

Compliance and barriers to hand hygiene practice among professionals during the COVID-19 pandemic: an integrative review

Adesão e barreiras à prática de higienização das mãos entre profissionais na pandemia de COVID-19: revisão integrativa

Adherencia y barreras a la práctica de la higiene de manos entre profesionales en la pandemia de COVID-19: revisión integradora

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Corresponding Author:

André Luiz Silva Alvim
andrealmv1@ufjf.br

Address: Rua José Lourenço Kelmer, s/n –
Campus Universitário – São Pedro – Juiz de
Fora/MG

André Luiz Silva Alvim¹ 

Stéphany Ronconi Brey Gil Moreira² 

Suellen Cristina Dias Emidio¹ 

Fábio da Costa Carbogim¹ 

Vitória Cunha Magalhães² 

¹ Universidade Federal de Juiz de Fora, MG, Brazil

² Faculdade de Minas Gerais, Belo Horizonte, Brazil

ABSTRACT

Background and objectives: compliance and barriers to hand hygiene practice remains a challenge in health services, especially during the COVID-19 pandemic. This preventive measure needs to be encouraged at all levels of care to reduce health problems. This article aimed to identify the reasons for compliance and main barriers to hand hygiene practice among health professionals during the COVID-19 pandemic. **Content:** an integrative review, performed in the MEDLINE via PubMed, Scopus, Wiley Online Library, Western Pacific Region Index Medicus, LILACS, IBECs, BDNF and SciELO databases. To interpret the results, Nola Pender's theoretical perspective was used. The sample consisted of 13 articles, allowing the stratification of six themes: health professionals' attitude and behavior during the pandemic; assessment of the five moments in hospitals during the pandemic period; availability, use and types of resources; barriers and facilitators; team compliance before and during the COVID-19 pandemic; and technique quality and glove use considering the need for hand hygiene. **Conclusion:** hand hygiene practice needs to be expanded and encouraged among team members, as there were barriers that hindered compliance during the COVID-19 pandemic.

Keywords: Hand Hygiene. COVID-19. Health Personnel. Pandemics. Patient Care. Review.

RESUMO

Justificativa e objetivos: adesão à prática de higienização das mãos permanece um desafio nos serviços de saúde, principalmente durante a pandemia de COVID-19. Essa medida preventiva necessita ser estimulada em todos os níveis de assistência para redução de agravos à saúde. Este artigo teve por objetivo identificar os motivos de adesão e principais barreiras à prática de higienização das mãos entre profissionais de saúde durante a pandemia de COVID-19.

Conteúdo: revisão integrativa, realizada nas bases de dados MEDLINE via PubMed, Scopus, *Wiley Online Library*, *Index Medicus* do Pacífico Ocidental, LILACS, IBECs, BDNF e SciELO. Para interpretação dos resultados, utilizou-se a perspectiva teórica de Nola Pender. A amostra foi constituída por 13 artigos, possibilitando a estratificação de seis temas: atitude e comportamento dos profissionais de saúde durante a pandemia; avaliação dos cinco momentos em hospitais no período pandêmico; disponibilidade, utilização e tipos de recursos; barreiras e facilitadores; adesão da equipe no antes e durante a pandemia de COVID-19; e qualidade da técnica e utilização de luvas diante da necessidade de higienização das mãos. **Conclusão:** a prática de higienização das mãos precisa ser ampliada e incentivada entre a equipe, visto que houve barreiras que dificultaram a adesão durante a pandemia de COVID-19.

Descritores: *Higiene das Mãos. COVID-19. Pessoal de Saúde. Pandemias. Assistência ao Paciente. Revisão.*

