Archives of Academic Emergency Medicine. 2025; 13(1): e28

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REVIEW ARTICLE

# Incidence and Risk Factors of Surgical Site Infection After Knee Arthroplasty; a Systematic Review and Meta-Analysis

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*Received: November 2024; Accepted: December 2024; Published online: 18 January 2025*

**Abstract:** **Introduction:** Surgical site infection (SSI) constitutes a substantial complication after knee arthroplasty, contributing to notable morbidity. This study aimed to review the existing literature on the incidence and risk factors of SSI following knee arthroplasty. **Methods:** A systematic search was undertaken across various international electronic databases, including Scopus, PubMed, Web of Science, and Persian electronic databases such as Iranmedex and the Scientific Information Database. The search strategy involved the use of keywords derived from Medical Subject Headings, such as "incidence", "Surgical wound infection", "Surgical site infection", and "Arthroplasty", covering records from the earliest available up to March 17, 2024. **Results:** The study incorporated a collective participant group of 1,366,494 knee arthroplasty procedures from twenty-three chosen studies. The pooled incidence rate of SSI after knee arthroplasty was 1.7% (95% confidence interval (CI): 1.1% to 2.6%; $I^2$=99.687%; P<0.001). The Odds Ratio (OR) for the incidence of SSI in males was observed to be significantly higher than that in females (OR: 1.617; 95% CI: 1.380 to 1.894; Z=5.951; P<0.001). The pooled incidence of SSI among diabetic patients was 1.3% (95% CI: 0.6% to 2.8%; $I^2$=99.126%; P<0.001). **Conclusion:** Based on the main findings, SSIs continue to be a significant complication of knee arthroplasty, with an incidence of 1.1% to 2.6%. Male gender and diabetes mellitus were associated with an augmented probability of SSIs following knee arthroplasty.

**Keywords:** Incidence; Surgical Wound Infection; Arthroplasty; Meta-analysis

Cite this article as: Bagheri A, Sharifi Niknafs A, Farhadi B, et al. Incidence and Risk Factors of Surgical Site Infection After Knee Arthroplasty; a Systematic Review and Meta-Analysis. Arch Acad Emerg Med. 2025; 13(1): e28. https://doi.org/10.22037/aaemj.v13i1.2543.

## 1. Introduction

A Surgical Site Infection (SSI) denotes an infectious complication arising after surgical intervention, localized to the anatomical region subjected to the surgical procedure (1, 2). Such infections may manifest across a spectrum, encompassing superficial afflictions limited to the dermal layer to more severe instances implicating subcutaneous tissues, visceral organs, or incorporated prosthetic materials (3). SSIs represent a noteworthy postoperative sequela associated with prolonged hospitalization, escalated healthcare expenditures, diminished patient contentment, heightened mortality risk, and necessitated subsequent surgical interventions (4-6).

SSIs constitute a substantial complication after knee arthroplasty, contributing to notable morbidity (7). SSIs present a substantial risk after knee arthroplasty owing to the invasive surgical procedures entailing incisions into the cutaneous layers and manipulation of intra-articular tissues within the knee joint (8, 9). Variables including the presence of pros-

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thetic implants, the duration of surgical intervention, the immunological status of the patient, and adherence to aseptic protocols throughout the surgical procedure are all determinants that may impact the probability of SSI occurrence (10, 11).

The incidence and associated risk factors of SSIs vary widely in the literature. A study conducted at the Clinic for Orthopedic Surgery and Traumatology, Clinical Center of Serbia (CCS) in Belgrade, spanning from May 2016 to April 2018, revealed an incidence rate of 4.8% for SSIs among total knee arthroplasty (TKA) recipients, equating to 3.4 occurrences per 1000 postoperative patient-days (12). Based on data from the National Healthcare Safety Network (NHSN), benchmark SSI rates for knee arthroplasty vary between 0.58% and 1.60%, contingent upon the classification of patient risk (13). Some literature indicates that the incidence of SSIs after TKA procedures may escalate to 2% (7).

This article systematically reviewed the existing literature on the incidence and risk factors of SSIs in patients undergoing knee arthroplasty. By doing so, it sought to provide a more accurate estimate of SSI incidence and identify the most significant risk factors, thereby guiding clinical practice and future research in this area.

## 2. Methods

### 2.1. Study design and setting

This systematic review and meta-analysis were conducted in strict accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist, thereby ensuring adherence to the guidelines stipulated by the PRISMA (14). It should be noted that this review has been registered in the International Prospective Register of Systematic Reviews (PROSPERO).

### 2.2. Search strategy

A comprehensive and systematic search was undertaken across various international electronic databases, including Scopus, PubMed, Web of Science, and Persian electronic databases such as Iranmedex and the Scientific Information Database (SID). The search strategy involved the use of keywords derived from Medical Subject Headings, such as “incidence”, “Surgical wound infection”, “Surgical site infection”, and “Arthroplasty”, covering records from the earliest available up to March 17, 2024 (supplementary table 1). For example, the search strategy employed in the PubMed/MEDLINE database included the following terms: ((“Incidence”)) AND ((“Surgical wound infection”) OR (“Surgical site infection”)) AND ((“Knee arthroplasty”) OR (“Total knee arthroplasty”) OR (“Knee hemiarthroplasty”)). Boolean operators “OR” and “AND” were used to amalgamate phrases. Additionally, the equivalent Persian keywords were applied in Iranian electronic databases. Two independent researchers carried out these comprehensive searches. Notably, this systematic review and meta-analysis excluded gray literature, including expert commentary, conference presentations, theses, research and committee reports, and ongoing studies. Gray literature refers to written material without official approval for commercial publication, whether in print or online (15).

### 2.3. Inclusion and exclusion criteria

This systematic review studied published primary research, including both Persian and English studies, concentrating on the incidence of SSI in patients who underwent knee arthroplasty. Our analysis deliberately omitted reviews, case studies, conference materials, letters to the editor, legal proceedings, and qualitative research.

### 2.4. Study selection

EndNote 20 software was employed for data management. The research selection, based on predetermined inclusion and exclusion criteria, adhered to the following protocol: 1) Preliminary screening encompassed evaluating the titles and abstracts of the identified studies. 2) Duplicate papers were discerned via both electronic and manual techniques. 3) A thorough review of the full content of the publications was conducted to finalize the inclusion or exclusion decisions. When discrepancies arose between the first two researchers during the study selection phase, a third researcher was brought in to resolve the disagreements. Additionally, an extensive review of references was carried out as a final safeguard to prevent potential data loss.

