

# Surgical site infection and nurse telemonitoring in the postoperative period: a scoping review\*

## Infecção de sítio cirúrgico e o telemonitoramento pelo enfermeiro no pós-operatório: uma revisão de escopo

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### ABSTRACT

**Objective:** This study aims to map scientific evidence regarding the prevention and early management of surgical site infection through telemonitoring in surgical patients after discharge from the hospital. **Method:** A scoping review was conducted following the guidelines proposed by the Joanna Briggs Institute (JBI). The search was performed across PubMed, Latin American and Caribbean Health Sciences Literature (LILACS), Cochrane Collaboration, Scopus, CINAHL, MEDLINE, Web of Science, and Embase databases. Three independent researchers collect the identified studies using Endnote Basic and Rayyan. **Results:** A total of 1,386 studies were identified, of which 31 were included in the analysis. These selected studies demonstrated significance regarding early and late warning signs of surgical site infection, complications, risk factors, prevention strategies, and the utilization of telemonitoring. **Conclusion:** While the studies address surgical site infection and telemonitoring, it is imperative to formulate the instruments employed in telephonic consultations, incorporating a more specific consideration of essential criteria to be addressed.

**Descriptors:** Surgical Wound Infection; Remote Consultation; Nursing Care.

### RESUMO

**Objetivo:** mapear evidências científicas sobre a prevenção e o manejo precoce de infecção de sítio cirúrgico por telemonitoramento em pacientes cirúrgicos após alta hospitalar. **Método:** revisão de escopo desenvolvida conforme proposto pelo Instituto Joanna Briggs (JBI). Foi realizada a pesquisa nas bases de dados PubMed, Literatura Latino-americana e do Caribe em Ciências da Saúde (LILACS), *Cochrane Collaboration*, Scopus, CINAHL, MEDLINE, *Web of Science* e Embase. Os estudos foram adicionados ao gerenciador Endnote Basic e Rayyan por três pesquisadores independentes. **Resultados:** foram identificados 1.386 estudos e incluídos 31, os quais apresentaram relevância em relação a sinais de alerta precoce e tardio da infecção de sítio cirúrgico, complicações, fatores de risco, prevenção e utilização do telemonitoramento. **Conclusão:** observou-se que, embora os estudos abordem a infecção de sítio cirúrgico e o telemonitoramento, faz-se necessário a formulação dos instrumentos utilizados nas consultas telefônicas, contemplando com maior especificidade os critérios indispensáveis a serem abordados.

**Descritores:** Infecção da Ferida Cirúrgica; Consulta Remota; Cuidados de Enfermagem.

### INTRODUCTION

Surgical Site Infection (SSI) is currently a potential public health issue in Brazil and globally despite being categorized as a preventable adverse event (AE). Brazilian studies reveal that surgical site infections occur in approximately 3% to 20% of all surgical procedures performed, thus representing a primary complication from surgical interventions. These infections can result in localized afflictions in cases of minor severity and even escalate to patient mortality, constituting the gravest outcome<sup>(1-3)</sup>.

These data underscore alarming statistics, accentuating the imperative for comprehensive studies that address factors contributing to the emergence of SSI, its prevention, and the application of management techniques. Such endeavors are essential for effectively curtailing new instances and mitigating

