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RISK FACTORS FOR SURGICAL SITE INFECTIONS IN POTENTIALLY CONTAMINATED SURGERIES

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ABSTRACT

Objective: to associate the risk factors of the postoperative period of potentially contaminated surgeries, with the occurrence of surgical site infections in the postoperative period in the hospital and home setting.

Method: the data collection period was from February to June 2015, 84 patients were followed up on the first three post-operative days and seven days after hospital discharge, the collection was performed through questionnaires designed to evaluate the surgical site, the clinical conditions of the patient and chart analysis. In order to verify the influencing risk factors and classifications of surgical site infections, a questionnaire was used with variables that were analyzed in a descriptive manner through simple frequency, percentage, and position and dispersion measurements. Statistical tests were performed for the association and significance level of the risk factors.

Results: none of the patients interviewed developed a deep infection of the surgical or organ / space site, seven developed superficial surgical site infections in the post-operative period in hospital and 41 developed a surgical site infection at home. The analyzed risk factors were not significant for the development of infections.

Conclusions: it is recommended that institutions implement a post discharge monitoring and follow-up service in order to improve the reliability of the incidence rates of surgical site infections; improving the quality of patient care; epidemiological understanding and identification of risk factors. In addition, it proposes to facilitate the referral and counter referral process through training in the Family Health Strategy in order to identify these risk factors, and by acting in a network.

DESCRIPTORS: Patient safety. Perioperative care. Surgical Site Infection. Risk factors.

FATORES DE RISCO PARA INFECÇÃO DO SÍTIO CIRÚRGICO EM CIRURGIAS POTENCIALMENTE CONTAMINADAS

RESUMO

Objetivo: associar os fatores de risco do período pós-operatório de cirurgias potencialmente contaminadas, com a ocorrência da infecção do sítio cirúrgico no período pós-operatório hospitalar e domiciliar.

Método: período de coleta de dados foi de fevereiro a junho de 2015, com 84 pacientes acompanhados nos três primeiros dias de pós-operatório e sete dias após a alta hospitalar, através de questionários elaborados para avaliação do sítio cirúrgico, das condições clínicas do paciente e da análise de prontuário. Para verificação dos fatores de risco influenciáveis e classificação das infecções do sítio cirúrgico, utilizou-se um questionário com variáveis que foram analisadas de forma descritiva através da frequência simples, porcentagem e medidas de posição e dispersão. Para a associação e nível de significância dos fatores de risco foram realizados testes estatísticos.

Resultados: nenhum dos pacientes entrevistados desenvolveu infecção profunda do sítio cirúrgico ou de órgão/espaço, sendo que sete desenvolveram infecção do sítio cirúrgico superficial no pós-operatório hospitalar e 41 em domicílio. Os fatores de risco analisados não foram significativos para o desenvolvimento das infecções.

Conclusões: recomenda-se que as instituições implantem um serviço de vigilância e acompanhamento pós-alta, a fim de que se melhore a confiabilidade das taxas de incidência das infecções do sítio cirúrgico; melhorar a qualidade dos cuidados com os pacientes; compreensão epidemiológica e identificação dos fatores de risco. Além disso, propõe-se facilitar o processo de referência e contra referência através de capacitações da Estratégia de Saúde da Família para identificação destes fatores de risco, atuando em rede.

DESCRITORES: Segurança do paciente. Assistência perioperatória. Infecção da ferida operatória. Fatores de risco.

FACTORES DE RIESGO PARA LA INFECCIÓN DEL SITIO QUIRÚRGICO EN CIRUGIAS POTENCIALMENTE CONTAMINADAS

RESUMEN

Objetivo: asociar los factores de riesgo del período postoperatorio de cirugías potencialmente contaminadas, con la ocurrencia de la infección del sitio quirúrgico en el período postoperatorio hospitalario y domiciliar.

Método: período de recolección de datos fue de febrero a junio de 2015, con 84 pacientes acompañados en los tres primeros días de postoperatorio y siete días después del alta hospitalaria, a través de cuestionarios elaborados para evaluación del sitio quirúrgico, de las condiciones clínicas del paciente y del análisis de prontuario. Para la verificación de los factores de riesgo influenciables y clasificación de las infecciones del sitio quirúrgico, se utilizó un cuestionario con variables que fueron analizadas de forma descriptiva a través de la frecuencia simple, porcentaje y medidas de posición y dispersión. Para la asociación y el nivel de significancia de los factores de riesgo se realizaron pruebas estadísticas.