### 2.5. Data extraction and quality assessment

For this review, the researchers gathered a variety of information, which included elements such as the name of the primary author, the year of publication, the location of the study, the sample size, the distribution of age and gender, the incidence of SSI, and the incidence of SSI in patients with diabetes. The quality of the studies was assessed using the Appraisal tool for Cross-Sectional Studies (AXIS tool). This tool is comprised of 20 items, each of which is rated on a two-point Likert scale. A response of “yes” is accorded a score of 1, while a response of “no” is a score of 0. This tool assesses report quality (7 items), study design quality (7 items), and the possible introduction of biases (6 items).

Finally, the AXIS tool rates the quality of studies at three levels: high (70 to 100%), fair (60 to 69.9%), and low (0 to 59.9%) (16).

### 2.6. Statistical analysis

Our study used the Comprehensive Meta-Analysis (CMA) program, version 3. The weight given to each study was ascertained based on its inverse variance. A forest plot visualization was employed to assess the heterogeneity among the studies. We gathered data on the sample size and the frequency of SSI for each survey, using this data to calculate the overall effect size. The extent of heterogeneity was evaluated using I2 statistics, with values of 25%, 50%, and 75%, signifying mild, moderate, and high heterogeneity, re-

spectively. We applied a random effects model due to the significant variability observed in the results. Furthermore, a meta-regression analysis was conducted on study-specific variables such as the year of publication to investigate the incidence of SSI.

### 2.7. Sensitivity analysis

A sensitivity analysis was conducted to assess the influence of individual studies on the overall estimation of SSI incidence. This methodological approach facilitated a thorough evaluation of the robustness of the results by systematically removing each study from the analysis and monitoring the subsequent alterations in the computed incidence of SSI.

### 2.8. Publication bias

We utilized the Egger test in combination with a Funnel plot analysis to assess the possibility of publication bias. This integrated approach facilitated a thorough evaluation of the existence and degree of publication bias among the studies reviewed. The Egger test offers statistical proof of asymmetry in the distribution of effect sizes. At the same time, the Funnel plot graphically illustrates the dispersion of study outcomes in terms of their precision, aiding in the detection of potential publication bias.

## 3. Results

### 3.1. Study selection

As depicted in Figure 1, the initial database exploration yielded 1,694 studies relevant to the systematic review and meta-analysis. The removal of duplicate studies subsequently reduced the pool to 1,158 papers. A comprehensive review of titles and abstracts led to excluding 927 studies that did not align with the study's objectives. Furthermore, 186 studies were discarded due to the inclusion of case reports, editorial letters, conference papers, dissertations, reviews, or other content not pertinent to the research. A meticulous examination of the full text of thirty-seven studies resulted in the further exclusion of nine studies due to inadequate research design or unsuitable results. At the same time, five were eliminated due to insufficient data. Ultimately, twenty-three studies (7, 12, 17-37) satisfied the inclusion criteria and were assimilated into this systematic review and meta-analysis.

### 3.2. Study characteristics

As outlined in Table 1, the study incorporated a collective participant group of 1,366,494 knee arthroplasty procedures derived from 23 chosen studies (7, 12, 17-37). The participants' mean age was 66.83 (standard deviation (SD)=0.55) years. Notably, females represented 65.50% of the total participant demographic.

### 3.3. Quality assessment of eligible studies

As illustrated in Figure 2, it was ascertained that every study (7, 12, 17-37) incorporated into the analysis demonstrated a superior degree of quality. Furthermore, there were six studies (17, 20, 25, 26, 31, 34) that neglected to disclose their funding sources or potential conflicts of interest. Simultaneously, an equal number of studies (21, 24, 25, 28, 31, 34) did not furnish information about the limitations inherent in their respective research.

### 3.4. Pooled incidence of SSI

As depicted in Figure 3 and Table 2, the collective SSI rate among patients subjected to knee arthroplasty, as recorded in the twenty-three studies (7, 12, 17-37) included in the analysis was 1.7% (95% confidence interval (CI): 1.1% to 2.6%; $I^2$=99.687%; P<0.001).

### 3.5. Incidence of SSI based on gender

As demonstrated in Figure 4 and Table 2, the Odds Ratio (OR) for the incidence of SSI in males was observed to be significantly higher than that in females (OR: 1.617; 95% CI: 1.380 to 1.894; Z=5.951; P<0.001) (7, 18, 20-22, 25, 30, 33, 34, 36, 37).

### 3.6. Incidence of SSI in diabetic patients

As illustrated in Figure 5 and Table 2, the aggregate incidence of SSI among diabetic patients who underwent knee arthroplasty, as documented in the ten studies (7, 18-21, 30, 33, 34, 36, 37) incorporated into the analysis, was estimated to be 1.3% (95% CI: 0.6% to 2.8%; $I^2$=99.126%; P<0.001).

### 3.7. Incidence of SSI during different years

As depicted in Figure 6, the outcome of the meta-regression analysis indicated that there is no significant correlation between the incidence of SSI and the year of publication (Coefficient=0.0017; 95% CI: -0.1215 to 0.1250; Z=0.03, P=0.9780).

### 3.8. Sensitivity analysis

As depicted in Figure 7, sensitivity analyses were executed by methodically omitting one study sequentially to evaluate each study's influence on the comprehensive results and the degree of heterogeneity amongst the studies. The findings suggested that removing any single study incorporated within the purview of this meta-analysis leads to a statistically significant modification in the pooled incidence of SSI after knee arthroplasty.

### 3.9. Publication bias

As illustrated in Figure 8, a funnel plot was employed to assess the potential for publication bias in evaluating SSI incidence after knee arthroplasty. Importantly, no noticeable signs of asymmetry were discerned in the funnel plot. Moreover, the Egger regression test outcomes revealed no substantial evidence of publication bias in the evaluation of SSI incidence following knee arthroplasty (t=1.261, P=0.221). Additionally, there was no significant evidence of publication bias

in evaluating SSI incidence in diabetic patients based on the Egger test (t=0.176, P=0.864).

## 4. Discussion

This systematic review and meta-analysis aimed to study the incidence rate of SSIs in patients subjected to knee arthroplasty. The findings of the research revealed an incidence rate of 1.7% for SSIs.

Knee arthroplasty, often referred to as knee replacement surgery, is a procedure that entails replacing impaired or diseased components of the knee joint with prosthetic elements. There is a correlation between SSIs and knee arthroplasty, given that the latter inherently possesses a potential risk for the emergence of such infections (30, 34).

