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Original Article

Use of personal protective equipment: invisible time in Nursing workload*

Uso de equipamentos de proteção individual: tempo invisível na carga de trabalho de enfermagem

Uso de equipo de protección personal: tiempo invisible en la carga de trabajo de los profesionales de Enfermería

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Abstract

Objective: to quantify the time spent by the Nursing team in donning and doffing during the care provided to patients in isolation. **Method:** A descriptive and quantitative study developed in a university hospital, with data collection carried out between September and November 2020. The donning and doffing times were timed, with variables represented by median and interquartile range (P50 [P25; P75]), according to the Shapiro-Wilk normality test and a 0.05 significance level. **Results:** in timekeeping, the median was 192.5 seconds per time an employee entered the room, representing an increase of 41.7 minutes in 24 hours, only with donning and doffing of Personal Protective Equipment in the development of routine activities, without considering urgencies. **Conclusion**: the time spent using protective equipment is an important factor to be considered in the Nursing workload for the care of patients in isolation, affecting staff sizing.
Descriptors: Nursing; Patient Isolation; Personal Protective Equipment; Workload; Personnel Downsizing

Resumo

Objetivo: quantificar o tempo gasto para paramentação e desparamentação da equipe de enfermagem nos cuidados aos pacientes em isolamento. **Método:** estudo descritivo, quantitativo, desenvolvido em hospital universitário, com coleta de dados realizada entre setembro e novembro de 2020. Foram cronometrados tempo de paramentação e desparamentação, com variáveis representadas pela mediana e intervalo interquartílico (P50 [P25; P75]), de acordo com teste de normalidade de Shapiro-Wilk e nível de significância de 0,05.

Resultados: na cronometragem de tempo, a mediana foi de 192,5 segundos por vez que o colaborador entrou no quarto, representando acréscimo de 41,7 minutos em 24 horas, apenas com a colocação e retirada de equipamentos de proteção individual no desenvolvimento de atividades de rotina, sem considerar urgências. **Conclusão**: o tempo gasto com uso de equipamentos de proteção é fator importante a ser considerado na carga de trabalho de enfermagem, no cuidado de pacientes em isolamento, repercutindo no dimensionamento de pessoal.
Descritores: Enfermagem; Isolamento de Pacientes; Equipamento de Proteção Individual; Carga de Trabalho; Redução de Pessoal

Resumen

Objetivo: cuantificar el tempo que dedica el equipo de Enfermería en su paramentación y desparamentación al atender a pacientes en asilamiento. **Método:** estudio descriptivo y cuantitativo desarrollado en un hospital universitario, cuyos datos se recolectaron entre septiembre y noviembre de 2020. Se cronometraron los tiempos de paramentación y desparamentación, y las variables se representaron por medio de mediana e intervalo intercuartil (P50 [P25; P75]), conforme a la prueba de normalidad de Shapiro-Wilk y con nivel de significancia de 0,05. **Resultados:** al cronometrar los tiempos, la mediana fue de 192,5 segundos por cada vez que un empleado ingresaba a la habitación, lo que representa un aumento 41,7 minutos en 24 horas, solamente para colocarse y quitarse el equipo de protección personal, sin considerar las urgencias. **Conclusión**: el tiempo durante el cual se utiliza equipo de protección personal es un factor importante que debe ser considerado en la carga de trabajo de los profesionales de Enfermería en la atención de pacientes en aislamiento, con repercusiones en el dimensionamiento del personal.
Descriptores: Enfermería; Aislamiento de Pacientes; Equipo de Protección Personal; Carga de Trabajo; Reducción de Personal

Introduction

The constant emergence of Healthcare-Related Infections (HAIs), associated with the rampant use of antimicrobials leading to the appearance of multidrug-resistant bacteria (MDRBs), has been a prominent problem in the hospital environment, mainly because nearly 10% of all HAIs are caused by MDRBs. New diseases have emerged, such as the Coronavirus Disease 19 (COVID-19), caused by the *Severe Acute Respiratory Syndrome* virus (SARS-CoV-2) and, in this context of new diseases such as the COVID-19 pandemic, Nursing plays a leading role in care in health institutions.[1-3]

With the advent of the COVID-19 pandemic, the deterioration of patients in isolation implied an increase in the Nursing workload due to the expansion of infection prevention and control routines.[4] The use of Personal Protective Equipment (PPE) such as gloves, aprons or covers, face shields, goggles and overalls, among others, is a constant in the Nursing work process for the care of patients with COVID-19. However, using all these items

is not a novelty for Nursing professionals, who already employed them in the occurrence of outbreaks, epidemics and pandemics, and also in the care of patients with infections, especially by multidrug-resistant bacteria.[1] It should be noted that PPE use aims at protecting patients and at avoiding cross-contamination in work environments, as well as at protecting health professionals, with a view to preserving their health.[5-6]

