

## Hands hygiene and the use of gloves by nursing team in hemodialysis service

*Higiene das mãos e uso de luvas pela enfermagem em hemodiálise*  
*Higiene de las manos y el uso de guantes por la enfermería en hemodiálises*

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### ABSTRACT

**Objective:** to analyze the adhesion of the nursing team to the practice of hands hygiene (HH) and the use of latex gloves in a hemodialysis service. **Method:** this is a descriptive-exploratory study with a quantitative approach, performed between August and October 2016 in a hemodialysis service in the countryside of São Paulo State, Brazil, where the nursing team adhered to HH and the use of gloves. All ethical aspects have been contemplated. **Results:** there were 1090 opportunities for HH, with the adhesion rate being only 16.6%. Regarding the use of gloves, of the 510 opportunities observed, there was correct use in 45%, reuse in 25% and absence of latex gloves in 29% of the time. **Conclusion:** the rate of HH and adherence to gloves is far from ideal, contributing to the increased risk of infection for both the user and the professional.

**Descriptors:** Hands Hygiene; Kidney Dialysis; Nursing Team; Hospital Infection; Universal Precautions.

### RESUMO

**Objetivo:** analisar a adesão da equipe de enfermagem à prática de higienização das mãos (HM) e ao uso de luvas em um serviço de hemodiálise. **Método:** estudo descritivo-exploratório de abordagem quantitativa, realizado entre agosto e outubro de 2016 em um serviço de hemodiálise do interior do Estado de São Paulo, Brasil, onde foi observada a adesão da equipe de enfermagem à HM e ao uso de luvas. Todos os aspectos éticos foram contemplados. **Resultados:** observou-se 1090 oportunidades de HM, sendo a taxa de adesão de apenas 16,6%. Quanto ao uso de luvas, das 510 oportunidades observadas, houve utilização correta em 45%, a reutilização em 25% e ausência do uso de luvas em 29% das vezes. **Conclusão:** a taxa de HM e a adesão ao uso de luvas estão muito aquém do ideal, contribuindo para o aumento do risco de infecção, tanto para o usuário como para o profissional.

**Descritores:** Higiene das Mãos; Diálise Renal; Equipe de Enfermagem; Infecção Hospitalar; Precauções Universais.

### RESUMEN

**Objetivo:** analizar la adhesión del equipo de enfermería a la práctica de higienización de las manos (HM) y al uso de guantes en un servicio de hemodiálisis. **Método:** el estudio descriptivo-exploratorio y cuantitativo, realizado entre agosto y octubre de 2016 en un servicio de hemodiálisis del interior del estado de São Paulo, Brasil, donde se observó la adhesión del equipo de enfermería a la HM y al uso de guantes. Todos los aspectos éticos fueron contemplados. **Resultados:** se observó 1090 oportunidades de HM, siendo la tasa de adhesión de apenas el 16,6%. En cuanto al uso de guantes, de las 510 oportunidades observadas, hubo utilización correcta en un 45%, la reutilización en un 25% y ausencia del uso de guantes en un 29%. **Conclusion:** la tasa de HM y la adhesión al uso de guantes están muy por debajo del ideal, contribuyendo al aumento del riesgo de infección, tanto para el usuario y para el profesional.

**Descriptor:** Higiene de las Manos; Diálisis Renal; Equipo de Enfermería; Infección Hospitalaria; Precauciones Universales.

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## INTRODUCTION

The Chronic Kidney Disease (CKD) is considered a public health problem, since its prevalence has increased year by year worldwide. This pathological process can lead to an evolution to End-Stage Kidney Disease (ESKD), requiring some type of Renal Replacement Therapy (RRT), such as hemodialysis, peritoneal dialysis and kidney transplantation<sup>(1)</sup>.

In Brazil, about 36 thousand patients started chronic dialysis in 2014, and of these, 90.8% underwent hemodialysis<sup>(2)</sup>. An access is needed to perform hemodialysis. The access is where you receive hemodialysis. Using the access, blood is removed from your body, cleaned by the dialysis machine (called the dialyzer), and then returned to your body<sup>(3)</sup>.