RESUMEN

Justificación y objetivos: la adherencia y las barreras para la práctica de la higiene de manos sigue siendo un desafío en los servicios de salud, especialmente durante la pandemia de COVID-19. Es necesario fomentar esta medida preventiva en todos los niveles de atención para reducir los problemas de salud. Este artículo tuvo como objetivo identificar las razones de la adherencia y las principales barreras para la práctica de la higiene de manos entre los profesionales de la salud durante la pandemia de COVID-19. **Contenido:** revisión integradora, realizada en bases de datos MEDLINE vía PubMed, Scopus, *Wiley Online Library*, *Western Pacific Region Index Medicus*, LILACS, IBECs, BDNF y SciELO. Para interpretar los resultados se utilizó la perspectiva teórica de Nola Pender. La muestra estuvo compuesta por 13 artículos, lo que permitió la estratificación de seis temas: actitud y comportamiento de los profesionales de la salud durante la pandemia; evaluación de los cinco momentos en los hospitales durante el período de pandemia; disponibilidad, uso y tipos de recursos; barreras y facilitadores; adherencia del equipo antes y durante la pandemia de COVID-19; y calidad de la técnica y uso de guantes ante la necesidad de higiene de manos. **Conclusión:** la práctica de la higiene de manos necesita ser ampliada y fomentada entre el equipo, ya que hubo barreras que dificultaron la adherencia durante la pandemia de COVID-19.

Palabras clave: *Higiene de las Manos. COVID-19. Personal de Salud. Pandemias. Atención al Paciente. Revisión.*

INTRODUCTION

On the world stage, the beginning of 2020 was marked by an outbreak of non-specific respiratory infections caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, known as the Coronavirus Disease (COVID-19). It is responsible for causing Severe Acute Respiratory Syndrome (SARS), and can be transmitted through droplets, secretions, aerosols and/or fomites of infected individuals.^{1,2}

Due to the high transmissibility rate of the virus, the World Health Organization (WHO) recommended preventive measures, especially in health services, which included hand hygiene with an alcoholic preparation and/or liquid soap, safe distancing and effective personal protective equipment (PPE) use.^{3,4} Health professionals represent one of the risk groups for COVID-19, due to direct contact with patients with a confirmed diagnosis.⁵⁻⁷

In this context, hand hygiene (HH) in patient care is referred to as one of the main measures to reduce incidents and transmission of SARS-CoV-2.^{4,7} It is considered simple, low cost and of paramount importance in healthcare-associated infection (HAI) prevention and control. The WHO recommends five recommended moments for HH, namely: 1) before touching a patient; 2) before clean/aseptic procedure; 3) after body fluid exposure risk; 4) after touching a patient; 5) after touching patient surroundings.⁸

The HH protocol must have full applicability,

especially during the COVID-19 pandemic, due to virus proliferation in health services.^{1,7,8} Among the complications generated by the lack of this preventive measure, the increase in HAI and the spread of microorganisms among patients, professionals and/or environments. It is observed that HH practice, in addition to avoiding accelerated transmission and disease outbreaks, reduces the risk of infection caused by SARS-CoV-2 by 36% and a 23% decline in other respiratory tract infections.⁹

A study on the subject also shows that health professionals' compliance remains below expectations, needing to be encouraged at all levels of care to reduce health problems.⁶ The low performance of this preventive measure, where there is patient care, in addition to its repercussions attributed to team members' knowledge, attitude and behavior, were not found at the same time in research, being the main gap that justified this review.^{1,3,6,8,9} Furthermore, the identification in the literature of effective strategies to improve compliance and reduce barriers, especially in times of public health crisis, such as the COVID-19 pandemic.

This study becomes relevant for revealing the practices of professionals who work in patient care, verifying in the light of the literature whether there were (or not) changes in the multidisciplinary team in the face of the pandemic, identifying challenges and gathering information that will allow directing actions and interventions to improve compliance in relation to HH.

Therefore, the objective was to identify the reasons for compliance and the main barriers to HH practice among health professionals during the COVID-19 pandemic.

METHODS

This is an integrative review, which covered six stages: establishment of the hypothesis or research question; sampling or literature search; categorization of studies; assessment of studies included in the review; interpretation of results; and synthesis of knowledge.¹⁰ The elaboration of the methodological stages of this study was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).¹¹

To establish the research question, the PICO strategy was used: (P) Population = health professionals; (I) Intervention = HH; (C) Comparison = practices among health team members during the COVID-19 pandemic; and (O) Outcome = repercussion and compliance regarding HH practice. This tool makes it possible to guide the elaboration of a research problem based on the best evidence.¹² The following guiding question was elaborated: what were the repercussions on HH practices and their respective compliance among health professionals, including students who were working in health services, during the COVID-19 pandemic?