The outcomes of a systematic review and meta-analysis conducted on patients post-knee surgery revealed an SSI incidence of 3.0% (38).

Contrasting with the results of the current study, it was illustrated that the incidence of SSI after hip arthroplasty among patients exceeded that reported in the 2010 study. The findings of a systematic review and meta-analysis focusing on individuals who underwent foot and ankle surgery disclosed a postoperative SSI incidence of 4.2% (39). Furthermore, results from another systematic review and meta-analysis centered on patients subjected to long-bone surgery exhibited a post-surgical SSI incidence of 3.3% within this cohort (40). In conjunction with our study results, these findings highlight the distinct incidence rates of SSI in diverse surgical contexts, illuminating the intricate nature of infection risk across various orthopedic procedures.

The outcomes of this research indicated that the likelihood of SSI incidence in male patients following knee arthroplasty is significantly higher in comparison to their female counterparts. Moreover, the results of an additional study on the incidence of SSI post-knee surgery demonstrated a higher incidence in men than women, albeit the difference was not statistically significant (38). In a similar vein, a distinct systematic review and meta-analysis executed in 2016, which focused on patients undergoing total joint arthroplasty surgery, unveiled a higher incidence of periprosthetic infection in men compared to women (41). These results collectively suggest that, in general, the incidence of SSI in men post-surgery surpasses that in women. Consequently, it is recommended that future research endeavors explore the risk factors that contribute to this heightened incidence in men.

The findings of this systematic review and meta-analysis indicated that the incidence of SSIs following knee arthroplasty in patients with diabetes was 1.3%. In contrast, another systematic review and meta-analysis focusing on patients post knee surgery demonstrated a higher SSI incidence of 5% in patients with diabetes (38). Diabetes has the potential to undermine the body's immune response, thereby rendering individuals with diabetes more prone to infections. Elevated blood glucose levels, a characteristic of diabetes, can debilitate the functionality of white blood cells, which play a crucial role in combating infections (42). Rigorous monitoring and proactive management of diabetes are imperative to mitigate the risk of SSIs and ensure favorable outcomes subsequent to knee replacement surgery.

Furthermore, the insights gleaned from the studies encompassed within this systematic review and meta-analysis denote a significant impact of comorbidities on the incidence of SSIs subsequent to knee arthroplasty (12, 13, 21, 24, 31, 33, 34, 37). These findings emphasize the profound influence of pre-existing medical conditions on postoperative outcomes, accentuating the necessity for thorough preoperative evaluation and management of comorbidities to minimize the risk of SSIs in patients subjected to knee arthroplasty. An in-depth exploration into the specific comorbidities and their corresponding effects on SSI incidence could guide targeted interventions aimed at enhancing patient care and diminishing postoperative complications within this demographic.

These findings emphasize the criticality of rigorous preoperative evaluation, scrupulous surgical methodology, and vigilant postoperative monitoring to curtail the risk of SSIs in patients subjected to knee arthroplasty. Nevertheless, there is a pressing need for additional research to corroborate these findings across varied patient demographics, evaluate the efficacy of preventive interventions, and fine-tune strategies for infection control within this patient cohort. Addressing these research lacunae will be instrumental in enhancing patient outcomes and optimizing the provision of care for individuals undergoing knee arthroplasty.

## 5. Limitations

This research study is subject to several limitations that necessitate careful consideration. The included studies exhibit variability in terms of patient demographics, surgical methodologies, and definitions of Surgical Site Infections (SSIs), among other factors, which can contribute to a high degree of heterogeneity. This heterogeneity may impede the ability to aggregate results and derive meaningful conclusions. The meta-analysis may not comprehensively account for all potential confounding variables that could influence the association between risk factors and SSIs following knee arthroplasty. An inadequate adjustment for confounders can result in biased estimates of association. This could potentially impact the comprehensiveness and generalizability of the findings.

### *5.1. Recommendations for future research*

In order to enhance comprehension and optimize patient outcomes in the context of knee arthroplasty, while concurrently addressing the burden of SSIs, future research endeavors should prioritize a number of key recommendations. Firstly, it is suggested to monitor patients longitudinally to evaluate the incidence and timing of SSIs following knee arthroplasty. Longitudinal studies can offer invaluable insights into the requisite duration of postoperative surveillance needed to detect SSIs and the risk factors associated

with late-onset infections. Secondly, comprehensive assessments of potential risk factors for SSIs after knee arthroplasty should be conducted, encompassing patient-related factors (e.g., comorbidities, Body Mass Index, smoking status), surgical factors (e.g., surgical technique, duration of surgery), and postoperative care practices (e.g., antibiotic prophylaxis, wound management). Lastly, it is recommended to perform health economic analyses to ascertain the healthcare costs associated with SSIs after knee arthroplasty and the cost-effectiveness of preventive measures. Such information can inform healthcare policies and decisions pertaining to resource allocation.

## 6. Conclusion

Our research findings underscore that SSIs continue to be a notable complication in the aftermath of knee arthroplasty, with an incidence oscillating between 1.1% and 2.6%. Male gender and diabetes mellitus were associated with an augmented probability of SSIs following knee arthroplasty.

## 7. Declarations

### *7.1. Acknowledgments*

None.

### *7.2. Authors contributions*

Study concept and design by all authors; Data acquisition by all authors; Data interpretation by all authors; drafting the manuscript by all authors; Revision of the manuscript by all authors; the final version of the manuscript is approved by all authors.

### *7.3. Conflict of interest*

The authors declare no conflict of interest.

### *7.4. Ethical approval*

None

### *7.5. Funding and support*

None.

