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INTERVENTION BEAM IN PREVENTION OF LOCAL SURGICAL INFECTION

Abstract

Introduction: Surgical site infections are frequent complications that affect patients undergoing surgery. These are preventable infections that constitute a loss of reputation for healthcare systems worldwide, with consequences for the patient in terms of morbidity, mortality, excessive length of stay, and additional costs to the system and the community. They aggravate their functional disability, increase the emotional stress of patients and families, leading to decreased quality of life.

Nurses, as members of the multidisciplinary team, play a crucial role as promoters of adherence to the best practices for prevention and control of surgical site infection called "intervention bundle".

Objective: Evaluate the adhesion of nurses to the intervention bundle in the prevention of Surgical Site Injury.

Methods: Descriptive, cross-sectional, quantitative study. Sample of convenience, made up to 54 nurses. The data collection instrument was the checklist of the DGS of 2015.

Results: The results revealed low adhesion in the pre-surgical bath with 2% chlorhexidine. Regarding trichotomy, it was avoided in about 59% of the cases. In the maintenance of capillary glycemia and normothermia, these were not met by 33% of professionals. Regarding adherence to surgical antibiotic prophylaxis, it was obeyed by 63% of the professionals, respecting the ideal timing of administration, 120 minutes before surgery.

Conclusion: The implementation of programs of continuing education, accountability and awareness of the management bodies for the implementation of a safety culture are substantial in the prevention of surgical site disruption.

KEYWORDS: INFECTION CONTROL, SURGERY, PREVENTION AND CONTROL, PREVENTIVE MEASURES, PERIOPERATIVE PROCEDURES.

INTRODUCTION

Health Care Associations (IACS) are a serious problem in all countries, regardless of their level of development, and are a central issue in the concerns of the International Health Organizations. concerns the safety of the patient, as it represents one of the adverse effects of potentially preventable health care provision, and there are studies showing that at least 20% of IACS could be avoided. ^[1] IACS is undoubtedly a problem that affects quality of care, quality of life, patient safety and health professionals. ^[2] They also have a high financial impact on health institutions and systems. ^[3] Data from the Directorate General for Health (DGS) (2017), show us that the rate of IACS in Portugal is around 7,8%, a decrease of 2,7% compared to the data obtained. ^[4] Regarding the location of the HAI, the most frequent are still airway (29,3%, followed by urinary tract (21,1%) and Surgical Site Infections (SSI) with 18%. Of the SSI, deep organ / space and incisional infections prevail, which make up 75% of all infections, of which one third refer to deep incisional infection and 41,8% to organ / space infection. ^[4] SSI is the one that occurs at or

near the surgical incision (incision or organ / space), in the first 30 postoperative days or up to a year in the case of prosthesis, implant / transplant placement. ^[4] In the United States, SSI has generally been the second largest group of IACS, which reaches the most patients, reaching 500,000 cases, resulting in an average of 3,7 million additional days of hospitalization, more than 1,6 \$ billion in extra costs, as well as physical, emotional and financial losses to the patients they suffer. ^[4,5] It is difficult to monitor and identify the occurrence of SSI, since the variables are multiple and unknown numbers, bearing in mind that hospital stay is shorter and shorter, going to hours or days, instead of traditional hospitalizations. they watched for weeks. The number of outpatient surgeries as well as the number of early discharges also increases. ^[5-7] The appearance of SSI is related to several risk factors inherent to the patient, surgery and environmental conditions. These are categorized as intrinsic (related to the person such as age, nutritional status, diabetes, smoking, obesity, microbial colonization, altered immune response and length of stay) while extrinsic risk factors for SSI

