

Elective Surgical Case Cancellation and Reasons in Ethiopia: A Systematic Review and Meta-Analysis

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Research

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Abstract

Background: Cancellation of elective surgical operation recognized as a major cause of emotional trauma to patients as well as their families. In Ethiopia, prevalence and reasons for elective surgical case cancellation are variable from time to time in different settings. This systematic review and meta-analysis aimed to find the pooled prevalence of elective surgical case cancellation. Besides, it aimed to find reasons for elective surgical case cancellation in Ethiopia.

Methods: The databases for the search were Web of Science, PubMed, and Google Scholar by the date 02/08/2020. To assess publication bias Egger's test regression analysis was applied.

Results: This meta-analysis included a total of 5 studies with 5591 study participants. The pooled prevalence of elective surgical case cancellation was 21.41% (95% CI: 12.75 to 30.06%).

Administration-related (34.50%) was the most common identified reason. Followed by Surgeon (25.29%), Medical (13.90%), and Patient-related reasons (13.34%).

Conclusions: The national prevalence of elective surgical case cancellation was considerable. The most common reason for elective surgical case cancellation was administration-related reasons, followed by the surgeon, medical and patient-related reasons. The administrative or management-related reasons for the cancellations are potentially preventable. Thus, efforts should be made to prevent unnecessary cancellations through careful planning.

Background

Elective surgical case cancellation refers to a scheduled *surgical procedure* that not performed on a given day[1]. It have been a major and long-standing problem for healthcare organizations across the world[2]. Many *patients on the elective surgery not operated upon the waiting list* [3].

Most hospitals invest considerable resources in maintaining operating suites. But, unanticipated cancellation of scheduled surgery is of concern[4]. In developing countries, cancellation of elective surgical operation is a common phenomenon [5].

Day of surgery cancellation is a well-recognized reflects inefficiency in management[6]. It contributes to frustration and mental stress to the patients and their families[7]. It also increases the waiting period for the patients[8]. Besides, it surges the economic burden due to extended hospital stays [9, 10]. Moreover, delayed *surgery increases the risk of in-hospital death*[11]. There are many reasons for the cancellation of elective surgical cases but they might differ from hospital to hospital[12]. Unexpected cancellations of planned surgery divided as avoidable and unavoidable cancellations[1]. Cancellations like scheduling errors, equipment shortages, and inadequate preoperative evaluation are avoidable cancellations. Unavoidable cancellations are emergency encounters and unexpected changes in the patient's medical status[13]. Different literature suggests that with improving the planning most cancellations are avoidable. It has also suggested that patients themselves should receive early notice of their operating day, and a reminder of their appointment [14]. Involving patients in these ways may even increase their satisfaction with treatment decisions during initial consultations, which is a strong predictor of attendance for surgery[15]

Based on study in Hong Kong China, reported surgical case cancellation was 7.6%[16]. Similarly 11% in Kingdom of Saudi Arabia[17], 3.6% in Jordan[18], 1.87% in Iran[19], 20.8% in Sub-Saharan Africa[20]. Variety of reasons listed for the cancelled operations. Of these administrative-related accounted for 30.4%[18] to 84.8% [21], patients' related accounted for 25.9% [17] to 68.28%[22], medical-related reasons and surgeon-related reasons accounted for 38.2%[18], 28%[23] respectively.

In Ethiopia, different primary studies had conducted to determine the prevalence of elective surgical case cancellation and reasons. The prevalence of elective surgical case cancellation found in the range between 8.9% to 33.9%[24, 25] in the Ethiopian setting. Hence, discrepancies between studies make it difficult to generalize the national problem. Having national representative data is real to underpin effective management strategies. Thus, a need to have a pooled estimation of elective surgical case cancellation recognizes at the country level. This systematic review and meta-analysis aimed to find the pooled prevalence of elective surgical case cancellation. Besides, it aimed to find reasons for elective surgical case cancellation in the Ethiopian setting. The review question was what are the prevalence and reasons for elective surgical case cancellation in Ethiopia?

Methods

Reporting

We reported the result of this meta-analysis according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guideline[26] (Additional file 1 research checklist).

