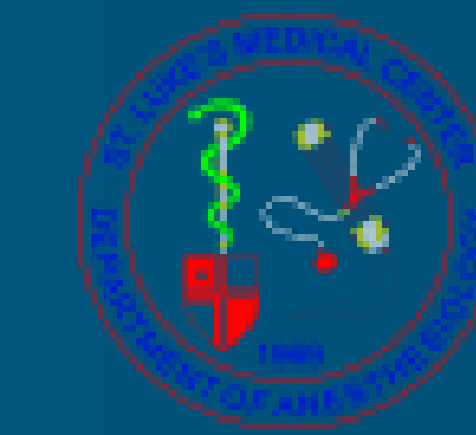




# The safety of norepinephrine versus phenylephrine in the treatment of post-spinal hypotension in parturients undergoing cesarean section: A systematic review & meta-analysis



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## Background

- By 2030, global cesarean section (CS) rate will be nearing 30% with 38 million being performed worldwide under spinal anesthesia.
- Spinal-induced hypotension has adverse effects on the fetus and is often treated with phenylephrine.
- While phenylephrine is an effective treatment for hypotension, repeated doses may cause prolonged and severe bradycardia.
- Phenylephrine-induced bradycardia has been shown to decrease cardiac output and utero-placental perfusion, which is the major determinant of fetal oxygenation and nutrient delivery. Decreased perfusion has been associated with fetal acidosis, and lower APGAR scores.
- Thus, there is a potential advantage of norepinephrine as a safer alternative in reducing maternal hypotension and improving neonatal outcomes.

## Research Question

In parturients undergoing cesarean sections, does norepinephrine have a decreased incidence of bradycardia compared to phenylephrine for treating post-spinal hypotension?

## Objectives

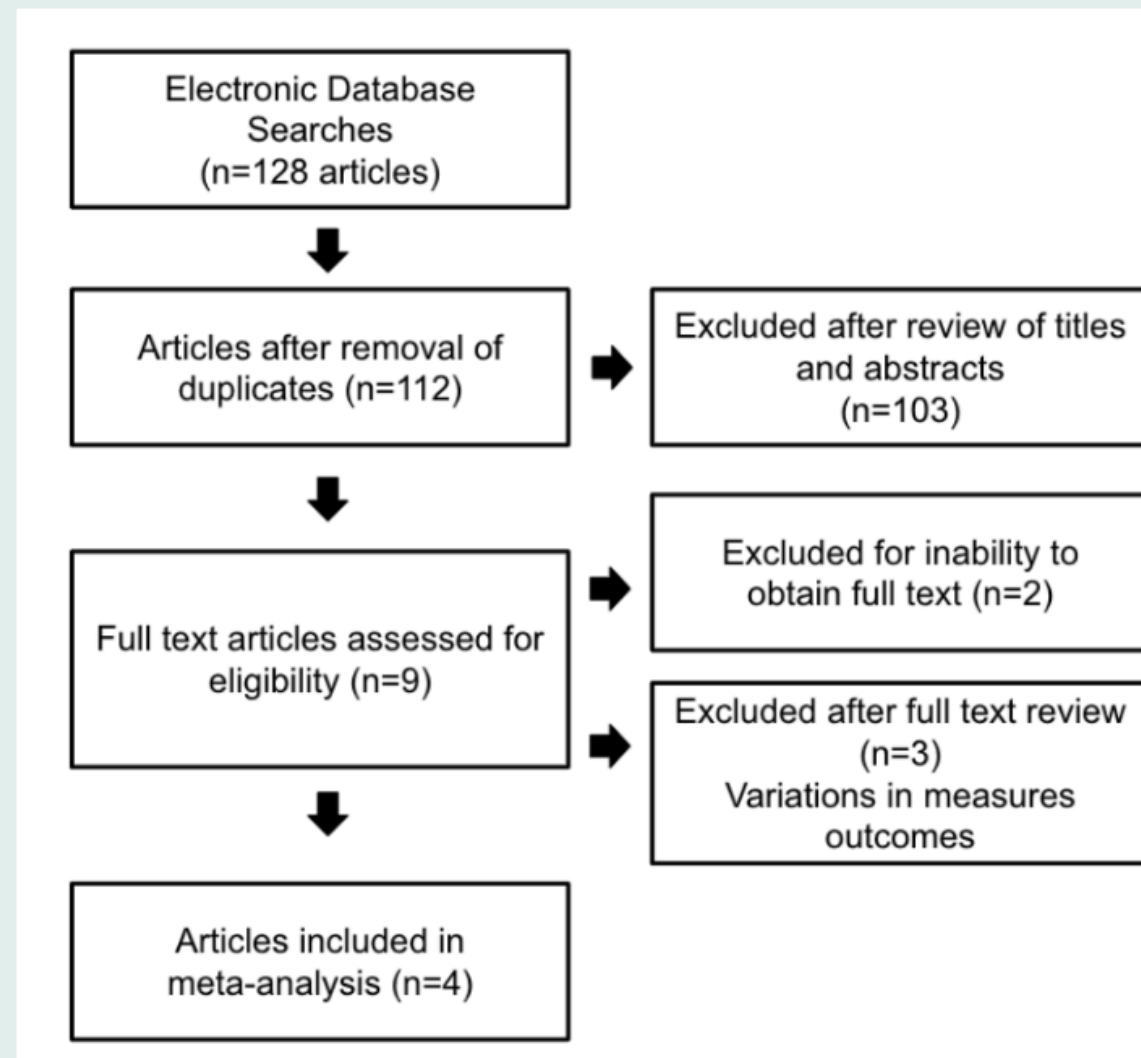
- To conduct a systematic review and meta-analysis of randomized control trials to determine the safety\* profile of norepinephrine and phenylephrine.
- Secondary outcomes would focus on hypotension as well as nausea, and vomiting