include surgery-related aspects such as preoperative preparation, preoperative bathing, trichotomy, skin preparation, choice of appropriate antiseptic, normoglycemia, normothermia, hand washing and disinfection, environmental control, surgical team uniforms, sterilization of medical devices, duration of surgical intervention, surgical technique, antimicrobial prophylaxis surgery and postoperative care. ^[6-8] Although SSI is conceived as multifactorial, the surgical team plays a fundamental role in the prevention of factors related to the surgical procedure during the preoperative and intraoperative period, whether in the number of people in the operating room, in the movement and in the excessive conversation of professionals within the room at the time of the surgical procedure, the movement of the doors, the ventilation system, the decision by the moment and type of the antimicrobial prophylaxis, the parameterization and adequate preparation of the skin of the patient and the hands of the surgical team. ^[5-8] Each SSI is responsible for 7-11 extra days of hospitalization and an increased risk of mortality by 2-11 times. ^[2,4] The nurse plays a key role in the management of the person-centered environment for therapeutic effectiveness and incident prevention, making efforts to minimize the negative impact, respecting their individuality, autonomy and their life project, ^[9] being the patient's safety understood as the absence of avoidable damage to the patient throughout the health care process. ^[10] Caring in the perioperative context requires from the nurse a series of specific skills, being the target of

TABLE 1

NURSES' AGE

AGES	FREQUENCY	PERCENTAGE (%)
25-29 ages	4	7,4
30-34 ages	8	14,8
35-39 ages	6	11,1
40-44 ages	14	25,9
45-49 ages	12	22,3
50-54 ages	10	18,5
Total	54	100,0

his intervention the person who needs invasive procedures / surgeons and anesthetics. [6-12] Surveillance, diagnosis and prophylaxis are important factors in its control. [13]

For the DGS (2013), perioperative nursing care, performed in the inpatient service and the surgery Center, should be performed with the aim of eliminating or minimizing the risk of SSI as much as possible. [4]

It is elementary for nurses to promote the involvement of the patient and the multidisciplinary pre, intra and postoperative team, to develop effective means for communicating relevant information to intraoperative teams in order to contribute to the reduction of risk factors. [12-14]

It is critical that care and treatment are able to meet the needs and preference of the person with or at risk for SSI, and should have the opportunity to make informed decisions about their health care in partnership with health professionals. This type of approach implies sharing information, involvement as well as accountability of the person and the nurse in the care process. [15]

SSI are among the preventable IACS, through preventive measures used by healthcare professionals, patients, family members and / or caregivers, particularly the surgical bundle / intervention bundle, as an effective measure in reducing SSI rates. according to evidence-based practice. They include a set of good practices (between three and five) that, when applied simultaneously, improve results compared to their individual application, which compromises their effectiveness.

In order to obtain high quality nursing care with patient safety benefits, it is recommended that all interventions be applied to all patients undergoing surgical intervention. [4,6]

Proper implementation of these measures during the perioperative period may directly interfere with the pathogenesis of SSI, as they contribute to the reduction / elimination of microorganism transfer to the surgical incision, which is one of the conditions for the development of infection.

OBJECTIVE

The present study aimed to evaluate the nurses adherence to the intervention beam for the prevention of SSI in the surgical department of a hospital in the north of Portugal. As specific objectives were set a) Identify the effectiveness of the implementation of the intervention bundle in the prevention of SSI; (b) Recognize situations of non-compliance with the implementation of the SSI prevention bundle of interventions; c) Estimate the rate of adherence to the implementation of the SSI prevention bundle of interventions.