Literature search

The databases for the search were Web of Science, PubMed, and Google Scholar databases. The terms for the search were pre-defined for a comprehensive search strategy. These included all fields within records and Medical Subject Headings (MeSH terms). In the Boolean operator, within each axis, we combined keywords with the "OR" operator. Then we linked the search strategies for the two axes with the "AND" operator. The search terms used for the search were "surgical case cancellation" OR "elective surgical case cancellation" AND "prevalence" OR "magnitude" AND reasons of surgical case cancellation AND "Ethiopia". The specific searching detail in PubMed with MeSH terms was ("magnitude of surgical case cancellation"[MeSH Terms] OR "magnitude of elective surgical case cancellation"[MeSH Terms] OR "surgical case cancellation"[MeSH Terms] OR "elective case cancellation"[MeSH Terms] AND "prevalence" [All Fields])OR "magnitude"[MeSH Terms] AND reasons of surgical case cancellation [All Fields]) AND ("Ethiopia"[MeSH Terms] by the date 02/08/2020. The publication year of the studies was not limited during the search.

Study selection

All retrieved studies were exported to Endnote version 7 (Thomson Reuters, London) reference manager that we used to remove duplicated studies.

The retrieved articles were screened according to pre-defined inclusion and exclusion criteria. Discussion and/or involvement of the third reviewer resolved any disagreements.

Eligibility criteria

Inclusion criteria

Included studies were articles that reported the prevalence of elective surgical case cancellation and/or reasons for elective surgical case cancellation. Studies published in English and studies conducted only in Ethiopia. The publication year of the studies was not limited during the search.

Exclusion criteria

Excluded criteria were articles without full-text available and qualitative studies. Other excluded criteria were any reviews, commentaries, consultants' corners, letters, and conference abstracts.

Quality assessment

We used Joanna Brigg's Institute (JBI) quality appraisal criteria[27]. It is the assessment tool used to check the quality of each article. The tool consists of nine major items. The first item is appropriate to the sample frame. The second is the appropriate sampling technique. The third is the adequacy of the sample size. The fourth is a description of the study subjects and settings. The fifth is enough coverage of data analysis. The sixth is the validity of the method for identification of the condition. The seventh item is a standard and reliable measurement for all participants. The eighth is the appropriateness of statistical analysis. And the last item is adequacy and management of response rate. Studies considered low-risk when it would fit 5 or above quality assessment checklists.

Data extraction

Three authors extract the data. The following information extracted from the each article. Such as first author, publication year, study design, study population, sample size, prevalence and reasons. The location of the study and the reasons for elective surgical case cancellation were also extracted.

Outcome measurement

This systematic review and meta-analysis have two major outcomes. The first outcome is to determine the prevalence of elective surgical case cancellation in Ethiopia. It calculated as dividing the number of elective surgical patients but whom surgical cases canceled to the total number of patients multiply by 100. A total number of patients refer to elective surgical patients in the study period. The second outcome of the study was to identify the reasons for elective surgical case cancellation.

Data analysis

The required data were collected using a Microsoft Excel 2010 workbook form. It used to collect the first author, publication year, study design, study population, sample size, prevalence and reasons. Then, the STATA Version11 software was used to analyze the data. The original articles presented using tables and forest plots. A weighted inverse variance random-effects model[28] used to estimate the pooled prevalence. I^2 statistics used to assess the percentage of total variation across studies [29]. $I^2 \leq 25\%$ suggested more homogeneity, $25\% < I^2 \leq 75\%$ suggested moderate heterogeneity, and $I^2 > 75\%$ suggested high heterogeneity[29].

Egger's regression test was also used to assess publication bias [30]. Furthermore, analysis were also carried out based on the reasons for elective surgical case cancellation.

Results

Literature search result

A comprehensive literature search of the database yielded a total of 81 publications. Among these, 76 disregarded due to abstracts and titles. A total of five eligible studies [24, 25, 31-33] with 5591 study participants were identified for analysis of prevalence. Of these, three studies[24, 25, 33] with 3379 subjects identified for analysis of reasons (Figure 1).

Characteristics of included studies

The range of publication year for included studies was from 2015 to 2020. Two regions and Addis Ababa, the capital city of Ethiopia was the settings where studies found. Three studies in Addis Ababa[24, 25, 31], one in Oromia[32], one in Southern Nation, Nationalities, and People Region (SNNPR)[33]. All included studies were done by using the cross-sectional study design (Table1).

Three of the included studies [24, 25, 33] reported reasons for elective surgical case cancellation (Table 2).

Quality assessment result

We assessed of studies with JBI quality appraisal checklists. Based on this, none of the included studies was poor quality status.