The search strategy was carried out in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed; Scopus; Wiley Online Library; Western Pacific Region Index Medicus (WPRO); Latin American and Caribbean Literature in Health Sciences (LILACS); *Índice Bibliográfico Español en Ciencias de la Salud* (IBECS); *Banco de Dados de Enfermagem* (BDENF); and the Scientific Electronic Library Online (SciELO) portal. The DeCS/MeSH descriptors were: Sars Virus, COVID-19, Hand Hygiene, Hand Disinfection, Cross Infection, Healthcare Workers and Health Personnel. Boolean operators (AND and OR) were adopted for crossing, and

the use of quotation marks was disregarded, to avoid the loss of articles (Table 1).

Full-type articles, published between January 2020 and May 2022, in Portuguese, English and Spanish, were included. Reflection studies, reviews, books, editorials, other research that were not submitted to the Ad hoc peer review process and did not answer the research question were excluded. To assess duplicate articles, the Mendeley® software was used.

The selection of double-blind articles, carried out by two researchers, independently, took place in June 2022, aiming at maintaining methodological rigor during the search strategy. Subsequently, data were checked simultaneously. Concluding the review trajectory, a synoptic table was built to systematize knowledge, defining the following variables: authors' names and year of publication; delineation and scenery; level of evidence as recommended by the Agency of Healthcare Research and Quality (AHRQ); and the purpose of selected studies.¹³

Data were analyzed using simple descriptive statistics to present absolute and relative values referring to the characterization of studies and stratification of research topics.

The interpretation of results obtained was carried out using the theoretical perspective of Nola Pender's Health Promotion Model. Although it is used for nursing actions that encourage self-care for a certain public, the theory allows the recognition of healthy behaviors regarding HH during the COVID-19 pandemic, through the analysis of personal characteristics and experiences; feelings and knowledge about the health promotion behavior that one wants to achieve; and results of team conduct. The articles found in this review were organized into these categories, making it possible to construct the health promotion diagram.¹⁴ All theoretical aspects proposed by Pender were directly applicable to the present study.

Due to the nature of an integrative review of this study, the approval of Research Ethics Committee (REC) was not required. It is important to emphasize that the

Table 1. Article search strategy in the databases selected for the study. Juiz de Fora, MG, Brazil, 2022.

Database	Search crossing	Articles found
MEDLINE via PubMed	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	66
Scopus	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers.	10
Wiley Online Library	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	49
WPRO	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	01
LILACS	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	02
IBECS	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	02
BDENF	(Sars Virus OR COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	02
SciELO	(COVID-19 AND Hand Hygiene OR Hand Disinfection AND Cross Infection AND Healthcare Workers OR Health Personnel)	07

methodology used was selected with the intention of exploring a wide range of studies, contemplating different theoretical approaches and research methods to qualitatively synthesize and interpret the findings. In this regard, the authors chose to carry out an integrative review instead of a systematic review.

RESULTS

Thirteen articles (100%) indexed in the MEDLINE (84.6%), Scopus (7.7%) and Wiley Online Library (7.7%) databases were selected (Figure 1). The temporal delimitation obtained little variation, due to theme topicality. As for the language, 10 (84.6%) studies were published in English, with the countries of origin being Ethiopia (18%) and Spain (18%). All searches were attributed to the health area (100%).

With regard to the design, the studies are

cross-sectional and descriptive, which had as their field of analysis HH practice in hospitals during the COVID-19 pandemic (92.3%). Most studies were classified with a level of evidence equal to 6 (76.9%) (Table 2).

From reading and analyzing the articles, it was possible to stratify the contents into six themes: health professionals' attitude and behavior during the pandemic; assessment of the five moments in hospitals during the pandemic period; availability, use and types of resources; barriers and facilitators; team compliance before and during the COVID-19 pandemic; and technique quality and glove use considering the need for HH.

Figure 2 shows the elaboration of the Nola Pender diagram applied to HH practices in the COVID-19 pandemic. Among the articles included in this review, it is noteworthy that expanding and encouraging compliance among multidisciplinary team members during and after the pandemic may be associated with HH promotion behavior in health services.