Isolation of patients is a common practice in an attempt to stop the spread of viruses and bacteria, being exalted when epidemic issues arise in everyday life. On June 11th, 2009, the World Health Organization (WHO) declared a pandemic due to the Influenza A (H1N1) virus, much less lethal in its first year of circulation, causing nearly 12,800 deaths worldwide. Ten years later, on March 11th, 2020, the WHO decreed a new pandemic, establishing a critical period for global health due to the magnitude achieved by the disease. More than 270 million cases and more than 5 million deaths have been recorded since its inception in December 2019, when it was first identified as the cause of an outbreak of the disease in Wuhan–China. The situation experienced was considered a serious health problem due to its rapid transmissibility and incited the need for a rapid response from health services.[7-9]

Due to COVID-19's high transmissibility pattern, there is interference in the routine of the Nursing team members, who had to learn to deal with the increase in records of contamination, illnesses, deaths, suicides, anxiety attacks and panic among the professionals. Thus, it is fundamental to preserve health workers' physical and mental health, which permeates working conditions in the care of COVID-19 victims, both for care practices and for maintenance of the workforce.[10-11]

The recommendation set forth by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária*, ANVISA) for hospitalized patients with suspected or confirmed infection by COVID-19 was for them to preferably be kept in a private room with its door closed, with identification on the door signaling that it was a contact and respiratory isolation room, as well as to restrict the number of professionals present during aerosol-generating procedures and to advise on the mandatory use of a respiratory protection mask (particulate respirator) with minimum effectiveness in filtering 95% of the particles up to 0.3μ (type N95, N99, N100, PFF2 or PFF3) by health professionals, in addition to disposable caps, goggles or face shields, aprons and gloves.[9]

Changes in the professionals' routines, institution of new activities, adjustments of

spaces and donning with Personal Protective Equipment, combined with anxiety and fear of contamination,[4,10-11] required duly qualified professionals to work on the front line and contributed to the increase of their workload. It was necessary to look at the Nursing staff sizing in those places. It is noted that this care measures for patients in isolation was already included in Nursing routines, although not in the proportions in which it occurred during the COVID-19 pandemic; it is also worth noting that patients in isolation require a differentiated approach, mainly due to the implication on Nursing time.[4]

Federal Nursing Council (*Conselho Federal de Enfermagem*, COFEN) Resolution No. 543/17 has some special considerations for inpatient units, such as Rooming-in, Nursery and Pediatrics, in which the dyad (mother and child) and children under 6 years of age should always be minimally classified as Intermediate Care. It also reinforces that sizing needs to be based on characteristics related to the health service, operation dynamics of the Nursing service and degree of patient dependence, that is, this calculation is considered as a minimum reference for staff in an inpatient unit.[12]

In 2020 and given the pandemic, through normative opinion No. 002/2020, COFEN determined minimum parameters of Nursing professionals for the care of patients affected by COVID-19 admitted to general/field hospitals and semi-intensive and intensive sectors.[14] However, regarding care for patients in isolation and regardless of the pandemic, there is no differentiated treatment, consideration and/or guidance for managers to strictly maintain contact precautions and all relevant recommendations for patient management in hospitals.

Some studies have addressed the importance of PPE use,[5-6] in addition to quantifying the time spent in PPE donning and doffing; however, they have not pointed out its implication in defining the workload. This issue is understood as paramount when discussing workers' health, overload and working conditions and, in particular, the patients' quality and safety.[4,14]

Proper donning is important to ensure workers' safety and, in this sense, the objective was to quantify the time the Nursing team spent donning and doffing in the care of patients in isolation.

Method

A descriptive study with a quantitative approach developed at a teaching hospital in the Brazilian South region, which serves medium- and high-complexity patients. With the advent of the pandemic, the institution under study prepared its Contingency Plan, establishing wards for hospitalization of suspected or confirmed COVID-19 patients: the research *locus* was Medical Clinic 1 (MC1), referred to as COVID Clinic and devoted to confirmed cases without any need for mechanical ventilation with 25 active beds.

The population and sample consisted of Nursing professionals: assistants, nursing technicians and nurses who were working at the COVID Clinic. All collaborators who agreed to participate in the study signed the Free Informed Consent Form (FICF).

