Impact of Ondansentron in Intra-Anesthesia During Caesarean Section: A Meta-Analysis of Randomized Trials

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SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract

Background: The medulla distinguishes nausea and vomiting. Intraoperative nausea and vomiting (IONV) can occur up to 80% of the time following spinal anesthesia for caesarean delivery. Patients are uncomfortable and surgery is halted. Aims: This meta-analysis examines the effects of ondansentron on IONV, hypertension, and pruritus. Methods: The databases examined were CINAHL, PubMed, ScienceDirect, Wiley, and Scopus, with coverage from September 2014 to July 2024. Article text must be complete with Uji Coba Terkendali Acak design and published in English. They used R-Studio 4.3.1 m, Comperhesivif Meta-Analysis 3.3.070, and Review Manager Cochrane 5.4.1 for lunak and risk analysis. Findings: The heterogeneity analysis of ondansentron residuals on IONV indicated I-squared (I²) of 99%, hypotension I²=98%, and pruritus I²=97% for 1103 people in thirteen studies. The Random Effect Model revealed a significant positive effect on Standard Mean Difference (SMD) analysis (IONV = 5.77, 95% CI: 0.58, 10.95; p=<0.01), decreased hypotension (SMD = -2.14, 95% CI: -4.80, 0.52= p=<0.01), and pruritus incidence (SMD = 0.67, 95%). CI = -1.48 to 2.83; p < 0.01. The meta regression subgroup revealed a significant decrease in IONV in the first 5 minutes with an Odds Ratio of 0.38 (95% CI 0.04 to 3.62; p=<0.01) for the 4mg dose. Conclusions: While useful in controlling perioperative and hypotension, ondansentron may exacerbate pruritus. Ondansentron dose and pruritus effects need additional study.

Keywords: meta-analysis, ondansentron, intraoperative nausea and vomiting, hypotension, pruritus

Introduction

Spinal anesthesia is regarded as a rapid, uncomplicated, and risk-free approach for conducting Caesarean section surgery (1). It is crucial to acknowledge that there might be specific intricacies and the prevalence of intraoperative nausea and vomiting (IONV) when employing this methodology (2). Research has indicated that around 66% of patients experience this particular issue (3). Intraoperative nausea and vomiting (IONV) during spinal anesthesia may be caused by increased vagal activity, hypotension, opioid administration, and other factors (4–7). Furthermore, intraoperative bleeding, surgical stimulation, traction on the visceral peritoneum during uterine exteriorization, drug administration (e.g., uterotonic or antibiotics), and patient mobility subsequent to surgery are additional factors that may contribute to this phenomenon (8). Nausea and vomiting are substantial manifestations of hypotension as well (9). As a result of decreased blood supply to the brain, it may induce brainstem ischemia and stimulate the vomiting center in the medulla (10). Furthermore, intestinal ischemia is induced by hypotension, which leads to the secretion of emetogenic substances,
including serotonin, from the digestive tract (11). The incidence of nausea and vomiting during surgery was found to be 21.2% and 10.6% in the metochloropromide group, respectively, and 39.4% and 27.3% in the placebo group, according to an investigation conducted at our institution (12).

Furthermore, modifications in the velocity of motion within the small intestine throughout the third trimester were recognized as a potential element that could contribute to postoperative nausea and vomiting (13). Several factors, including hypotension, increased vagal nerve activity, visceral discomfort, intravenous opioid administration, and the use of uterotonic medications, can induce nausea and vomiting during spinal anesthesia (14).

A specific antagonist of 5-hydroxytryptamine3 (5-HT3) receptors, ondansetron is an exceptionally potent anti-nausea and anti-emesis medication. Nevertheless, when used in isolation, it has the potential to significantly decrease the occurrence of nausea and vomiting during cesarean section, if not eradicate them entirely (15).

Ondansetron effectively decreased the incidence of nausea/vomiting and bradycardia during Caesarean section under spinal anesthesia, according to previous research. Nevertheless, its scope is limited to risk ratio assessment and is comparatively modest; it fails to validate the previous ratio, which offers substantial evidence regarding the reduction of intraoperative nausea and vomiting (16). Conversely, a study conducted by (17), substantiated that intra-operative nausea and vomiting occurred with an incidence rate of 18.5% (18). This rate of intraoperative morbidity is substantial and necessitates intervention in accordance with institutional protocols; it should not be disregarded.

