

REVIEW ARTICLE

Risk management practices developed by health professionals at the intensive care unit: a scoping review

Conduitas relativas à redução do risco desenvolvidas pelos profissionais de saúde na unidade de terapia intensiva: uma scoping review

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ABSTRACT: *Objective:* To map and identify risk management practices developed by health professionals in the intensive care unit. *Method:* Scoping review following the JBI Institute Reviewer's Manual. In the initial search, the MeSH 'health personnel', 'risk management' and 'intensive care unit' were used to define the final search strategy, composed of a combination of two hundred and twenty-two keywords. The search was carried out in scientific and grey databases, with no time limitation. Information about the year, country of origin, objective, practices performed, practices neglected, protocols developed, professionals involved, aspects of the method, results and conclusions related to the scoping review were extracted. *Results:* The primary selection was composed of 10,349,624 texts, of which 94 were read in full. Then, 79 studies were (40 did not respond to the objective, 38 were unavailable and 1 was written in French). Thus, the final selection was composed of 15 articles. Among the main practices performed by health professionals, the one that stood out the most was hand hygiene. However, this practice is still very neglected in this environment, which leads to greater risk for patients and ICU professionals. In addition, high workload, lack of discussion about errors and lack of training were cited as actions that directly affect the quality of the health service. *Conclusions and implications for practice:* It is important to prioritize risk management in the ICU in an efficient and quality manner in order to avoid or minimize adverse events and provide comprehensive, qualified and responsible assistance during the clinical evolution of each patient.

Keywords: Risk management; Patient safety; ICU; Health professionals.

RESUMO: *Objetivo:* Mapear e identificar as condutas relativas à redução do risco desenvolvidas pelos profissionais de saúde na unidade de terapia intensiva. *Método:* Scoping review segundo o JBI Institute Reviewer's Manual. Na busca inicial foram utilizados os descritores encontrados no MESH: *health personnel, risk management e Intensive care unit*, para delimitar a estratégia final de busca, composta por uma combinação de duzentas e vinte e duas palavras-chave, realizada em bases de dados científicas e cinzentas, sem limite temporal. Foram extraídas informações sobre o ano, país de origem, objetivo da publicação, condutas realizadas, condutas negligenciadas, protocolos desenvolvidos, profissionais envolvidos, aspectos do método, resultados e conclusões relacionados ao tema proposto neste artigo de *scoping review*. *Resultados:* A seleção primária foi de 10.349.624 textos que tiveram seus títulos e resumos avaliados e, de acordo com os critérios de inclusão estabelecidos, foram selecionados 94 para leitura na íntegra. Posteriormente excluímos 79 (40 não responderam ao objetivo, 38 eram indisponíveis e 1 foi escrito em francês). Assim, a seleção final foi composta por 15 artigos. Entre as principais condutas realizadas pelos profissionais de saúde, a que mais se destacou foi a higienização das mãos, no entanto, ainda é muito negligenciada nesse meio, o que gera maior risco para pacientes e profissionais das UTI's. Além disso, a elevada carga de trabalho, falta de discussão sobre erros e falta de capacitação, são ações muito citadas que afetam diretamente a qualidade do serviço de saúde. Conclusões e implicações para a prática: É fundamental que o gerenciamento de risco no ambiente de UTI seja feito de forma prioritária, eficiente e com qualidade, a fim de evitar ou minimizar os eventos adversos, culminando, portanto, em uma assistência integral, qualificada e responsável da evolução do quadro clínico de cada paciente.

Palavras-chave: Gerenciamento de risco; Segurança do paciente; UTI; Profissionais de saúde.

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INTRODUCTION

In 2015, the Ministry of Health (MS) instituted the National Patient Safety Program (PNSP) with the objective of developing strategies, products and actions focused on patient safety and directed to health managers, professionals, and users, aiming to minimize the occurrence of adverse event (AEs) in healthcare with a multidisciplinary focus¹.

Risk management is used to increase quality and safety of patient care and includes several principles and guidelines, among which are: the creation of a safety culture; the systematic and structured execution of risk management processes; integration with all care processes; coordination with the organizational processes of health services; the best available evidence; transparency, inclusion, accountability, awareness, and ability to react to changes².