The inclusion criterion was as follows: workers that were active in the unit under study, with minimum previous experience of one year in care. The exclusion criterion corresponded to workers on leave due to vacations and medical reasons.

The main researcher invited the Nursing professionals working in the unit to take part in the study, upon presentation of its objective and data collection strategy. The research took place in two concomitant stages, but with different approaches, from September 20th to November 21st, 2020. The first stage consisted in applying a questionnaire that was delivered in paper to the employees or online (via *Google Forms* sent through *WhatsApp*®), in which sampling was freely developed. Participation of the employees qualified by the inclusion criteria was encouraged, ensuring confidentiality of all the information and leaving them free to answer in an appropriate and private environment.

Among other socio-occupational characteristics, categorical variables were surveyed in this questionnaire (gender, age, professional category, time in the profession and participation in training on isolation and PPE), which were later crossed with the timed donning and doffing procedures.

The instrument was prepared by the main researcher, with closed questions and seeking clarity to avoid reading deviations. A pre-test was carried out to determine if the instrument was adequate and capable of generating all the necessary information.[16] It was applied from September 18th to 20th, 2020, with five (5) professionals: two nurses, one nursing resident and two nursing technicians. Adjustments to the *Likert* scale were made to better understand the text, and the questionnaires applied to the pre-test were later discarded.

The questionnaires were answered by 29 workers, totaling 90.6% of the

population comprised by 32 workers. There were no refusals; those who did not participate in this stage were on leave.

In the second data collection stage (total timing phase [donning and doffing]), the population was the same Nursing team and 27 professionals were observed in different shifts and working hours; those on legal leave during the period did not participate in this stage.

On the data collection start date, a pre-test of the instrument created (Timing Instrument) was applied, which was approved, identifying that with it would be feasible to achieve the objective proposed, being used without changes until the end of data collection.

Each professional was followed-up more than once and the timekeeping stage took place from September 22nd, 2020 to October 7th, 2020. Daily choice of the participants was first directed to those who had not been observed so far, in order to diversify the sample as much as possible; and, when everyone had already participated, preference was given to those who were working in the care of patients with a positive PCR test result for COVID-19, according to the sector's record. The same participants were observed more than once to reach the 64 necessary samples, having been identified by the date of birth in the data collection spreadsheet. As all signed the FICF, the observation was carried out randomly, without knowing when timekeeping of each participant would occur, so as to avoid bias in the results.

Timing was through the observation of the professionals, in an individualized way, that is, one professional followed-up at a time, so as not to interfere with the timekeeping process. It is noted that there was no contact with patients, as the professionals were not monitored during the procedures, considering that this was not the study objective.

Timing is a quantitative method that involves the use of formal instruments and protocols that dictate the specific event, characterizing sampling by event, in which the researchers select the integral event to be observed, as occurrence of the activity is frequent when it comes to the Nursing routine. Structured observation is best suited for testing formal hypotheses concerning measurable aspects of human behaviors.[15]

In this stage, time was measured using a unit Standard Deviation and an error of 1/4 of the Standard Deviation = (1/4*SD). Considering the population size, 64 was defined as the minimum sample of measures, for a 95% Confidence Interval (CI)

calculation. The calculation was based on a sample size where a 25% error relative to the unit Standard Deviation may come to occur. Building a CI around a sample is to establish a range of values for the population value and correctness probability. By convention, researchers usually employ 95 or 99% CIs.[15]

Timekeeping strictly complied with the flowchart (Figure 1), being divided into PPE donning and doffing and using a stopwatch. Data collection was exclusively performed by the study author and samples were discarded when there was more than one interruption during the observation and timing process, which is the criterion established for sample disposal.

A total of 81 observations were performed, of which 17 were discarded due to interruptions during the procedure, reaching the 64 samples required, according to the flow shown in Figure 1.