Meta-analysis

The absence of publication bias was assessed with Egger's regression test ($p = 0.062$), which showed that no publication bias.

The pooled prevalence of elective surgical case cancellation estimated was 21.41% (95% CI 12.75 to 30.06%) (Figure 2).

The pooled prevalence of reasons from three studies [24, 25, 33] showed that administration-related reasons (34.50%) were most prevalent. Followed by Surgeon-related reasons (25.29%), Medical-related reasons (13.90%), and Patient-related reasons (13.34%) (Figure3).

Discussion

There is no acceptable case cancellation rate for efficient operating theatres. But rates under 5% are generally recommended[34]. According to this meta-analysis, the estimation of elective surgical case cancellation was 21.41% (12.75, 30.06) in Ethiopia. This is comparable with the study conducted in Sub-Saharan Africa[20] and Sudan[22]. Reasons for elective surgical case cancellation are almost similar in developing countries[20]. Besides, management strategies or surgical settings might be similar in developing countries, but lower than a study conducted in Nigeria[23], Uganda[35] and Malawi[21]. This discrepancy might be due to findings of

cancellation varying widely by study design; hospital type, country, and capacity; patient type (inpatients vs. outpatients). Evidence shows that surgical case cancellation rates vary because of a lack of a standard definition, different patient populations and study methodology[36]. The current finding is higher than the study from Hong Kong China[16], Kingdom of Saudi Arabia[17], and Jordan[18]. This difference might be due to poor hospital administration strategies. Evidence shows that lack of materials, surgeons delay, the patient not fully prepared, preliminary examinations not carried out, a lack of beds in intensive care, inadequate administrative planning are indicators of poor hospital administration strategies [37]. This could cause the elective surgical case cancellation[10]. But not effective utilization of available resource hours, such as trained staff, appropriate facilities, equipment, good communication, operational layout[38].

Based on the estimation of the reason for elective surgical case cancellation, the most common identified reason was administration-related reasons. The same report from the Kingdom of Saudi Arabia[17], Jordan[18], Uganda[35], and Malawi[21] showed that administration-related reasons found the most common reasons of elective surgical case cancellation. This might be due to the reality is that surgical case cancellation can result in the financially under-utilization of theatres[2]. So, during the surgical procedure, it could cause a shortage of surgical materials in the hospital setting and it makes in difficult to run the activities accordingly. This finding helps healthcare policy and/or decision-makers to consider elective surgical case cancellation prevention strategies.

Due to the lack of studies in some locations of Ethiopia, the result may not represent a national figure. Although R^2 is not an absolute measure of heterogeneity, high heterogeneity was observed.

Conclusions

In this finding, the prevalence of elective surgical case cancellation was considerable. The most common reason for elective surgical case cancellation was administration-related reasons, followed by surgeon-related, medical-related, and patient-related reasons. The reasons for the cancellations are potentially preventable and the vast majority of them are administration-related. Thus, efforts should be made to prevent unnecessary cancellations through careful planning. It means quality improvement strategies are necessary for surgical specialties that are susceptible to procedure cancellations caused by administrative reasons.

Abbreviations

CI: Confidence Interval; SNNPR: Southern Nations and Nationalities of People Region.

Declarations

Ethical approval and consent:

No need approval from the ethical committee. Because there is no primary data collected.

Consent for publication:

Not applicable

Availability of data and materials:

No need for more data. All information stated in the manuscript and, its supplementary information files.

Competing interests:

The author declares that, no competing interests

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Authors' contributions:

YB: Design and planning of the study, review of the literature. More to the point YB contributes data analysis and drafting manuscript. AE: literature review, and data collection. AA: Took part to realize statistical analysis. All authors have read and approved the manuscript.

Acknowledgments:

Not applicable

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Tables

Table 1:
 Characteristics of included studies in the meta-analysis for elective surgical case cancellation.

Author/Year	Study year	Region	Study design	Sample size	Prevalence	Study population
Ayele AS et al/2019[25]	February 1 to March 1, 2016	Addis Ababa	Cross-sectional	369	33.9	All elective surgical patients
Desta M et al/2018[33]	March 1 to 30, 2018	SNNPR	Cross-sectional	462	31.6	All elective surgical patients
Haile M and Desalegn N/2015[32]	February 1 to June 30, 2014	Oromia	Cross-sectional	1438	23	All elective surgical patients
Bekele M et al/2020[24]	March 1, 2018 to February 28, 2019	Addis Ababa	Cross-sectional	2548	8.9	All elective surgical patients
Gebresellassie HW and Tamerat G/2019[31]	June 1, 2016 to May 30, 2017	Addis Ababa	Cross-sectional	774	10.7	All elective surgical patients

Table 2:

Characteristics of included studies in the meta-analysis for the reasons of elective surgical case cancellation.