In this context, risk management is related to actions that aim to avoid or reduce errors and dangerous situations that can compromise the health or cause the death of a patient and, in this scenario, healthcare workers play a prominent role². Therefore, it is necessary to highlight the importance of addressing risk management in the Intensive Care Unit (ICU), given the complexity of the procedures performed and the critical condition of the patients, who need extra care. Thus, in the ICUs, risk management actions are practices that must be followed strictly and responsibly to ensure that all procedures are safe for patients and professionals³.

According to Silvestre *et al.*⁴ adverse events to patients increase hospital costs, as they lead to longer hospital stays and greater use of medical and hospital supplies and medication. In addition, adverse events facilitate the occurrence of Healthcare-Associated Infections (HAIs) and reduce bed turnover, causing a burden on the health system and making it impossible to make investments that would be essential in other health care sectors.

The early identification of health care risks can reduce health hazards for professionals and patients, improve the quality of hospital care, reduce costs for managers, increase the scope of health services, promote the sustainability of practices and services and provide good outcomes. Considering the above, this scope review aimed to map and identify risk management practices developed by health professionals in the ICU.

METHODS

This is a scoping review based on the recommendations of the Joanna Briggs Institute, Reviewers Manual (2015)⁵, according to the theoretical framework proposed by Arksey and O'Malley (2005)⁶. This review was registered in the Open Science Framework (<https://>

osf.io/rab59/) and followed PRISMA checklist (2018)⁷ for scope reviews.

The study population was composed of scientific articles and publications available in the grey literature that made it possible to identify risk management practices developed by health professionals in the ICU.

The question that guided our search in the literature was based on the PCC strategy, where “P” stands for population/participants, “C” for the concept to be investigated and “C” for context, for which the words were, respectively, “health personnel”, “risk management” and “intensive care unit”. Then, the following guiding question was elaborated: “What are the main risk management practices developed by health professionals in the intensive care unit?”.

Then, a search was performed in the Medical Subject Heading Terms (MeSH) for the corresponding descriptors, according to the PCC strategy: Health personnel, Risk management and Intensive Care Unit. Based on the combination of these descriptors using the Boolean operator AND, the keywords related to each term were identified through studies published in the National Library of Medicine (PubMed) and in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), concluding the elaboration of the search strategy (Table 1).

After selecting the descriptors and equivalences, the studies were retrieved in the databases PubMed, CINAHL, LILACS, Web of Science and Scopus, and in the gray literature: Catalog of Theses and Dissertations from the Coordination for the Improvement of Higher Education Personnel (CAPES), The National Library of Australia's Trobe (TROBE), Academic Archive Online (DIVA), DART-Europe E-Theses Portal, Electronic Theses Online Service (ETHOS), Open Access Scientific Repository of Portugal (RCAAP), National ETD Portal, Canada-Thesis, Europe E-thesis Portal (DART).

The research was carried out through the CAPES Portal of Journals, after identification through the Federated Academic Community (CAFe), to standardize data collection on these bases. This search was carried out in the period of December/January 2019/2020.

Studies published in full, in Portuguese, English or Spanish and with the objective of evaluating risk management practices developed by health professionals in the ICU were included. Data collection was based on primary studies, therefore, the following were excluded: editorials, experience reports, reflection studies, reviews, and randomized clinical trials, as the objective was to identify which procedures were performed, and not their effectiveness. Studies that did not have their abstract and online text available in full were also excluded. There was no time limitation.

All studies with full abstracts available in the databases were exported to the bibliographic reference manager EndNote Web.

Table 1: Descriptors and keywords used in the search, Brazil, Campina Grande, PB, 2020

PCC	MeSH	KEYWORDS	
P – Population	Health personnel	OR	Nurse practitioner or physician assistant staffing or Local pharmacist or Intensive care nurses or Nurse staffing or pharmacist or Nursing workforce or ICU nurses
AND			
C – Concept	Risk management	OR	Or quality improvement or root-cause analysis or patient safety or safety climate or quality or real time safety audits or Risk stratification or Infection control or adverse events or Risk management or or Early warning system or Cross transmission or Infection control or safety culture or barrier precautions or infection prevention or quality of health care or Telemedicine or SEIPS model of work system or Error perception or process improvement team or quality improvement or Organizational culture or quality of care or risk analysis or Hygiene or Communication failures or risk identification or risk mitigation or Information transfer or identification or safety interventions or ICU physician staffing standard or clinical protocols or Safety management or safety attitudes or supervision or pressure ulcer prevention or Quality assurance or Hand hygiene or infection control or standard precautions or Medication therapy management or transfer of patient care or clinical decision support or Diagnostic errors or Restrictive practices or Safety or Quality of health care or communication or Hand hygiene compliance or Personal responsibility or Safety or Medication errors or Safety considerations or risk-appropriate care
AND			
C – Context	Intensive care unit	OR	Or neonatal intensive care unit or Tele-ICU or Remote ICU