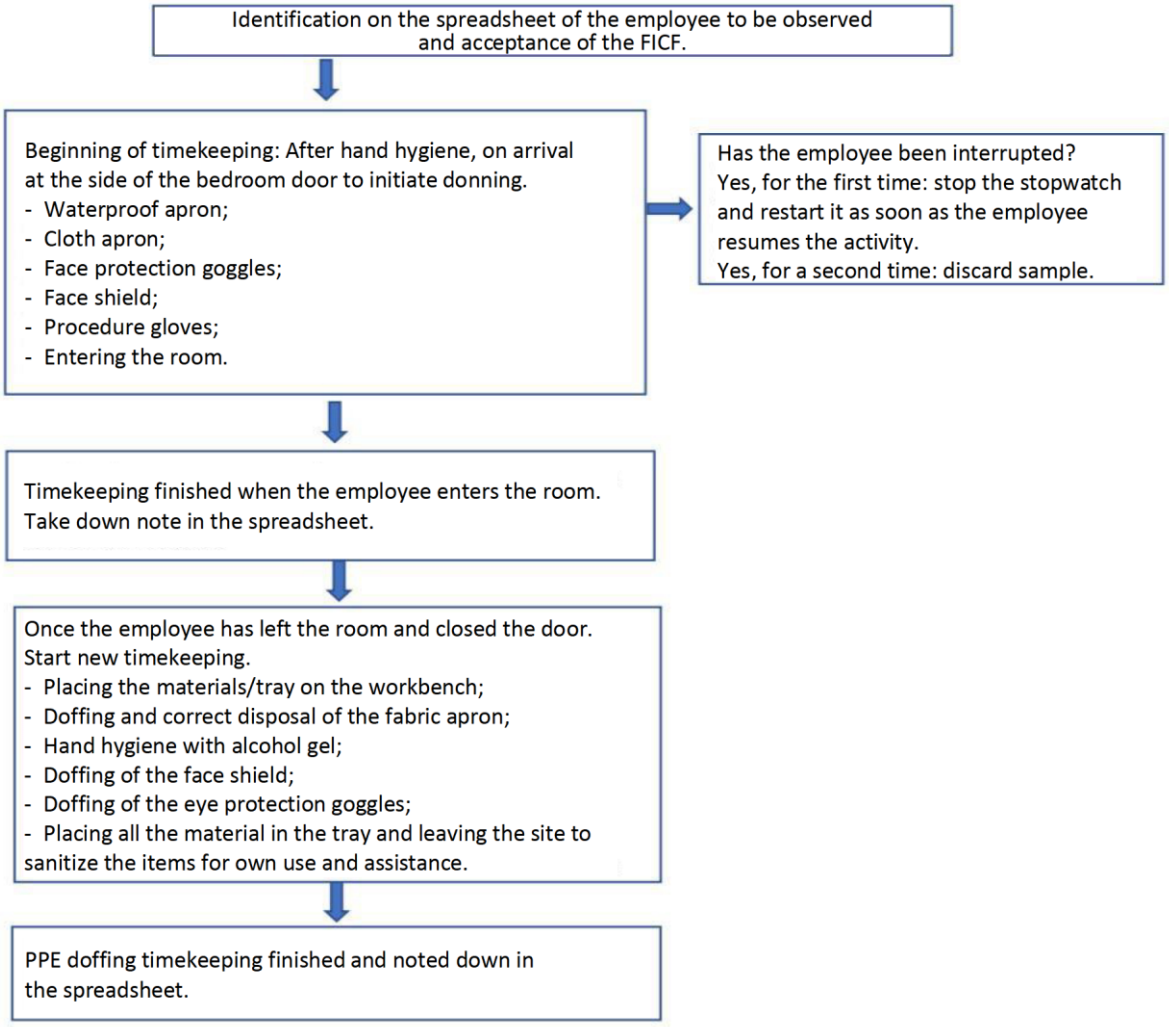

Figure 1 – Flow for data collection of the donning and doffing timing procedures,

Florianópolis, Brazil, 2020

Considering that the use of N95 masks is continuous, it was not measured in timekeeping. As for the “goggles” and “waterproof apron” items, some workers maintained their use, with the sole addition of “fabric aprons” when entering and leaving the room.

In data analysis, the categorical variables (gender, professional category, participation in training on isolation and PPE) were represented by means of absolute and relative frequencies. When the “age” and “experience time” variables, originally continuous and quantitative, were analyzed, they were represented by mean values and standard deviations and categorized into values close to the percentiles, so that they also had a practical interpretation.

The “donning time” and “doffing time” variables were represented by means of medians and interquartile ranges (P50 [P25; P75]), according to the distribution verified by the Shapiro-Wilk normality test, considering that the time variables were considered asymmetric. The donning and doffing time distributions and sum were compared between the categories of the “gender” and “occupation” variables by means of the Mann-Whitney test and between the categories of the “age”, “experience time” and “collection shift” variables by using the Kruskal-Wallis test. When significant, this last test was compared by Dunn's pairwise (*post-hoc*) test. A 0.05 significance level was adopted. The analyses were performed using the IBM-SPSS software, version 25.