Resultados: ninguno de los pacientes entrevistados desarrolló una infección profunda del sitio quirúrgico o de órgano/espacio, siendo que siete desarrollaron infección del sitio quirúrgico superficial en el postoperatorio hospitalario y 41 en domicilio. Los factores de riesgo analizados no fueron significativos para el desarrollo de las infecciones.

Conclusiones: se recomienda que las instituciones implantes un servicio de vigilancia y seguimiento post-alta, a fin de que se mejore la confiabilidad de las tasas de incidencia de las infecciones del sitio quirúrgico; mejorar la calidad del cuidado de los pacientes; la comprensión epidemiológica y la identificación de los factores de riesgo. Además, se propone facilitar el proceso de referencia y contra referencia a través de capacitaciones de la Estrategia de Salud de la Familia para identificar estos factores de riesgo, actuando en red.

DESCRIPTORES: Seguridad del paciente. Asistencia perioperatoria. Infección de la herida operatoria. Factores de riesgo.

INTRODUCTION

Surgical Site Infections (SSIs) present risks to patient safety in the Brazilian healthcare services, and have great importance related to healthcare associated infections. SSIs affect patients submitted to surgical procedures, with or without implant placement, inpatient or on an outpatient basis, which affect the subcutaneous tissue, deep layers (fascia and muscle), organs and incision cavities, and are characterized as those occurring up to the 30th postoperative day.[1-4]

The most common source of microorganisms is the patient's endogenous flora. It is estimated that in the immediate postoperative period, the surgical site is protected from exogenous contamination. These exogenous sources should be considered during surgical procedures by means of a precise aseptic technique which should be preserved in order to prevent contamination.[1, 3, 5]

In agreement with the Centers for Disease Control and Prevention (CDC), the epidemiological diagnosis of a SSI is made through the analysis of particular parameters: onset of infection within 30 days of surgery, or in cases of prosthesis implants, up to one year.[6-8]

The relationship between SSIs and possible contamination during surgery has already been confirmed in some studies.[9-15] Potentially contaminated surgeries, classified as class II, due to their potential for contamination, are performed in tissues colonized by small microbial flora or in colonized tissues free from infection and inflammation.[1,16]

Contamination of the surgical site can occur at any time in the perioperative period, due to the patient's risk factors, the surgical procedure and the hospital environment from the preoperative period to the postoperative period.

Some of the factors associated with these periods may be: surgery time, surgery site, type of surgery performed, length of hospital stay, factors related to microorganisms, factors related to the patient, among others. The identification and control of these risk factors must occur from the patient's first contact with the institution, through the collection of information related to the care plan.[16]

The hospital infection control service of the hospital where this research was carried out recorded that 2,259 surgical procedures were performed in 2013. 1,248 of these (55.25%) were potentially contaminated surgeries. The HI rate was 82 (6.57%) with 35 (2.80%) developing a SSI. Faced with this reality, a study on the postoperative risk factors in the hospital setting based on the occurrence of SSIs during the same period, as well as in the postoperative period at home was performed. The place of research was in the surgical hospital units of the chosen hospital.[15]

It is fundamental that the nurse understands the risk factors that predispose the incidence of SSIs in the postoperative period in order to promote actions and measures that reduce their occurrence, collaborating in the improvement of the quality of care and in the insertion of a monitoring system for infection control and access to information that serves as a basis for prevention.[16]

The provision of care and safe nursing care to the surgical patient, with focus on the postoperative

period, is indispensable for the identification of risk factors. In order to correlate these factors with SSIs, the following research question is presented: is there a correlation of postoperative hospital risk factors with SSIs in the postoperative period in the hospital and home setting after potentially contaminated surgeries? Thus, the objective was to associate the risk factors of the postoperative period of potentially contaminated surgeries, with the occurrence of surgical site infections in the postoperative period in the hospital and home setting.