The publications analyzed were selected and the data was extracted to identify authors, type of study, year of publication, country of origin, objective, practices developed, practices neglected, professionals involved, and important conclusions related to the purpose of the scoping review. The data were synthesized in a descriptive manner (absolute and relative frequencies), using tables, charts, and graphs, as relevant.

RESULTS

The primary selection contained 10,349,624 texts.

The first 1000 titles and abstracts from each database were read and ordered by relevance to assess the compatibility between the objective of this review and the texts found in the search. A total of 94 articles were selected for full reading. Afterwards, 79 were excluded (40 did not respond to the objective, 38 were unavailable and 1 was written in French). Thus, the final selection was composed of 15 articles, as shown in Figure 1.

The 15 texts selected were categorized according to authors, year of publication, objective, country of origin, continent, and type of study, as shown in Table 2.

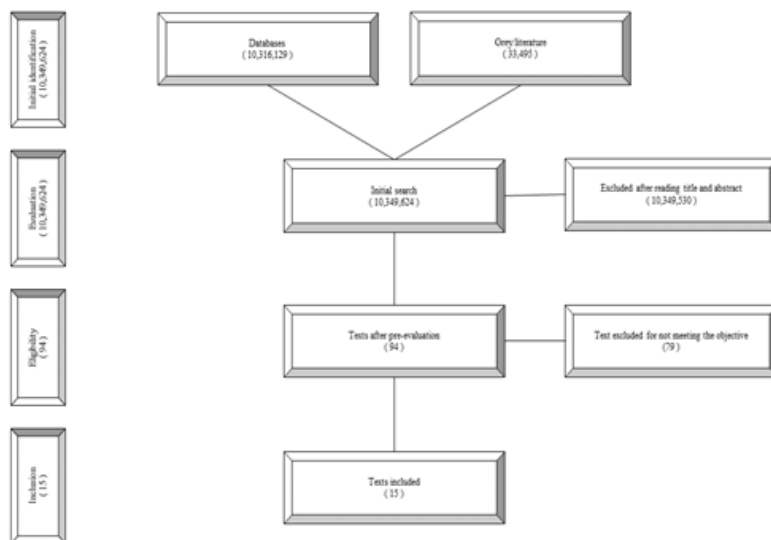


Figure 1: Search flowchart of the scoping review, Brazil, Campina Grande, Paraíba, 2020

Table 2: Characterization of publications according to ID, author/year, country of origin/continent and type of study of the articles included in the scoping review (n=15). Campina Grande, Paraíba, Brazil, 2020.