the severity of consequences. Nevertheless, the care provided to surgical patients within health-care systems exposes potential vulnerabilities as SSI rates persist in their upward trajectory<sup>(4-5)</sup>. SSI prevails as a reality within healthcare systems, encompassing both public and private domains. Given that we are contending with a preventable AE, this reality necessitates expedient solutions. The care extended to patients is pivotal in preventing and promptly managing this adverse event, with this responsibility intrinsically entwined with nursing actions. Nurses play a fundamental role in caring for surgical patients, overseeing clinical and epidemiological developments, assessing dressings, drains, and offering health education through pre- and post-operative guidance<sup>(6-7)</sup>. These functions hold paramount importance for surgical patients and require reinforcement through the implementation of Advanced Nursing Practice (ANP). While ANP encompasses all realms of nursing, it can substantially contribute to advancements in the prevention and early management of SSIs while also fulfilling a critical role in post-discharge monitoring. Notably, the established hospital-based model for surgical patient care may inadvertently result in gaps in post-discharge follow-up as patients return for predetermined appointments, leaving intervals devoid of oversight<sup>(8-9)</sup>. These patients to be monitored post-discharge, given that data indicate the most critical complication period and SSI development occurs within the initial 30 days following the surgical procedure<sup>(10-12)</sup>. In this context, telemonitoring emerges as a technological care modality, offering swift and efficient patient tracking at reduced costs, thus addressing existing gaps<sup>(1,13-14)</sup>. Telemonitoring constitutes a nursing intervention embraced within the Nursing Interventions Classification (NIC) scope<sup>(15)</sup>, substantiating and legitimizing nurses' remote patient monitoring. It facilitates disease and health issue tracking, clinical data collection, care prescription, and management of diverse health-related situations, supported by Digital Information and Communication Technologies (DICTs)<sup>(11)</sup>. Over the years, telemonitoring has witnessed limited application and minimal emphasis on healthcare. However, during the Covid-19 pandemic, it garnered prominence and evolved into a vital ally for healthcare systems, leading to normalization through Resolution 692/2022 by the Federal Nursing Council, which delineates concepts and modalities associated with telehealth

and tele-nursing, integrating Information and Communication Technologies (ICTs)<sup>(9)</sup>. Confronted with the need to develop a post-operative telephonic consultation model for SSI monitoring and early management as part of the Professional Master's in Assisting Nursing (PMAN) thesis, it is imperative to synthesize the best evidence pertaining to the topics to be addressed during this telephonic consultation, for the prevention and early management of SSI. Consequently, this study seeks to map the scientific evidence concerning the prevention and early management of surgical site infection through telemonitoring in surgical patients following hospital discharge.

## METHOD

This study constitutes a scoping review conducted following the methodology outlined by the Joanna Briggs Institute (JBI)<sup>(16)</sup> and guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines<sup>(17)</sup>. The study registration was completed on the Open Science Framework (OSF) through the link <https://osf.io/7xp2n>, with the assigned DOI identifier: 10.17605/OSF.IO/7XP2N. The inclusion criteria for study selection encompassed the following: descriptive, qualitative, quantitative, methodological, conceptual, and/or reflective studies; randomized controlled trials; quasi-experimental or experimental design; case-control studies; time series analyses; reviews; grey literature; books; theses; and dissertations. No temporal constraints were applied in alignment with PRISMA-ScR guidance<sup>(17)</sup>. Exclusions were applied to studies in the format of editorials, editor letters, and duplicates.

For the initial identification of studies, the Brazilian Virtual Health Library (BVS) and Public Medline (PubMed) databases were selected. Alongside these databases, the Latin American and Caribbean Health Sciences Literature (LILACS), Cochrane Collaboration, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), Web of Science, and Embase were consulted. These databases were selected based on the indexing quantity of primary health-related articles. The search for studies within these databases was terminated in November 2022.

The PCC (Population, Concept, and Context) mnemonic<sup>(16)</sup> was employed to formulate the

research question. The following elements were defined: P – patients of any age and gender with surgical site infection/prevention and early management of infection; C – telemonitoring; C – postoperative care after hospital discharge. Based on these definitions, the following research question was developed: “Does telemonitoring performed by nurses enable the identification, prevention, and management of surgical site infection post-hospital discharge?”

The PCC descriptors were combined with Boolean operators AND (intersection of terms) and OR (grouping/sum of synonyms) for study identification. The search strategy employed in PubMed and BVS was: “Infecção da Ferida Cirúrgica” AND (“Consulta Remota” OR telemedicina). When combined with Boolean operators, these terms resulted in the search strategy depicted in Figure 1, which was tested and applied across all mentioned databases.