The research was conducted according to the required ethical standards (Ministry of Health Resolutions 466/2012 - 510/2016 - 580/2018) and was approved by the Ethics and Research Committee of *Universidade Federal de Santa Catarina* under CAAE No. 36931820.1.0000.0121 and consolidated opinion No. 4,279,592 dated September 15th, 2020; the report was based on the *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) guide.

Results

Regarding the socio-occupational characteristics, the sample was mostly comprised by women (n=25; 85.2%), with a mean age of 41.4 years old and Nursing experience of 14.9 years. Most of the participants were nursing technicians (n=20; 69%),

and nurses corresponded to 31% (n=9).

In relation to the two mandatory training programs offered by the institution to work in the COVID area, 27 (93.1%) subjects participated in training on routines with isolated patients with COVID-19 and 28 (96.5%) attended training on guidelines for PPE donning and doffing. Such training sessions lasted a mean of 6 hours in total.

Table 1 – Relationship between PPE donning and doffing times and socio-occupational variables. Florianópolis, Brazil, 2021.

	Time (seconds)		
	Donning	**Doffing**	**Total**
	P50 [P25; P75]*	P50 [P25; P75]	P50 [P25; P75]
	116 [79; 172]	76 [61; 97]	192,5 [148; 245]
Gender†			
Female (n=57)	115 [75; 171]	76 [61; 99]	193 [153; 247]
Male (n=7)	120 [90; 184]	77 [57; 89]	184 [140; 241]
p‡	0,85	0,933	0,966
Age§			
≤40 years old (n=21)	113 [67; 174]	76 [68; 89]	187 [137; 241]
40-50 years old (n=29)	100 [83; 135]	62 [54; 78]	177 [137; 203]
≥50 years old (n=14)	166 [122; 199]	126 [77; 139]	302 [208; 329]
p	0,057	<0,001	<0,001
Occupation†			
Nurse (n=18)	135 [97; 173]	76 [61; 99]	204 [173; 307]
Nursing Technician (n=46)	106 [72; 153]	75 [60; 95]	189 [137; 241]
p	0,093	0,565	0,215
Collection Shift§			
Morning (n=33)	123 [90; 189]	80 [56; 101]	193 [153; 284]
Night (n=16)	116 [71; 173]	69 [60; 86]	211 [136; 242]
Afternoon (n=15)	113 [74; 128]	76 [69; 103]	184 [157; 208]
p	0,471	0,565	0,747
Experience time§			
≤10 years (n=22)	100 [72; 140]	69 [59; 89]	181 [137; 221]
10-20 years (n=18)	108 [59; 174]	70 [57; 84]	182 [128; 241]
≥20 years (n=24)	133 [95; 185]	83 [69; 130]	220 [181; 309]
p	0,198	0,079	0,046

*"Donning time" and "doffing time" variables represented by interquartile range (P50 [P25; P75])
†Mann-Whitney test
‡"Donning time" and "doffing time" variables represented by median
§Kruskal-Wallis test (Dunn's *post-hoc* test).

Regarding timekeeping of the time spent in PPE donning and doffing, 64 valid timings were performed (Table 1).

The median of the total value for PPE donning and doffing varied from 148 to 245 seconds, with a median of 192.5 seconds each time the professionals entered and exited the room. This can be accounted for as time spent caring for patients in isolation, depending on the number of times an individual performs this task. In these cases, the median is used more reliably due to the asymmetry in the distribution of the time values.

Discussion

Especially in hospital environments, the biological risks to which health professionals are exposed in the direct care provided to the patients indicate the need to adopt biosafety measures. It is considered that, when contaminated in their workplace, the professionals suffer negative impacts on their physical and mental health.[5] Such risks increase in the case of outbreaks, epidemics and pandemics, such as the one caused by COVID-19. PPE use is one of the biosafety precautions to be adopted.