### *7.6. Data availability*

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

### *7.7. Using artificial intelligence chatbots*

None

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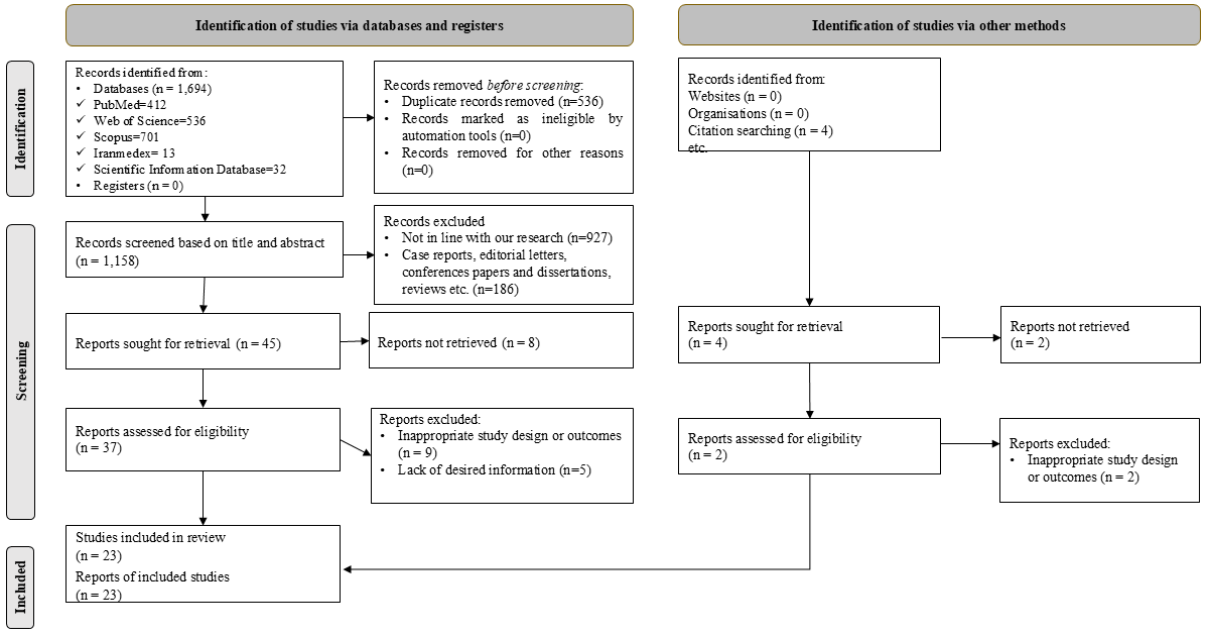