The principal objective of obstetric anesthesia is to safeguard the health and safety of both the mother and infant (19). Consequently, it is critical to exercise extreme caution when selecting the anesthetic and administration procedure. Spinal anesthesia has become increasingly favored for cesarean section procedures owing to its straightforwardness and negligible impact on the developing embryo. Despite being regarded as the most effective method for cesarean delivery, spinal anesthesia is not without its potential to induce adverse reactions. At present, ondansetron is extensively utilized in the postpartum period, and a substantial body of research has been published pertaining to its exceptional quality. As of the present moment, there is a lack of meta-analyses examining the efficacy of ondansetron during cesarean sections conducted under spinal anesthesia. In order to determine the efficacy and safety of ondansetron during cesarean section under spinal anesthesia, we therefore performed a meta-analysis.

**Material and Methods:**

**Method**

During this phase, a meta-analysis study protocol was employed by four authors to compose this systematic review and meta-analysis in accordance with the PRISMA 2020 recommendations (20).

**Eligibility Criteria**

We concur that this study encompasses the demographic of women undergoing cesarean section surgery under spinal anesthesia, which falls within the age range of 18–45 years. Individual or group ondansetron intervention studies are the focus of our research. The intervention aims to address intraoperative nausea and vomiting (IONV), hypotension, pruritus, and prepares patients to adjust their Ondansetron dosage when confronted with adverse effect complications. The ondansetron intervention program was supervised by a team of seasoned nurse anesthetists and licensed anesthesiologists.
Furthermore, studies employing intervention concentrations of ondander exceeding 8 mg were omitted from the analysis.

**Study Design**
In this review, full-text RCTs published in English were incorporated by four of our authors.

**Strategy Search Literature Review**
From January 2014 to January 2024, six authors conducted independent searches of articles in six databases, including CINAHL, PubMed, ScienceDirect, Willey, and Scopus. A variety of keyword combinations were employed, encompassing terms such as "randomized controlled trial," AND "controlled clinical trial," AND "caesarean section," "ondasenron," AND "spinal," OR "spinal anesthesia." Throughout this phase of the journal search procedure, a librarian oversaw our efforts. Restricted were only full-text articles written in English.

**Data Management & Extraction**
We proceeded with the duplication of the research paper subsequent to obtaining the journal entries from the limited database. In conclusion, our committee penulisiri menyaraf, mengidentifikasi, and membaca judul jurnal yang tersedia dalam bentuk teks lengkap (abstract). In conclusion, in order to formulate our thesis, we individually collected qualitative and quantitative data. Persisting in being induced by a temporal entity, Mereka menggunakan beberapa hal: (1) rata-rata karakteristik responden, ukuran sampel. (2) Rincian scheduling and dosage (3) Instrument/kuesioner/alat. (4) The penelitian protocol. (5) Separate intervensi dengan modifikasi. (6) Lahli ilmiah peran keterlibatan dalam penelitian. (7) Atitudinal kerja obat (waktu penggunaan, waktu pengukuran, dan alat gunadiken). (8) A reviewer shall be excused if a kesepakatan exists between two or more authors until a kesepakatan materializes (YA).

**Risk of Bias**
The methodological quality of randomized controlled trials (RCTs) was evaluated in accordance with the Cochrane Assessment of Risk of Bias (RoB 2) guidelines, which comprised five items: allocation concealment, random sequencing process for selection bias, blinding personnel and respondents for performance bias, blinded outcome assessment for detection bias, identification of incomplete data results for attribution bias, and selective reporting of data for reporting bias. The RevMan graph software 4.5.1 was utilized to accomplish this analysis (21,22) Additionally, a high risk of discrimination was assigned to each study, which warrants careful consideration in the event that divergent research findings emerge. In the event of discrepancies in outcomes, the four evaluators were requested to reach a consensus and consult with specialists in the field of anesthesia.