\*Safety defined as a lower incidence of bradycardia as found in the given studies.

## Conclusion & Recommendations

- In conclusion, this study provides evidence supporting the superiority of norepinephrine over phenylephrine in mitigating the occurrence of bradycardia among parturients undergoing cesarean section under subarachnoid block.
- While both phenylephrine and norepinephrine are efficient at treating spinal-induced hypotension, **norepinephrine has a better safety profile wherein safety is defined as the prevention of bradycardia.**
- Minimizing adverse events such as bradycardia contributes to optimizing maternal and fetal safety during cesarean deliveries.
- Further research, including larger-scale randomized controlled trials, is warranted to elucidate additional factors such as long-term maternal and neonatal outcomes, cost-effectiveness, and the potential for adverse effects associated with prolonged use of norepinephrine.

## Methodology



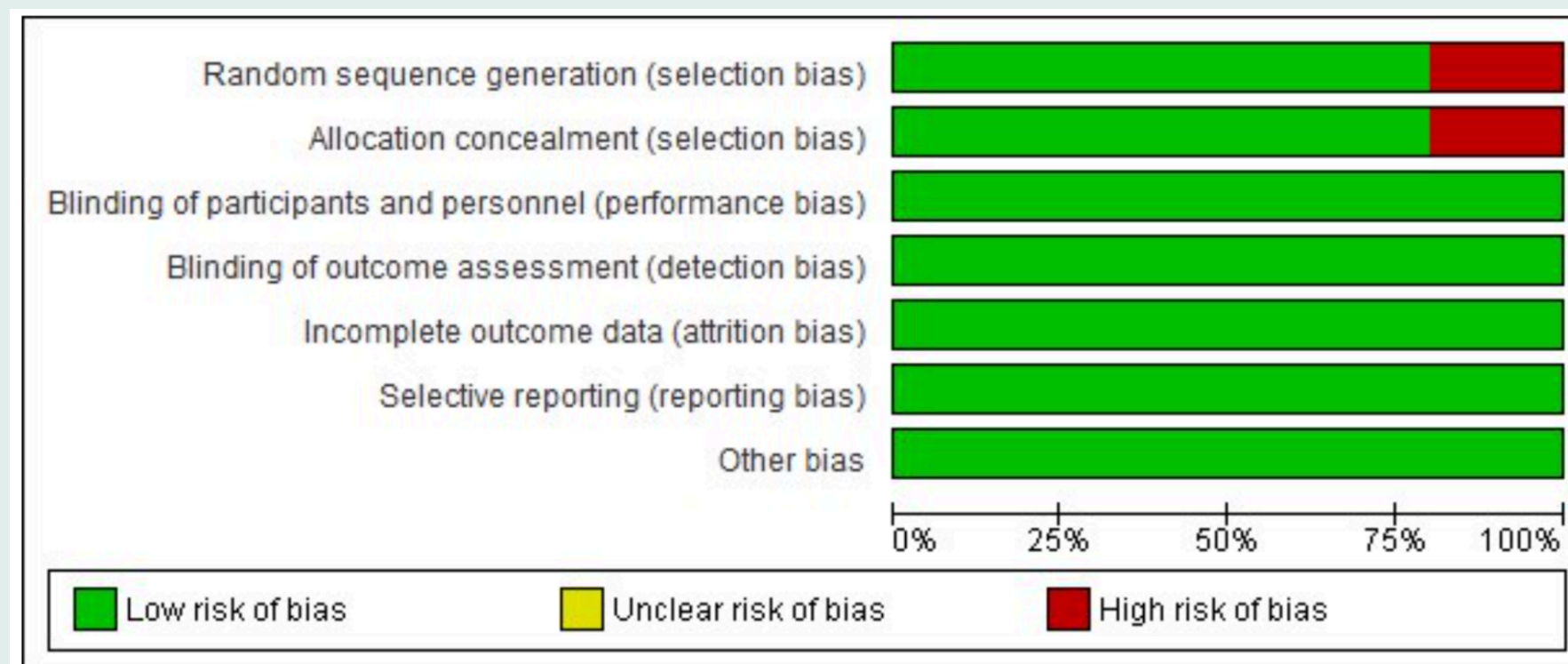