Author/ Year	Study year	Region	Study design	Cancelled elective surgical cases	Reasons	Prevalence	Study population
Ayele AS et al/2019[25]	February 1 to March 1, 2016	Addis Ababa	Cross-sectional	125	Patient-related reasons	13.6	All elective surgical patients
					Medical-related reasons	12	
					Administration-related reasons	30.4	
					Surgeon-related reasons	42.4	
					Emergency case priority	1.6	
Desta M et al/2018[33]	March 1 to 30, 2018	SNNPR	Cross-sectional	146	Patient-related reasons	18.4	All elective surgical patients
					Medical-related reasons	11.6	
					Surgeon-related reasons	23.4	
					Emergency case priority	11.6	
					Administration-related reasons	21	
					Anesthesia-related reasons	14	
Bekele M et al/2020[24]	March 1, 2018 to February 28, 2019	Addis Ababa	Cross-sectional	226	Administration-related reasons	52	All elective surgical patients
					Surgeon-related reasons	11.1	
					Emergency case priority	7.1	
					Anesthesia-related reasons	2.7	
					Medical-related reasons	17.7	
					Patient-related reasons	9.4	

Figures

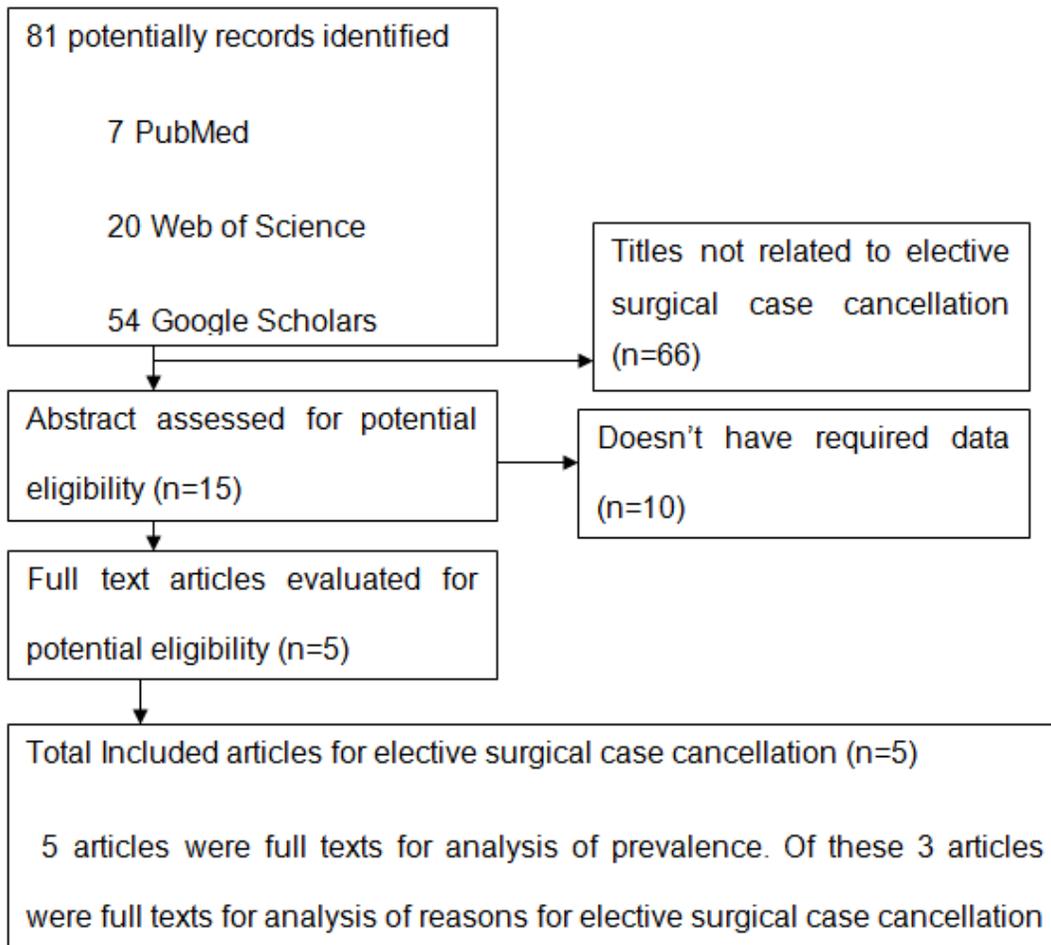


Figure 1

Flow chart of the literature search for the articles included in a meta-analysis of elective surgical case cancellation.