In the health area, Nursing stands out in the care of patients with HAIs and MDRBs, as these professionals are the ones who develop many care procedures, from invasive ones such as drug administration and use of tubes to hygiene and comfort. Therefore, they assume a leading role, as was the case in coping with the COVID-19 pandemic, where they were active in the front lines. In this study, this workforce was predominantly comprised by women and female nursing technicians. A research study on the profile of Brazilian Nursing shows that it is composed of 84.6% female professionals.[16]

The institution was concerned with training the workers in relation to the care measures for isolated patients and to PPE donning and doffing. It is important to emphasize the importance of permanent education as one of the strategies to ensure proper PPE use, as well as implementing safety measures.[1-2,5,9,17]

Regulatory standards recommend that all health services must ensure that health and support professionals are duly trained and have carried out practical activities related to PPE use, including: correct use (donning and doffing stages); sealing

tests of the N95/PFF2 masks; prevention of contamination in garments, skin and environment during the doffing process; as well as training on occupational safety and health, updating on infection prevention and control and disposal of equipment.[17-21]

The data found in the research indicate a trend of a time difference in PPE donning and doffing in relation to age. Younger workers spent less time in PPE donning and doffing. This fact can be related to greater care on the part of more experienced workers with the standard precautions, which is corroborated by a study that indicated younger age as associated with lower compliance with the standard precautionary guidelines, suggesting an association between time spent and adherence to the precautions.[6]

This same study identified that nurses obtained higher scores than nursing technicians regarding adherence to the guidelines, confirming the data found in the timing procedures, where nurses spent more than almost thirty seconds when compared to technicians, reinforcing the precautions in PPE donning and doffing.[6]

Based on individual characteristics such as competence, training and experience, the professionals' experience time can prevent the occurrence of undesirable incidents. It is identified that professionals with extended professional experience (11–20 years) contribute through their experience, based on a qualified and solid theoretical basis, to narrow the error margins and promote a qualified organizational culture.[22]

It is noted that it is proven knowledge that, associated with all infection control measures, consistent use of full-body PPE items can reduce the risk of infections in health professionals and of those infections spreading to other patients and professionals. However, a study on PPE use has shown that covering more parts of the body leads to better protection, despite the difficulties donning and doffing; therefore, it can even lead to increased contamination. Although it is difficult to wear, a hooded Powered-Air Purifying Respirator (PAPR) can provide better protection when compared to using an N95 mask with an apron. Thus, the importance of correct donning is verified, as well as the allocation of an exclusive and defined time for such activity.[22]

When measuring the median of the total time spent on PPE donning and doffing, the value found provides another relevant fact: it is found that 192.5 more seconds are spent per employee, which can be multiplied in 24 hours, each time they provide some

type of assistance; this time is spent only with PPE use for the development of the institution's routines, without considering urgencies and additional activities. This additional time is independent of the patient's dependence degree; eventually, PPE use needs to be added, minimally, to the time spent in the care provided to the patients, from those identified as minimum care to those in intensive care.

COFEN Resolution No. 543/17, which provides for staffing, reinforces that the institution must consider the characteristics related to the health service, the service operation dynamics and the patients' dependence degree, that is, it considers this calculation as a minimum reference to establish the staff required in care units.[12]

It is noted that there is no guidance in the current legislation regarding patients in isolation, and that a general hospitalization calculation is used, unlike other special cases such as Rooming-in, Neonatal units and Pediatrics. It is observed that only with the advent of the pandemic did new guidelines emerge through COFEN's normative opinion No. 002/2020. This is the staff sizing for COVID-19 areas, with a specific look at patients with this pathology, although without mentioning isolation cases in general, pointing to a gap still existing in the legislation.[13]

Given that the PPE donning and doffing times are calculated according to the routines' manual of the institution under study, a minimum number of 13 PPE donning and doffing instance in 24 hours is reached, which equals 2,502.5 seconds, that is, 41.7 minutes more in 24 hours. It is understood that this time, which passes invisibly in the workers' activities, is an important parameter to be considered in sizing the staff in COVID-19 units or even in other isolation units.

A study carried out with an event simulator to quantify the effects of the variation in the number of assigned COVID-19 patients on nurses' workload and on the care quality found that, when caring for five patients with COVID-19, the simulator nurse donned and doffed Personal Protective Equipment (PPE) items 106 times per shift, totaling 6.1 hours.[4] Although the number of times that a professional accesses the patient's room has not been measured, when considering the number of times pointed out in the aforementioned study, there is a total of 6.5 hours, corroborating the data on the donning and doffing times found in this study.

