

## Rapid Statistical Review Report for your manuscript

**Title:** Practical role of preoperative echocardiography in low-risk non-cardiac surgery.

**Job Code:** CATER\_4795\_6

Dear Author,

Welcome to Editage and thank you for giving us the opportunity to work with you!

For ease of understanding, this report is divided into the following sections:

|                  |  |
|------------------|--|
| <b>Section 1</b> | <b>TECHNICAL CHECKS</b><br>Details of the checks that we have undertaken as part of the review |
| <b>Section 2</b> | <b>OVERVIEW &amp; NEXT STEPS</b><br>Recommended next steps for you                             |
| <b>Appendix</b>  | Frequently Asked Questions   |

We will be happy to provide further clarifications or answer any queries you may have about this report.

We look forward to continuing to be your partner in your publication journey towards acceptance!

Best regards,

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## Section 1: TECHNICAL CHECKS

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### ➤ **Review of research design & methods**

- The study aimed to investigate the role of preoperative echocardiography in predicting postoperative adverse cardiovascular events (CVEs) in asymptomatic patients undergoing low-risk non-cardiac surgery (NCS).
- The study employed an observational design to investigate the real-world clinical practice of preoperative cardiac risk assessment in patients undergoing low-risk NCS, with a focus on the role of preoperative echocardiography in predicting adverse CVEs.
- The study captured data from consecutive patients undergoing low-risk NCS in tertiary university hospitals, reflecting real-world clinical practices.
- The study collected comprehensive data on patient demographics, comorbidities, surgical procedures, preoperative assessments (including echocardiography, electrocardiography, and chest radiography), and postoperative outcomes, providing a detailed analysis of various factors related to preoperative cardiac risk assessment.
- The retrospective nature of the study limits the ability to establish causal relationships between preoperative echocardiography and adverse outcomes.
- The study's inclusion criteria focused on patients from tertiary hospitals, potentially introducing selection bias and limiting the generalizability of the findings to lower-level healthcare settings.
- The sample size, although adequate for an observational study, may have been insufficient to detect significant associations, particularly for rare outcomes such as adverse CVEs.
- Implementing standardized protocols for preoperative assessment, including cardiac risk evaluation, across healthcare institutions could minimize variability in practice and enhance comparability of results across studies.
- Employing propensity score matching techniques could help balance baseline characteristics between groups undergoing preoperative echocardiography and those who do not, thereby reducing potential bias and confounding in observational studies.
- Extending the follow-up period beyond the immediate postoperative period to assess long-term cardiovascular outcomes, including morbidity and mortality, would provide a more comprehensive understanding of the impact of preoperative echocardiography on patient health outcomes.

### ➤ **Data analysis**

- The statistical analyses software employed in the article were SPSS (version 27).
- The study employs multivariate analysis to adjust for potential confounding factors, which enhances the robustness of the statistical models and improves the validity of the findings.
- The comparison between groups with and without preoperative echocardiography allows for the identification of differences in patient characteristics, surgical outcomes, and cardiac events.

- Tables 1-4 provide a comprehensive overview of the clinical characteristics of the study population, including demographics, comorbidities, surgical details, and outcomes, facilitating a detailed understanding of the patient cohort.
- The retrospective nature of the study limits the ability to establish causality between preoperative echocardiography and outcomes, as it is susceptible to biases and confounding variables inherent in observational studies.
- The relatively small sample size may restrict the statistical power of the analysis, potentially leading to type II errors and limiting the generalizability of the findings to larger populations.
- Utilizing survival analysis techniques, such as Kaplan-Meier curves and Cox proportional hazards models, could evaluate the time-to-event outcomes, such as cardiovascular events, and account for censoring in the follow-up period.
- Conducting propensity score matching analysis could balance baseline characteristics between groups and minimize the influence of confounding factors on the estimated treatment effect.
- Also, performing subgroup analyses based on specific patient characteristics, such as age, sex, and comorbidities, could assess differential treatment effects and identify patient subgroups that may benefit most from preoperative echocardiography.

➤ **Critical appraisal of strengths/weaknesses**

- The study collected extensive data on patient demographics, comorbidities, surgical details, and outcomes, providing a thorough understanding of the study population and allowing for detailed analyses.
- The use of multivariate analysis enabled the adjustment for potential confounding factors, enhancing the validity of the results by controlling for variables that could influence the outcomes of interest.
- The study addressed an important clinical question regarding the role of preoperative echocardiography in low-risk non-cardiac surgery.
- The retrospective nature of the study limits the ability to establish causal relationships and introduces the potential for bias and confounding, undermining the strength of the evidence generated.
- The relatively small sample size may restrict the statistical power of the analysis and limit the generalizability of the findings to broader patient populations, diminishing the reliability of the study results.
- The inclusion of patients from tertiary hospitals with advanced perioperative management may introduce selection bias and limit the external validity of the study findings to other healthcare settings.
- The study primarily focused on short-term outcomes after surgery, with limited follow-up periods, which may overlook the long-term impact of preoperative echocardiography on patient outcomes, reducing the completeness of the evidence presented.