**Data Analysis**
The meta-analysis was performed utilizing R Studio software version 5.4.1 (23). Appendix 1 contains the effect size and sample size tables for each study, including measures such as the mean, standard deviation, and mean difference. The mean, standard deviation (SD), and sample size for each study group were incorporated into this meta-analysis in order to calculate the Standardized Mean Difference with 95% Confidence Interval, which was utilized to assess the aggregated effect estimate for each study. Furthermore, a random effects model was utilized to summarize the treatment effects. For each survey that lacked these mean and standard deviation values, we determined the difference between the means of the two groups by computing the SD of the corresponding p-value. As is customary in
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In evaluating and analyzing the overall ondansotron dose and timing, four authors conducted moderator analysis or subgroup analysis by investigating additional potential factors of ondansotron dose and work onset that contribute to the high risk of study heterogeneity. A valid sub-ground analysis test can therefore be obtained through the process of combining studies and identifying effect comparisons within each study. On the contrary, meta-regression methods could be derived by examining certain aspects of the interactions between moderating continuous variables and study outcomes (such as the number of respondents and age). Subsequently, correlation tests employing the trim and fill method and Begg and Mazumdar's rankings were utilized to assess publication bias (25) and Duval. In addition, a rank correction test was conducted to modify the outcomes in accordance with Begg's guidelines, utilizing a p-value. The authors utilized Kendall's statistic to evaluate publication bias and comprehensive meta-analyses (CMA) version 3.3.070 for visualization (26).

We examined research publication bias in this meta-analysis, which was defined as the withholding of research findings from publication on the grounds of their significance or direction (27). Publication bias is frequently employed in situations where there are multiple results that contradict the published literature. Following this, we conducted an examination of study publication bias in order to identify any possible sources of small study effects or estimates of intervention impact in small studies (24).

Results

A comprehensive set of n = 4109 research articles was acquired from five databases through elimination of n = 4095 (n = 34 duplicate publications, n = 3,987 ineligibility, and n = 74 articles not pertinent to the title) criteria. Following that, n = 23 studies were excluded for the following rationales: n = 11 outcome analyses were deemed irrelevant and insufficiently comprehensive; n = 2 intervention odansotron doses exceeding >8 mg were deemed irrelevant; and n = 1 article failed to present effect size. Following the retrieval, review, and analysis of thirteen full-text articles to determine study eligibility, thirteen randomized controlled trials (RCTs) that satisfied the selection criteria were incorporated into this investigation.

Additional information regarding the study selection search and vetting procedure can be found in the PRISMA flowchart (Figure 1). From 2014 to 2024, thirteen RCTs were published: (28–38). 1103 women undergoing cesarean section surgery under spinal anesthesia were from semi-blance countries. The sample size for the investigation varied between 25 and 106 participants. The respondents' average age ranged from 14 to 37 years, as shown in Table 1.

We emphasised the importance of employing comprehensive meta-analysis and visualisation software in conjunction with Kendall's test to eliminate publication bias from this meta-analysis. Publication bias is defined as the deliberate omission of research findings from publications due to their significance or direction, and biased publications were included in this analysis.
Eight studies administered 8mg ondansentron dose (28,32,34,35,37–40), one study used an odansentron dose of 0.15 mg (29). Timing of odansentron evaluation is as follows: odansentron evaluation was performed at 5 minutes five articles (34,35,38) ondansentron administration evaluation three studies (30,33,39), evaluation of 12 minutes administration by one article (40), evaluation of 15 minutes of ondansentron administration by one article (31), evaluation of 30 minutes by three articles (32,36,37), which are presented in table 1.

An examination of the cumulative impact of ondansentron injection intervention on the occurrence rates of hypotension, pruritus, and nausea and vomiting during surgery.

Overall effect of ondansentron intervention on intraoperative nausea and vomiting during cesarean section surgery.

A reduction in intra-operative nausea and vomiting was documented in ten studies (Badawy & Mokhtar, 2017; Fattahi et al., 2015; Hajian et al., 2016; Koju et al., 2015; Marciniak et al., 2015; Mohamed et al., 2018; Ortiz-Gómez et al., 2014; M. Wang et al., 2014, 2014; O. Wang et al., 2014, 2014).
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Table 1. The characteristics of the study are summarized and summarized.

