

Research Article



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Prevalence of surgical wound infection in Iranian patients: A systematic review and meta-analysis

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Abstract

Objective :the aim of this systematic review and meta-analysis was to evaluate the Prevalence of surgical wound infection in Iranian patients.

Method: Two separate researchers conducted studies until November 2018 at international (PubMed, Google Scholar, and WOS) and national (SID and Magiran) databases in English and Persian, without any time limit. The key words used in the research strategy included: surgical wound, infection ,post operation infection , prevalence , frequency and Iran, which were combined with Boolean agents such as AND, OR, NOT. The final data extracted using the STAT 14.0 statistical software.

Result: 2 studies conducted on 6260 Iranian patients were included in the meta-analysis. In Iranian patients, the overall Prevalence of surgical wound infection in Iranian patients was 2.5%(95% CI :2.2 % , 2.9%; I² = 69.1%).

Discussion and conclusion: To put it in a nutshell, the results of the present study indicate that, despite being not such a common complication, surgical wound infection should be closely and precisely controlled due to further complications it might cause for the patient and the costs imposed on the family and the community, with the final hope being decreasing postoperative infection.

Keywords: surgical wound, infection, post operation infection , prevalence

Introduction

Surgical wound infection is one of the most important nosocomial infections. Hospital-acquired infection is an infection that, despite not being in incubation, is not diagnosed; it, rather, is developed during hospitalization or after discharge(1,2). Millions of dollars are annually spent on the diagnosis, treatment and compensation of nosocomial infections; there are, also, other costs, such as absenteeism, disability and reduced efficiency, occupancy of hospital beds and other patients' suffering(3,4). Nosocomial infection may affect any part of the body, but the most common types of nosocomial infections include urinary tract infection, respiratory infections, site infections, septicemia, and acute infections (AIDS and hepatitis)(5,6). The most common causes are cocci positive and bacilli negative .The most common gram-positive coccus is the golden staphylococcus which is found abundantly on the patient's skin; it, additionally,

might be transferred to the patient from the staff of the hospital, especially to the site of surgery(7,8). *Staphylococcus aureus*, *Klebsiella* and *Pseudomonas* are the most common gram-negative bacilli(9). Despite considerable advances within the field of surgical techniques and the increasing identification of the pathogenesis of surgical wound infections, and widespread use of prophylactic antibiotics, with an occurrence rate of 2-5% and accounting for 24% of infections, surgical site infection is the second most common nosocomial infections; this kind of infection increases the incidence of illness and mortality rates in patients(10-12). The first step to handle nosocomial infections properly is the establishment of an effective care system, an important part of which is determining the main objectives and missions of the system(13,14). The most important and first goal is to decrease the incidence of infection in the surgical site in order to

lower mortality rate and discomfort and improve the condition of care(15,16). To do this, one must first determine the amount of infection in the endemic or basic site of surgery. Determining this base rate will help epidemiologists to control the endometrial baseline by controlling the infection statistics continuously(17).the aim of this systematic review and meta-analysis was to evaluate the Prevalence of surgical wound infection in Iranian patients.

Materials and Methods

The present systematic investigation applies developed methods that are consistent with the accurate instructions in the PRISMA check list.

Inclusion and exclusion criteria

Observational studies, including posting to editors, publications, poor quality articles (based on the Hoy's tool) and studies on adult subjects were only excluded from the study. Only articles in English and Persian are included.

Sampling methods and sample size

All observational studies with any sampling and statistical surveys were included in the present systematic study.

Research strategy

Two separate researchers conducted studies until November 2018 at international (PubMed, Google Scholar, and WOS) and national (SID and Magiran) databases in English and Persian, without any time limit. We examined a list of available articles sources for further related article searches. Specific research strategies have been developed using the MESH vocabulary explorer and free vocabularies, according to the PRESS standard, by a Health scientist librarian specializing in research on systematic review. We used the MEDLINE research strategy to investigate other databases. The key words used in the research strategy included: surgical wound, infection, post operation infection , prevalence , frequency and Iran, which were combined with Boolean agents such as AND, OR, NOT.

Selection of research and data extraction:

Two separate researchers examined the titles and abstracts by considering qualifying criteria. After removing the repetitive research, the full text of the research was examined depending on the qualifying criteria and the required data was extracted. To answer questions regarding qualifications, additional research information was obtained from the authors in case it is required. The general information (first

author, province, and year of publication), research characteristics (sampling method, research design, location, sample size and bias risk), and the measurement of results (frequency of primary headache) were also collected.

Quality assessment and abstraction:

Hoy's et al. tool was used to assess the methodological quality and the risk of getting away from the truth (bias) for each one of the observational studies. This tool evaluates 10 items for assessing the quality of studies in two dimensions such as foreign (items 1-4, target population, sampling frame, sampling method and the minimum deviation from response) and domestic credits (the issues 5-9 of the data collection method, case definition, research tool, data collection mode were assessed while the issue 10 of the bias evaluation was related to data analysis). The higher index indicated that the bias is likely to reduce and the lower index indicated the risk of more bias. The separate bias risk was investigated by two researchers. Consensus was used to solve the disagreements.