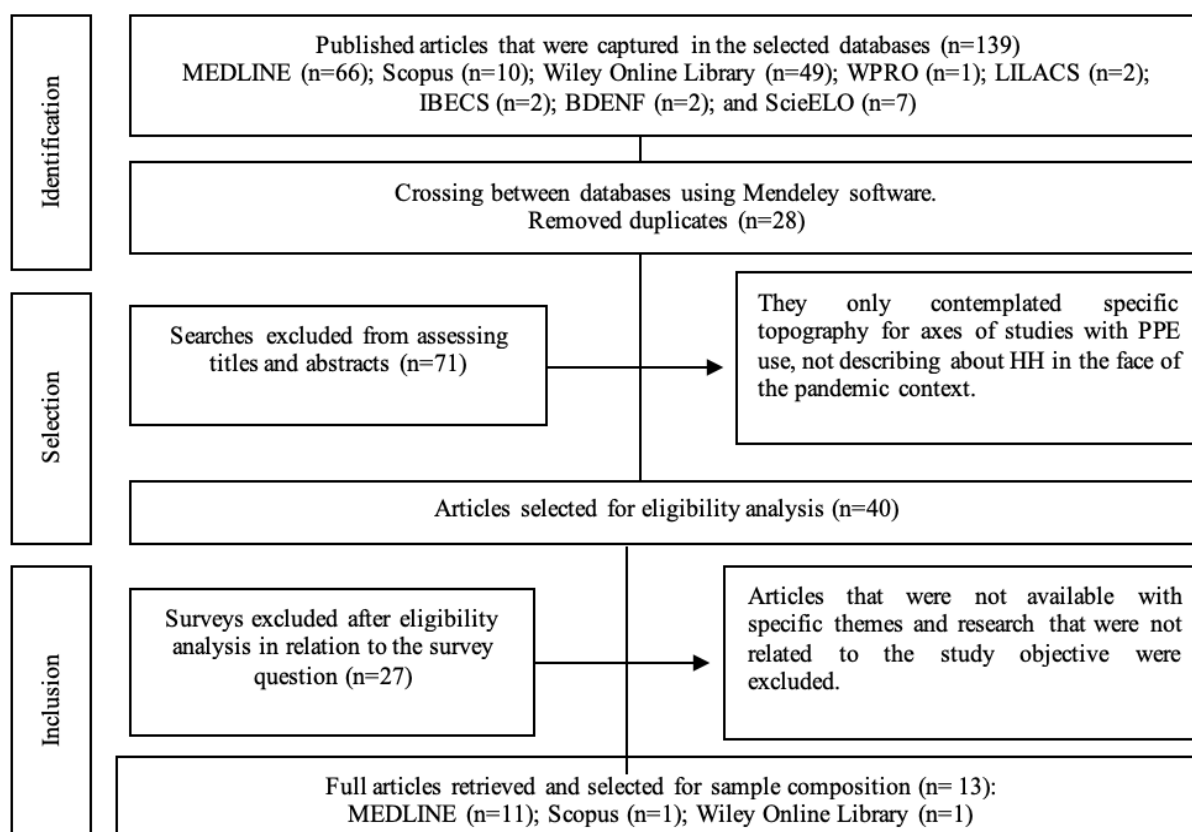


Figure 1. Prism of studies included in the integrative review. Juiz de Fora, MG, Brazil, 2022

Table 2. Description of research included in the integrative review. Juiz de Fora, MG, Brazil, 2022.