The study selection process occurred across four stages: 1) Removal of duplicates; 2) Title and abstract analysis; 3) Comprehensive study review; and 4) Summarization and categorization of findings. Duplicate removal was executed using the reference management tool EndNote Basic (Clarivate Analytics). Subsequently, the pre-selected studies were exported to the Rayaan app from the Qatar Computing Research Institute (QCRI) for title and abstract analysis conducted by three independent reviewers. Disagreements were resolved by a fourth, also independent, reviewer.

Following the title, abstract, and keyword (topic) selection, a spreadsheet was created using Microsoft Excel. A tool adapted for this research was devised for the comprehensive study review, based on the form recommended by JBI<sup>(16)</sup>. This tool aided in synthesizing information, including title, authors, publication year, country of origin, objective, sample, methodology, intervention,

results, and key conclusions.

The final selection stage involved data summarization and organization, resulting in five analytical categories devised to facilitate the evaluation and description of findings. However, a methodological rigor analysis of the studies was not performed, as this step is not required in scoping reviews, whose objective is to map available evidence to address a specific question.

## RESULTS

Initially, 3,957 studies were identified, including one study from grey literature. Following the removal of duplicates, 1,386 studies remained. The scrutiny of titles, abstracts, and keywords yielded 118 studies that were further selected for full-text review. Ultimately, 31 articles were included in this review. A comprehensive breakdown of the search and selection outcomes is depicted in the PRISMA-ScR flowchart<sup>(17)</sup>, available for reference in Figure 2.

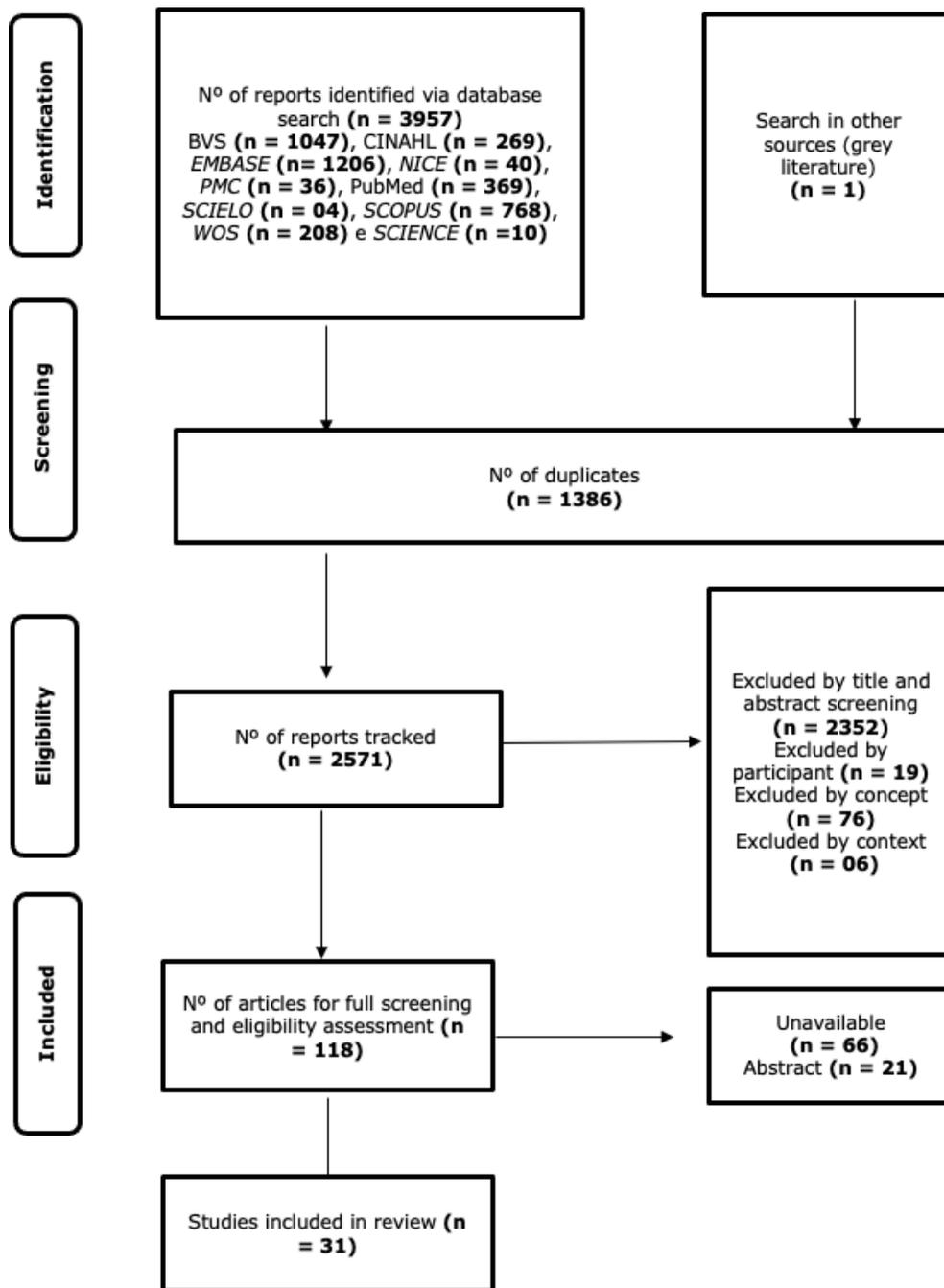
Of the 31 studies included in this review, 77.4% (n=24) were published in English and conducted across diverse countries. The research encompassed various surgical procedures, with no specific dominance of any type. Regarding the participants' age range, 41.9% (n=13) were individuals above 18 years, 6.4% (n=2) were minors under 18 years, and 51.6% (n=16) did not specify the age group. A noticeable increase in publications was observed between 2011 and 2021, accounting for 68.37% (n=1758) of the located publications based on title and abstract. The primary findings were pivotal in shaping the formulation of the five analytical categories, as illustrated in Figure 4.