Infection is the second cause of mortality among patients with ESKD, representing approximately 14% of deaths among them, preceded only by cardiovascular diseases<sup>(4-5)</sup>.

Nursing plays an extremely important role in the care of the patient with chronic kidney disease, focusing on the prevention of infections, promoting self-care, family and patient orientations, and promoting a comfortable environment<sup>(6)</sup>. In this sense, the nurse has an essential role in hemodialysis, acting directly in the planning and execution of these cares<sup>(7)</sup>.

Patients undergoing hemodialysis have a high risk for the contraction of Healthcare-Associated Infections (HCAI), as well as the acquisition of multi-drug-resistant microorganism<sup>(8)</sup>. The handling of devices, such as catheters, and colonization of the skin at the site during of its insertion, can be related as the main etiology of infections. Predisposing factors, such as: immunosuppression of patients being treated, inadequate diet, comorbidities, several patients simultaneously dialyzing in the same environment, handling of devices and the length of time the catheter stays for long periods<sup>(9)</sup>.

Hands hygiene (HH) is one of the most important measures for the control of HCAI. The hands of healthcare professionals are the main route of transmission of exogenous infections mainly through invasive procedures<sup>(10)</sup>. Improving HH should be a priority for health authorities at all levels, in addition to the individual responsibility of each health professional<sup>(11)</sup>.

In Brazil, efforts are focused on infection control; where in Brazilian legislation through Resolution nº 50/2002 the minimum actions to be contracted are established with a view to reducing the incidence of HCAI and the physical standards and projects of care institutions of health<sup>(12)</sup>. The World Health Organization (WHO), through the World Alliance for Patient Safety, has also dedicated efforts in the preparation of guidelines and strategies for the implementation of measures aimed at adhering to the practice of hands hygiene<sup>(13)</sup>.

In hemodialysis services, the complexity of the actions and peculiarity of the patients with chronic kidney disease stands out. To perform hemodialysis requires specific procedures and, for practitioners it is required the use of health protection and safety measures, such as the adoption of standard precaution<sup>(14)</sup>. Failure to comply with patient protection standards and non-in-service training for professionals directly influence the risk of contracting HCAI<sup>(15)</sup>.

Studies on adherence to HH in health services have high rates of non-compliance, with reports of factors that hinder their action, such as haste and lack of time<sup>(16-18)</sup>. Considering the high risk of HCAI for the patient and healthcare professionals, since

they undergo repeated invasive procedures, and professionals, with the frequent handling of blood, it is of utmost importance to guarantee the ideal requirements for HH, including valuing the existence of a high frequency of opportunities for its realization<sup>(19)</sup>.

The adequate use of gloves, associated to the practice of HH, is a determining factor for the protection of the professional during health care<sup>(19)</sup>. According to NR 32 (Regulatory Norm), which legislates for the purpose of establishing the basic guidelines for the implementation of measures to protect the health and safety of health workers, the use of gloves does not replace the HH process, which must occur at least before and after their use<sup>(20)</sup>. Reducing the risk of HCAI on hemodialysis reflects on the improvement of quality of services provided, as well as on the quality of life of the patient with chronic kidney disease.

Considering the high number of patients undergoing dialysis, the relevance of the nursing role and the importance of HCAI prevention in this setting is that it was proposed to carry out this study, in which the nursing team adhered to HH and the use of gloves.

## OBJECTIVE

To analyze the adherence of the nursing team to the practice of hands hygiene and latex glove use in a hemodialysis in the countryside of São Paulo State.

## METHOD

### Ethical aspects

The resolution 466/12 was respected, the project was approved by the Research Ethics Committee (REC) with human beings from the *Universidade Federal de São Carlos* (Federal University of São Carlos) and all participants signed the Informed Consent.

### Design, place of study and study period

This is a descriptive-exploratory study, with a quantitative approach, performed in the period from August to October 2016, in a hemodialysis unit in the interior of the state of São Paulo - Brazil. The unit provides care to patients who are contracted and predominantly from the Brazilian Unified Health System (SUS). During the study period, there were 180 patients undergoing treatment, with sessions occurring three times a week.