METHODS

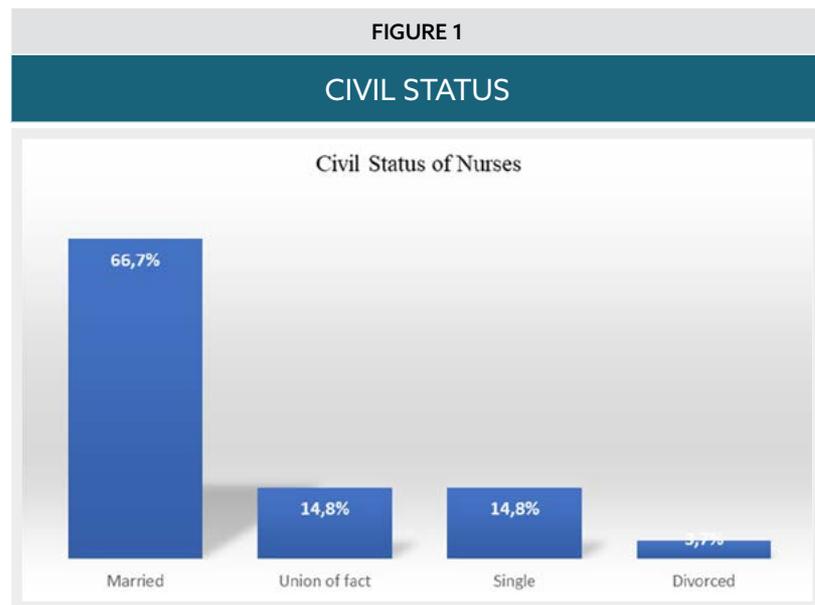
A descriptive, cross-sectional, quantitative study was carried out in a hospital in the north of Por-

tugal, in the Internal Surgery and Operative Block (BO). The study population consisted of all the nurses of the referred hospital. A convenience sample was used, consisting of nurses working in the Surgery and Operative Block service, who were available to participate in the study at the time of application of the questionnaire, being composed by 54 nurses. The data collection instrument was the checklist of DGS, 2015, inherent to the standard of "Prevention of Injury Prevention of Surgical Site" and the analysis of records in the clinical process.

RESULTS

The sample was composed mainly by female subjects (66.7%), aged between 25 and 54 years, with a average age of 42 years (Table 1).

Regarding the distribution of nurses according to the Civil Status (Figure 1), we found that the majority are married (66.7%). With regard to the educational qualifications of the Nurses, it is evident in figure 2 that the majority is licensed (96.3%) and 3.7% have the Master degree.



Of the 54 nurses, we can observe from the analysis of **figure 3**, that 15% are Specialist nurses, while 85% only have a Nursing Degree. Nurses have been working on average for about 18 years (SD = 8.46), with service time ranging from a minimum of 1 year, to a maximum of 18 years.

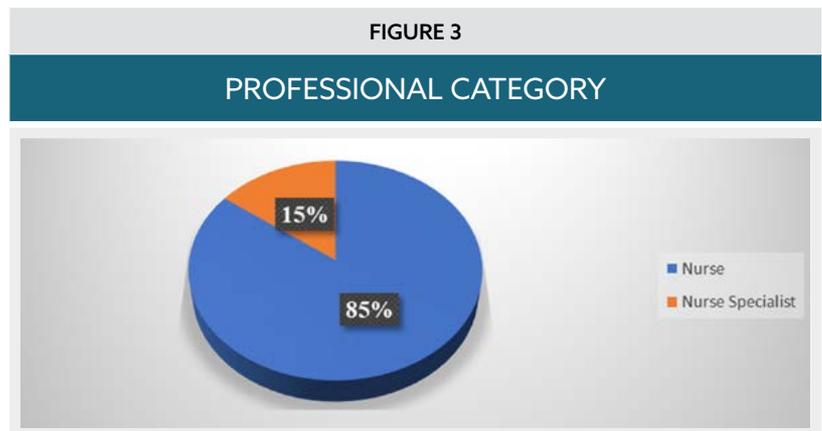
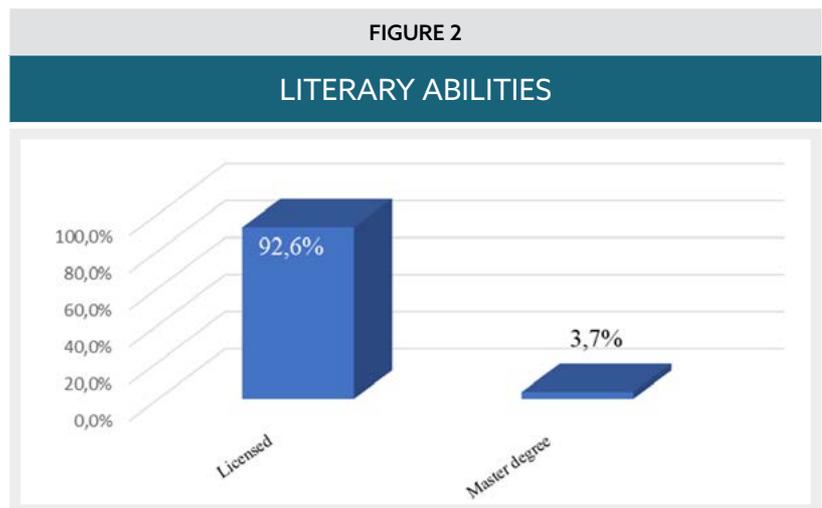
The analysis of **figure 4** shows that 70% of the nurses attended training in the area of infection control. However, 30% said they had not completed specific training.