**Figure 1:** Flow diagram of the study selection process.

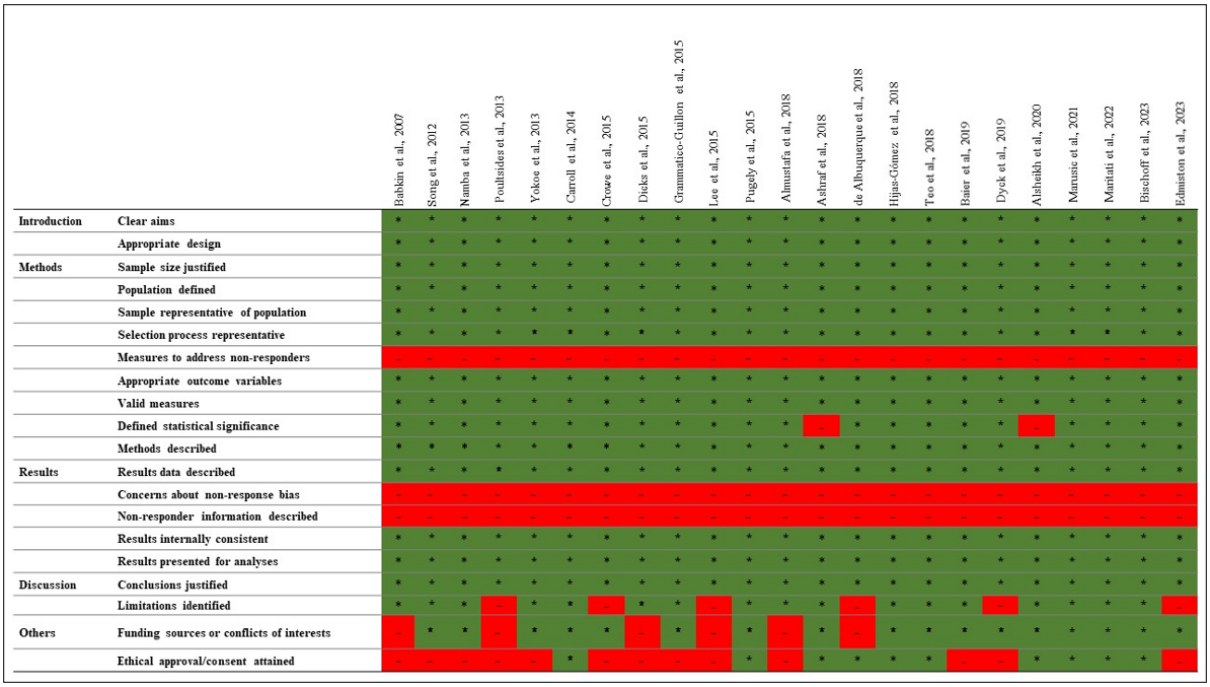


**Figure 2:** Quality assessment of included studies.

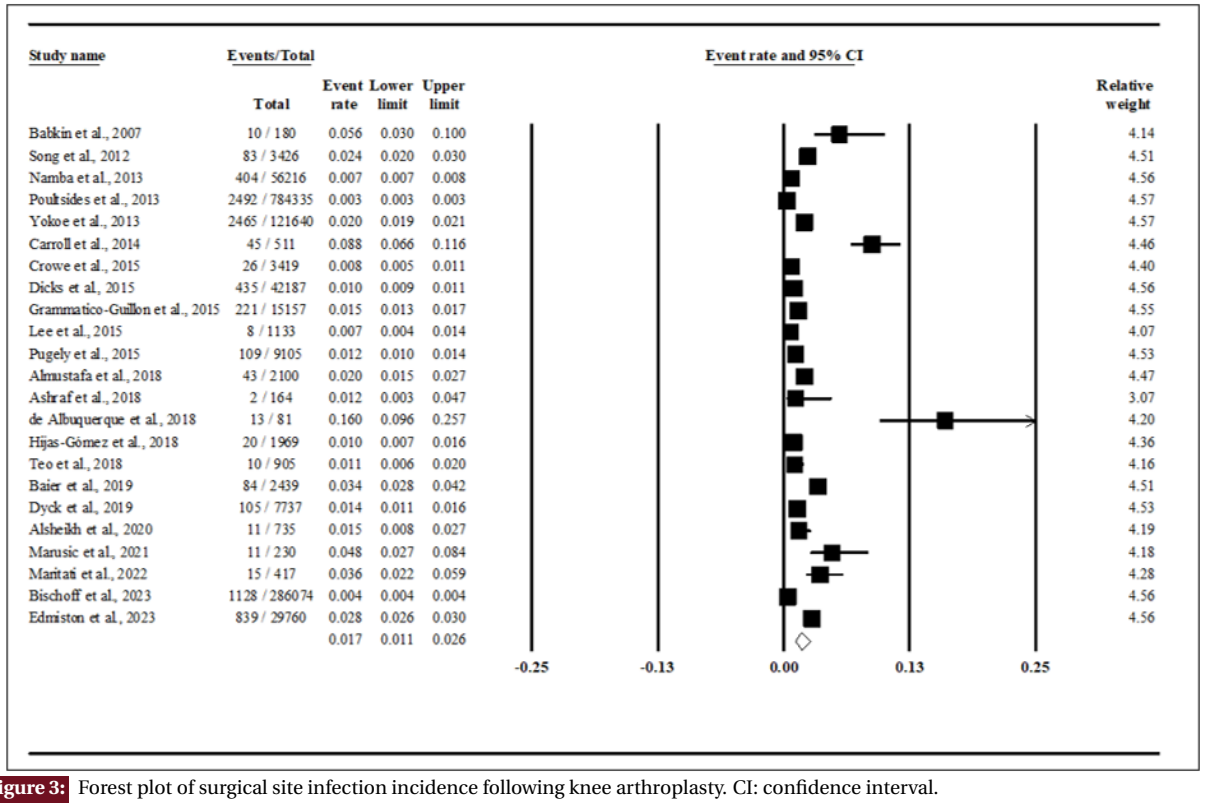


**Figure 3:** Forest plot of surgical site infection incidence following knee arthroplasty. CI: confidence interval.

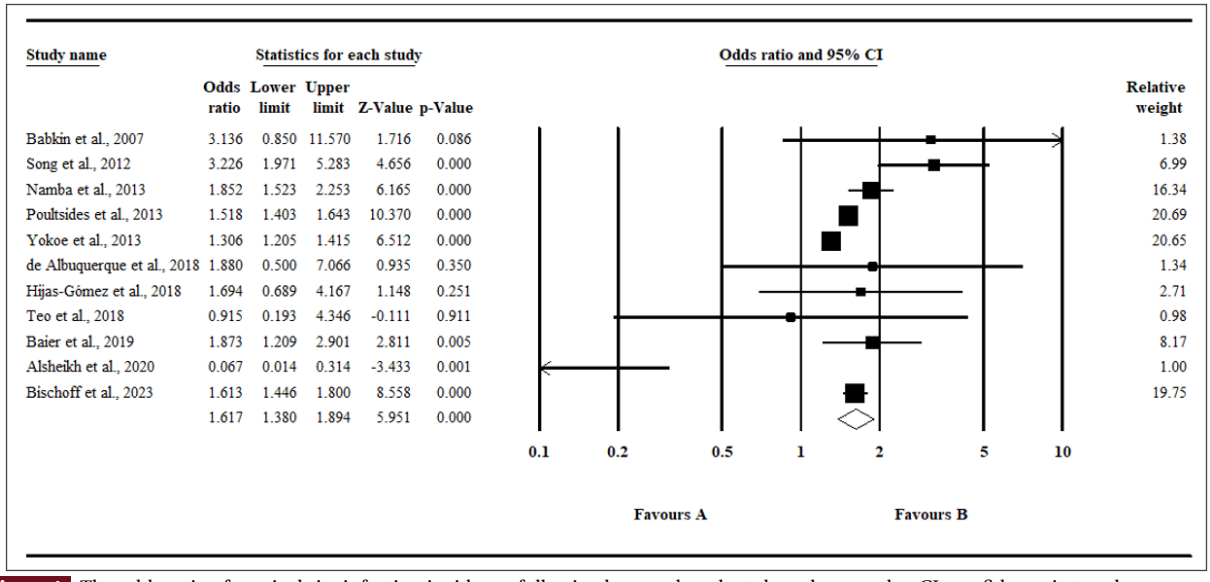


**Figure 4:** The odds ratio of surgical site infection incidence following knee arthroplasty based on gender. CI: confidence interval.

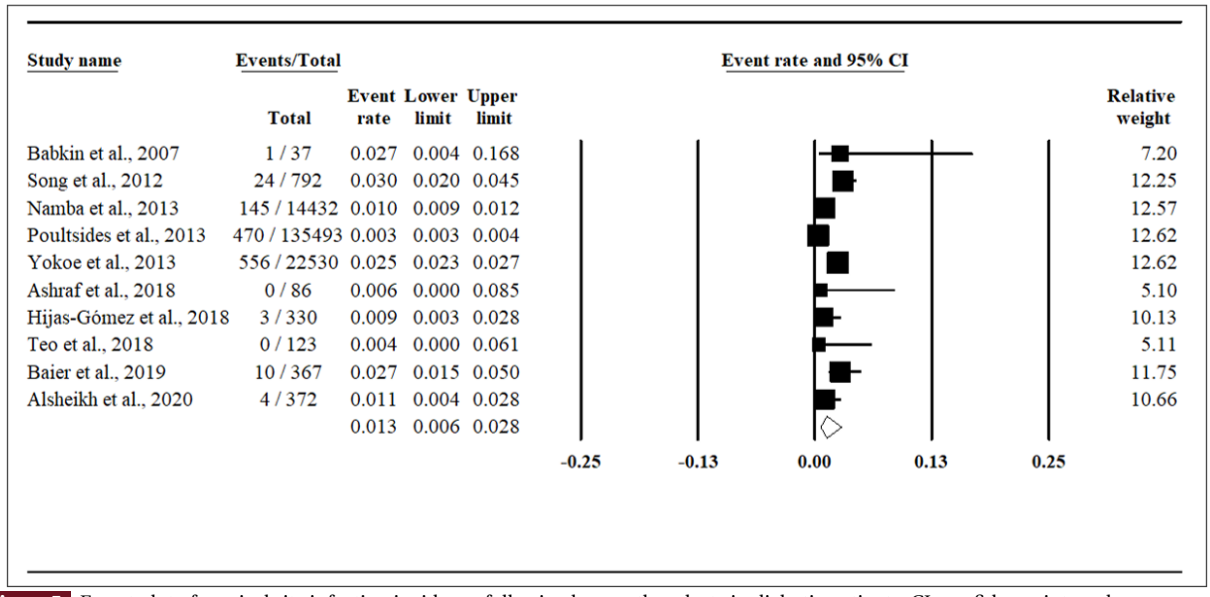


**Figure 5:** Forest plot of surgical site infection incidence following knee arthroplasty in diabetic patients. CI: confidence interval.

