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Nursing Extensionists in Hospital Infection Control before and during the COVID-19 pandemic

Extensionistas de Enfermagem no Controle de Infecção Hospitalar antes e durante a pandemia da Covid-19

Extensionistas de Enfermería en el Control de Infecciones Hospitalarias antes y durante la pandemia de Covid-19

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ABSTRACT
Introduction: The Hospital Infection Control Service plays a vital role in preventing Healthcare-Associated Infections, and the nurse, as an active member of this service, contributes with both technical and managerial expertise. With the onset of the COVID-19 pandemic, measures such as the mandatory use of Personal Protective Equipment became essential to curb the spread of SARS-CoV-2. Objective: To describe the importance of the role of nursing extensionists before and during the COVID-19 pandemic in the Hospital Infection Control Service of a University Hospital. Method: This is an experience report carried out between 2020 and 2022 by undergraduate nursing students from the 5th and 6th semesters at the Federal University of Piauí, participants in the project "Surveillance of Risk and Protective Factors for Healthcare-Associated Infections." The activities included active chart review, inspection of invasive devices, observation of hand hygiene practices, and development of educational materials. Results: The actions promoted hands-on learning, encouraged a culture of safety, and supported the strategies implemented by the Hospital Infection Control Service. Implications: The experience highlighted the importance of health education and the effective use of remote tools as a means of disseminating knowledge.

DESCRIPTORS:
Nursing. Hospital Infection Control Program. Infection Control. COVID-19.

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INTRODUCTION

In Brazil, Law No. 9431/1997 mandates that hospitals must establish and maintain a Hospital Infection Control Program (PCIH). Ministry of Health Ordinance No. 2,616/1998 sets forth, in five annexes, the guidelines and regulations for the prevention and control of hospital infections[1].

The National Health Surveillance Agency (ANVISA), Brazil's official health regulatory agency, has issued updated normative acts in alignment with international organizations such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), as well as evidence-based research, providing guiding materials for the prevention and control of Healthcare-Associated Infections (HAIs) and COVID-19[2].

As one of the key members responsible for implementing the Hospital Infection Control Service (SCIH), nurses play a fundamental role in planning and executing the PCIH. Their qualifications, combined with experience, grant them the autonomy and competence to oversee a significant portion of the service's activities. The nurse's responsibilities within the SCIH include epidemiological surveillance, the development of internal protocols and guidelines, collaboration with microbiology and pharmacy departments, health education, among other activities[1,3].

The pandemic caused by a virus brought serious consequences to people's lives worldwide. The initial lack of knowledge regarding the transmission mechanisms of SARS-CoV-2 led to the immediate implementation of pre-existing precautionary measures, enforcing strict safety protocols in patient care—from admission to the full continuum of care within health services. As such, prevention and control measures became essential when managing suspected or confirmed cases of COVID-19. Among the activities carried out by the SCIH of a university hospital is the training of students on the importance of knowledge and contributions to HAI surveillance (Healthcare-Associated Infections), which is why nursing students from extension projects are welcomed into the service[4-6].

After multiple studies on the transmission of COVID-19, it was found that the virus SARS-CoV-2 spreads through very small droplets (aerosols) that remain suspended in the air for extended periods. To prevent this in hospital settings, the use of Personal Protective Equipment (PPE) became mandatory. When these virus-laden aerosols are inhaled by individuals not properly using PPE, the risk of infection becomes significantly higher[6].

The prevention and control of Healthcare-Associated Infections (HAIs) remain ongoing challenges in hospital settings, especially during public health crises such as the COVID-19 pandemic. In this context, the involvement of extension students in the Hospital Infection Control Service (SCIH) represents a valuable strategy to strengthen epidemiological surveillance and promote safe patient care practices.

Moreover, this study aligns with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda, particularly SDG 3 (Good Health and Well-Being), by promoting actions focused on patient safety and infection prevention; SDG 4 (Quality Education), by integrating teaching and professional practice in a critical and contextualized manner; and SDG 16 (Peace, Justice, and Strong Institutions), by contributing to the institutional strengthening of health services[7].

This study is based on the experience of extension students engaged in various infection prevention and control activities at a university hospital, under the supervision of SCIH nurses and the coordinators of the extension project entitled "Surveillance of Risk and Protective Factors for Healthcare-Associated Infections" at the Federal University of Piauí. These activities provide students with opportunities to recognize HAI cases, understand the processes of notification and dissemination, and participate in educational initiatives alongside the service's nursing professionals. Accordingly, the objective is to describe the importance of the role of extension students before and during the COVID-19 pandemic within the Hospital Infection Control Service of a University Hospital.