The analysis of **Figure 4** reveals a low adhesion to the bath of the patient with chlorhexidine 2% on the day before surgery (11%) and for the bath with chlorhexidine 2% on the day of surgery, at least 2 hours in advance (33%). Regarding the administration of antibiotic prophylaxis, this was performed by 63% of professionals.

It was also observed that 33% of the professionals did trichotomy in the inpatient service. Regarding perioperative normothermia and glycemia ≤ 180 mg / dl during surgery and in the 24 hours 70% of the professionals, for both questions (**Figure 5**).

DISCUSSION

We know that the nursing profession consists mainly of women and this study is in line, since the predominant gender is the feminine (66.7%), varying the age between 25 and 54 years, with the most representative age group in the 42 years. Regarding the specific training in infection control, 30% reported not having trained in the area. This situation may be related to the fact that this concept, Surgical bundle / intervention bundles and its dissemination by the DGS, is recent and still little explored by the institutions so far. We know that the procedures of the Surgical Bundle / Intervention Bundles, integrate the pre-surgical bath,



antibiotic prophylaxis, trichotomy, capillary glycemia and normothermia. ^[6]

When analyzing the results obtained for the question "if there is evidence that 2% chlorhexidine bath is performed in the patient on the day before surgery", 70% of the nurses did not comply with this recommendation, which is analogous to the question "if there is evidence that 2% chlorhexidine bath is performed on the day of surgery, at least 2 hours in advance", 41% said no and 33.3% said yes. In spite of DGS 020/2015 regulations recommend bathing with chlorhexidine as an intervention to be adopted, a meta-analysis was performed with 16 studies in a total of 17932 patients in which 7952 performed pre-operative bath with chlorhexidine and 9980 allocated

to several groups of comparison with soap, placebo or no bath, the authors concluded that bathing with chlorhexidine does not significantly reduce the rate of SSI when compared to soap. ^[16]

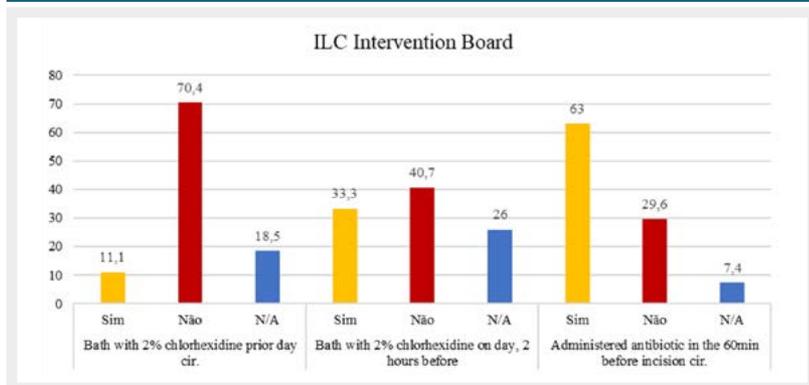
In a review carried out, the effectiveness of the chlorhexidine bath in reducing pathogenic levels is referenced. The evidence suggests that it is possible to prevent colonization and infection in nursing care associated with dissemination of microorganisms. ^[17]