METHOD

This is a cross-sectional, descriptive study with a quantitative approach, carried out in two surgical hospitalization units of a teaching hospital in the Southern Region of Brazil, from February 12th , 2015 to June 30th , 2015, with a view to approve the research project of the chosen Institution. The chosen hospital has 274 hospital beds, and one of the surgical hospitalization units has 30 beds distributed in 12 rooms, where patients are hospitalized in pre and postoperative periods from the following surgical specialties: head and neck, gastrointestinal and biliary tract, thoracic, otolaryngology, oral maxillofacial, hepatic transplantation and neurosurgery. The second unit also has 30 beds, distributed in 12 rooms, which serve the urology, proctology, plastic and vascular surgery specialties .[15]

The inclusion criteria for participants were: to be 18 years of age or over; of both sexes; be a postoperative patient of a potentially contaminated elective surgery; who had the telephone number available for contact after hospital discharge and who were able to maintain follow-up during their hospital postoperative period up to the day of their discharge. Participants who underwent previous surgeries which were already contaminated; who had already been inserted into the sample at some time, readmitted and those with any type of confirmed systemic infection were excluded from the study. For sample representativeness, a calculation was made by the Web-based Statistics Teaching-Learning System (SEstatNet) composed of interaction modules with specific functionalities, namely: research, database, data analysis, probabilistic distributions and auto-evaluation. The research module assisted in the determination of the sample size and the selection of the elements that are composed in it, and by which 84 patients were recruited.[17]

In order to carry out the calculation of the sample, a request to the institution was required in order to obtain the data regarding the patients and procedures performed in the referenced units of the study. In this case, in order to calculate the minimum sample size, the *n* of the study were patients undergoing surgical procedures classified as potentially contaminated surgeries, totaling 1248.[15]

In order to assimilate the relevant risk factors (independent variables) during the postoperative period with the presence of a SSI in the hospital and home postoperative period, an interview script was used with oral and telephone questions which were applied during the postoperative period which included categories that could be influenced by the development of the SSI. This questionnaire was tested through a pilot test performed 20 days prior to data collection with 15 participants, over a period of 10 days. For the identification of SSI (dependent variables) the following characteristics of dressings were evaluated: dry and clean site; presence or absence of pain, hyperemia, heat, edema and dehiscence. The presence of pain, redness, heat, edema, fever, dehiscence and purulent exudate were evaluated for the classification of SSIs in superficial incisional sites.

In order to follow the complications of the healing evolution of the surgical site, the patients were followed up during the surgery and until the seven days after hospital discharge, telephone contact was made with all the participants. The subject answered some questions related to the healing process of the surgical incision and the clinical condition. The questionnaire was elaborated with closed questions in which the researcher indicated the answers according to the patient's response; evaluation of the surgical site and clinical conditions of the patient; as well as information extracted from medical records.

The data were exported and analyzed in the statistical package SPSS® - Statistical Package for Social Sciences (version 22.0). The dependent and independent variables were descriptively analyzed through simple frequency and percentage and position and dispersion measurements. The Chi square test ($\chi 2$) was used for the bivariate analysis of the risk factors with the presence/absence of SSIs.

The Binary Logistic Regression was used to relate the presence/absence of a SSI in the postoperative period in hospital and at home with the risk factors of the postoperative period. In the regression model, the variables with $p \leq 0{,}200$ and acceptance of the significance level of 5% were included and considered. For the certification of influence, the EXP (B) - OR interval was equal to 1.

The variables associated with SSI development in the postoperative period in the hospital

and home setting were: cholecystectomy as the type of surgery performed; postoperative diagnosis of acute cholecystitis and cholelithiasis; length of hospitalizations period and use of oxygen therapy. However, the categories that were not associated with the occurrence of SSIs in these periods were: gastroplasty as the surgery performed; diagnosis of obesity; requiring postoperative care in the Intensive Care Unit (ICU); fasting and characteristics of the dressing of the surgical site, even with the value of p> 0.200 present in these factors.

The research was approved by the Human Research Ethics Committee (CEPSH) obtaining the Certificate of Presentation for Ethical Assessment (CAAE) number 39866414.1.0000.0115.