## Section 2: OVERVIEW & NEXT STEPS

### SUMMARY

The research article titled "Evaluation of Preoperative Echocardiography in Low-Risk Non-Cardiac Surgery: A Retrospective Observational Study" investigates the clinical utility of preoperative echocardiography in low-risk non-cardiac surgery (NCS) through a retrospective observational study. The study examines the prevalence of preoperative echocardiography, its association with patient demographics and comorbidities, and its predictive value for adverse cardiovascular events (CVEs) post-surgery.

Using a comprehensive dataset from 1,264 consecutive patients undergoing low-risk NCS, the study reveals insights into current clinical practices surrounding preoperative cardiac risk assessment. Findings indicate that while echocardiography is frequently performed, particularly in elderly patients and those with cardiovascular risk factors, its predictive value for adverse CVEs is limited. Multivariate analysis identifies associations between preoperative echocardiography and factors such as patient age, comorbidities, and surgical characteristics. However, the study highlights the need for further research to validate these associations and elucidate the role of echocardiography in risk stratification for low-risk NCS.

Despite its strengths in data collection and analysis, including multivariate regression and adjustment for potential confounding factors, the study has notable limitations. These include its retrospective design, which may introduce bias and limit causal inference, as well as its reliance on data from tertiary hospitals, which may not be representative of broader patient populations. Additionally, the study's small sample size and short-term follow-up limit the generalizability and completeness of the findings. To address these limitations and strengthen the reliability of the conclusions, future research could focus on prospective designs with larger, more diverse patient cohorts could provide deeper insights into the clinical relevance of preoperative echocardiography in low-risk NCS and inform evidence-based perioperative management practices.

### RECOMMENDATIONS

We have listed focus areas that should be addressed to improve the robustness of your study.

#### Major issues:

|    | Focus area                               | Recommendations  |
|----|--|--|
| 1. | Sample size                              | Increase the sample size to improve statistical power and generalizability of findings.                  |
| 2. | Retrospective design                     | Prospective studies could reduce bias and enhance causal inference.                                      |
| 3. | Reliance on data from tertiary hospitals | Including data from a broader range of healthcare settings will account for more representative results. |

|    |                        |   |
|----|------------------------|---|
| 4. | Generalizability       | Conducting the study in diverse populations will enhance the generalizability of the results.           |
| 5. | Bias and their effects | Different biases that have been considered, and the efforts taken to address them, should be mentioned. |
| 6. | Follow up              | Long follow-up period will capture long-term outcomes and assess sustained effects.                     |

**Minor issues:**

|    | <b>Focus area</b>                  | <b>Recommendations</b>  |
|----|------------------------------------|---|
| 1. | Confidence intervals               | Confidence intervals would have indicated the precision of estimates.   |
| 2. | Effect sizes                       | Reporting effect sizes alongside significance tests would facilitate interpretation of the magnitude of observed effects. |
| 3. | Absence of inter-rater reliability | Data on inter-rater reliability will assess the consistency of measurements and findings.                                 |

If you would like us to run the analysis on your dataset to validate your results and verify reproducibility, please ask us about our full Statistical Check service. We can also conduct additional analysis, if needed. You can look at our website for the full suite of [Statistical Analysis and Review Services](#).

Write to us at [request@editage.com](mailto:request@editage.com) for a quote customized to your requirements.

Best regards,

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## **Appendix: FREQUENTLY ASKED QUESTIONS**

**Q: What is the technical experts' qualification?**

A: Our experts reviewers have a minimum qualification of a PhD in your relevant subject area and have extensive experience in publishing and peer-reviewing manuscripts. These experts also have experience of writing and publishing their own manuscripts in peer-reviewed journals. Many of our experts even serve as peer reviewers on journal editorial boards.

**Q: The expert has advised collection of additional data. Will the analysis be redone free of charge, once this is collected?**

A: Data analysis is not included as part of this service. You can write to us with your requirements for data analysis – we will give you a quote based on the type and complexity of the analysis needed.