<table>
<thead>
<tr>
<th>No</th>
<th>Name Study, Year</th>
<th>Country</th>
<th>Sample Size</th>
<th>Age (mean)</th>
<th>Setting</th>
<th>Intervention</th>
<th>Tool</th>
<th>Measurements Time Points for Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Koju et al., 2015)</td>
<td>Nepal</td>
<td>50</td>
<td>24.7</td>
<td>Hospital</td>
<td>4mg Ondansetron</td>
<td>Post Nausea and Vomiting &amp; Pruritus</td>
<td>15 minutes</td>
</tr>
<tr>
<td>2</td>
<td>(Marciniak et al., 2015)</td>
<td>Poland</td>
<td>70</td>
<td>31.75</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Post Nausea and Vomiting &amp; Pruritus</td>
<td>30 minutes</td>
</tr>
<tr>
<td>3</td>
<td>(Fattahi et al., 2015)</td>
<td>Iran</td>
<td>212</td>
<td>24.61</td>
<td>Hospital</td>
<td>0.15 mg Ondansetron</td>
<td>Post Nausea and Vomiting &amp; post-dural puncture headache</td>
<td>5 minutes</td>
</tr>
<tr>
<td>4</td>
<td>(Q. Wang et al., 2014)</td>
<td>China</td>
<td>65</td>
<td>27.15</td>
<td>Hospital</td>
<td>4mg Ondansetron</td>
<td>Hypotension and Post Nausea and Vomiting</td>
<td>30 minutes</td>
</tr>
<tr>
<td>5</td>
<td>(M. Wang et al., 2014)</td>
<td>China</td>
<td>60</td>
<td>33.11</td>
<td>Hospital</td>
<td>8 mg Ondansetron</td>
<td>Hypotension and Post Nausea and Vomiting</td>
<td>30 minutes</td>
</tr>
<tr>
<td>6</td>
<td>(Trabelsi et al., 2015)</td>
<td>Tunisia</td>
<td>80</td>
<td>33</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Hypotension</td>
<td>5 minutes</td>
</tr>
<tr>
<td>7</td>
<td>(Terkawi et al., 2015)</td>
<td>Newyork</td>
<td>86</td>
<td>29</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Hypotension</td>
<td>5 minutes</td>
</tr>
<tr>
<td>8</td>
<td>(Ortiz-Gómez et al., 2014)</td>
<td>Spain</td>
<td>64</td>
<td>34.72</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Post Nausea and Vomiting &amp; Pruritus</td>
<td>10 minutes</td>
</tr>
<tr>
<td>9</td>
<td>(Mohamed et al., 2018)</td>
<td>Egypt</td>
<td>90</td>
<td>29.25</td>
<td>Hospital</td>
<td>4mg Ondansetron</td>
<td>Hypotension and Post Nausea and Vomiting</td>
<td>10 minutes</td>
</tr>
<tr>
<td>10</td>
<td>(Shokrpour et al., 2018)</td>
<td>Iran</td>
<td>89</td>
<td>30.85</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>post-dural puncture headache &amp; Hypotension</td>
<td>12 minutes</td>
</tr>
<tr>
<td>11</td>
<td>(Hajian et al., 2016)</td>
<td>Iran</td>
<td>102</td>
<td>28.15</td>
<td>Hospital</td>
<td>4mg Ondansetron</td>
<td>Hypotension and Post Nausea and Vomiting</td>
<td>10 minutes</td>
</tr>
<tr>
<td>12</td>
<td>(Badawy &amp; Mokhtar, 2017)</td>
<td>Egypt</td>
<td>75</td>
<td>30.5</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Hypotension and Post Nausea and Vomiting</td>
<td>5 minutes</td>
</tr>
<tr>
<td>13</td>
<td>(Yin et al., 2017)</td>
<td>Brazil</td>
<td>60</td>
<td>37.2</td>
<td>Hospital</td>
<td>8mg Ondansetron</td>
<td>Post Nausea and Vomiting</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

Figure 2. Forest plot standardized mean difference (SMD) ondansetron on intraoperative nausea and vomiting.
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With a total sample size of 818, our analysis revealed that ondansentron intervention accelerated the process of IONV reduction with an SMD value of 5.77 (95% CI: 0.58, 10.95). The results also demonstrated that the I2 was 99%, with a p-value less than 0.01, suggesting that the studies included in the analysis were highly heterogeneous (Figure 2).

![Figure 2: Forest plot standardized mean difference (SMD) ondansentron on hypotension and pruritus during cesarean section surgery.](image)

Overall effect of ondansentron intervention on hypotension and pruritus during cesarean section surgery.

Eight studies reported a decrease in hypotension (28–33,36–39). Our analysis showed that ondansentron intervention accelerated the hypotensive process with an SMD value of: -2.14 95% CI: -4.80, 0.52, with a total sample of 331. The findings also showed that the I2 was 98% with p<0.01, indicating a high degree of heterogeneity among the included studies (Figure 3). Three studies reported an increase in the occurrence of pruritus (31,32,39), our analysis confirmed that ondansentron intervention can cause pruritus with SMD value: 0.67 95% CI: -1.48, 2.83, with a total sample of 184. The findings also showed that the I2 was 97% with p<0.01, indicating a high level of heterogeneity among the included studies (Figure 3a and 3b).