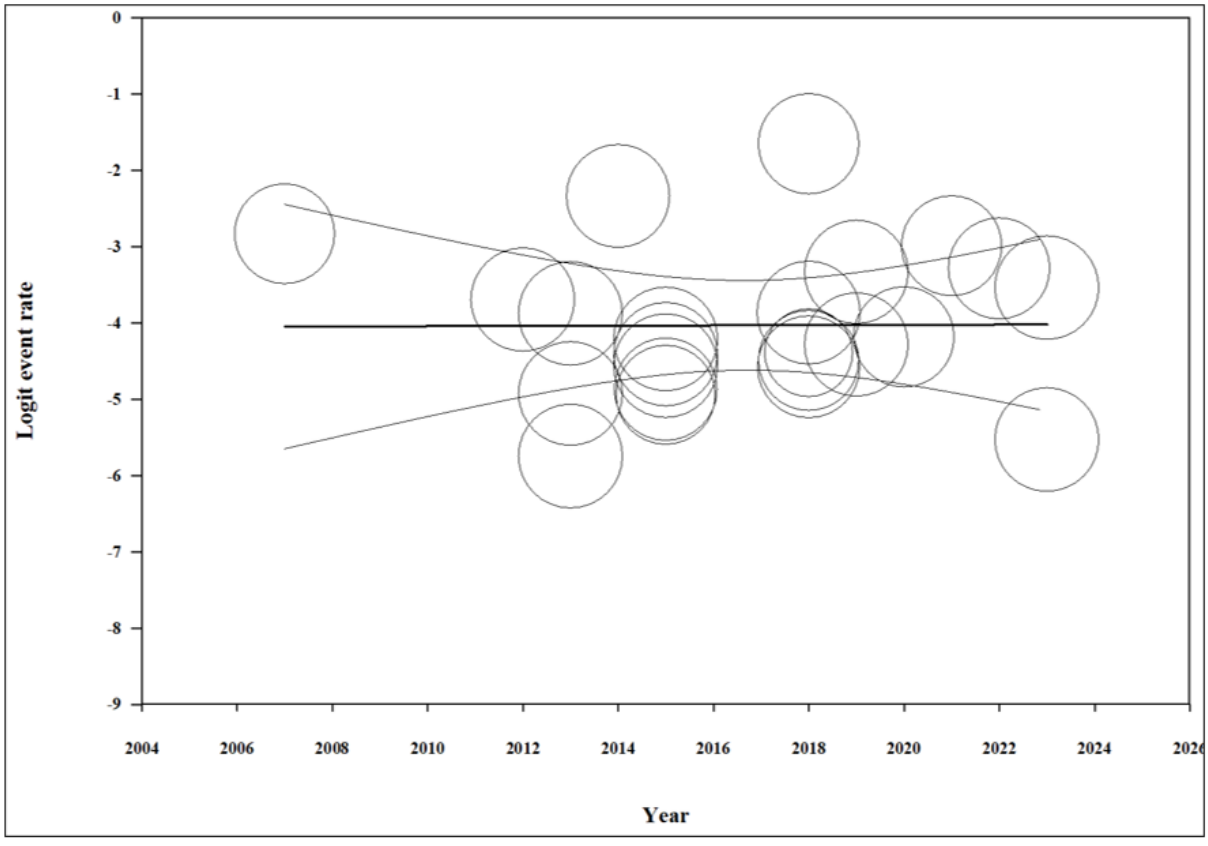


**Figure 6:** Meta-regression based on the relationship between surgical site infection incidence following knee arthroplasty and year of publication.

