborn care were physical therapists (91.9%), followed by physicians (82.4%) and nursing technicians (82%). When observing the PI, the professional category of nurses was classified as borderline. The general classification was considered safe.

Table 1. Hand hygiene compliance by professional category

Professional category	Hand hygiene opportunities observed			
	Compliance n(%)	Non-compliance n(%)	Total observations	Classification of compliance according to PI*
Physical therapist	34(91.9)	3(8.1)	37	Adequate
Physician	28(82.4)	6(17.6)	34	Safe
Nurse	61(70.9)	25(29.1)	86	Borderline
Nursing technician	114(82.0)	25(18.0)	139	Safe
Psychologist	1(100)		01	Desirable
Laboratory technician	6(85.7)	1(14.3)	07	Safe
Total	244(80.3)	60(19.7)	304	Safe

*PI - Positivity Index.

Table 2 shows the number of times professionals sanitized their hands arranged in moments for HH. The highest rates of compliance occurred at the first moment – "before touching a patient" (94.4%) - and in the fourth moment - "after touching a patient" (93.9%). The fifth moment, which corresponds to the item "after touching patient surroundings", was the one with the lowest support (21.8%) in all professional categories and had its PI classified as poor.

Table 3 shows the results of the Odds Ratio (OR) between the moments for HH, with statistical significance p<0.05 and a 95% confidence interval.

When associating moments for HH, there was statistical significance between the fifth moment (after touching patient surroundings) with the other

Table 2. Hand hygiene compliance at the times recommended by the World Health Organization

Five moments for hand hygiene	Hand hygiene opportunities observed			
	Compliance n(%)	Non-compliance n(%)	Total observations	Classification of compliance according to PI*
1. Before touching a patient	102(94.4)	6(5.6)	108	Adequate
2. Before clean/ aseptic procedures	20(83.3)	4(16.7)	24	Safe
3. After body fluid exposure/risk	2(66.6)	1(33.4)	03	Poor
4. After touching a patient	107(93.9)	7(6.1)	114	Adequate
5. After touching patient surroundings	12(21.8)	43(78.2)	55	Poor
Total	243(79.9)	61(20.1)	304	Borderline

*PI - Positivity Index.

Table 3. Association between the moments for hand hygiene recommended by the World Health Organization

Association between moments for hand hygiene*	**p	***OR	ǂ(95%) CI
Moment 1 and Moment 2	0.083	3.40	0.88 – 13.15
Moment 1 and Moment 3	0.179	8.50	0.67 – 107.53
Moment 1 and Moment 4	1	1.11	0.36 – 3.42
Moment 1 and Moment 5	< 0.00001	60.91	21.47 – 172.82
Moment 2 and Moment 3	0.474	2.50	0.18 – 34.67
Moment 2 and Moment 4	0.099	0.33	0.09 – 1.22
Moment 2 and Moment 5	< 0.00001	17.92	5.13 – 62.53
Moment 3 and Moment 4	0.193	0.13	0.01 – 1.63
Moment 3 and Moment 5	0.142	7.17	0.60 – 85.95
Moment 4 and Moment 5	< 0.00001	54.77	20.21 – 148.45

*Moment 1 - before touching a patient; Moment 2 - before clean/aseptic procedures; Moment 3 - after body fluid exposure/risk; Moment 4 - after touching a patient; Moment 5 - after touching patient surroundings; **Fisher's exact test; OR: Odds Ratio; ǂ CI: Confidence Interval.

moments. The most relevant OR significance and associations were between the first and fifth moments (p<0.00001/OR: 60.91/CI - 21.47-172.82), second and fifth moments (p<0.00001/ OR: 17.92/CI - 5.13-62.53) and fourth and fifth moments (p<0.00001/ OR: 54.77/CI - 20.21-148.45). The OR between the occurrence or not of the events showed that the chance of HH in the first moment was 60 times greater than in the fifth. The highest chance of HH between one moment and another was obtained between the second and fourth moments (before clean/aseptic procedures and after touching a patient) with a chance of not performing it of only 0.33.

Discussion

Direct observation is a method considered gold standard by the WHO for HH evaluation by an-

alyzing different professional categories, different work shifts, the technique used, as well as evaluating the specific characteristics of each location and identifying areas where they need to improve HH compliance.[14] This method was used because it is considered a reference and allows immediate feedback to health professionals in order to improve their performance in HH, as well as an organizational change.[15]

The study limitations were the HH compliance rate evaluation only in daytime work shifts and weekdays, thereby reducing the number of opportunities for hand washing, which can influence the affirmation of the professional category that most complied with HH, as well as the evaluation of the 5 hygiene moments. Another limitation was the advance notice of the observation, which may have increased the Hawthorne effect, however, not canceling it out. Moreover, the disproportionate number of observation opportunities in the 5 moments for HH (after body fluid exposure/risk - three and before clean/aseptic procedures - 24) and by professional category (smaller number of physical therapists - 37 and physicians - 34, and a very small number of psychologists - one - and laboratory technicians - seven).