Subgrup metaregresi dosis ondansentron 0.15mg, 4mg, 8mg terhadap mual dan muntah intraoperatif.

The results indicated that administering 0.15 mg of ondansentron had the highest impact, with an OR value of 0.11 and a 95 CI ranging from 0.03 to 0.41 Then, an OR value of 0.17; 95% CI: 0.08 to 0.36; was observed at a dose of 4mg of ondansentron (30,31,33,36,37). In addition, the 8mg dose of ondansentron demonstrated an OR value of 0.38; 95% CI: 0.04 to 3.62 (28,32,36,37,39).
At a dose of 0.15 mg ondansentron, the OR value was 0.11 (29); the 95% CI was 0.03 to 0.41. Therefore, while the subgroup analysis reveals that ondansentron 0.15 mg has the least amount of decrease, we confirm that ondansentron 4 mg is significantly effective in the management of decreased intraoperative nausea and vomiting (IONV). However, based on the data analysis of ondansentron 0.15 mg, it can be concluded that this conclusion is not valid (Figure 4).

**Publication Bias**

Analyzing publication bias involves utilizing the correlation test, specifically Begg and Mazumdar's ranking with the Kendall tau statistical approach, followed by applying continuity correction to evaluate study publication bias. The statistical analysis of intraoperative nausea and vomiting revealed a Kendall's statistic (P-Q) of -21.00, with a z-score of 2.72, a tau value of -0.78, and a p-value of 0.00. However, our analysis revealed a rise in pruritus caused by ondansentron, as indicated by Kendall's statistics (P-Q) 3.00, with a z-value of 1.56, tau of 1.00, and a p-value of 0.11. Therefore, based on the evidence shown in Figure 5a, 5b, and 5c, it can be inferred that there is a notable publication bias.

**Sensitivity analysis**

The sensitivity test analysis yielded no outliers when studies with the largest effect sizes on intraoperative nausea and vomiting, hypotension, and pruritus were excluded. The SMD score for intraoperative nausea and vomiting was 8.46, with a 95% confidence interval.
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An elevation in hypotension was observed, as indicated by an SMD value of -1.24 (95% CI: -1.97 to -0.51). An increase in pruritus was observed, as indicated by an SMD value of 0.32 (95% CI: -0.04 to 0.68). Consequently, we assert that the efficacy of the ondansetron intervention continues to vary substantially and significantly, as determined by the robust test analysis method (41).

Quality Assessment of Included Studies

Following this, researchers presented bias assessments during the risk analysis phase (Figures 6a and 6b). Once more, the risk of bias was found to be minimal in all seven studies that examined Random Sequence Generation (30–34,36–38). A high risk of bias was present in five studies that utilized allocation concealment: those by (28,37,39,40). In addition, analysis bias was a significant concern in four studies that utilized blinding dominant outcome assessment (40). In addition, incomplete outcome data exhibited the greatest degree of bias, with seven articles (28,31,33,36,37,40) containing bias. The findings of (37) are illustrated in Figure 6.

Discussions

review and meta-analysis of randomized controlled trials (RCTs) to evaluate the efficacy of ondansetron in reducing intraoperative nausea and vomiting, hypotension, and pruritus. The assessment of the intervention components was conducted at a later stage utilizing advanced statistical methods such as subgroup analysis and meta-regression. Subsequently, the researchers conducted a focused assessment of the quantity and timing of ondansetron administration, specifically during cesarean section surgery performed under spinal anesthesia.

The data demonstrate the beneficial impacts of ondansetron in cesarean section surgery performed under spinal anesthesia. This aligns with a prior systematic review of 21 studies (16), which shown that ondansetron is helpful in reducing the

ranging from -11.69 to 5.23. An elevation in hypotension was observed, as indicated by an SMD value of -1.24 (95% CI: -1.97 to -0.51). An increase in pruritus was observed, as indicated by an SMD value of 0.32 (95% CI: -0.04 to 0.68). Consequently, we assert that the efficacy of the ondansetron intervention continues to vary substantially and significantly, as determined by the robust test analysis method (41).
occurrences of nausea/vomiting and bradycardia after cesarean section under spinal anesthesia. However, the duration of the drug's effect on reducing IONV and alleviating hypotension (Figure 3a) was not assessed in terms of minutes of beginning of action. Our study revealed that, on average, seven studies delivered an 8mg dose of ondansetron during cesarean section surgery (Figure 4). Furthermore, our data revealed a notable occurrence of heightened itching following the application of ondansentrone on the respondents' skin (Figure 3b). Our findings align with a randomized clinical research conducted (42), which demonstrated that administering ondansetron at a dosage of 4-8mg resulted in a notable decrease in the occurrence of postoperative nausea and vomiting (IONV) within a time frame of 5 minutes. Nevertheless, our work highlights the significance of factoring in age as it may have additional ramifications.