### Population, inclusion and exclusion criteria

30 nursing professionals work in this service (four nurses, 23 nursing technicians and three nursing assistants). The work is organized in two teams in the morning shift and two in the afternoon shift, who work on alternate days. The observation was carried out equally between the different teams and shifts.

The inclusion criteria adopted were to be a member of the nursing team and to work in the cited sector during the period of data collection. Licensed professionals, professionals on vacation and professionals with work leave were excluded during data collection.

### Study protocol

After a previous evaluation of the place, it was decided to perform the data collection through two observers, since the patients were distributed in two different rooms, and there was inclusion of the observation of the use of gloves, since the inadequate use of this

one influenced directly at HH at different opportunities. Another aspect identified was that due to the simultaneity of the procedures and the need to guarantee the anonymity of the professional, it was decided to observe if they made the hands hygiene or not and if they used gloves, independent of the professional who performed it.

The road map for the data collection, elaborated from then on, contained the list of procedures to be observed (preparation in the capillary placement, puncture and connection of the Arteriovenous Fistula (AVF) hemodialysis, Foley Catheter (FC) dressing, disconnection of AVF access, disconnection of FC access, handling of extension with blood fluids, hemodialysis connection in FC, and the possibility of identifying the opportunities of HH "before" and "after" the accomplishment of the same. In order to evaluate the structure for HH, the indicator of Infrastructure Assessment for Washing Hands was used<sup>(21)</sup>.

**Analysis of results and statistics**

The OpenEpi public domain program version 3.0<sup>(22)</sup> was used for the sample calculation, which indicated the need for a minimum observation of 384 procedures, that is, 768 opportunities, taking into account the moments "before" and "after" procedure. However, the perspective of the data collection by opportunities allowed a greater number of observations, reaching 1090 opportunities, which raised the confidence interval of the sample calculation to 99.9%.

Adhesion rates were calculated from the relative frequencies of adherence to HH and the use of gloves for each procedure. The data were organized and stored in a database using the Microsoft Excell 2010<sup>®</sup> program and performed descriptive statistical analysis with the help of the Statistical Package for the Social Sciences (SPSS), version 22<sup>(23)</sup>.

**RESULTS**

HH was performed in only 182 (16.6%) of the 1,090 identified opportunities. Table 1 shows the relative frequencies of HH adhesion in the opportunities "before" or "after" the procedures, in addition to the HH Adhesion Indicator for each type of procedure.

The most frequent and, consequently, the most observed procedures were those related to puncture/connection and disconnection of the AVF. AVF puncture and connection obtained a total of 372 HH opportunities, with the adhesion rate of 7.6% for "before" and 23.5% for "after" the procedure. Regarding the disconnection of AVF access in the 207 opportunities observed, the "before" and "after" adhesion rate was 7.6% and 33.9% respectively.

The general rate of adherence to HH "after" procedure of 27% was higher than the general "HH" adherence rate of 6.4% in all procedures observed (Table 1). Regarding the product used, the use of soap and water was the first choice in 162 (89%) and alcoholic solution in 20 (12%) of the opportunities used.

The HH technique performed by the professionals was also observed 176 times of the 182 HH observed, noting that in only one time the professional followed all the steps recommended by the WHO<sup>(19)</sup>.

Regarding the physical structure, in each hemodialysis room contained a sink that complied without any irregularities, such as the use of cloth, lack of water, dirty dispenser or soap, broken faucet or dirt visible in the sink. The availability of alcoholic solution at the point of care was not identified, ie close to each hemodialysis machine.

**Table 2 –** Frequency distribution and characteristics of latex gloves used by nursing professionals in hemodialysis service, São Carlos city, São Paulo State, Brazil, 2017

Observed Procedures	Use of Latex Gloves			Total
	Coreect use	Reuse	Absence	
Preparing capillary placement	20	59	41	120
Puncture and connection of AVF hemodialysis	120	32	31	183
Disconnection of AVF access from hemodialysis	34	17	34	85
Disconnection of FC access from hemodialysis	4	0	0	4
Handling of extensions with blood fluids	21	19	42	82
Hemodialysis connection in FC	34	2	0	36
Total	233	129	148	510

Note: AVF = Arteriovenous Fistula; FC = Foley Catheter.