**Q: I would like the Results and Discussion sections to be written down, based on the data analysis results. Can you do this as part of the service?**

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**Q: The Rapid Statistical Review did not reveal significant gaps in my work. Since this is not of use to me, will you provide me a refund?**

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**Q: Is there post service support?**

A: This is a one-round service. However, if you have any queries about any of the deliverables, you can get in touch with us at any time.

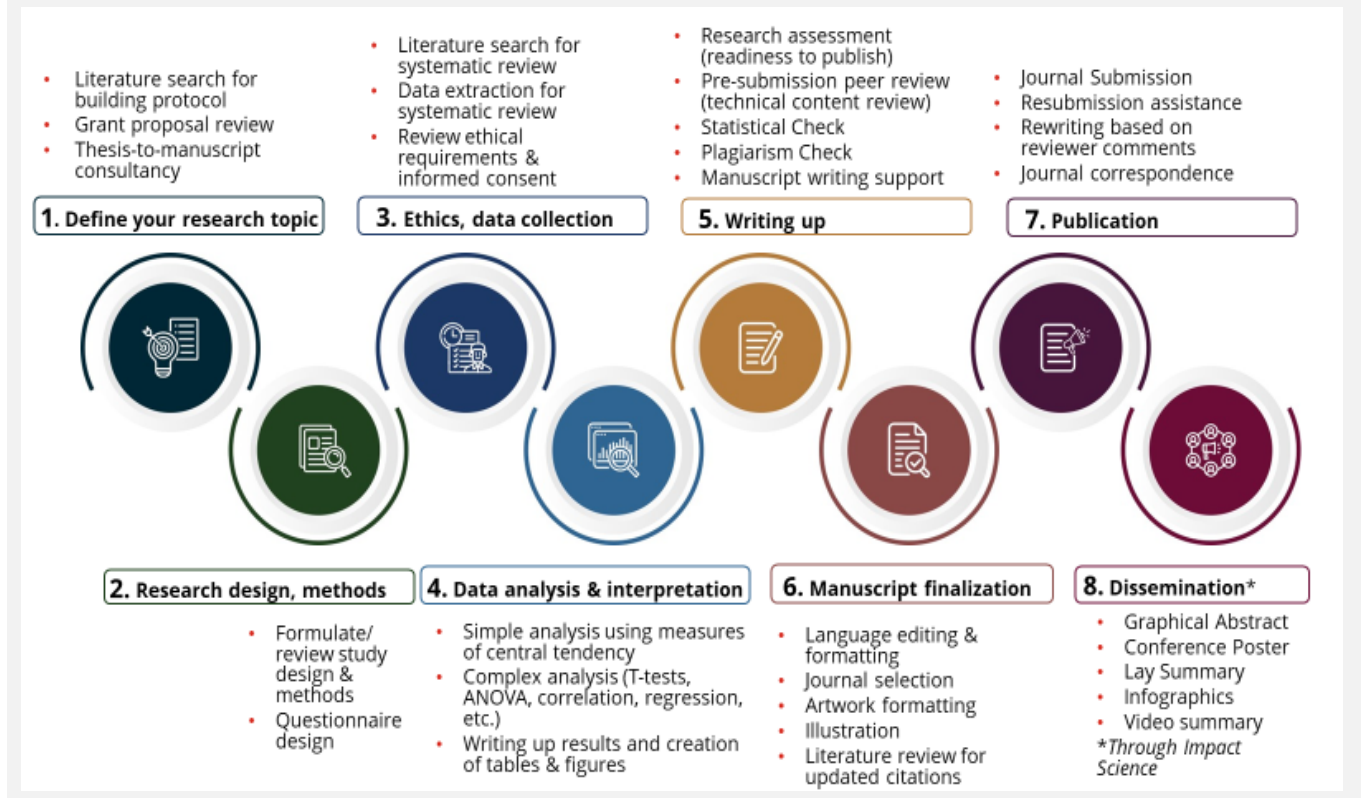
### Appendix: Other service offerings - Example pack with timelines\*

This is an example of a publication support ‘pack’ that includes services to help improve scientific content and check for overlapping text, recommending appropriate journals, editing and formatting the manuscript, and submitting the manuscript to the selected target journal. You can choose to use these and many other services (including literature review, graphical abstract, etc.) as you see fit for your manuscript. We will be happy to customize a pack/service to your needs!



## Appendix: Comprehensive support through your research and publication journey

We understand that support could be needed at any stage of your research and publication journey – so we have service offerings to work with you from the point of thinking about a research topic, all the way until publishing and disseminating your work. We will be happy to customize a pack/service to your needs!



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