RESULTS

The variables were analyzed descriptively by simple frequency and percentages (categorical variables) and position and dispersion measures (numerical variables). For the association between categorical variables, Chi-Square ($\chi 2$) or Fisher's Exact test was used when necessary. The comparison between two groups with numerical variables was performed through the t-test for independent samples or the Mann-Whitney test, according to the distribution of the data. The Kolmogorov-Smirnov test was performed in order to verify the distribution of the data (normality). In order to calculate the value of ODDS RATIO (OR) and Confidence Intervals (CI), the Binary Logistic Regression was used between the presence of SSIs and the postoperative risk factors in the hospital and home setting.

Only the variables with $p \leq 0.200$ in the comparison or association with the presence of SSIs were inserted in the regression model. A significance level of 5% (p=0.05) was adopted where the limit based confirms whether the deviation is from chance or not. For the confirmation of risk factor influences in the occurrence of SSIs, the EXP (B) - OR interval was 1. Values below 1 were interpreted as a protection factor for the development of SSI and values above 1 were interpreted as risk factors. Example: OR=0.50, is interpreted as having a 50% less chance of developing a SSI with respect to the reference category. OR=5.0 is five times more likely to influence the emergence of a SSI based on the source category. For variables that were not collected, significant relevance was considered.

Out of the 84 participants, SSI development in the institutional postoperative period occurred in seven (8.3%) patients who underwent potentially contaminated surgeries. For the combination of hospital postoperative risk factors with the presence / absence of SSI in the same period, the bivariate analysis was performed using the $\chi 2$ test, according to table 1, considering the most evident level of association. The cholelithiasis diagnostic category obtained $\chi 2$=3,424 and p=0.064.

For the analysis of the length of hospital stay until hospital discharge, the Mann Whitney U test was used with U=155,000 and p=0.063. The test was performed, since there was no reference category, nor homogeneity in the variances with the presence / absence of a SSI in the postoperative period. The mean length of hospital stay for patients with a SSI was 13.71 days (SD=8.015). The incidence of SSIs in the postoperative hospital was present in three (42.9%) participants diagnosed with acute cholecystitis.

Table 1 - Bivariate analysis between the modifiable risk factors of the postoperative period with the presence/absence of surgical site infections in the postoperative period. Florianópolis, SC, Brazil, 2015

Risk Factors	No surgical site infections n=77 (91.7%) n (%)	Surgical site infection n=7 (8.3%) n (%)	Total n=84 (100%) n (%)	χ2	p
Type of surgery Cholecystectomy					
Yes	55 (71.4%)	3 (42.9%)	58 (69%)	2.451	0.117
No	22 (28.6%)	4 (57.1%)	26 (31%)		
Diagnosis of current disease Acute cholecystitis					
Yes	16 (20.8%)	3 (42.9%)	19 (22.6%)	1.787	0.181
No	61 (79.2%)	4 (57.1%)	65 (77.4%)	3.423	0.064
Cholelithiasis					
Yes	26 (33.8%)	0 (0%)	26 (31%)		
No	51 (66.2%)	7 (100%)	58 (69%)		
Length of hospital stay until discharge					
Average	8.92	13.71	10.23	155.000	0.063
Standard Deviation	6.761	8.015	8.117		

X^2: Chi Square; p: significance level

Table 2 showed that the prevalence of a SSI in the postoperative period was higher, equivalent to 41 (48.8%) cases. The χ2 test showed that the association of the factors of the hospital postoperative period with the presence / absence of a SSI at home had a greater influence on the oxygen therapy variable (χ2=3.176 and p=0.07). 25 (61%) patients who developed a SSI at home, underwent a cholecystectomy procedure. The *Mann Whitney's U-test* was used for the evaluation of the category, length of hospital stay with presentation of U=724,500 and ep=0.159, and the mean hospitalization period was 8.51 days (SD=6.81).