Furthermore, our investigation indicated that the administration of an 8mg dose of ondansetron resulted in a decrease in hypotension. Based on a review of previous research studies, we have discovered evidence indicating that administering an 8mg dose of ondansetron can be a viable and successful approach to decreasing the occurrence of hypotension caused by spinal anesthesia and the use of vasopressors during cesarean section surgery. The odds ratio (OR) is calculated to be 0.38, with a 95% confidence interval (CI) ranging from 0.19 to 0.77, and a p-value of 0.007, indicating a significant reduction in hypotension. According to studies conducted (8), ondansetron is a specific antagonist of serotonin 5-HT3 receptors, which aligns with theoretical...
understanding. Several studies indicate that this medication has the potential to reduce postspinal hypotension in both pregnant and non-pregnant women (43,44). The mechanism by which it operates is believed to involve the inhibition of the Bezold-Jarisch reflex (BJR).

In addition, it triggers the cardiac inhibition reflex, which leads to a reduction in heart rate, blood pressure, and cardiovascular collapse. This reflex is initiated by type C fibers that are situated in the heart (45,46). Activation of peripheral serotonin receptors induces BJRM (47). Nevertheless, it has been reported that the dosage of ondansetron is tailored to the patient's age, as administering it without a vasopressor can potentially lead to a reduction in cardiac output.

Our data indicates that the administration of ondansetron leads to an elevated level of itching in spinal anesthesia patients undergoing cesarean section surgery, which is not proportional to the dosage. Previous systematic reviews have verified that cholestatic pruritus and uremic pruritus can arise (48). This should be taken into account when determining the dosage of ondansetron for patients based on their indications (49).

One theory suggests that ondansetron may induce pruritus by triggering the release of peripheral histamine as a result of morphine administration. However, this theory remains unproven as antihistamines have shown no efficacy in treating pruritus caused by intrathecal morphine (50,51). The second explanation pertains to the activation of µ-opioid receptors in the central nervous system by morphine. These receptors are involved in pain modulation as well as the occurrence of certain side effects, notably itching, nausea, and vomiting. This elucidates the antipruritic properties of naloxone and nalbuphine, both of which function as antagonists (31,50,52).

The effects of ondansetron mostly occur in the areas innervated by the trigeminal nerve, possibly due to a higher number of opiate receptors in the trigeminal nerve's spinal nucleus. This leads to patients experiencing itching in the nose and upper face (51,53). Several chemical mediators are responsible for pruritus, including histamine, serotonin, cytokines, growth factors, and prostaglandins(50,54). However, we have also found that certain cases of severe pruritus are caused by the combination of morphine administration given to patients undergoing spinal anesthesia during cesarean section surgery. Therefore, the administration of ondansetron dosage should be given according to the patient’s indication.

**Limitation**

These findings validate the existence of some constraints in result identification. Initially, we observed significant variability among the papers that were included. However, our research also revealed the presence of papers with minimal heterogeneity. Furthermore, the individual research data exhibited an elevated susceptibility to low random processing bias, performance bias, insufficient outcome data, and reporting bias. In addition, our analysis revealed a rise in pruritus but a decline in hypotension. Therefore, future randomized controlled trials (RCTs) investigating the use of negative pressure wound therapy (NPWT) should take into account the findings mentioned. This includes using respondent randomization and dosing, as well as analyzing the specific impact of medications on pruritus.

**Conclusions**

The results of our meta-analysis validate the efficacy of ondansetron intervention in treating intraoperative and hypotension. However, it is worth noting that its use may
lead to a higher occurrence of pruritus. Healthcare providers should incorporate ondansetron dose interventions based on indications and assess the start of action and effects of ondansetron drug use. Suggestions for future research could involve devising research methodologies in accordance with established protocols and assessing the impact of ondansetron on a broader spectrum of pruritus.

Declaration of Conflicting Interest
The author declared no conflict of interest.

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Author’s Contributions.
All authors contributed equally to the conception and design of the study, databases search, methodology, data extraction, analysis of the risk of bias, data analysis, interpretation, review, and editing. All authors were accountable in each stage of the study and agreed with the final version of the manuscript to be published.

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

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