## DISCUSSION

The temporal aspect and incidence of SSI have been extensively addressed in the literature, as

<b>PORTUGUESE, SPANISH AND FRENCH</b>
<i>"Infecção da Ferida Cirúrgica" OR "Infección de la Herida Quirúrgica" OR "Infection d'une plaie chirurgicale" AND "Consulta remota" OR Telemedicina OR Telemonitoramento OR Teleorientação OR "Monitorización Remota" OR "Teleorientación" OR "Consultation à distance" OR "Telesalud" OR "Télésanté" AND "Alta hospitalar" OR "Assistência domiciliar" OR "Assistência Pós-Operatória" OR "Alta del Hospital" OR "Planification des sorties d'hôpital" OR "Soins postopératoires".</i>
<b>ENGLISH</b>
<i>"Surgical Wound Infection" OR "Surgical Wound Infections" OR "Surgical Site Infection" OR "Surgical Site Infections" OR "Postoperative Wound Infections" OR "Postoperative Wound Infection" AND "Remote consultation" OR "Telemonitoring" OR "Smarthphone" OR "Teleorientation" AND "Patient Discharge" OR "Home nursing" OR "Postoperative".</i>

**Figure 1** - Search strategy using descriptors and terms in Portuguese, Spanish, and French for national and Latin databases, and in English for international databases. Niterói, RJ, Brazil, 2022



Source: PRISMA-ScR Flowchart adapted from Tricco et al., 2021.