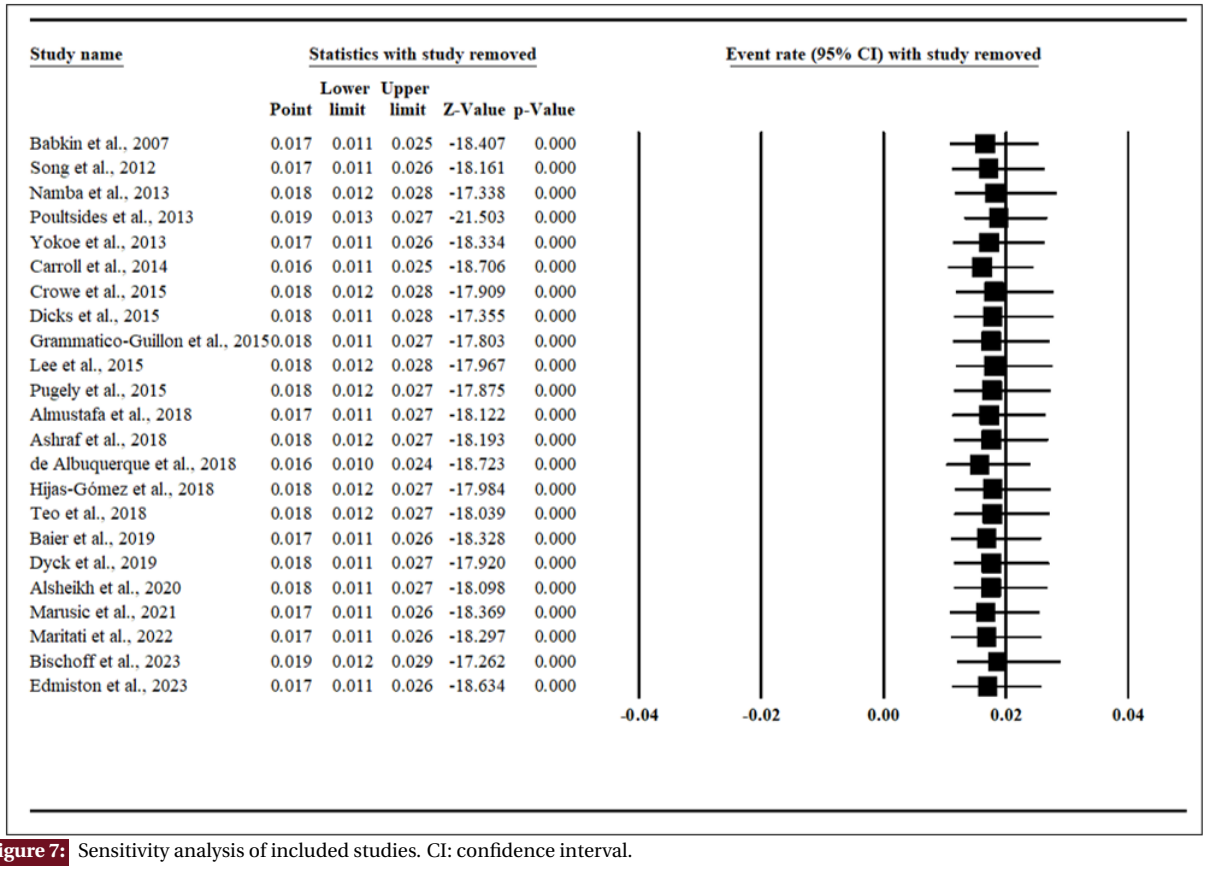


**Figure 7:** Sensitivity analysis of included studies. CI: confidence interval.

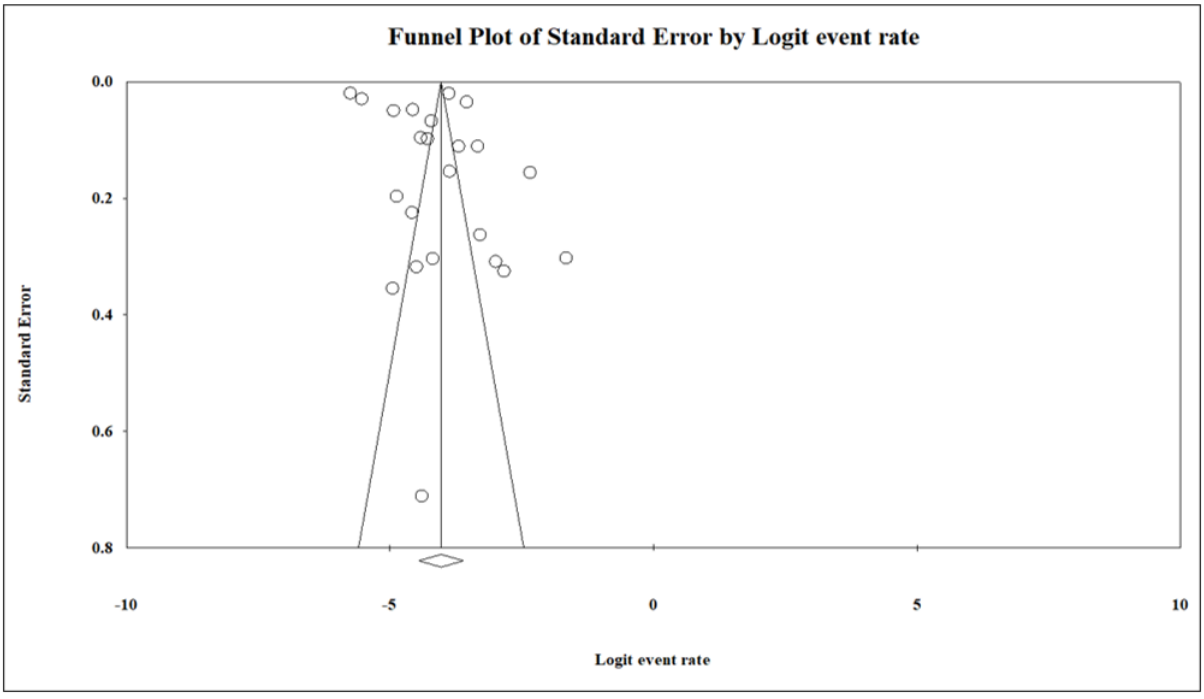


**Figure 8:** Publication bias evaluation of included studies using Funnel plot.

**Table 1:** Characteristics of the included studies in this systematic review and meta-analysis

| First Author/year | Location | N | Age (year) | M/F (%) | Associated risk factors of SSI |
|---|---|---|---|---|---|
| **Babkin et al., 2007(20)** | Israel | 180 | 72.40 (SD=7.40) | 33.89/66.11 | Direction of knee operation (P=0.03)<br>Prosthesis type (P<0.01) |
| Song et al., 2012(36) | Korea | 3426 | N/A | 11.03/88.97 | N/A |
| Namba et al., 2013(33) | USA | 56216 | 67.40 (SD=9.60) | 36.99/63.01 | Gender (P<0.001)<br>Race (P=0.003)<br>Diabetes (P<0.001)<br>Osteoarthritis (P=0.005)<br>Posttraumatic arthritis (P<0.001)<br>Osteonecrosis (P=0.011)<br>Age (P=0.037) |
| Poultsides et al., 2013(34) | USA | 784335 | 67.26 | 35.96/64.04 | Alcohol abuse (P<0.001)<br>Congestive heart failure (P<0.001)<br>Coagulopathy (P<0.001)<br>Chronic lung disease (P<0.001)<br>Diabetes (P=0.0035)<br>Liver disease (P<0.001)<br>Fluid and electrolyte disturbance (P<0.001)<br>Metastatic cancer (P<0.001)<br>Neurologic disorder (P<0.001)<br>Pulmonary circulatory disease (P<0.001)<br>Renal disease (P<0.001)<br>Valvular disease (P=0.0206) |
| Yokoe et al., 2013(37) | USA | 121640 | 67.70 (SD=10.40) | 37.64/62.36 | Race and electrolyte disturbance (P=0.001)<br>Length of stay (P<0.001)<br>Diabetes (P=0.003)<br>Congestive heart failure (P<0.001)<br>Renal failure (P<0.001)<br>Lymphoma (P=0.004)<br>Metastatic cancer (P=0.001)<br>Liver disease (P<0.001)<br>Rheumatoid arthritis (P=0.002)<br>Obesity (P<0.001) |
| Carroll et al., 2014(23) | Australia | 511 | N/A | 34.44/65.56 | Rheumatoid arthritis (P=0.043) Tourniquet time (P=0.029) |
| Crowe et al., 2015(24) | USA | 3419 | N/A | 31.32/68.68 | Gender (P=0.021)<br>Smoking (P=0.047)<br>Pulmonary disease (P=0.015) |
| Dicks et al., 2015(26) | USA | 42187 | N/A | N/A | Surgery duration (P<0.01) |
| Grammatico-Guillon et al., 2015(29) | France | 15157 | N/A | N/A | N/A |
| Lee et al., 2015(31) | Hong Kong | 1133 | N/A | N/A | Age (P<0.05)<br>Diabetes (P<0.05)<br>Anemia (P<0.05)<br>Thyroid disease (P<0.05)<br>Heart disease (P<0.05)<br>Lung disease (P<0.05)<br>Operation time (P<0.05) |
| Pugely et al., 2015(35) | USA | 9105 | N/A | N/A | N/A |
| Almustafa et al., 2018(17) | Scotland | 2100 | 68.30 (SD=8.90) | 44.90/55.10 | N/A |
| Ashraf et al., 2018(19) | Pakistan | 164 | 62.00 (SD=13.00) | 35.98/64.02 | N/A |
| de Albuquerque et al., 2018(25) | Brazil | 81 | N/A | 20.99/79.01 | N/A |
| Hijas-Gómez et al., 2018(30) | Spain | 1969 | 71.70 (SD=7.20) | 28.64/71.36 | Hair removal (P=0.011)<br>Contaminated surgery (P<0.001) |
| Teo et al., 2018(7) | Singapore | 905 | 65.90 (SD=7.70) | 21.44/78.56 | Duration of surgery (P=0.03) |
| Baier et al., 2019(21) | Germany | 2439 | N/A | 32.14/67.86 | Gender (P=0.006)<br>Length of hospital stay (P<0.001)<br>Smoking (P=0.002)<br>Chronic skin disease (P=0.011)<br>The duration of surgery (P=0.008)<br>Postoperative bleeding (P<0.001)<br>Postoperative wound healing disorder (P<0.001) |
| Dyck et al., 2019(27) | Canada | 7737 | N/A | N/A | N/A |