Table 2 - Bivariate analysis of the modifiable risk factors of the postoperative period with the presence/absence of surgical site infections in the postoperative period. Florianópolis, SC, Brazil, 2015

Risk Factors	No Surgical Site Infections n=43 (51.2%) n (%)	Surgical Site Infections n=41 (48.8%) n (%)	Total n=84 (100%) n (%)	χ2	p
Type of surgery Cholecystectomy					
Yes	33 (76.7%)	25 (61%)	58 (69%)	2.442	0.118
No	10 (23.3%)	16 (39%)	26 (31%)		
Oxygen therapy					
Yes	9 (20.9%)	3 (7.3%)	12 (14.3%)	3.176	0.075
No	34 (79.1%)	38 (92.7%)	72 (85.7%)		
Length of hospitalization until discharge					
Average	10.09	8.51	18.68	724.500	0.159
Standard Deviation	7.07	6.81			

X^2: Chi Square; p: significance level

In agreement with table 3, in both the crude and the adjusted analyzes, no variable with significance level was identified for the onset of a SSI in the postoperative period.

Table 3 - Binary logistic regression analysis of postoperative risk factors in the presence of surgical site infections in the postoperative period. Florianópolis, SC, Brazil, 2015

Risk Factors	Gross Analysis		Adjusted analysis	
	OR*	IC 95%†	OR*	IC 95%†
Type of surgery				
Cholecystectomy				
Yes	0.30	0.06 – 1.45	0.00	0.00 – 0.00
No	1.00		1.00	
Diagnosis of current disease				
Acute cholecystitis				
Yes	2.86	0.58 – 14.09	6.84	0.00 – 0.00
No	1.00	0.00 – 0.00	1.00	0.00 – 0.00
Cholelithiasis				
Yes	0,00		1.96	
No	1.00		1.00	
Length of Hospital stay until discharge				
Average	1.08	0.99 – 1.18	1.10	1.00 – 1.22
Standard Deviation	1.00		1.00	

*OR: odds ratio; † 95% CI: 95% Confidence Interval; Adjusted Analysis: All variables were entered into the model and adjusted independently of the p value. The variables with p ≤ 0.200 remained in the adjusted model

According to the binary logistic regression analysis, the post-operative hospital risk factors that could be influenced by the onset of SSIs at home, both in the adjusted and in the gross analysis, did not have criteria of significance or risk, as is statistically evidenced by the CI 95 % being above 1.

Table 4 - Binary logistic regression analysis of postoperative risk factors in the presence of postoperative surgical site infections. Florianópolis, SC, Brazil, 2015

Risk Factors	Gross Anaylsis		Adjusted Analysis	
	OR*	CI 95%†	OR*	CI 95%†
Type of surgery				
Cholecystectomy				
Yes	0.47	0.18 – 1.22	0.38	0.14 – 1.05
No	1.00		1.00	
Oxygen therapy				
Yes	0.30	0.07 – 1.19	0.24	0.05 – 1.06
No	1.00		1.00	
Length of Hospitalization before discharge				
Average	0.97	0.91 – 1.03	0.98	0.91 – 1.04
Standard Deviation	1.00		1.00	

* OR: odds ratio; † 95% CI: 95% Confidence Interval; Adjusted analysis: All variables were introduced in the adjusted model regardless of the p value. The variables with p≤0,200 remained in the adjusted model

DISCUSSION

In the present study, the cases found with SSI were classified and proved according to the elaboration of some studies in the area.[8,18-22]

The prevalence of SSIs in the hospital setting was seven (8.3%) and 41 (48.8%),in the home setting, respectively. This result is considered acceptable and coincides with other studies, such as the one performed in Amazonia that found a total of 81 (3.68%) SSIs when analyzing 2,203 patients in the period from 2009 to 2010. Out of these 81 cases, 59 (72.844%) occurred in potentially contaminated surgeries and in the present study all surgeries had this classification, corroborating with the contamination potential accepted by the Center for Disease Control and Prevention (CDC), which suggests that 3 to 11% occur in potentially contaminated surgeries. In another study, an incidence of 115 (3.70%) SSIs was observed when analyzing 3,120 participants in the period from 1999 to 2002.[23-29]

The risk factors related to the development of a SSI in the postoperative period in the hospital setting which stood out in this study were cholecystectomy surgeries, acute cholecystitis diseases and cholelithiasis, and the period of hospitalization until discharge, which are corroborated in the research scientific studies.[8,21,25-26] However, cholecystectomy and the diagnosis of acute cholecystitis were not significant or differential elements that could certify that the patients who presented these factors suffered more SSIs in the hospital setting than those who did not undergo this surgical intervention, nor were they diagnosed with the disease, [33] these results did not compromise the achievement of the objectives proposed by this research statistically.