Authors and year	Design and setting	Level of evidence	Study sample	Main results
Sandbol et al., 2022 ¹⁵	Observational, prospective study	Level 4	A total of 150 team professionals participated before the COVID-19 pandemic and 136 during the pandemic.	Compliance with HH practices was higher before the COVID-19 pandemic, when compared to the assessed pandemic period.
Casaroto et al., 2022 ¹⁶	Observational, prospective study	Level 4	An electronic HH monitoring system was used that investigated compliance for 45 months. However, the article did not mention the number of professionals included in the survey.	Workload, lack of training and work leave due to mental health may have negatively affected HH quality.
Sandbekk, et al., 2022 ¹⁷	Observational, descriptive study	Level 6	There were 105 nursing students who performed 7,316 HH observations in 20 wards.	Nursing students had the highest compliance, followed by nurses. Of the professionals who wore gloves, 64.7% did not perform the HH.
Barcenilla-Uitard et al., 2022 ¹⁸	Observational, descriptive and cross-sectional study	Level 6	The study sample consisted of 716 participants who answered a questionnaire via WhatsApp® and Telegram®.	Females are associated with the highest number of attitudes and best practices related to HH. Age, as it increases, positively influences practices and attitudes.
Keleb et al., 2021 ¹⁹	Cross-sectional study	Level 6	A total of 489 health professionals who worked in public hospitals participated.	Feedback to health professionals, training on COVID-19 prevention and perception of the risk of infection were factors related to good HH indicators and PPE use.
Wang et al., 2021 ²⁰	Cross-sectional, descriptive study	Level 6	The online survey reached 786 health professionals.	It is noteworthy that 25% of assessed professionals did not perform HH. Low compliance with preventive behaviors was due to misinformation about COVID-19 origin, severity and prevention, making it necessary to encourage health education.
Berman et al., 2021 ²¹	Cross-sectional study	Level 6	This study obtained a sample of 250 health professionals.	Several barriers influenced HH: scarcity of inputs, ineffective training, minimal presence of the infection control team and high workload. The pandemic did not significantly influence the increase in HH compliance.
Fernández et al., 2021 ²²	Cross-sectional and descriptive study	Level 6	The researchers looked at 4,560 opportunities. However, the article did not mention the number of professionals included in the survey.	The pandemic has increased HH rates. However, previous contact with patients was the moment that maintained low compliance. It is necessary to expand HH among nursing technicians.
Huang et al., 2021 ²³	Descriptive study	Level 6	The sample consisted of 162,334 entries and exits related to HH, recorded by an automatic monitoring system.	Health professionals have modified their behaviors during the pandemic. However, compliance upon entering the patients' room remained low. It is necessary to train the team regarding using gloves and HH, as their use does not replace carrying out this measure.
Zhou et al., 2021 ²⁴	Cross-sectional study	Level 6	There were 1,734 participants from 17 health services.	Burnout was negatively associated with HH. Acting on this psychic disorder improves the team's behavior in relation to HH, aiming at infection prevention and control.
Vatan et al., 2021 ²⁵	Observational and descriptive study	Level 6	A total of 400 health professionals working in the Emergency Medical Care Service (SAMU - Serviço de Atendimento Médico de Urgência) were included.	Among respondents, 36% were unaware of the correct technique for HH.
Roshan et al., 2020 ²⁶	Observational and descriptive study	Level 6	The researchers observed all time points for HH over six months. However, the article did not mention the number of professionals included in the survey.	A reduction in the number of infections related to care was observed after the pandemic, being associated with HH improvement in recent months.
Derksen et al., 2020 ²⁷	Observational, prospective study	Level 4	A total of 267 behavioral observations were made in two German hospitals.	The researchers highlight that compliance with UM recommendations increased from 47% before the COVID-19 pandemic to 95% shortly before implementing the lockdown.