**Figure 2** - PRISMA-ScR flowchart of article selection for scoping reviews. Niterói, RJ, Brazil, 2021

<b>STUDY</b>	<b>OBJECTIVE</b>	<b>METHODOLOGY</b>	<b>RESULT</b>
A1 <sup>(18)</sup>	To evaluate a post-discharge surveillance method and compare the incidence of SSI at discharge and post-discharge.	Implement a post-discharge surveillance program that used a questionnaire with questions related to SSI.	Eighty-nine patients were contacted by telephone, and 13 surgical site infections were identified by telephone consultation.
A2 <sup>(19)</sup>	To identify evidence for the validity of different SSI and post-discharge SSI surveillance methods.	Systematic review addressing a follow-up within the post-discharge surveillance program.	It was impossible to assess whether all professionals involved in the research made phone calls using the same criteria.
A3 <sup>(1)</sup>	To conduct a pilot study of a residential post-operative telemonitoring system, through telephone consultation with the GPRS system allowing the capture and sending of images.	Upon patient discharge, before leaving the unit, a cell phone was handed over, and instructions were given on how the research would be carried out, such as: handling the device and sending photos by e-mail.	It was identified through the telephone interview local problems such as inflammation with exudate. Doubts were clarified, and if necessary, a face-to-face consultation was requested.
A4 <sup>(20)</sup>	To evaluate the use of a recommendation sheet at the time of discharge by telephone and e-mail.	Descriptive and observational study in which one of the variables presented is the presence of complications in the immediate post-operative period.	The research nurse solved 72.4% of the reasons via telephone.
A5 <sup>(21)</sup>	To evaluate the effectiveness of the intervention over the telephone, comparing conventional treatment	Controlled and randomized clinical trial with 43 patients submitted and followed up for four weeks	A total of seven patients had a post-operative infection at their incision site.
A6 <sup>(22)</sup>	To analyze telephone follow-up as a simple and effective way to facilitate post-discharge guidelines for surgical procedures.	Integrative review on post-operative telephone monitoring.	The telephone calls offered relevant teaching and guidance during hospital discharge. Specialist nurses carried out their monitoring.
A7 <sup>(23)</sup>	To investigate the possibility of safely replacing face-to-face clinical visits with telephone visits.	Use a script for telephone consultations with a primary care physician two weeks after surgery.	The patients were successfully approached by telephone, with no complications resulting from the surgeries.
A8 <sup>(24)</sup>	To assess problems raised by patients through their post-discharge calls.	Prospective cohort study with surgical patients.	71% of the 612 problems reported by callers were related to SSI-related symptoms.
A9 <sup>(25)</sup>	To analyze the epidemiological aspects of SSI in patients undergoing orthopedic surgeries with implants.	Cohort study with 222 patients undergoing orthopedic surgery with implants and post-discharge follow-up by telephone contact.	SSI cases were diagnosed up to 90 days after surgery; the most frequent type was superficial.

<b>STUDY</b>	<b>OBJECTIVE</b>	<b>METHODOLOGY</b>	<b>RESULT</b>
A10 <sup>(26)</sup>	To measure the quality of visits and priorities for general surgical care in the post-operative period with telephone contact, videos, and post-operative visits.	Telephone contact and videos, and face-to-face visits were made available using an instrument.	Most patients (16 out of 23) preferred monitoring through telehealth. It was possible to observe that all possible cases of SSI were detected and resolved.
A11 <sup>(13)</sup>	To review findings following an introduction of the PHE methodology (postal questionnaire) for neurosurgery and consider its suitability.	Telephone follow-up was carried out within 30 days; if necessary, the patient attended the clinical consultation in person.	Of the 1776 patients followed up in the 30 days after surgery, 82 patients had SSI confirmed through telephone contact.
A12 <sup>(27)</sup>	To evaluate the effect of structured telemonitoring (through telephone contact) through the first post-operative clinical visit.	Observational study with structured telephone calls made by surgeons from the 1st to the 4th day after discharge.	One hundred sixty-five telephone calls were made from 196 patients submitted to the research. Thirty-four health problems were identified, seven of which were due to SSI.
A13 <sup>(28)</sup>	To describe the implementation of a post-operative clinical consultation by telephone consultation in patients undergoing general surgery.	Patients were followed up for 90 days, where calls were made once a week, and it was always one day before face-to-face consultations.	Of the 171 patients, 69% were assisted by telemonitoring. Only one patient was diagnosed with superficial SSI and referred to a face-to-face consultation.
A14 <sup>(29)</sup>	To develop a new cell phone application based on images for monitoring surgical wounds.	Capture of wound images by nine vascular and general surgery patients.	Not clearly stated.
A15 <sup>(30)</sup>	To evaluate patient-provided photographs of their post-operative wounds, the accuracy of the SSI diagnosis, and their confidence in patient management.	The study was divided into two stages, where the first, participants received information on operative data, limited vital signs, and wound characteristics. The original descriptive details and available photographs were revised in the second stage.	There was an improvement in diagnostic accuracy from 67% to 76% with the photographs provided by the patients in the study, in addition to offering a potential facilitator of customer-centered care.
A16 <sup>(14)</sup>	To assess the effect of telephone follow-up on hospital readmission rates and improved patient care.	Patients received a follow-up phone call from the nursing staff.	The results were inconclusive.
A17 <sup>(31)</sup>	To analyze the conclusion of telemonitoring interventions by telephone calls of elderly people undergoing prostatectomy surgery.	Intervention study, randomized and controlled through evaluation of the research objective.	Telephone follow-up proved beneficial and has a low cost for continuity of care.