The specificity of a patient in isolation that is usually in a private room and

without companions is also noted, presenting some emotional instability and depending more on the Nursing team. This is added to the need for donning in each procedure to be performed, pointing out that this time should be accounted for as the professionals' workload to the activities added to control hospital infections that are not measured. It is inferred that a patient in isolation should be classified as Intermediate Care in the patient classification system; in the same way as specific patients were classified, such as those hospitalized in units like Rooming-in and Pediatrics, defined in COFEN Resolution No. 543/2017.[12]

These results coincide with preliminary studies that indicate an eight times higher probability of occurrence of adverse events when compared to non-isolated patients, indicating that the precautions can exert a negative impact on the professionals' attitude towards the assistance to be provided. This can be influenced by fears and concerns about being exposed to a greater risk and also by the workload for the time involved in properly preparing to care for these patients, as isolation alone requires more work stages and increases insecurity and lack of surveillance linked to the additional work required by the isolation precautions.[23]

As limitations, there is scarcity of literature addressing the topic of staff sizing related to patient isolation, which implied greater theoretical deepening on the subject matter, even with regard to corroborating or opposing the findings of this study. In addition to that, the possibility of memory bias in the first stage of data collection is pointed out, considering that the questionnaires were self-applied.

It is believed that the research can contribute to new debates and studies in the area, aiming to foster better Nursing staff sizing and adequacy practices and, thus, impact on the quality of the care provided.

Conclusion

The study showed that, in order to ensure patient and worker safety, PPE donning and doffing is “invisible” time; in other words, it is not quantified. It implies the time spent caring for patients in isolation, such as those with COVID-19, and should be considered for Nursing staff sizing.

Defining an adequate number of professionals can have repercussions on

managers' decision-making, on minimizing risks to the professionals' physical and mental health and, especially, on patient safety. Therefore, the donning and doffing times indicate the need for a close scrutiny at regulatory agencies, especially the Federal Nursing Council, which should be conducted with a view to incorporating staff sizing to the legislation, a number of professionals that care for patients in contact and respiratory isolation conditions. This is what happens in cases of multidrug-resistant bacteria and other infectious diseases, and not only at moments such as those experienced during the COVID-19 pandemic. Therefore, the specificities on the care provided to patients in isolation must be considered, thus ensuring quality in the care offered and workers' safety.

References

1. Florentino AO, Duarte AGG, Meira CSM, Amaral Júnior I, Perez FCS, Pereira TACF, et al. A atuação do enfermeiro na prevenção de microrganismos multirresistentes em unidade de terapia intensiva. Glob Acad Nurs J. 2022;3(Supl 1):e238. doi: 10.5935/2675-5602.20200238

2. Rocha MYYO, Lima JFS, Kuzma S, Pontes L, Pasquini R. Conhecimento de enfermeiros de hospital universitário sobre bactérias multirresistentes. Rev Rene (Online); 2019; 20:e41281. doi: 10.15253/2175-6783.20192041281

3. Santos BMP, Gomes AMF, Lourenção LG, Cunha ICKO, Cavalcanti AJC, Silva MCN, et al. Perfil e essencialidade da Enfermagem no contexto da pandemia da COVID-19. Ciênc Saúde Colet. 2023;28(10):2785-96. doi: 10.1590/1413-812320232810.09772023

4. Qureshi SM, Bookey-Bassett S, Purdy N, Greig MA, Kelly H, Neumann WP. Modelling the impacts of COVID-19 on nurse workload and quality of care using process simulation. PLoS One. 2022 Oct 13;17(10):e0275890. doi: 10.1371/journal.pone.0275890. PMID: 36228015.

5. Sousa RK, Gonçalves N, Silva TL, Echevarria-Guanilo ME. Personal protective equipment in Hospital Nursing Care: a scoping review. Texto Contexto Enferm. 2022;31:e20210421. doi: 10.1590/1980-265X-TCE-2021-0421en

6. Pereira VH, Torres LN, Rodrigues NM, Monteiro DAT, Moraes JT, Pereira-Ávila FMV, et al. Cumprimento às precauções-padrão por profissionais de enfermagem e fatores associados. Esc Anna Nery Rev Enferm. 2021;25(3):e20200193. doi: 10.1590/2177-9465-EAN-2020-0193

7. Rawson TM, Moore LSP, Castro-Sanchez E, Charani E, Davies F, Satta G, et al. COVID-19 and the potential long-term impact on antimicrobial resistance. J Antimicrob Chemother. 2020;1(75):1681-84. doi: 10.1093/jac/dkaa194

8. Bellei N, Melchior TB. H1N1: pandemia e perspectiva atual. J Bras Patol Med Lab. 2011;47(6):611-17. doi: 10.1590/S1676-24442011000600007