Data combination:

The final data extracted using the STAT 14.0 statistical software, including studies combined with stock diagram and the prevalence of surgical wound infection, were assessed with random effect of the model.

Results

In the initial search conducted in different databases, 398 articles were reviewed. From among these articles, as many as 354 were considered as duplicate in the screening process of titles and abstracts. As many as 35 articles were excluded for having irrelevant titles. From among the 9 remaining articles, 2 articles met the eligibility criteria. From the 7 articles that were excluded, 2 articles were reviews, 2 articles were letters to editor, 1 article did not have a full text, and 2 articles had poor quality that could not be included in the present study (Figure 1).

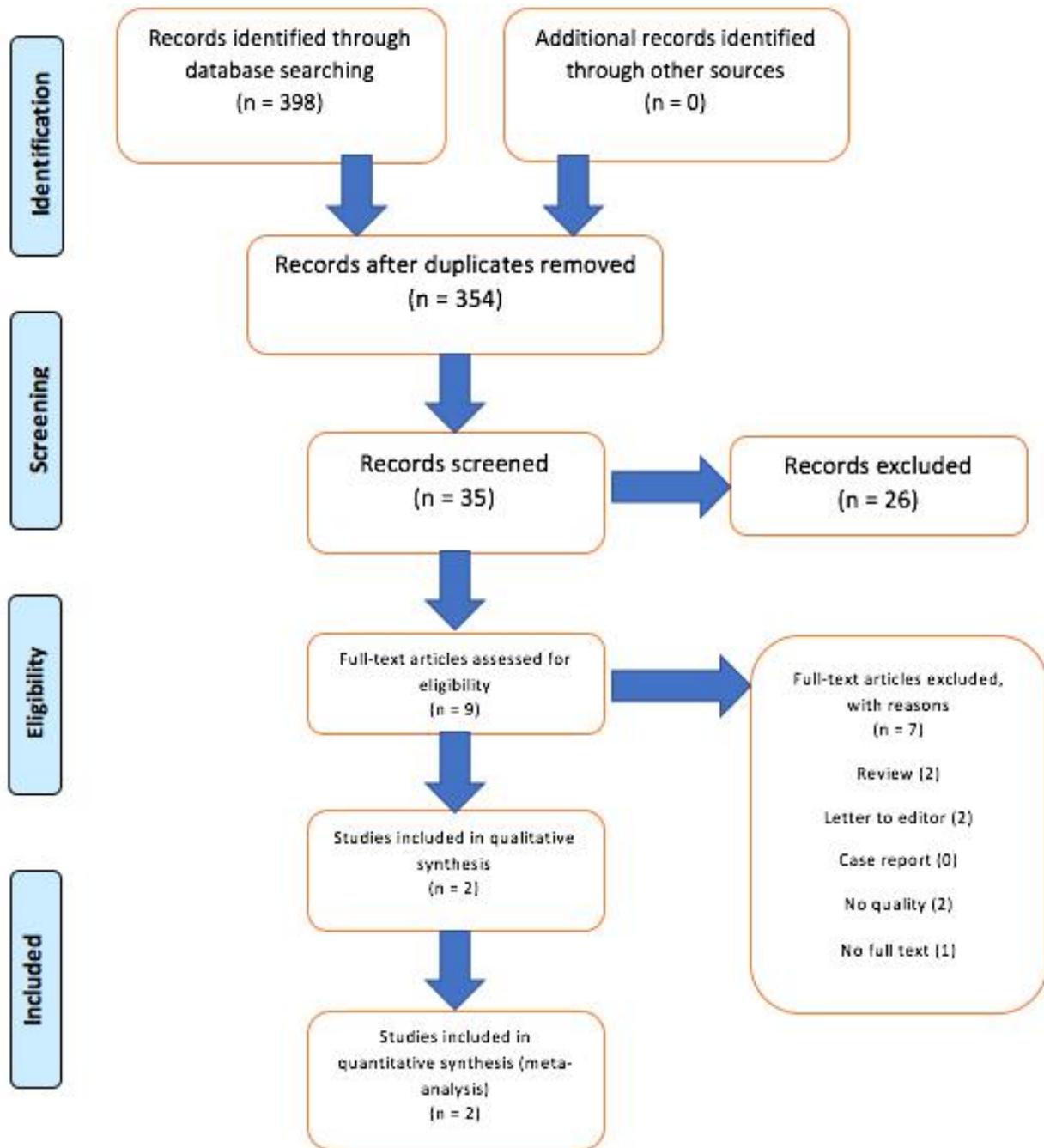


Fig 1. Study selection process

Research characteristics

These 2 studies were conducted on 6260 Iranian patients. all of the 2 studies, provided cross-sectional data. Out of the 2 studies, one was from Qom province, and one from Tehran province. The most

commonly used sampling method was convenience (easiness), (n = 2). All studies had a low bias risk. The place to conduct the studies was in the hospital (n = 2). all of the 2 research studies were included in the final analysis context. (Table 1).