METHODS

This is a descriptive experience report, developed from the participation of 10 undergraduate Nursing students, regularly enrolled in the 5th and 6th semesters at the Federal University of Piauí (UFPI), who were members of the university extension project entitled: *"Surveillance of Risk and Protective Factors for Healthcare-Associated Infections."* The experience described encompasses the period before and during the COVID-19 pandemic, taking into account the adaptations imposed by health and safety

measures.

The objective of the extension project was to train Nursing students to engage in the prevention and control of Healthcare-Associated Infections (HAIs) through participation in educational activities and infection surveillance, including active case finding and reporting, at a large university hospital located in the Northeast region of Brazil. All actions were directly supervised by nurses from the Hospital Infection Control Service.

The experience took place at a public teaching, research, and extension hospital, classified as a large-scale, high-complexity facility, with an extensive physical structure and multiple healthcare sectors. The institution is equipped with inpatient beds, including Intensive Care Units (ICUs), outpatient clinics, operating rooms, and a diagnostic center offering technologies such as magnetic resonance imaging, computed tomography, ultrasound, hemodynamics, and additional diagnostic tests. The Hospital Infection Control Service (SCIH) was responsible for planning the actions that were carried out with the collaboration of its technical team and the extension students.

To facilitate understanding, the activities were organized into two distinct phases: before the COVID-19 pandemic (conducted in person) and during the pandemic (carried out remotely).

The pre-pandemic activities took place during the first quarter of 2020. Before the onset of the pandemic, the project's activities were conducted in person, with extension students working in various hospital sectors known as Stations 1, 2, 3, and 4, in addition to the Intensive Care Unit (ICU). The 10 students were divided into pairs and scheduled weekly from Monday to Saturday. Activities were conducted in the afternoon from Monday to Friday, and in the morning on Tuesdays and Saturdays, with only one student assigned on those mornings. All activities were directly supervised by nurses from the SCIH, who guided each extension student’s specific responsibilities.

The tasks performed included medical record review and patient follow-up to complete protocols related to: central line-associated bloodstream infections (only in the ICU); surgical site and urinary tract infections (monitored in all stations and the ICU); observation of hand hygiene (HH) practices by healthcare professionals, with documentation using specific forms provided by the Brazilian Health Regulatory Agency (ANVISA)[8].

The activities during the pandemic were suspended indefinitely by the Crisis Management Committee of the Federal University of Piauí, which included the extension actions. As the pandemic progressed and in the absence of vaccines or effective treatments at the time, in April and May of 2020, the remote development of an educational leaflet on Hand Hygiene (HH) was proposed, with a focus on the prevention of Healthcare-Associated Infections (HAIs) and the importance of HH as a barrier to the spread of the novel coronavirus (SARS-CoV-2).

The educational leaflet on hand hygiene was developed remotely by the extension students using the Canva digital platform, which allowed for collaborative and visually appealing content creation. The material was based on the institutional document “Standard Operating Procedure (SOP/CCIH/001) – Hand Hygiene,” reviewed by the Hospital Infection Control Committee, which served as the technical and scientific reference for the content(9). Its development included meetings held through Google Meet and WhatsApp platforms, enabling continuous communication among students, the project coordinator, and nurses from the Hospital Infection Control Service (SCIH). Upon completion, the leaflet underwent collective review and content validation by the team and was subsequently approved for dissemination in the university hospital environment.

As this is an experience report related to activities carried out by extension students within the scope of patient safety and quality of care, approval by a Research Ethics Committee (REC) involving Human Subjects was not required, with the confidentiality of those involved being respected. Nevertheless, this study complies with Resolution No. 466/2012 of the Brazilian National Health Council (CNS)[10].

RESULTS

Based on the participation of extension students in the project aimed at preventing Healthcare-Associated Infections (HAIs), several positive outcomes were observed, involving aspects of academic training, practical performance in the hospital environment, and adaptation to the challenges imposed by the pandemic. Table 1 presents a systematization of these results, organized by thematic dimensions, providing a comprehensive view of the contributions and implications of the extension experience.

Table 1. Contributions and implications of the extension experience in the control of HAIs, Teresina, Piauí, Brazil.

Dimension	Observed Results	Remarks/Impacts
Health Surveillance	Monitoramento e avaliação sistemática de dispositivos invasivos utilizados em pacientes hospitalizados.	Contribuição direta à prevenção das IRAS e apoio ao SCIH.
Critical and Reflective Education	Critical reflection by students on safe practices, especially regarding hand hygiene.	Strengthening of patient safety culture and evidence-based practice.
Health Education (Remote)	Development of educational material (digital folder), even during the suspension of in-person activities.	Maintenance of educational actions during the pandemic; innovation in material production.
Promotion of Health Education	Promotion of health education as an active tool in preventing HAIs and disseminating knowledge among professionals and students.	Expansion of knowledge dissemination and strengthening of the role of university extension.
Teaching-Service Integration	Active student participation in the routine of the HICS, with practical and educational actions in the hospital setting.	Student engagement with real-world service and strengthening of bonds with the multidisciplinary team.
Adaptability and Innovation	Adaptation of educational strategies during the pandemic, using digital tools and virtual meetings.	Project flexibility and student engagement even under adverse conditions.
Challenges and Practice Limitations	Resistance by some professionals to hand hygiene and limited staffing in the HICS.	Reinforces the importance of student involvement as a strategic support to the service and patient safety.