9. Agência Nacional de Vigilância Sanitária (ANVISA). Nota Técnica Gvims/Ggtes/Anvisa Nº 07/2020. Orientações para prevenção e vigilância epidemiológica das infecções por SARS-cov-2 (COVID-19) dentro dos serviços de saúde [Internet]. 2020 [acesso em 2021 maio 15]. Disponível em: https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/notas-

tecnicas/2020/nt-07-2020_covid-em-servicos-saude_atualizada-em_09-03-2022.pdf

10. Jackson Filho JM, Assunção AÁ, Algranti E, Garcia EG, Saito CA, Maeno M. A saúde do trabalhador e o enfrentamento da COVID-19. Rev Bras Saúde Ocup. 2020;45:e14. doi: 10.1590/2317-6369ED0000120

11. Faria MGA, França KCFG, Guedes FC, Soares MS, Gallasch CH, Alves LVV. Repercussões para saúde mental de profissionais de enfermagem atuantes no enfrentamento à Covid-19: revisão integrativa. Rev Enferm UFSM. 2021;11:e70. doi: 10.5902/2179769264313

12. Conselho Federal de Enfermagem (COFEN). Resolução nº 543/2017. Atualiza e estabelece parâmetros para o dimensionamento do quadro de profissionais de enfermagem nos serviços/locais em que são realizadas atividades de enfermagem. Brasília (DF): COFEN; 2017 [acesso em 2021 maio 15]. Disponível em: http://www.cofen.gov.br/resolucao-cofen-5432017_51440.html

13. Conselho Federal de Enfermagem (COFEN). Parecer Normativo nº 002/2020 - exclusivo para vigência da pandemia - COVID-19. Brasília (DF): COFEN; 2020 [acesso 2021 maio 15]. Disponível em: http://www.cofen.gov.br/parecer-normativo-no-002-2020_79941.html

14. Van Dijk MD, Holt AFVI, Polinder S, Severin JA, Vos MC. The daily direct costs of isolating patients identified with highly resistant micro-organisms in a non-outbreak setting. J Hosp Infect. 2021 Mar;109:88-95. doi: 10.1016/j.jhin.2020.12.013. Epub 2020 Dec 24. PMID: 33359899.

15. Polit DF, Beck CT. Fundamentos de pesquisa em enfermagem: avaliação de evidências para a prática da enfermagem. 2ª ed. Porto Alegre: Artmed; 2019.

16. Conselho Federal de Enfermagem (COFEN); Machado MH, Oliveira ES, Lemos WR, Wermelinger MW, Vieira M, Santos MR, et al. Perfil da enfermagem no Brasil: relatório final. Brasília (DF): COFEN; 2017.

17. Lee H, Jeong IS. Effect of the personal protective equipment donning and doffing program for nurses in military hospitals. Nurs Health Sci. 2022 Sept;24(3):690-8. doi: 10.1111/nhs.12966. Epub 2022 Aug 10. PMID: 35699674.

18. Agência Nacional de Vigilância Sanitária (ANVISA). Nota técnica nº 04/2020. Orientações para serviços de saúde: medidas de prevenção e controle que devem ser adotadas durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo coronavírus (SARS-CoV-2) [Internet]. 2020 [acesso em 2021 maio 15]. Disponível em: https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/notas-tecnicas/2020/nota-tecnica-gvims_ggtes_anvisa-04-2020-09-09-2021.pdf

19. Verbeek JH, Rajamaki B, Ijaz S, Sauni R, Toomey E, Blackwood B, et al. Equipamento de proteção individual para profissionais de saúde para prevenir doenças altamente contagiosas pela exposição a fluidos corporais contaminados: uma Revisão Cochrane. JBMEDE [Internet]. 2021 [acesso em 2021 maio 15];1(2):e21017. Disponível em: https://jbmede.com.br/index.php/jbme/article/view/40

20. Wold Health Organization (WHO). Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health: interim guidance [Internet]. 2020 [cited 2021 May 15]. Available from: https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf

21. Wang J, Zhou M, Liu F. Reasons for healthcare workers becoming infected with novel coronavirus disease 2019 (COVID-19) in China. J Hosp Infect. 2020;105(1):100-1. doi: 10.1016/j.jhin.2020.03.002

22. Fassarella CS, Ferreira SS, Camerini FG, Henrique DM, Luna AA, Almeida LF. Professional patient quality and safety mediators as a strategy for safe health care. Reme Rev Min Enferm. 2017;21:e-1068. doi: 10.5935/1415-2762.20170078

23. Jiménez-Pericás F, Castro MTGV, Pastor-Valero M, Remón CA, Miralles JJ, García MDCM, et al; Higher incidence of adverse events in isolated patients compared with non-isolated patients: a cohort study. BMJ Open. 2020;10(10):e035238. doi: 10.1136/bmjopen-2019-035238 PMID: 33109639.

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