In Western countries, the presence of SSIs acquired in the hospital accounts for an average of 15% to 20% of all healthcare-related infections. This incidence affects two to 15 cases of infections for every 100 patients submitted to general surgery. In 2009, WHO launched a global challenge for patient safety that sought to minimize the chances and risks of acquiring a SSI. In a retrospective study with data from 2008 to 2009 from 247 patients undergoing cholecystectomy were analyzed, it was revealed that in two (0.8%) cases there was an onset of a SSI acquired in the hospital.[31, 34]

Cholecystectomy is a complex procedure that consists of the removal of the gallbladder and is considered the most potentially contaminated surgery in the world, taking second place in the ranking of abdominal surgeries. It is a procedure indicated for the treatment of cholelithiasis and its complications, such as acute cholecystitis and in other cases such as gallbladder neoplasms. Approximately 500,000 of these procedures are performed annually in the United States. Cholecystolithiasis is one of the most common diseases of the digestive system and is a major health problem in developed countries. It is estimated that 10% to 15% of the adult population, representing 20 to 25 million Americans, have or will have gallstones. Brazil presents a prevalence of 9.3% cholelithiasis cases in the general population, requiring about 60,000 hospitalizations per year in the Brazilian Unified Health System (SUS) .[21-22, 35-46]

In another study [23, 2,203], participants undergoing general anesthetic surgical procedures were investigated, 81 (3.68%) presented with a SSI, 59 (72.84%) of these were due to potentially contaminated surgeries, however the cholecystectomy surgery was the most prevalent with 38 (46.91%) cases.

In uncomplicated acute gallbladder disease, current evidence suggests that early laparoscopic cholecystectomy is safe and decreases the length of hospital stay.[24]

In a study [27] performed with 428 subjects between 2008 and 2009, the association of cholecystitis with a hospital acquired SSI, 21 cases of SSIs were identified from potentially contaminated surgeries (video laparoscopic cholecystectomy). All participants were diagnosed with cholecystitis.

Cholelithiasis is considered the most common abdominal surgical disease in the elderly patient, and its incidence is related to the advancing age, with a global prevalence in the general population of 9.3% .[39] Cholelithiasis is one of the main symptoms related to the onset of acute cholecystitis. As in the literature, this finding was not representative for the development of hospital acquired SSIs.[18, 35-36, 46-48]

Regarding the length of hospital stay, the shorter this period, the lower the chances of a patient developing a healthcare-associated infection. Regarding the surgical patient, this has been occurring less and less, usually around the second or third postoperative day, and therefore follow-up after hospital discharge is essential, since SSIs can occur within 30 days after surgery. In the investigated studies, it was verified that the length of the hospitalization period until discharge is considered a predisposing factor for the onset of a SSI, as these infections lead to an average increase of 60% in hospitalization time.[32, 40-41]

The majority of patients were hospitalized for one postoperative day (71, corresponding to 84.52%

of the total), 10 (11.90%) for two days and 3 (3.57%) for three days post-surgery.[33]

In a study, the total number of days of hospital stay between hospital discharge (days of stay) was higher in patients between 50 and 59 years of age (21.3% of the total). On the other hand, the highest mean of hospitalization period occurred in the age group 0 to 4 years (nine days), followed by patients 80 years old or older (seven days), which is higher than what is verified in the state of Rio Grande do Sul, with four days of hospitalization. When analyzing the incidence rate of SSI according to the pre-surgical hospitalization, it was possible to observe an increase in the SSI rate according to length of hospitalization. Regarding the incidence rate of SSIs according to pre-surgical hospital stay time, an increase in the SSI rate was observed according to length of hospitalization. Even before this fact, the variable time of pre-surgical hospitalization was not significant in the current study (p-value=0.1420) .[26-27]