**Table 1 –** Frequency distribution and rate of adhesion to the procedures of hands hygiene by nursing professionals in hemodialysis service, São Carlos city, São Paulo State, Brazil, 2017

Observed procedures	HH before the procedure		Total of Observations	Adherence rate (%)	HH after the procedure		Total of Observations	Adherence rate (%)
	Water and soap	Alcoholic preparation			Water and soap	Alcoholic preparation		
Preparing capillary placement	3	0	120	2.5	16	0	95	16.8
Puncture and connection of AVF hemodialysis	12	2	185	7.6	40	4	187	23.5
Dressing the FC	3	1	27	14.8	21	0	28	75.0
Disconnection of AVF access	4	3	92	7.6	32	7	115	33.9
Disconnection of FC access	1	0	7	14.3	1	2	7	42.9
Handling of extensions with blood fluids	3	1	78	5.1	11	0	75	14.7
Hemodialysis connection in FC	2	0	36	5.6	13	0	38	34.2
Total	28	7	545	6.4	134	13	545	27.0

Note: AVF = Arteriovenous Fistula; FC = Foley Catheter; HH = Hands Hygiene.

There were also 510 opportunities for the use of gloves, as described in Table 2. It was considered as "correct use" when at the beginning of the procedure the professional put on new procedure gloves. "Reuse" refers to the time when the practitioner uses the same glove in more than one patient. And "absence" means that the professional did not use procedure gloves, although there was indication. The incorrect use of gloves, reuse and absence of gloves, was superior to 54% of the observed opportunities.

## DISCUSSION

In the present study, 1090 opportunities for HH were identified, and this was performed in only 182 (16.6%) of them, resembling a multicenter study performed in dialysis units in Spain, where adherence to HH was only 13, 8% before contact with the patient and 35.6% after contact<sup>(24)</sup>.

The fact that low adherence to HH is more pronounced at the time "before" contact with the patient has also been previously reported in the literature both for other health services in general<sup>(17,25-26)</sup> and for the hemodialysis service<sup>(8)</sup>. These data suggest that the professional recognizes the importance of HH more for its own protection than for patient safety<sup>(27)</sup>.

Adherence to HH is considered a basic care in all health care, however, it gains an even larger dimension in hemodialysis units, considering the complexity of these units and the exposure of professionals to frequent contact with large quantities of organic fluids<sup>(28)</sup>. A study that evaluated 13 specific components of the HF Maintenance Indicator for Hemodialysis showed that nine of them obtained 100% compliance and HH presented one of the worst rates (83.9%), showing the fragility in adherence to the practice<sup>(29)</sup>.

It is worth mentioning that in addition to the low adherence to HH (16.6%) found in the present study; only one observation was made following the WHO recommended steps (WHO, 2014). A similar result was found in a study conducted at a school hospital in Goiânia city, where no nursing professional performed the HH technique as recommended by the literature<sup>(30)</sup>.

The preference for the use of soap and water 162 (89%) to the detriment of the alcohol preparation 20 (12%), identified in this study, is corroborated in the literature<sup>(17,26,31)</sup>. In the study service, it was verified that there are two types of gloves available, with talc and without talc, factor that may have influenced in the preference for the use of water and soap in detriment of the alcoholic solution. The use of alcoholic preparation is recommended by the WHO as the main means of routine hand hygiene, being considered fast and effective for inactivation of a large number of microorganisms<sup>(19)</sup>. In Brazil, ANVISA's Resolution of the Collegiate Board (RDC), N<sup>o</sup>. 42, September 2010, on the use of alcoholic preparation, guarantees the antimicrobial efficacy of the 70% alcohol preparation in any formulation, and can thus be used for HH<sup>(32)</sup>.

A study comparing the two HH techniques in peritoneal dialysis patients demonstrated that sanitation with alcohol preparation produced a greater reduction in the number of colony forming units when compared to a non-antimicrobial soap<sup>(33)</sup>.