STUDY	OBJECTIVE	METHODOLOGY	RESULT
A18 <sup>(32)</sup>	To evaluate the feasibility of post-discharge telemonitoring telephone calls carried out by a nurse of patients undergoing outpatient urological surgeries.	Data were prospectively collected from all patients admitted to the surgical clinic who were discharged from the urology service from October 2015 to September 2016.	The overall response rate to the call was 59.7% (n = 889). Of these patients, 366 (41%) had concerns requiring nursing intervention.
A19 <sup>(33)</sup>	To evaluate the use of mHealth technology to assist CHWs (community health agents) in identifying SSI to refer patients back to health facilities.	The study was divided into three stages, the 1st (community agent visit on the 10th post-operative day), 2nd (telephone consultation), and 3rd (not receiving any follow-up care).	The standard of care has not changed, thus showing minimal or no risk to the patient using the technology.
A20 <sup>(34)</sup>	To describe and evaluate the process of implementing a routine telephone follow-up system (TFU) for recording post-operative complications.	Telephone contacts were made with the study patients, the first one 48 hours after surgery, focusing the questions mainly on pain, bleeding, fever, ecchymosis, and edema, and then at a one-week interval.	It was concluded that telemonitoring is effective and efficient due to the low rates of complications, in addition to preserving the clinic's time to see the scheduled patients without compromising their safety.
A21 <sup>(35)</sup>	To analyze telemedicine literature and assess of the feasibility of using mobile telephony.	Scoping review was performed based on the Prisma-ScR framework.	As a primary outcome, a considerable number of SSI diagnoses through telephone calls were obtained.
A22 <sup>(36)</sup>	To accompany the issue of telephone and clinical visits from two perspectives.	Randomized study using female patients who underwent pelvic surgical intervention.	Telephone follow-ups were not inferior to clinical visits, neither from the point of view of applicability nor in terms of adverse effects.
A23 <sup>(37)</sup>	To evaluate the effectiveness and safety of telemedicine visits and providing post-operative care to neurosurgical clients.	Telephone calls were made for 30 days with the 30 neurosurgical patients. The calls addressed clinical aspects of the progress of the surgical wound.	Pain management, seizure control, wound infection, and hydrocephalus are among the most evaluated subjects in telemedicine visits. The satisfaction rate among patients and physicians was 90% and 95%, respectively.
A24 <sup>(6)</sup>	To compare the use of telemonitoring clinics with face-to-face follow-up of post-operative care after gastric surgeries during the COVID-19 pandemic.	Prospective study included abdominal surgery patients operated on during the beginning of the COVID-19 pandemic, where they were asked about the possibility of remote monitoring at the time of hospital discharge.	Of the 219 patients who underwent abdominal surgeries, 106 (48%) had telemedicine follow-ups. Their morbidity rate for the group was 5.7%.