ID	Authors; (Year)	Title	Country/ Continent	Study type
E1	Lam BCC, et al. ⁸ 2004	Hand Hygiene Practices in a Neonatal Intensive Care Unit: A Multimodal Intervention and Impact on Nosocomial Infection	China/Asia	Quantitative
E2	Picheansathian W, et al. ⁹ 2008	The effectiveness of a promotion programme on hand hygiene compliance and nosocomial infections in a neonatal intensive care unit	Thailand/Asia	Quantitative
E3	Armellino D; et al. ¹⁰ 2013	Replicating changes in hand hygiene in a surgical intensive care unit with remote video auditing and feedback	United States of America/North America	Quantitative
E4	Abdi Z, et al. ¹¹ 2013	The culture of patient safety in an Iranian intensive care unit.	Iran/Asia	Quantitative
E5	Alayed A, et al. ¹² 2014	Saudi Arabian ICU safety culture and nurses attitudes	Saudi Arabia/ Asia	Mixed
E6	Alp E, McLaws M ¹³ 2014	Evaluation of the effectiveness of an infection control program in adult intensive care units: A report from a middle-income country.	Turkey/Asia/ Europe	Qualitative
E7	Vifladt A, Farup P ¹⁴ 2015	Changes in patient safety culture after restructuring of intensive care units: Two cross-sectional studies	Norway/Europe	Quantitative
E8	Abu-el-noor NI, et al. ¹⁵ 2017	Safety Culture in Neonatal Intensive Care Units in the Gaza Strip, Palestine: A Need for Policy Change	Palestine/Asia	Qualitative
E9	Tomazoni A, et al. ¹⁶ 2017	Perception of nursing and medical professionals on patient safety in neonatal intensive care units	Brazil/South America	Quantitative
E10	Battistella G, et al. ¹⁷ 2017	Developing professional habits of hand hygiene in intensive care settings: An action-research intervention	Italy/Europe	Quantitative
E11	Stahmeyer JT, et al. ¹⁸ 2017	Hand hygiene in intensive care units: a matter of time?	Germany/Europe	Quantitative
E12	Mahomed S, et al. ¹⁹ 2017	An evaluation of infection control in private and public sector intensive care units in South Africa	South Africa/ Africa	Qualitative
E13	Musu M, et al. ²⁰ 2017	Assessing hand hygiene compliance among healthcare workers in six Intensive Care Units	Italy/Europe	Qualitative
E14	Salem MR, Youssef MRL ²¹ 2017	Health care providers perspectives for providing quality infection control measures at the neonatal intensive care unit, Cairo University hospital	Egypt/Africa	Quantitative
E15	Silva MVO, Caregnato RCA ²² 2019	Intensive Care Unit: Safety and monitoring of adverse events	Brazil/South America	Qualitative

The studies were homogeneous on the concern of researchers in their respective countries when addressing this topic. Approximately 86.66% of the studies were carried out in the last ten years. It is worth noting that most studies were carried out in Europe and Asia (66.66%),

followed by America (20%) and Africa (13.33%). Among the studies, 9 were quantitative, 5 were qualitative and 1 was a mixed study, addressing these two aspects.

The main practices performed and neglected and the professionals involved in risk management in the ICU are presented in Table 3.

Table 3: Identification of the article (ID), objective, practices performed, practices neglected, and professionals involved in the studies included in the scoping review (n=15). Campina Grande, Paraíba, Brazil, 2020

ID	Objective	Risk management practices	Neglected risk management practices	Professionals Involved
E1	To study the impact of an education and intervention program on the hand hygiene of health care workers.	Hand hygiene	Recontamination of washed hands	Doctors Nurses
E2	To identify the impact of a promotion programme on hand hygiene practices and its effect on nosocomial infection rates in a neonatal intensive care unit (NICU) of a university hospital in Thailand.	Hand hygiene	Does not address	Nurses
E3	To assess health care workers' hand hygiene upon entry and exit on a second, adjacent surgical intensive care unit (SICU) with the use of RVA without and with feedback.	Hand hygiene	Does not address	Doctors
E4	To explore nurses' and physicians' attitudes and perceptions relevant to safety culture	Identification of errors through reports	Work conditions. Communication of the team.	Doctors Nurses
E5	To examine nurses' attitudes towards safety culture in six Saudi Arabian intensive care units (ICUs).	Working conditions	Working conditions. General practices in infection control.	Nurses
E6	To evaluate hand hygiene improvement and healthcare associated infections after the introduction of an infection surveillance and prevention program at a university hospital in a low- to middle- income country for 09 years.	Infrastructure of the ICU Hand hygiene	General practices in infection control. Infrastructure of the ICU.	Doctors
E7	To compare changes in registered nurses' perception of the patient safety culture in intensive care units during a four-year period.	Work conditions Team communication Infrastructure of the ICU	Infrastructure of the ICU. Working conditions.	Nurses
E8	To answer the following two questions: (a) what is the level of safety culture at NICU's in Gaza Strip? And (b) is there a relationship between reported safety culture and caregivers' characteristics?	Infrastructure of the ICU Working conditions	Working conditions. Team communication.	Nurses and doctors
E10	To investigate patterns and structures of intensive care nurses in hand hygiene and to explore perceptions and unconscious psychological processes underlying hand-washing behaviors.	Hand hygiene	Hand hygiene	Nurses
E11	To determine the number of hand hygiene opportunities per patient and the real time spent on hand hygiene.	Hand hygiene	Hand hygiene	Doctors Nurses Other health professionals, such as the physical therapist.
E12	To report on an evaluation of infection control practices in public and private sector ICUs in South Africa.	Infrastructure of the ICU Hand hygiene General infection control practices	Infrastructure of the ICU. General infection control practices. Use of PPE.	Health professionals in the ICU and were not quantified.
E13	To measure the adherence to the best practice in hand hygiene in six ICUs from four Italian hospitals.	Hand hygiene General infection control practices Use of PPE	Hand hygiene. General infection control practices. Infrastructure of the ICU.	Doctors, nurses and nursing technicians
E14	To identify health care providers' perspectives for providing quality infection control measures at a NICU.	Does not address	Working conditions. Use of PPE. General infection control practices. Training and continuous updating of ICU health professionals.	Doctors Nurses
E15	To know publications about the monitoring of adverse events (AE) in patients admitted to the Intensive Care Unit.	Development of a software to identify and prevent errors. Development of an educational program.	Low adherence to records in the software. Team communication. Hand hygiene. Training and continuous updating of ICU health professionals.	Nurse
E9	To describe patient safety according to the perception of nursing and medical professionals in Neonatal Intensive Care Units.	Does not address	Infrastructure of the ICU. Working conditions. Team communication. Notification of adverse events. Calibrate professionals for handling ICU equipment.	Doctors Nurses Nursing technicians and assistants