### Step 1: Selection of studies

A systematic search was conducted in the following databases; PubMed, clinicaltrial.gov, and Cochrane Library. Two independent researchers screened the studies based on the ff. inclusion and exclusion criteria

- Inclusion Criteria:** Elective cesarean delivery under subarachnoid block; the intervention involved the use of norepinephrine and phenylephrine to treat post-spinal hypotension, the article was peer-reviewed, and the study was a randomized controlled trial from August 2022-February 2024.
- Exclusion Criteria:** Emergency surgery, cesarean section performed under general anesthesia, non-RCT, and literature for which information on inclusion to the study could not be obtained and was inaccessible even after contacting the original authors.

**Step 2: Data Extraction:** Two authors (AKL and TDM) selected and independently reviewed each article included.

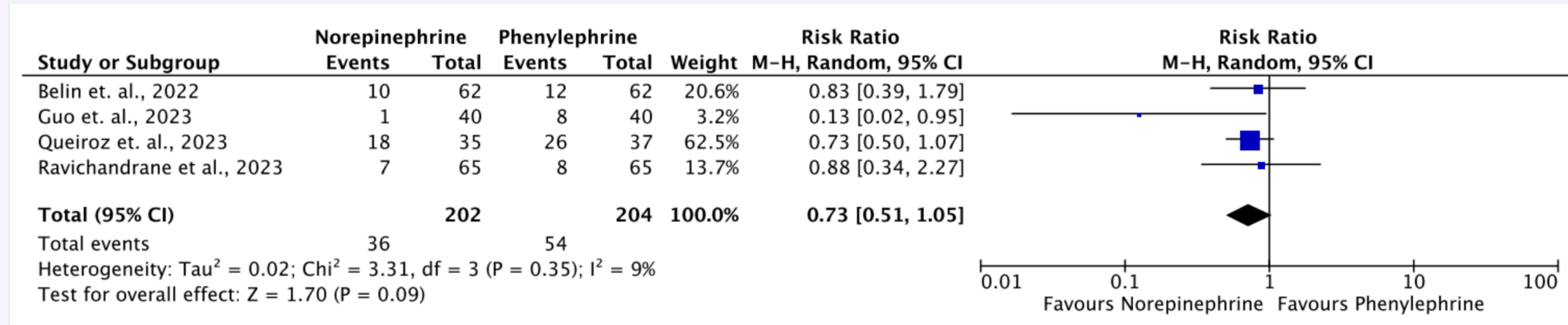
**Step 3: Risk of Bias:** Two independent reviewers (AKL and TDM) critically appraised each trial using the Cochrane Risk of Bias tool. A third reviewer (MC) was available to settle discrepancies in the appraisal process.