STUDY	OBJECTIVE	METHODOLOGY	RESULT
A25 <sup>(4)</sup>	To evaluate the possibilities of conduct to reduce readmissions due to SSI.	Analysis of what has been done for the diagnosis and risk of SSI in discharged patients.	The telephone call appeared to be effective in reducing SSI readmissions.
A26 <sup>(7)</sup>	To understand the reality of post-discharge surveillance and changes in the surgical site in Brazilian university hospitals.	One hundred ninety-three hospitals were evaluated, only eight did not accept participation because they do not carry out post-discharge surveillance, and 36 did not respond. The main post-discharge surveillance is through active contact, through telephone calls.	The nurse has a prominent role in identifying and screening SSI, with an active search during hospitalization and post-discharge surveillance by telephone.
A27 <sup>(10)</sup>	To use phone calls for 30 days for post-operative analysis.	Follow-up carried out by the nursing staff of the hospitals included in the study.	Phone follow-up improved 65% - 78% in the first half of project implementation and 77% - 89% in the second half.
A28 <sup>(38)</sup>	To assess the impact of patient phone calls and virtual wound checking within 72 hours post-discharge.	In addition to the calls within 72 hours after discharge, patients could make a video or send photos to complement the phone calls.	Twenty-five patients used the telephone to treat surgical wounds, and compared to the previous year, there was a drastic decrease in visits to the emergency departments for SSI treatment.
A29 <sup>(11)</sup>	To accurately record SSI rates within 30 days of colorectal surgeries across Wales.	Electronic registration with a clinical visit and/or a phone call.	Of the 545 patients, 13% developed SSI within 30 days of hospital discharge. SSI rates were 14.3% for elective surgeries and 11.7% for emergency surgeries.
A30 <sup>(12)</sup>	To evaluate the use of telemedicine in diagnosing of SSI in post-surgical adult patients and compare it with face-to-face evaluations.	Review of databases conducted from the beginning of 2020 until December 1st.	Some studies met the inclusion criteria and were qualitatively summarized.
A31 <sup>(2)</sup>	To define IRAS diagnostic criteria for mandatory notification to the National System of Epidemiological Surveillance of IRAS.	Revision and update of the Patient Safety Series handbook.	Not clearly stated.

**Figure 3** - Study selection results. Niterói, RJ, Brazil, 2022

ANALYSIS CATEGORY	NURSING CONCEPTS, CARE, PRACTICES AND GUIDELINES	ARTIGOS RELACIONADOS
Early and late warning signs of SSI	Pain.	1, 2, 7, 12-14, 18, 19, 21, 23, 26-31, 33, 36, 37.
	Characteristic signs of infection/phlogistic signs (heat, redness, edema, limitation, and loss of function in the affected region).	
Complications of SSI	Septic shock,	1, 2, 12, 14, 19, 20, 24, 25, 28, 32, 33.
	Hemorrhages;	
	Bruises;	
	Most isolated microorganisms;	
Risk factors	Cardiac Ailments.	18, 20, 24, 35.
	BMI extremes;	
	Chronic diseases;	
Prevention measures for SSI	Age.	2, 4, 6, 18, 20, 30, 37.
	Oral antibiotic therapy;	
	Safe surgery checklist;	
	Proper nutrition;	
Using the phone call	Hand sanitization.	1, 4, 6, 7, 10-14, 19-34, 36-38.
	Multidisciplinary team;	
	Use of questionnaires and/or protocols;	
	Analysis of symptoms;	
	Phone call time.	
	Interval between phone calls	
	First 48 hours after the procedure;	
Analysis of recovery;		
	30 days of follow-up.	