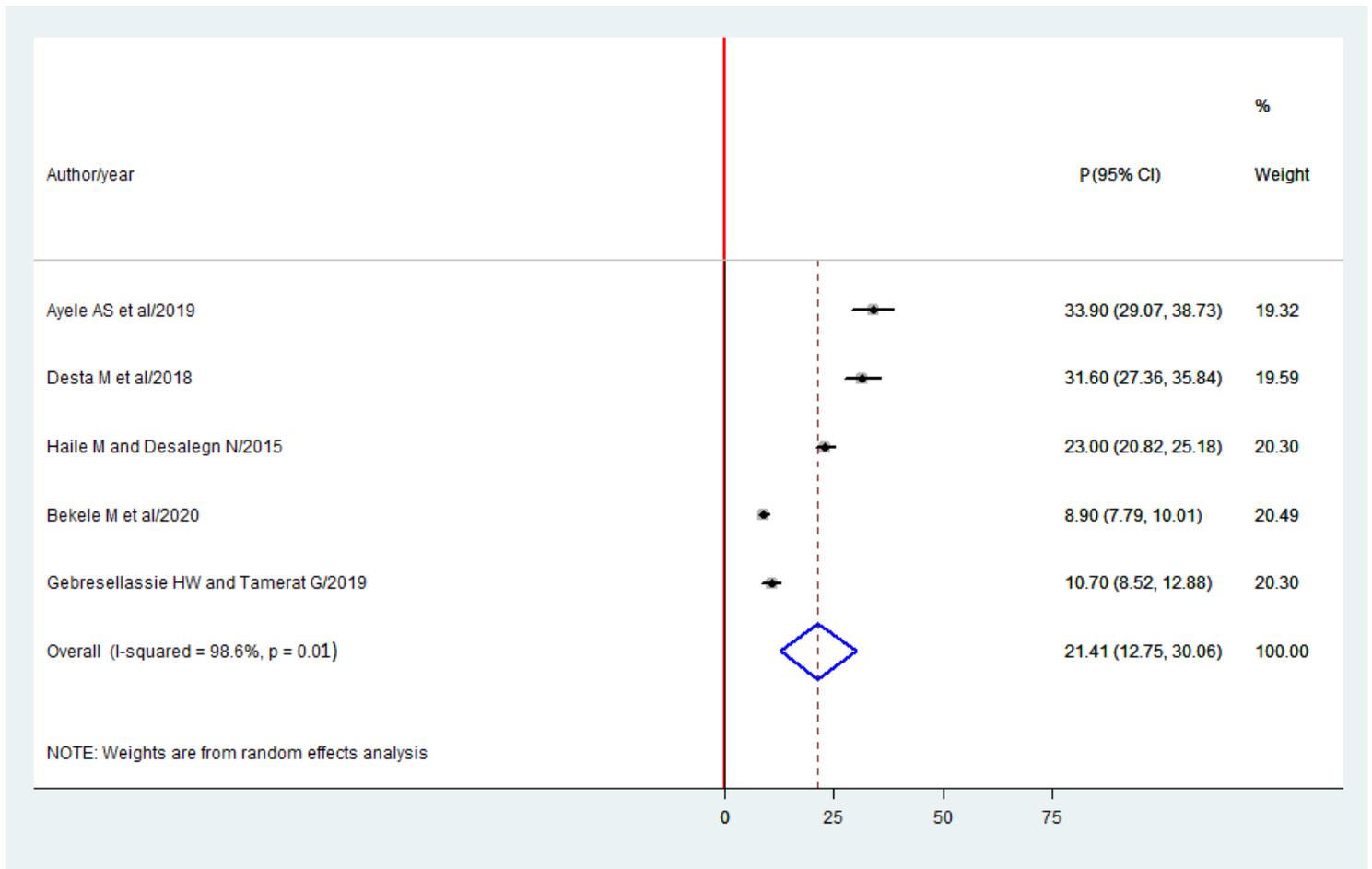


Figure 2

Forest plot of prevalence with corresponding 95% CIs of the five studies on elective surgical case cancellation. The midpoint and the length of each segment indicated prevalence and a 95% CI. The diamond shape showed the combined prevalence of all studies.