The ratio between the number of opportunities and the number of HH in the study indicated an overall compliance rate of 80.3%, which can be considered according to the PI, adequate for safe care. A study carried out in the city of Aracaju, Sergipe, found rates between undesirable and poor (29% compliance) differing from the data found here.[16] Research carried out in northern Ceará showed an compliance rate of 77.2%, considered borderline.[17]

Regarding the hygiene action by professional category, physical therapists (91.9%) were the professionals with the highest HH compliance during observation. However, it is noteworthy that this category had fewer opportunities for HH when compared to the nursing staff. Similar results are reported in national and international surveys, indicating a higher rate of HH compliance by physical therapists.[15,16,18]

Nurses were the professionals with the lowest rate of HH compliance (70.9%). This value according to the adopted PI is considered borderline. Nursing technicians, on the other hand, are within the safe care values (82%). Failure by these professionals to carry out this practice entails a greater risk of infections for both patients and professionals.[4] However, research carried out in Portugal and Brazil on the use of peripheral catheters show that nurses and nursing technicians are the professionals who wash their hands the most.[18,19]

This indicator alone does not take into account the duration of exposure or the time spent with each patient. The fact that lower compliance may be related to the greater load of services and the stress that the nursing staff goes through daily.[20]

HH before and after touching a patient was observed in 94.4% and 93.9% of observations, which can be justified by the professional perceiving this practice as a way of preventing infection, i.e., patient and own protection. These data corroborate other studies that indicate that HH often occurs before and after touching a patient.[21-23]

Contrasting the results found in this research with regard to moments for HH, an observational study carried out in an institution in southern Brazil, in an adult Intensive Care Unit,[19] showed that the first moment that occurs before touching a patient (18.4%, $p< 0.0001$) was the one that showed lower compliance, different from what was evidenced in this research.

A low HH compliance in the fifth moment (after touching patient surroundings) was also reported in other studies carried out with health professionals who provide care to newborns.[17,24]

Individual measures cannot modify and maintain HH behavior by health professionals on an ongoing basis, as well as emphasize that sustaining this change is a major challenge. Acceptable levels of HH compliance best practices are difficult to achieve and maintain. For this reason, the importance of health promotion actions other than health in hospital environments that involve all individuals who are in these places.[21,23,25,26]

In Italy, after carrying out a retrospective study to search for the actions idealized at the beginning of the implementation of the WHO multimodal strategy in 2007, there was an increase in the level

of compliance rates to HH from 40% to 63% in 65 hospitals.[26]

The same occurred in Ethiopia, where the rate of HH compliance was increased from 1.4% to 13.1% ($p < 0.001$), through simple health promotion actions aimed at professionals and patients, as well as health education actions and periodic training. In the survey, the neonatology sector had the highest compliance rate (24.5%/ $p < 0.002$).[27]

The interest of managers and teamwork is necessary in the institution to obtain better results, recognizing the relevance of best health practices, the importance of the institutional safety culture, cost reduction and compliance with ethical and legal precepts, contributing to the improvement of care, and HAI prevention and control, promoting patient safety.[5]

It is understood that the findings of this investigation are extremely important and that, from them, it became evident that all health professionals need training and continuing education regarding HH in care practices, in order to ensure quality of care, patient safety and professional health.

Although nurses have reached a borderline HH rate according to PI, their role is fundamental in the education of patient, family, community, and they should be responsible for creating strategies aimed at better HH compliance, especially in an environment in which lives are as fragile as that of premature and/or at-risk neonates.

Conclusion

Physical therapists, physicians and nursing technicians stood out with the highest rates of HH compliance. However, with regard to physical therapists and physicians, it is noteworthy that this value is due to the lower number of observations of opportunities for HH. Regarding the rate of compliance during the five moments for HH, the first and third moments were the ones with the highest compliance by professionals. The fifth moment had a lower percentage of professional compliance. The most relevant OR significance and associations were between the first and fifth moments, second and fifth moments, and fourth and fifth moments. The highest chance of HH between one moment and another was obtained between the second and fourth moments. It is suggested that other research be carried out with a greater number of observations and that evaluations be made without prior notice, for later comparison of the results obtained.

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Collaborations

Oliveira ES, Cardoso MVLML, Bezerra CM, Barbosa LP, Nobre KSS and Carneiro TA contributed to study design, data analysis and interpretation, article writing, relevant critical review of intellectual content and approval of the final version to be published.

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