**Figure 4** - Summary of evidence on surgical site infection and telephone consultation. Niterói, RJ, Brazil, 2022

diagnostic and reporting methods are linked to the period during which this complication occurs. Regarding the onset time of SSI, there are variations, with the period of up to 30 days after surgery in cases without implants being predominant in the studies. However, in surgeries involving prosthetic implants, SSI can emerge between 90 days<sup>(6)</sup> and 1 year<sup>(29)</sup> after the intervention. Concerning incidence rates, a wide variation is observed, ranging from 1.4% to 22.7%, reflecting differences associated with factors such as the type of surgery performed, whether it was emergent or elective, among others. The variation may also be influenced by the contexts of different countries<sup>(2,14,24,34,38)</sup>. Studies indicate that SSI incidence rates are higher in underdeveloped or developing countries, where healthcare systems might be economically strained, leading to

weaker care. In such countries, rates can reach around 30% of surgical procedures and even higher in regions with limited resources and social challenges<sup>(7,14,32,38)</sup>.

It is interesting to note that emergency surgeries and those considered major tend to exhibit a higher SSI incidence. Nevertheless, studies highlight that SSI can occur in any type of surgery, including minor elective procedures, albeit with reduced likelihood. The critical period for the emergence of complications related to SSI generally falls between 24 and 48 hours after surgery, aligning with clinical practice and patients' hospitalization duration, allowing for a more effective clinical approach<sup>(21,24,26,36)</sup>.

Regarding early warning signs and management, pain in the surgical incision area was the most reported early alert sign for SSI (48.3% of studies), followed by characteristic signs of infection, such

as warmth, redness, swelling, and loss of function in the affected area (19.3%). More prevalent complications associated with SSI included hematoma, abscess, hemorrhage, and bacteremia in severe cases<sup>(1,2,4,6,7,12,14,20,21,26,28,29,32,33,38)</sup>.

Chronic diseases such as systemic arterial hypertension, diabetes mellitus, and detrimental health practices like smoking were identified as significant risk factors for post-surgery complications. Such factors correlate with patient adherence and the nature of surgeries, especially in emergency cases where prevention may be more challenging. Nonetheless, specific measures like hand hygiene, antibiotic administration, adequate nutritional care, and pre- and intra-operative attention have proven effective in preventing SSI<sup>(2,3,18,20,25)</sup>.

Concerns regarding early warning signs and management intensify in the post-hospital discharge period, as follow-up during this time is deficient, and monitoring patients during this period is critical for early complication detection. It is recommended that follow-up be conducted during the first month after surgery, emphasizing on days 2, 15, and 30 for operative wound analysis. Additionally, follow-up at other intervals, such as days 4, 8, 12, 18, and 25 after surgery, is suggested for surgical recovery assessment<sup>(20)</sup>. Telemonitoring, particularly telephone consultation, emerges as a promising practice for surgical patient follow-up, allowing for the assessment of surgical incisions, recovery information, and daily needs. However, it is recommended that these consultations be based on structured protocols to ensure consistency and effectiveness of the approach<sup>(7,26,29,32,34)</sup>. Studies evaluating the efficacy of telephone consultation for prevention and early detection of SSI were conducted at different in-

tervals, such as five to seven days and between 22 and 28 days after surgery, demonstrating the potential of telemonitoring for both early and delayed SSI detection<sup>(2-4,30,33)</sup>.

## CONCLUSION

Through this study, the unquestionable impact of SSI on patients' lives and healthcare systems has become evident, underscoring the joint effort required for its prevention and, whenever possible, early management. While studies address the need for follow-up, recommend telemonitoring practice, and meticulously detail critical alert points and complications associated with SSI onset, few genuinely present strategies for nurse-led telemonitoring implementation, assessing its impacts on SSI-related indicators. In this context, as a limitation of this study, the absence of information for telemonitoring implementation in healthcare services stands out as one of the main research obstacles. Furthermore, the studies encompassed in this review were not conducted in Brazilian settings, and the characteristics of the studied population were predominantly adult and/or undefined, as some studies did not elucidate this information. Consequently, the present review could not encompass all age groups related to the surgical procedure.

\*Paper extracted from the master's dissertation "Surgical site infection and nurse-performed telemonitoring in the postoperative period", presented to the Federal Fluminense University, Niterói, RJ, Brazil.

## CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

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