**Table 1:** Characteristics of the included studies in this systematic review and meta-analysis (continue)

| First Author/year | Location | N | Age (year) | M/F (%) | Associated risk factors of SSI |
|---|---|---|---|---|---|
| Alsheikh et al., 2020(18) | Saudi Arabia | 735 | 64.00 (SD=9.03) | 75.92/24.08 | N/A |
| Marusic et al., 2021(12) | Serbia | 230 | 67.82 (SD=7.93) | 34.35/65.65 | Peripheral vascular disease (P=0.037) |
| Maritati et al., 2022(32) | Italy | 417 | N/A | N/A | N/A |
| Bischoff et al., 2023(22) | Germany | 286074 | N/A | 37.37/62.63 | N/A |
| Edmiston et al., 2023(28) | UK | 29760 | 61.51 | 38.71/61.29 | N/A |

SD: Standard Deviation; SSI: Surgical Site Infection; M/F: male/female; N: sample size; N/A: not applicable.

**Table 2:** The incidence rate of surgical site infection (SSI) based on gender and diabetes mellitus in included studies

| First Author/year | SSI n (%) | Gender | | Diabetes |
|---|---|---|---|---|
| | | Male | Female | |
| Babkin et al., 2007 (20) | 10 (5.56) | 6/61 | 4/119 | 1/37 |
| Song et al., 2012 (36) | 83 (2.42) | 23/378 | 60/3048 | 24/792 |
| Namba et al., 2013 (33) | 404 (1.14) | 210/20797 | 194/35419 | 145/14432 |
| Poultsides et al., 2013 (34) | 2492 (0.32) | 1146/282062 | 1346/502273 | 470/135493 |
| Yokoe et al., 2013 (37) | 2465 (2.03) | 1089/46058 | 1376/75582 | 556/22530 |
| Carroll et al., 2014 (23) | 45 (8.81) | N/A | N/A | N/A |
| Crowe et al., 2015 (24) | 26 (0.76) | | | N/A |
| Dicks et al., 2015 (26) | 435 (1.03) | N/A | N/A | N/A |
| Grammatico-Guillon et al., 2015 (29) | 221 (2.00) | N/A | N/A | N/A |
| Lee et al., 2015 (31) | 8 (0.71) | N/A | N/A | N/A |
| Pugely et al., 2015 (35) | 109 (1.20) | N/A | N/A | N/A |
| Almustafa et al., 2018 (17) | 43 (2.05) | N/A | N/A | N/A |
| Ashraf et al., 2018 (19) | 2 (1.22) | N/A | N/A | 0/86 |
| de Albuquerque et al., 2018 (25) | 13 (16.05) | 4/17 | 9/64 | N/A |
| Hijas-Gómez et al., 2018 (30) | 20 (1.02) | 8/564 | 12/1425 | 3/330 |
| Teo et al., 2018 (7) | 10 (1.10) | 2/194 | 8/711 | 0/123 |
| Baier et al., 2019 (21) | 84 (3.45) | 39/784 | 45/1655 | 10/367 |
| Dyck et al., 2019 (27) | 105 (1.36) | N/A | N/A | N/A |
| Alsheikh et al., 2020 (18) | 11 (1.50) | 2/558 | 9/177 | 4/372 |
| Marusic et al., 2021 (12) | 11 (4.78) | N/A | N/A | N/A |
| Maritati et al., 2022 (32) | 15 (3.60) | N/A | N/A | N/A |
| Bischoff et al., 2023 (22) | 1128 (0.77) | 631/106910 | 657/179164 | N/A |
| Edmiston et al., 2023 (28) | 839 (2.82) | N/A | N/A | N/A |

N/A: not applicable.

**Supplementary table 1:** Search strategy in different databases

| Database | Strategy |
|---|---|
| Scopus | ((“Prevalence”) OR (“Incidence”) OR (“Epidemiology”) OR (“Frequency”) OR (“Burden”)) AND ((“Surgical wound infection”) OR (“Surgical site infection”)) AND ((“Knee arthroplasty”) OR (“Total knee arthroplasty”) OR (“Knee hemiarthroplasty”)) |
| Pubmed | ((“Prevalence”) OR (“Incidence”) OR (“Epidemiology”) OR (“Frequency”) OR (“Burden”)) AND ((“Surgical wound infection”) OR (“Surgical site infection”)) AND ((“Knee arthroplasty”) OR (“Total knee arthroplasty”) OR (“Knee hemiarthroplasty”)) |
| Web Of Science | ((“Prevalence”) OR (“Incidence”) OR (“Epidemiology”) OR (“Frequency”) OR (“Burden”)) AND ((“Surgical wound infection”) OR (“Surgical site infection”)) AND ((“Knee arthroplasty”) OR (“Total knee arthroplasty”) OR (“Knee hemiarthroplasty”)) |
| Other | ((“Prevalence”) OR (“Incidence”) OR (“Epidemiology”) OR (“Frequency”) OR (“Burden”)) AND ((“Surgical wound infection”) OR (“Surgical site infection”)) AND ((“Knee arthroplasty”) OR (“Total knee arthroplasty”) OR (“Knee hemiarthroplasty”)) |