1. Personal characteristics and experiences

2. Feelings and knowledge about the health promotion behavior that one wants to achieve

3. Results of conduct

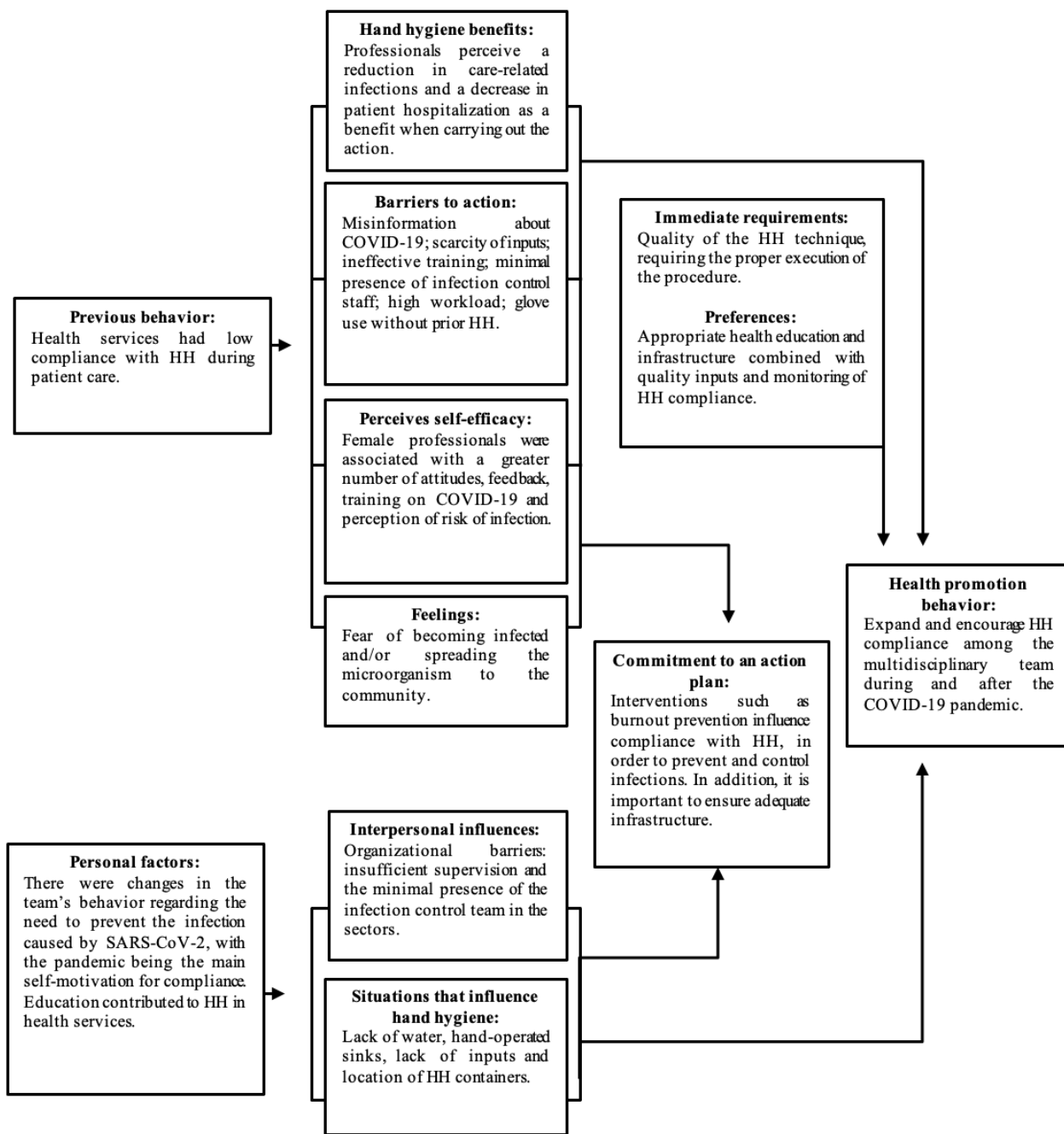


Figure 2. Nola Pender's Health Promotion Model applied to hand hygiene in relation to professionals' behavior and attitude during the COVID-19 pandemic. Juiz de Fora, MG, Brazil, 2022.

DISCUSSION

It was possible to analyze that all articles selected for this review addressed health professionals' practices in relation to HH during the pandemic.¹⁵⁻²⁷ Using Nola Pender's theoretical perspective, the studies showed some improvements of this preventive measure in health services, such as greater concern in preventing the spread of the virus and the execution of the correct technique in the five moments recommended by the WHO. However,

excellent compliance is still far from ideal among multi-disciplinary team members.

Attitude and behavior were two variables that can directly influence HH when there is high patient demand, work overload and lack of specific training.^{15-17,21,24} Two studies elucidated that there was greater compliance in the pre-COVID period when compared to the pandemic.^{15,16} In this case, it is inferred that this fact may have been influenced by misinformation regarding the origin of the virus, its severity and forms of prevention, especially at

the beginning of its worldwide dissemination.^{1,28,29}

With the evolution of the state of public emergency, health professionals adapted their behavior to the need to prevent infections caused by SARS-CoV-2 and the fear of becoming infected and/or spreading the microorganism to the community.^{22,23} The literature states that HH after contact with patients stood out against the five moments recommended by the WHO,^{22,23} attributing this fact to the need for professional self-protection.^{29,30}

In this context, after the first year of the pandemic, health professionals sanitized their hands in a lower percentage before contact with patients. It appears that the change in behavior and attitude did not show significant changes during COVID-19 when compared to the previous period.²³ This fact may be mainly related to the increased demand for services caused by the high volume of hospitalized patients and the unavailability of supplies close to the assistance points.²⁵⁻²⁷