Source: Direct research, 2025.

Based on the activities carried out by the extension students within the project, it was possible to identify significant results that highlight the importance of student involvement in HAI prevention efforts. Table 2 below presents a systematized overview of the main aspects of this experience, including the dimensions involved, actions performed, observed impacts, and challenges faced during the execution of the activities.

Table 2. Observed impacts and challenges faced by extension students in the control of HAIs, Teresina, Piauí, Brazil.

Dimension	Observed Results	Estimated Data
Student Participation	Students were involved in-person before the pandemic and remotely during the pandemic, under HICS supervision.	10 extension students (5 pairs on a weekly rotation)
Work Settings	Stations 1, 2, 3, 4, and the Intensive Care Unit (ICU).	5 hospital sectors covered
Activities Performed	Medical record assessment and inspection of invasive devices; observation of HH (hand hygiene); completion of protocols.	>60 estimated weekly evaluations
Educational Materials Produced	Educational folder on HH developed during the pandemic, with active student participation and academic and technical supervision.	1 approved and disseminated digital folder
Platforms Used	Google Meet, WhatsApp, Canva.	3 digital tools for remote support
Impact on Training	Development of critical thinking, preventive practice, and awareness of patient safety.	Positive feedback in meetings and debriefings.
Identified Challenges	Resistance among professionals regarding the 5 moments of HH and limited staffing in the HICS.	Identified both before and during the pandemic.
Contributions to Care Delivery	Expanded HAI surveillance; support for indicator collection; improvement of care practices.	Direct contribution to HICS and the university hospital

Source: Direct research, 2025.

EXPERIENCE REPORT

Patients undergoing healthcare procedures are exposed to both intrinsic and extrinsic risks of acquiring Hospital-Acquired Infections (HAIs), currently also referred to as Healthcare-Associated Infections (HAIs). These infections may occur during hospitalization in a healthcare facility or even after discharge. Preventing and controlling HAIs poses a significant challenge, especially in the context of the COVID-19 pandemic.

The involvement of extension students also contributed to raising awareness among healthcare professionals regarding the importance of HAI prevention through informal dialogues and evidence-based clinical discussions. This interaction fostered a continuous learning environment, strengthening the connection between theory and practice. Additionally, initiatives such as systematic observation and feedback to professionals based on collected data enabled the development of collaborative spaces for improving care practices[11,12].

This experience report aims to describe the role of extension students during the pandemic. The activities consisted of analyzing patient medical records to verify information such as correct patient identification, whether the use of invasive devices was properly prescribed by a physician, as well as the insertion date and the type of device used. Following this step, direct inspection of the patient was performed to assess the correct positioning of the device, its securement, and any conditions that could increase the risk of infection. All collected data were recorded in a spreadsheet created by the Hospital Infection Control Service (HICS).

The COVID-19 pandemic introduced new routines to healthcare services, requiring rapid adaptation of protocols and heightened vigilance over patient safety. In this scenario, the role of extension students was essential in strengthening infection prevention barriers, such as the proper use of PPE, aseptic chain control, and monitoring of isolation practices[13-15]. The students' critical and reflective training aligned with the National Nursing Curriculum Guidelines, which emphasize the integration of teaching, service, and community[16].

The evaluation of patients and invasive devices—such as central venous catheters and indwelling urinary catheters—along with the information recorded in medical charts, was essential for identifying signs and symptoms indicative of HAIs and for completing the required protocols. Additionally, observing hand hygiene (HH) practices among healthcare professionals prompted reflection among extension students, fostering a critical perspective on the hygienic measures necessary during direct patient care.

The development of the educational hand hygiene folder by extension students was carried out through meetings held via information and communication platforms such as Google Meet and WhatsApp. These tools enabled the collaborative organization of the material with contributions from students, extension project coordinators, and the HICS nurses. This demonstrates that health education must be preserved even during times of crisis, such as a pandemic, in order to continue promoting knowledge among students.

Importantly, the creation of the folder allowed students to serve as knowledge multipliers. The folder not only served as an educational resource but also represented a strategy for student empowerment and leadership in health promotion. The use of digital platforms facilitated both access to and dissemination of this material, thereby expanding its reach[17-19].