The World Health Organization in the publication of the guidelines for SSI prevention recommends bathing the day before and 2 hours before surgery without giving relevance to chlorhexidine as its effectiveness is not adequately proven. ^[18]

In a review study, which identified >

FIGURE 4

INTEGRATED IMPLEMENTATION OF THE INTERVENTION BEAM



7 studies, involving more than 10.000 patients, comparing the use of 4% chlorhexidine solution, plain soap, or bath failure in the period immediately prior to surgery. The review of these studies did not show clear evidence in favor of the preoperative chlorhexidine bath when compared to the bath with other products. [19] For the question “if there is evidence that in the patient is administered antibiotic for surgical antibiotic prophylaxis within 60 minutes before the surgical incision, whenever indicated, in a single dose or for a maximum of 24 hours” the majority of professionals, 63% answered that yes, while about 30% said no. The timing of administration of the antibiotic depends on the type of surgery, however, and in the face of the evidence the ideal time of administration should be up to 120 minutes before surgery. [18] The importance of involving the administration and managers of the institution and services in the implementation of standards and procedures is manifested. [20] For the question “whether there is evidence that in the patient is avoided tricotomy and when absolutely necessary is used cutting machine immediately before the

surgical intervention according”, the majority of professionals 59.3% answered that yes, 33.3% answered that not, 7.4% do not know. In a study that indicated trichotomy as a strong predictor of infection rate, as such a method that demonstrated nonconformity with the principles of safe surgery. [21] Other studies indicate that the shorter the time between performing the tricotomy and the surgical act, the lower the risk of surgical wound colonization and eventual infection. [22,23] The available research recommends as an elective method the electric tricotomy machine to the detriment of the blade and in the eventual need to perform the tricotomy, it must be performed within a maximum of two hours, before surgery. There have been some associations with increased male infection rate due to hairiness and with comorbidities as chronic diseases that increase the immune deficit and obesity. [6, 26, 24] Regarding the question “there is evidence that perioperative normothermia is maintained in the patient (central temperature $\geq 35.5^{\circ}\text{C}$)”, most professionals, 66.6% answered that yes, 33.3% answered that they were not, 7.4% do not know. The recommenda-

tions of the Portuguese Society of Anesthesiology (SPA) indicate that during a surgical intervention it is possible to progressively normalize the capacity and physiological response of the thermoregulation mechanisms, however there are external and implicit contributions to the practice of perioperative care, directly or indirectly related to the patient that have an impact on that response. [25]

These mediates supporting the perioperative normothermia include 3 moments of evaluation and consequent strategic decision regarding body temperature: the preoperative phase; the intraoperative phase and the postoperative phases. [26] In the preoperative phase, an evaluation of the patient’s risk factors, recognized by the multidisciplinary team, is recommended; the temperature should be monitored and, if it is not possible, and in the absence of signs of hypothermia, it should be evaluated at least 15/15 minutes; the thermal comfort scale must be applied; the ambient temperature should be maintained between 20-25 ° C; the detection of signs and symptoms of hypothermia; if the central temperature is higher than 36 ° C, maintain normothermia through thermal insulation measures, promoting reduction of body exposure at the end of the intervention, immediately before the transfer to the recovery, repeat the evaluation of the level of thermal comfort, through the scale and signs and symptoms of hypothermia. [27-29]

The intraoperative phase encompasses similar measures as pre-heating, passive heating, active heating adjuvanted by heating the infusion and irrigation fluids. [30] Thus, in a period up to 24 hours, after admission to the recovery / Post Anesthetic Care Unit, there are moments of implementation and progressive reappraisal. The strategy begins with the patient’s

admission to the recovery, with a first evaluation, comparable and over-arching to the evaluation of the anamnesis in the inpatient service and ending in the anesthetic discharge, with continuation of the nursing care in the inpatient service, until 4 hours after it. [26,29]

According to the literature consulted, body temperature in the pre-operative period is not mentioned as being part of the procedure of the surgical bundle / intervention bundles. However, predisposing factors to the decrease in temperature, among which anxiety, are pointed out. [30]