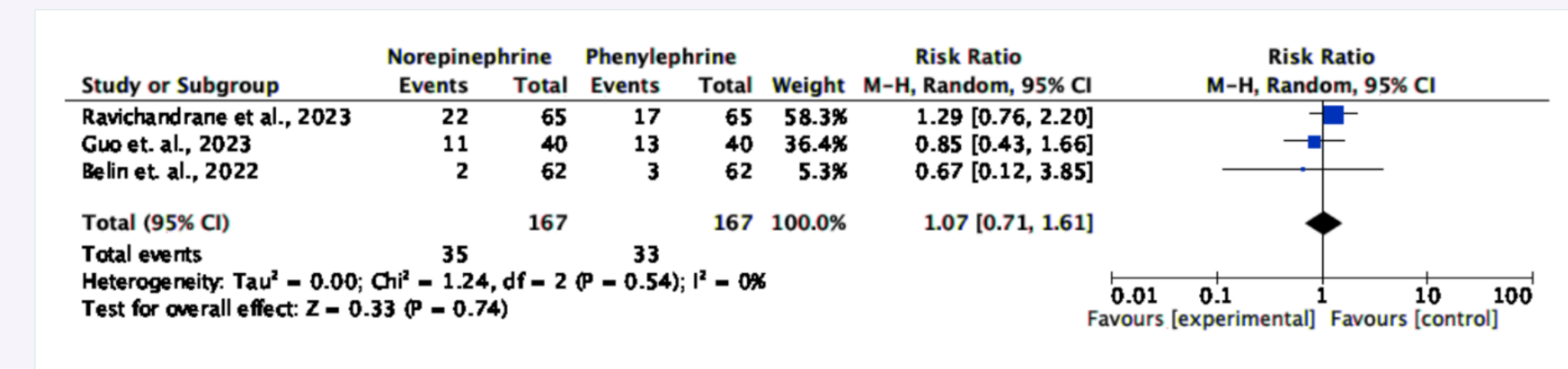
### Step 4: Data Analysis

## Results

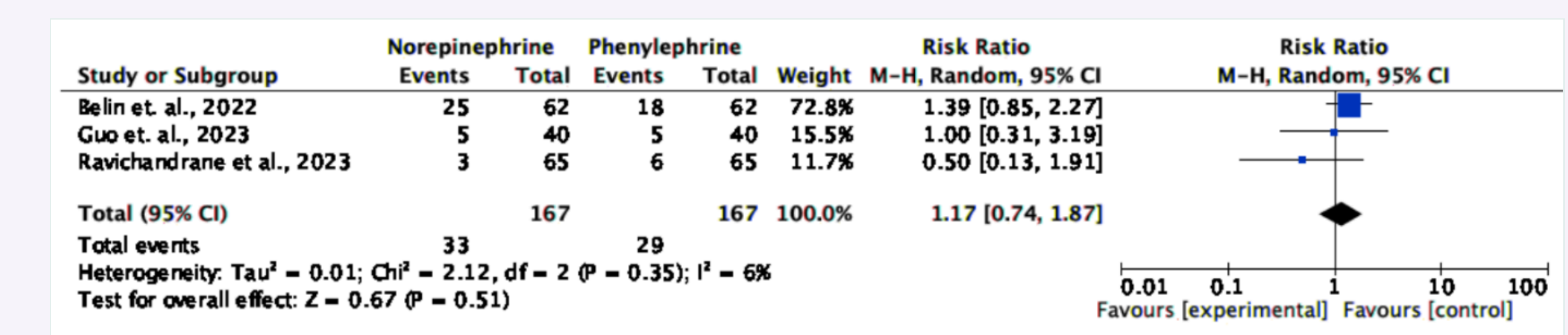
### Incidence of Bradycardia



### Incidence of Hypotension



### Incidence of Nausea and Vomiting



- Our findings are based on a meticulous analysis of four randomized controlled trials involving 406 parturients.
- The primary outcome of interest, the incidence of bradycardia, exhibited a marked difference between the two groups.
- Parturients administered norepinephrine demonstrated a significantly lower incidence of bradycardia compared to those receiving phenylephrine.
- This finding underscores the potential superiority of norepinephrine in maintaining maternal cardiac stability, which is paramount during cesarean section to ensure optimal placental perfusion and fetal well-being

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