The role of the HICS in hospital environments is significant, as it aims to reduce health risks for patients. The participation of undergraduate nursing students in the extension project contributed to their academic training, preparing future professionals, managers, and frontline workers who are aware of the importance of collective engagement in promoting quality care. Thus, student participation in educational activities focused on the prevention of HAIs is of great value in enhancing the knowledge acquired through both extension activities and academic instruction.

Health education is a tool that fosters the interaction between health promotion and knowledge dissemination. Currently, it has been conducted remotely, demonstrating that health education strategies can be adapted to support the spread of knowledge even during a pandemic, as evidenced by the creation of the handwashing educational folder[20].

Resistance among professionals to adhering to hand hygiene (HH), as observed during the experience, is a reality highlighted in several studies. Barriers such as lack of supplies, work overload, lack of knowledge about the five moments for HH, and a weakened institutional culture contribute to this scenario[21-23]. The presence of extension students as observers and promoters of this practice helped reinforce the importance of hand hygiene as a primary measure for preventing HAIs.

Studies indicate that university extension projects contribute to strengthening the ethical, critical, and civic education of nursing students, in addition to bridging academic learning with the reality of healthcare services[24,25]. Participation in activities focused on patient safety also fosters the development of essential competencies such as teamwork, leadership, assertive communication, and clinical reasoning[26,27].

Undergraduate nursing students must become increasingly proactive. In addition to participating in educational activities, they should work to transform the realities experienced in healthcare settings. One example of this is the fight against cross-infection. A simple act of hand hygiene can prevent serious complications, reduce hospitalization time, and limit the patient's exposure to additional procedures[28].

The use of clinical indicators is a crucial tool for evaluating healthcare services. The inclusion of nursing extension students in health education activities enhances care practices by enabling professional engagement that goes beyond typical undergraduate training. It is evident that the integration of teaching and service, as promoted by projects like this, aligns with the principles of the Brazilian Unified Health System (SUS), especially regarding comprehensive and humanized care. The active surveillance of HAIs carried out by students contributes to the construction of a safety culture, in which all stakeholders—from patients to managers—share responsibility for care[29,30].

There are many challenges in minimizing HAIs. Among the difficulties encountered, resistance from some professionals to performing hand hygiene during the five moments of patient care, especially before the pandemic, stands out[31]. Therefore, it is essential to incorporate more strategies into the routine of healthcare professionals to promote HH practices. Surveillance by the Hospital Infection Control Service (SCIH) must be continuous. Given the limited number of professionals working in the service, the contribution of nursing students has been fundamental for the implementation of HAI prevention measures in the university hospital. This has a direct impact on infection rates, patient safety, and the quality of care provided.

It is worth highlighting that the incorporation of extension students into healthcare services adds value to both professional practice and the teaching-learning process. This experience allows for the reframing of theoretical knowledge, contributing to the training of nurses who are more sensitive to social demands and committed to improving the quality of care—especially in the prevention of avoidable infections[32,33].

The extension activity was successfully carried out despite limitations, such as a lack of guidance and patients' limited understanding—possibly due to a lack of knowledge about patient safety. As a key contribution, participation in the project supported the students' academic development, promoting a critical perspective on patient safety and preventive care. Despite challenges, such as professionals' resistance to hand hygiene, the actions demonstrated the importance of health education and the integration of remote strategies for knowledge dissemination and the reduction of hospital-related risks.

CONCLUSION

The participation of nursing students in the Hospital Infection Control Service (SCIH) proved to be highly relevant both for academic training and for strengthening the strategies for the prevention of Healthcare-Associated Infections (HAIs) at the university hospital. Through data collection, observation of professional practice, and the development of educational materials, the students actively contributed to patient safety strategies, promoting effective integration between education and healthcare services.

Even in the challenging context of the COVID-19 pandemic, the experience showed that university extension programs can adapt and continue to serve as powerful tools for education and social impact. Remote participation, coordinated through digital tools, enabled the continuity of extension activities and reinforced student leadership in health education. The creation of resources such as the educational hand hygiene folder and participation in surveillance activities demonstrate that, even at a distance, students were able to contribute to knowledge dissemination and the monitoring of safe practices.

It can be concluded that the inclusion of students in the SCIH contributed to broadening their critical perspective on care, fostering a sensitive awareness of preventive measures and the importance of a safety culture within healthcare services. This experience reaffirms the strategic role of extension as a bridge between theory and practice, preparing future professionals to act ethically, with commitment, and grounded in evidence-based practices for the prevention of avoidable infections—ultimately contributing to the improvement of the quality of care provided in hospital settings.

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ORIGIN OF THE ARTICLE

Experience Report.

CONTRIBUTION OF AUTHORSHIP

All authors contributed equally to the conception, design, analysis, and writing of this manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest to declare.