As shown above, hand hygiene was the most performed and most neglected practice among health professionals. In addition, high workload, lack of discussion about errors and lack of training were frequently cited as neglected practices or practices that increase the number of adverse events and directly affect the quality of the health service.

As for the health professionals included, 33.33% of the studies analyzed the practices of nurses, 13.33% analyzed the practices of doctors, and 26.66% observed the two professionals simultaneously. The evaluation of other professional groups, such as nursing technicians and

assistants, physical therapists, among others, was observed in 26.66% of the studies.

It is important to highlight that, among the selected studies, 13 (86.66%) addressed the risk management practices of nurses and it was possible to observe the exclusion and/or scarcity of data about other professionals who are in direct contact with patients in the ICUs and need, as well as nurses and doctors, to comply with measures and protocols to reduce risks and adverse events.

Finally, the main conclusions of each article are presented and grouped according to the similarities between the studies (Table 4).

Table 4: Important conclusions according to the studies included in the scoping review (n=15). Campina Grande, Paraíba, Brazil, 2020

Important conclusions	Studies
Suggestion of an effective continuing education program to improve hand hygiene	E1, E2
Increased effectiveness and improved hand hygiene in infection control	E3, E2
Additional attention in communication, analysis of errors and teamwork	E4, E15
Implementation of a multifaceted infection control program was associated with a reduced rate of healthcare-associated infections (HAIs)	E6, E12
Development of actions that promote a patient safety culture	E7
Adequate working conditions	E7, E14
Creation of new policies and programs to increase safety in the ICU	E8, E5
Need for teaching and continuing education on the topic of patient safety	E9, E15
Performing hand hygiene according to current guidelines is the most effective way to prevent infections considering the educational and structural aspects	E10, E11, E13
Continuing education and training of nurses in training programs related to NICU infection control	E14

It is noted that 13.33% of the conclusions mention continuing education to improve hand hygiene; increased effectiveness and improved hand hygiene in infection control; and additional attention in communication and teamwork. Another 13.33% of the studies recommended a multifaceted infection control program, adequate working conditions, creation of new policies to improve ICU safety, and continuing education addressing patient safety.

Furthermore, 6.66% of the studies indicated the need for continuing education for nurses and the development of actions that promote a patient safety culture.

DISCUSSION

According to the study by Rodriguez et al.²³, the main reasons for the hospitalization of patients in the ICU are diseases of the circulatory system (23.3%), followed by injuries, poisoning and other consequences of external causes, among which the most frequent was traumatism (21.3%). Regarding the outcome of the hospitalization, it was found that 79.3% of patients were discharged from the ICU, while 20.4% (n=142) died. These numbers demonstrate the importance of an adequate risk

management in the intensive care environment to reduce the damage to the health of patients and professionals. These aspects may be related to the high number of scientific studies addressing this theme.

Among the main performed and neglected risk management practices identified in the articles of the present study, hand hygiene stands out. Hand hygiene must be constantly performed and improved in the care processes to reduce contamination rates.