Table 1. Studies included in the systematic review

First Author	year	Provence	Sample size	Female/male	Risk of bias
Soroush ^[21]	2007	Tehran	2860	0.74	Low
Riyahin ^[22]	2011	Ghom	3400	1.11	LOW

Prevalence of surgical wound infection in Iranian patients :

2 studies conducted on 6260 Iranian patients were included in the meta-analysis. In Iranian patients, the

overall Prevalence of surgical wound infection in Iranian patients was 2.5% (95% CI : 2.2 % , 2.9%; I² = 69.1%) [Table 2].

Table 2 : Prevalence of surgical wound infection in Iranian patients

ID	First Author	Year	Province	ES	95% CI for ES		% Wight
					Lower	Up	
1	Soroush	2007	Tehran	0.022	0.017	0.027	51.82
2	Riyahin	2011	Ghom	0.029	0.024	0.034	48.18
Sub-total Random pooled ES		----	-----	0.025	0.022	0.029	100

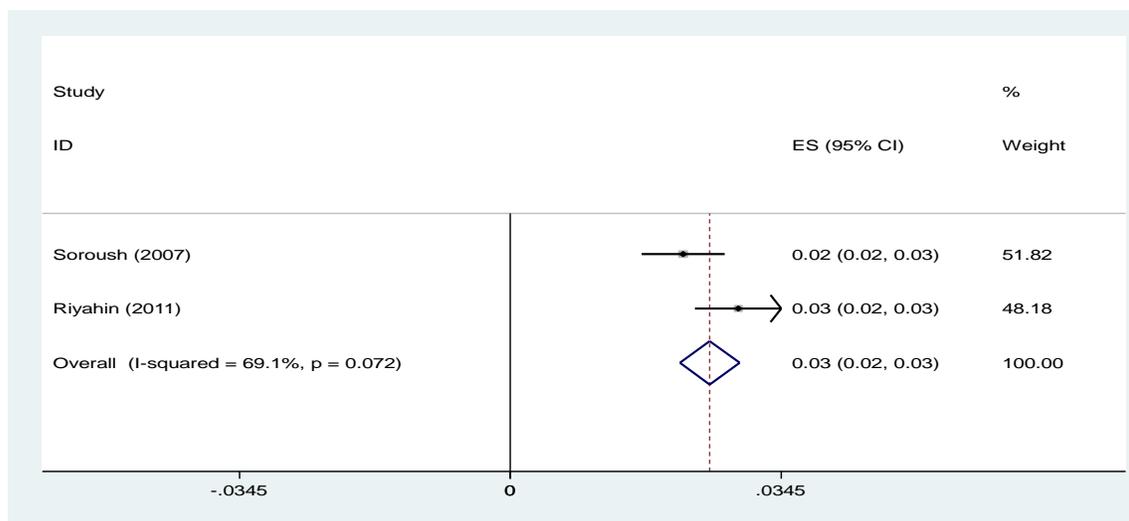


Fig. 2 :The Prevalence of surgical wound infection in Iranian patients and its 95% interval for the studied cases according to the year and the city where the study was conducted based on the model of the random effects model. The midpoint of each section of the line estimates the % value and the length of the lines showing the 95% confidence interval in each study. The oval sign shows Prevalence of surgical wound infection in Iranian patients for all studies.

Discussion

The incidence of surgical wound infections during the hospitalization period was 2.2%, which is comparable to the statistics found in other studies. In different sources, the incidence of surgical wound infections has been reported to be generally about 2-5%.

However, this rate was much higher in certain populations, such as cancer patients or individuals with other risk factors(18). There was no statistically significant relationship between the incidence of surgical wound infections and sex; however, Velasc and Chuang studies revealed an incidence of wound infections on the basis of the sex of the individual(19).

The weaknesses and limitations of this study include low and limited sample size; additionally, the present research investigates only wound infections and other types of post-operative infections have been left out. This might be the main reason for the consistency of statistics of the incidence of infection of foreign studies. It is suggested to implement a well-designed study on the impact of multiple risk factors. Considering that various socioeconomic conditions are one of the effective factors, one can measure the impact on different populations with larger sample size. It is suggested to conduct a similar study with a larger population in order to pave the ground for the implementation of a meta-analysis study to attain a single result. It is also recommended to investigate the relationship between the type of anesthesia and postpartum infection.

Conclusion

To put it in a nutshell, the results of the present study indicate that, despite being not such a common complication, surgical wound infection should be closely and precisely controlled due to further complications it might cause for the patient and the costs imposed on the family and the community, with the final hope being decreasing postoperative infection.

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