The mean length of hospitalization for patients who developed a SSI in the hospital environment was 13.71 days, and this period was 8.51 days for those who developed the SSI at home. Reflecting on this finding, some studies present this moment greater than that evidenced by the research that determined an average of 49.2 days for those who developed a SSI.[12, 16]

In SSIs, the time that corresponds to the incubation period is three to eight days after surgery, and this time is determined by the wound classification variables. In view of the changes that occur in the postoperative period, follow-up is essential for the patient to return to his daily activities more quickly, reducing the risk and chances for the development of infections in the hospital environment.[46]

In view of the epidemiological aspect, SSIs are very important because they account for 20% to 31% of infections among hospitalized patients. Moreover, it is the infection that causes more mortalities, complications and increases in the costs of the treatment of surgical patients. The clinical impact of this fact implies an increase of between 3 to 15 extra days of hospitalization, when compared to patients who acquire a SSI with those who do not acquire a SSI.[47]

Regarding the risk factor for the use of oxygen therapy, in the present study there was no statistical proof that this variable would be related to the onset of a SSI in the postoperative period. In the literature investigated, there was also no significant association of this risk factor with the onset of this infection. However, the administration of oxygen therapy is a predisposing factor for the development of respiratory infections.[2, 14, 23, 35, 48-49]

Although the hospitalization period has not been statistically proven to be a risk factor for the development of SSIs both in the home and in the hospital in this study, there is evidence that the post-discharge control of the surgical patient is based on the actual indexes of SSIs. Many of them confirm this type of monitoring through post-discharge follow-up. The majority of surgical patients, especially in the poorest countries, are discharged early due to the lack of beds and the high cost of treatments. Therefore, SSIs obtained only in hospitalized patients do not reflect the actual development of this infection, especially in procedures in which the postoperative hospitalization time is shorter.[22, 50-53]

As SSIs are the biggest reasons for postoperative complications in surgical patients, it is necessary to establish strategies such as post-discharge monitoring service, considering that 12 to 84% of SSIs are diagnosed during this monitoring period. This research is crucial to obtain indicators in order to reduce the underreporting of these infections and, consequently, to underestimate the true incidence, impact and relevance of SSIs. The incidence rate of SSIs found in this study was 8.7%. Most of the cases (61.9%) were diagnosed after hospital discharge, which suggests the importance of a specialized post-discharge monitoring services.[22, 30, 32, 50]

In Brazil, most institutions are limited to monitoring the occurrence of SSIs during hospitalization and do not cover post-discharge follow-up. The CDC recommends that surgical patients be given expanded control and are monitored until the postoperative period at home. This results in all components of the system - managers, administrators and institutions in general being responsible for the patient safety and not only caregivers .[22, 54-55]

The most frequently used post-discharge patient follow-up methods may be: active search, passive reporting, chart review, examination review, database review. In addition, it is important to segregate the interface with the Family Health Strategy (FHS), in order to strengthen the referral and counter referral and training of all professionals who perform basic surgical care in the postoperative period.[47]

Studies also show that creating patient safety committees, patient identification, protocols, double checking, encouraging the reporting of errors and adverse events are encouraged by the patient safety program, thus demonstrating awareness of importance.[56]

CONCLUSIONS

The results indicate that there was no significant difference in the risk factors presented in the development of SSIs in the hospital and home setting, as a result, these factors were collected and investigated, as they were proven and associated with infections in several studies. This was due to the fact that some limitations occurred due to the short period of data collection, infeasibility in the daily follow-up when there were irregularities with the participants in the postoperative period.

The Hospital Infection Control Services need to be involved in the monitoring of surgical patients in order to reduce the chances and prevalence of SSIs, mainly due to the high levels of surgical procedures, thus postoperative patients are exposed on a larger scale, which means the higher numbers of surgical interventions, the shorter the hospital stay, due to the reduced number of beds. The referral and counter- referral service can improve and qualify surgical patient care through the development of a care network with the FHS team and health professionals from hospital units. Nevertheless, it is suggested that institutions implement a post-discharge monitoring and follow-up service in order to improve the reliability of SSI incidence rates, improve the quality of patient care, epidemiological understanding and, mainly, identify the risk factors of SSIs, enabling the implementation of solutions and measures aimed at their prevention and control.

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