The importance of this measure is clear, but its implementation is still a worldwide challenge, mainly due to the low adhesion of health professionals. This fact may be associated with several reasons, which include the routine of the institution and the professionals, the absence of previous experiences with the theme and/or lack of recognition of the importance of this approach, a deficit of human resources leading to work overload, lack of material resources and a precarious local infrastructure, which considerably increases the risks to patients²⁴.

A study by Lacey²⁵ developed a proficiency-based training to improve hand hygiene technique according to WHO guidelines. This study found a strong correlation between training sessions, proficiency level and time spent

in training, highlighting that, on average, a student had to take 32 hand hygiene exercises with feedback to achieve satisfactory results. Thus, it is necessary to expand and improve this exercise in the undergraduate training of doctors, nurses, and technicians, aiming to have qualified professionals and to reduce the number of deaths due to HAIs, which represent a high risk to patient safety and generate significant costs for the health system. Problems like these can be avoided with the simple act of hand hygiene.

Team communication stands out among the main neglected practices, which corroborates the need to maintain an interprofessional dialogue. Neglecting this simple measure can lead to countless adverse events and reduce the quality of patient care. This study showed that some factors that hinder communication are the professional relationship between the leaders of each professional sector, fatigue, high workload, and terrible working conditions.

According to a study carried out by Seo²⁶, the greater the number of hospitalized patients, the worse the working conditions will be. A high number of patients increases the tiredness and stress of workers, leading to physical and mental exhaustion and neglect of hand hygiene, while also hindering the management of the unit and the good relationship between the team.

It is important to highlight that most of the professionals involved were nurses and doctors. This may have happened because this team has greater contact with patients and, therefore, needs to be better observed. The study mentioned above also found that ICU doctors and nurses have greater skills and experience to deal with stressful events, as they often work under adverse conditions²⁶.

However, considering the multidisciplinary approach in the ICU, all professionals involved in this context should be adequately qualified, including physical therapists, nursing technicians, nutritionists, pharmacists, and the general services team. Continuing education should be provided with the objective of qualifying these workers and avoiding work accidents and adverse events. However, the results of this review demonstrate the lack of training of these professionals.

It appears that the approach to this theme is fragmented, superficial and disconnected from reality since undergraduate studies. A study published by Silva²⁷ found that, in recent years, the number of complaints about errors and adverse events in healthcare environments has grown by about 30%. Among the main factors that contribute to this outcome are the inadequate training of nurses, technicians, and nursing assistants. In this perspective, it is possible to perceive the importance of training health professionals to reduce future errors and promote quality in the workplace.

Currently, there are deficient public policies that hinder the free access to training for these professionals. Therefore, it is necessary to implement resources that allow a continuing education and that promote patient safety in healthcare environments and in the training of these workers. With this, satisfactory results regarding patient safety and risk management can be obtained in healthcare settings such as ICUs^{21,27}.

Given the above, it is possible to perceive that risk management in ICUs still has gaps and failures that need maintenance in order to improve the quality of care and reduce the risks of contamination^{21,25}. In this perspective, it was observed that 20% of the articles show that the best way to prevent the risk of infection is to perform hand hygiene according to the current guidelines, which is the simplest and most effective measure to reduce infections.

Thus, although the results of this research reveal the main actions taken by health professionals in risk management, it is essential to reflect on the main problems and obstacles that are observed, such as hand hygiene, workload, team communication and working conditions. Finally, even though the study intended to evaluate most of the existing literature, limitations may occur, as it is likely that there is research published in other languages, as well as indexing databases not included in this study.

CONCLUSION

It is important to prioritize risk management in the ICU in an efficient and quality manner in order to avoid or minimize adverse events and provide comprehensive, qualified and responsible assistance during the clinical evolution of each patient. Another important aspect is the need for continuing education and daily calibration of the multi-professional team, as many structural and interpersonal barriers of the team are real barriers to an effective and harmonious work environment.

Among the practices neglected in the ICU, hand hygiene was the most ignored. This is an alert and concern, as hand hygiene is a simple and easy measure that is fundamental for risk management and prevention of HAIs. However, there are still several obstacles to its efficient execution, such as lack of time, lack of knowledge of the hand hygiene protocol, and overcrowding in the ICUs.

The current scenario deserves to be highlighted, as the world faces the Coronavirus pandemic (SARS-Cov-2), which led to the recognition of the extreme importance of adequate and frequent hand hygiene as one of the main ways of fighting the disease. Once neglected, this measure contributes to the uncontrolled transmission and the fatality of cases.

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