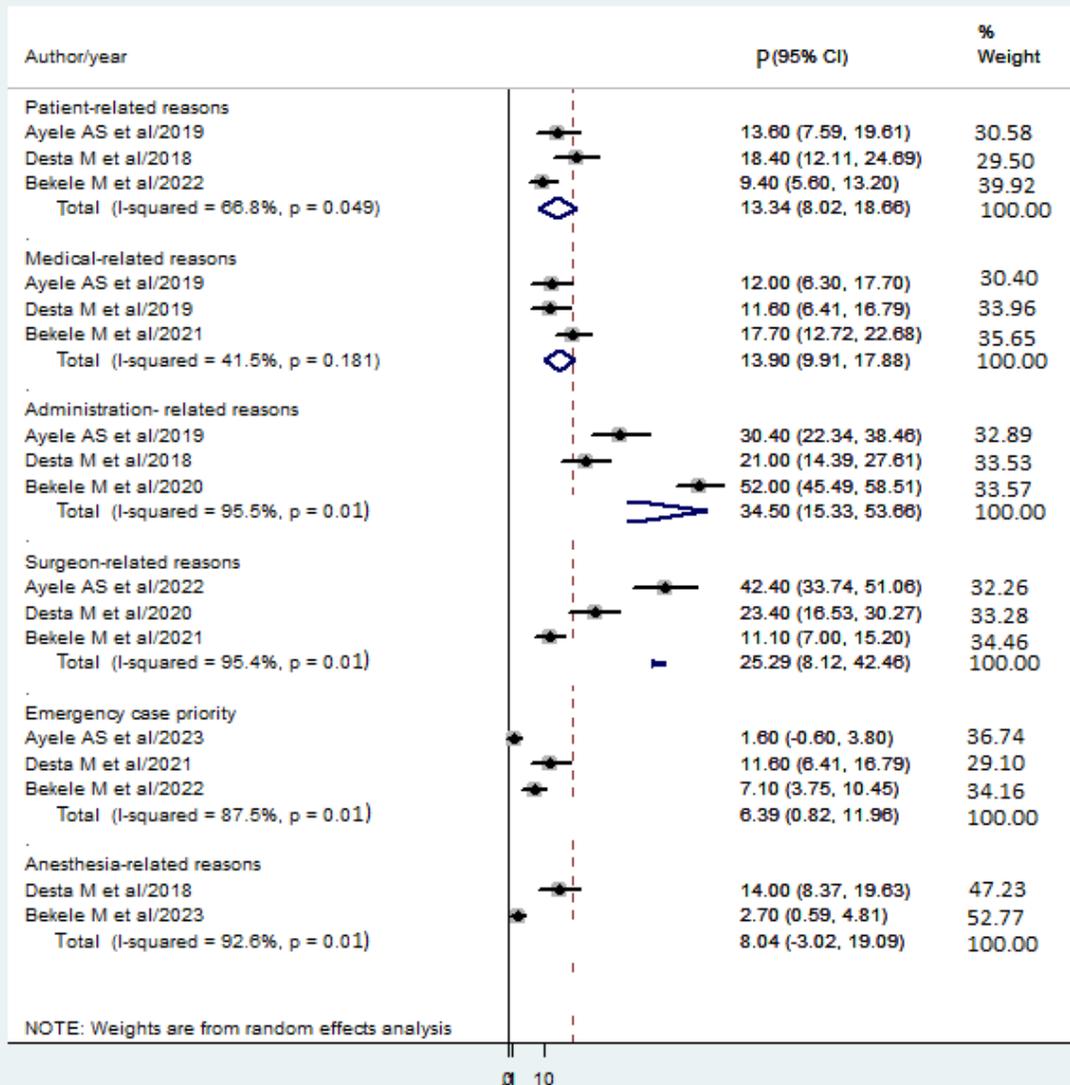


Figure 3

Forest plot of prevalence with corresponding 95% CIs of three studies for the reasons of elective surgical case cancellation. The midpoint and the length of each segment indicated prevalence and a 95% CI. The diamond shape showed the combined prevalence of all studies.

Supplementary Files

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