Regarding the question "there is evidence that in the patient glycemia is maintained ≤ 180 mg / dl during surgery and in the following 24 hours", most of the professionals, 66.7% answered that yes, 33.3% answered no. The literature suggests that glycemic control is one of the factors to be observed for the prevention of infections [31] and that there is in fact a relationship between glycemic control and the rate of infection at the surgical site, as well as mortality and length of stay at the hospital. [31,32]

The current research indicates the need for careful glycemic control models for SSI and maintenance

below 200mg / dl and below 150mg / dl prevents the occurrence of SSI. Thus, hyperglycemia is related to difficulties in the patient's recovery process in the postoperative period, in which the intervention-efficient role of the nursing team in the SSI prevention process and strict control of glycemic levels. [33]

CONCLUSIONS

The guarantee of the quality of the care comes from the conditions of the institutions and the services, and the health professionals are key elements. In clinical practice, they are expected to ensure patient well-being and safety, although IACS, in particular SSI, undermine this principle. They lead to suffering and a prolongation of hospitalization and treatment, which come to absorb resources, leading to the loss of yield and productivity of the patient. The surgical bundle / intervention beam, when fully complied with, shows an effective way to prevent ILC. It is composed of a set of procedures that are transversal to several services and professional categories.

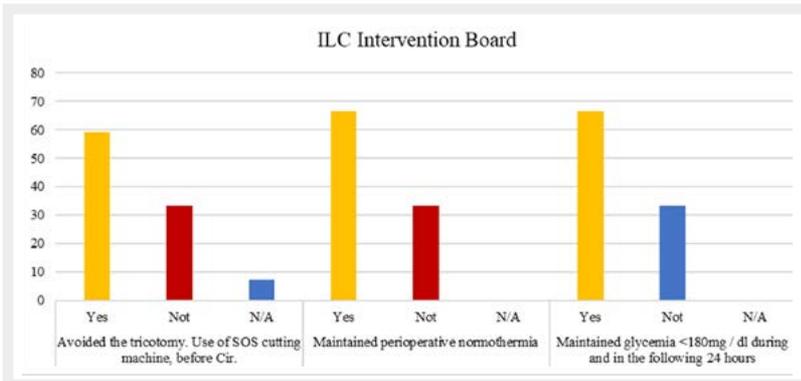
The results of the study show that nurses are mostly female, with a

mean age of 42 years. About 15% are Specialist nurses, while 85% have a Nursing Degree. They mostly have 18 years of professional experience with service time ranging from a minimum of 1 to 18 years. It was also verified that only 70% of nurses attended training in the area of infection control. Training is fundamental and necessary, but it is essential to develop new strategies to promote adherence to good practices in prevention and control of infection.

The results revealed a low adherence in the pre-surgical bath the day before and the day of surgery with 2% chlorhexidine. Regarding trichotomy, there were some discrepancies and was only avoided by 59% of professionals. The maintenance of capillary blood glucose ≤ 180 mg / dl during surgery and in the following 24 hours, was not fulfilled by 33% of the professionals. Adherence to maintenance of normothermia (central temperature $\geq 35.5^{\circ}\text{C}$) was not observed as recommended by 33% of professionals. Regarding adherence to antibiotic administration for surgical antibiotic prophylaxis within 60 minutes prior to surgical incision, whenever indicated, in a single dose or during a maximum of 24 hours, this was obeyed by professionals (63%). The results show that in relation to the prevention of SSI, it is necessary to make the management units of the Hospital Units accountable for the implementation of a safety culture so that the prevention of this infection is seen as an integral part of the daily activities of professionals, contributing to patient safety and quality of care. However, the successful implementation of infection control measures, particularly prevention of SSI and well-structured continuing education programs, are considered a substantial element for improving the knowledge of health professionals. ▴

FIGURE 5

INTEGRATED IMPLEMENTATION OF THE INTERVENTION





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