The main barrier to meeting the five moments of HH recommended by the WHO is related to the increase in the workload and the volume of patients during the pandemic.^{15,16} Allied to this are the team's professional exhaustion and mental health in the face of increased COVID-19 attendances, which directly reflects on reduced HH actions.²⁴

Sociodemographic aspects such as sex and age also influenced the team's behavior and attitude towards HH. Studies have found that health professionals who are female have greater compliance.¹⁸ Moreover, the age group influences the practice, highlighting recent graduates as those who obtained more actions considering the opportunities assessed for HH.^{17,24}

When it comes to technique quality, it is important to mention that several professionals self-reported good procedure execution in health services. Despite performing the technique properly, the recommended execution time (40 to 60 seconds) was not followed in multicenter research.¹⁸ In this case, it is very common to observe failures in procedure execution in relation to the time recommended in the literature in clinical practice. It is therefore recommended to distribute visual reminders emphasizing this aspect next to sinks and dispensers of alcoholic preparations and/or liquid soap.

Most health professionals who participated in a survey conducted in Spain reported having sufficient knowledge about how to properly clean their hands, and most received training and/or had prior knowledge regarding the procedure's basic steps.¹⁸ Among the assessed professional categories, the nursing team had the best performance.^{17,19,28} However, the assessment methodology may have influenced HH indicators, attributing a change in professionals' behavior when being observed (Hawthorne effect).^{23,25}

It was possible to perceive in this review that the resources attributed to service structure influenced HH, such as water scarcity, hand-operated sinks, lack of inputs, location of containers and burnout associated with work

overload. It is added that difficulty in accessing materials and psychological disorders caused by the pandemic directly influenced compliance, being important factors that must be worked on by health managers.²²

Furthermore, the ineffective structure was not the only weakness found by the selected studies. The authors reinforced that the mere existence of COVID-19 management protocols, in isolation, is not enough to improve compliance, and it is necessary to disseminate the main results among the care team.¹⁹ Feedback to health professionals was reported as a key factor in increasing HH indicators.

The discussion presented so far shows that professionals modify their behavior and attitude based on the risks they are exposed to, in the same way that patient care site, the availability of inputs and the offer of training favor HH. This fact can be evidenced in the Health Promotion Model used in this study. On the other hand, it was possible to verify that there are factors that weaken the HH process in hospitals, highlighting organizational barriers, such as insufficient supervision and minimal presence of an infection control team in care sectors.²¹

It is worth noting that a difficult point still present in several hospitals is related to glove use as an option to replace HH.¹⁷ They are considered one of the effective PPE in the context of biosecurity that guarantee protection during health care.^{1,4} But it is known that its use without prior HH is directly related to a greater spread of microorganisms among patients, professionals and/or environments.^{17,19,23,28-31}

As limitations of this study, the time frame stands out, as the theme is current and emerging in the literature and, thus, new studies are constantly published and may reflect on the results presented in this review. It is important to mention the low level of evidence in the selected studies and weaknesses in the method used, with most cross-sectional studies.

Through subsidized results from the perspective of Nola Pender's Health Promotion Model, this study strengthens discussions between managers and nurses in relation to clinical practice and encouragement of HH compliance by their collaborators, following WHO protocols.

CONCLUSION

In this context, it was possible to analyze HH practices among health professionals during the COVID-19 pandemic. The articles included in the review elucidated several improvements of this preventive measure in health services, but compliance with the five moments recommended by the WHO still needs to be expanded and encouraged among multidisciplinary team members.

It is concluded that COVID-19 enabled a new look at HH, with a focus on infection prevention, care demands, inputs used, the importance of training and indicator monitoring. For this reason, in addition to professional self-protection, HH can directly contribute to patient care quality.

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AUTHORS' CONTRIBUTIONS

André Luiz Silva Alvim, Stéphany Ronconi Brey Gil Moreira and Vitória Cunha Magalhães contributed to article conception, design, data analysis and writing of the manuscript.

André Luiz Silva Alvim, Stéphany Ronconi Brey Gil Moreira, Suellen Cristina Dias Emidio, Fábio da Costa Carbogim and Vitória Cunha Magalhães contributed to data analysis and interpretation.

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