Regarding the physical and material structure for hands hygiene, no irregularities were found in this study, contrary to other studies where deficiencies in the infrastructure, as well as the non-availability of materials favored non-adherence to HH<sup>(34-35)</sup>. Thus, it

is evident that the available infrastructure is important for HH, but it does not guarantee the expected results. The institutions must carry out a set of actions that encourage this practice, facilitating the performance of HH<sup>(17,35)</sup>. Interventions such as the provision of alcoholic preparation, leadership involvement, informative leaflets and health education have been indicated as important strategies to improve HH adherence of health professionals<sup>(36-37)</sup>.

Regarding the use of gloves, the data obtained surprised both the high rate of reuse of gloves (25%) and the absence of use (29%) in the indicated situations. A study carried out at a hemodialysis clinic in Vietnam for the investigation of hepatitis C outbreak showed that adherence to the use of gloves was 100% for dressings, 100% during cleaning of the dialysis room, 93% for the handle of veins and arteries of patients, 86% for disconnection and 75% for material disposal. However, the authors also reported that the work process was organized for simultaneous care of several patients and the use of the same glove for the care of more than one patient was frequent<sup>(38)</sup>.

It is known that the indiscriminate or inadequate use of gloves may be associated with the transmission of pathogens and, in addition, the use of gloves does not replace HH and this should occur at least before and after the use of gloves<sup>(20,39)</sup>.

A study performed in a small general hospital in the state of São Paulo observed the use of the same glove in more than one patient, in the handling of different sites of the same patient and in the touch of surfaces outside the bed<sup>(40)</sup>. Another study carried out with nursing technicians found that from all lost opportunities of HH in 13 (22.0%) of them, the professional was using procedure gloves, that is, it reinforces that the inappropriate use of gloves influences HH<sup>(31)</sup>.

Another worrying situation found in the present study was the absence of gloves in 29% of the opportunities observed. Procedure gloves are a protective barrier for health professionals when exposed to biological material, being one of the main personal protective equipment (PPE) for this professional group<sup>(41)</sup>. A review study carried out in Saudi Arabia highlights the importance of the use of gloves to perform hemodialysis, both for professional protection and for the prevention and control of HCAI<sup>(42)</sup>.

In the present study, 17% of the AVF punctures were performed without gloves. Studies with the nursing team about adherence to standard precautions show that it is common for procedures such as venipuncture to be performed without gloves, in total disagreement with current recommendations<sup>(43-45)</sup>.

Factors such as haste, excessive talc powder and unavailability of correct size are mentioned as a barrier to adherence to gloves<sup>(40,45)</sup>. In the hemodialysis service, the poor quality of the AVF was pointed out by nursing professionals, as difficulties for the use of gloves during the handling of the AVF<sup>(38)</sup>. The authors continue to affirm that individualized patient care is necessary to minimize the risk of microorganism transmission, enhanced by concomitant contact with multiple patients, as identified in the present study<sup>(38)</sup>.

### Study limitations

Due to the complexity and dynamics of the unit it was not possible to establish a proportional number of observations between the different procedures. In addition, it should be noted that the data obtained here refer to a single unit and, although in line with the current literature, they cannot be extrapolated.

### Contributions to the nursing, health or public policy sectors

It is understood that the findings of this investigation are extremely important, as they reveal the need for professionals and managers of hemodialysis services to rethink their work processes. Shared, non-patient focused work can contribute to low HH compliance rates and adequate glove use. It is hoped that nurses can assume their role as care manager, thus reviewing their practices in order to guarantee the quality of care, patient safety and the health of the professional.

### CONCLUSION

There was a low rate of adherence to HH by the nursing team, and the adhesion was even worse at the time “before”

the procedures were performed and the use of soap and water was the first choice option, in detriment to the use of the alcohol solution.

Regarding the use of gloves, problems in adherence were identified both by the high rate of reuse and by the absence of the same in the indicated situations. It was also identified that the nursing actions occur concomitantly with more than one patient.

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