

## Review report

Final title: **Novel robotic rehabilitation in Bangladesh: A narrative review**

Title at submission: **Novel robotic rehabilitation in low- and middle-income countries- Infrastructure, clinical scope, and the experience of Bangladesh Medical University: A systematic review**



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Reviewer C: Taslim Uddin, ORCID: 0000-0002-4983-0086

We sincerely thank Reviewer C for the careful evaluation of our manuscript and for recognizing its relevance to rehabilitation robotics in low- and middle-income countries (LMICs), particularly the pioneering role of Bangladesh Medical University (BMU). We have addressed all comments in full and revised the manuscript substantially. Point-by-point responses are provided below.

We appreciate the reviewer's constructive feedback highlighting both the strengths and the areas requiring major revision. In response, we have revised the manuscript to improve methodological transparency, scientific rigor, ethical disclosure, clarity, and alignment between Results and Discussion.

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### Responsible editor

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### Reviewer

C: Taslim Uddin  
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F: Palash Chandra Banik  
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### Keywords

robotic rehabilitation;  
neuror rehabilitation; Bangladesh;  
stroke; spinal cord injury; LMICs

### Funding

None

### Ethical approval

Not applicable

### Trial registration number

Not applicable

1. **Comment** Correction of methodology labeling (change from “systematic” to “narrative review”).

**Response** We agree with the reviewer. The manuscript has been revised to accurately describe the study as narrative review. The title, abstract, keywords, and Methods section have been updated accordingly (Title: line no 5; Abstract: line no 35).

2. **Comment** Strengthening of the Methods section with a transparent search strategy.

**Response** The Methods section has been expanded to clearly describe databases searched (PubMed, Scopus, Web of Science, Google Scholar), search terms, time period (January 2010–September 2025), inclusion/exclusion criteria, and thematic synthesis approach (Methods, Lines: 91–105). This enhances transparency while remaining appropriate for a narrative review.

3. **Comment** Including a critical appraisal of how you have included/analyzed the studies.

**Response** A critical appraisal framework has been incorporated. Evidence is now discussed according to study design, strength of evidence, heterogeneity of devices and outcomes, and relevance to LMIC contexts (Results, Lines; 107–212; Discussion, Lines; 214–262). Limitations of the existing literature are explicitly acknowledged.

4. **Comment** Claims of early successes (Lines 283–286) are anecdotal—no tables, no sample sizes.

**Response** We agree and have revised this section to avoid anecdotal or overstated claims. Statements regarding BMU outcomes are now clearly framed as preliminary observational experiences, emphasizing feasibility, service delivery, and patient engagement rather than definitive clinical effectiveness (BMU Centre section, Lines; 191–212). Language implying proven efficacy has been removed, and the need for formal prospective studies is highlighted.

5. **Comment** Improving grammar, clarity, and removing redundancy

**Response** The manuscript has undergone comprehensive language revision. Redundant statements particularly between Results and Discussion have been removed or consolidated. Overall clarity, academic tone, and coherence have been improved throughout (entire manuscript).

5. **Comment** Expanding ethical and cost-related discussion.

**Response** A dedicated subsection addressing ethical considerations and cost implications has been added to the Discussion (Lines; 245–257). This includes equity of access, informed consent, data privacy, prioritization of limited resources, affordability, and sustainability in LMIC health systems.

5. **Comment** Robots supplied as a “gift” from China: this should be disclosed under conflict of interest.

**Response** This has now been transparently disclosed. The Conflict of Interest/Funding section states that the robotic equipment was provided as a government-to-government gift, with no involvement of manufacturers in study design, data analysis, interpretation, or manuscript preparation (Conflict of Interest, Lines; 284–286).

5. **Comment** Several findings in Results repeat the same conclusions in Discussion.

**Response** We have revised the manuscript to clearly separate sections. The Results section now strictly presents synthesized evidence and contextual findings, while the Discussion focuses on interpretation, implications, limitations, and future directions. Redundant content has been removed.

We are grateful to Reviewer C for the insightful and constructive comments, which have significantly strengthened the manuscript. We believe the revised version now meets publication standards in terms of methodological clarity, ethical transparency, and scientific rigor, and we thank the reviewer for contributing to this improvement.

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**Reviewer E: Keertika Orchi, ORCID: 0009-0009-6173-6509**

We sincerely thank Reviewer E for the detailed and constructive comments. We agree that several inconsistencies existed between the title, abstract, and methodology in the original submission. In response, we have carefully revised the manuscript to ensure conceptual clarity, methodological transparency, and consistency throughout. Our point-by-point responses are provided below.

- 10. Comment** The title of the paper and the methodology described here don't match. Please decide on the study design.
- Response** We agree with the reviewer. After careful consideration, we have revised the manuscript to clearly define it as narrative review, not a systematic review. The title, abstract, keywords, and Methods section have all been updated to ensure full consistency with this design (Title; Abstract; Methods, revised throughout).
- 11. Comment** Kindly define accurately whether this is a systematic review paper or a narrative review paper.
- Response** The title has been revised to explicitly reflect that this manuscript is a narrative review. All references to “systematic review” have been removed to avoid misclassification.
- 12. Comment** Abstract  
P 2, Background: Objective of the review is missing
- Response** The abstract has been revised to clearly state the objective of the review, specifying that the aims are to:
1. synthesize global evidence on robotic rehabilitation,
  2. contextualize challenges in LMICs, and
  3. describe the BMU robotic rehabilitation initiative as a case study (Abstract, Lines 31–34).
- 13. Comment** P 2, L 31: What is the actual methodology followed?
- Response** The abstract now explicitly states that this is a narrative review, summarizing databases searched, timeframe, and thematic synthesis approach (Abstract, Lines 35–41). This ensures alignment between the abstract and the full Methods section.
- 13. Comment** The abstract should reflect the methods and findings of the paper in general.
- Response** We have revised the abstract to concisely reflect the methods, scope of evidence, and key findings, including evidence trends, LMIC challenges, and the role of BMU as a contextual case example.
- 13. Comment** P 5, L 82: Define accurately if this is a systematic or narrative review
- Response** This section has been revised to clearly state that the manuscript is narrative review. Any terminology implying systematic review methodology has been removed (Methods, Lines; 91–105).
- 13. Comment** P 5, L 86: When was the search conducted?
- Response** The Methods section now explicitly states the search period (January 2010–September 2025) and notes that the final search was completed in September 2025 (Methods, Lines; 91–105).
- 13. Comment** P 5, L 93: Number of reviewers, blinding, software use
- Response** As this is a narrative review, formal duplicate screening, blinding, or PRISMA-based workflows were not employed. This has now been clearly stated to avoid methodological confusion. Article selection and synthesis were conducted by the authors collaboratively, without screening software, consistent with narrative review standards (Methods, Lines; 91–105).
- 13. Comment** P 5, L 93: How was emphasis on evidence strength given?
- Response** We have clarified that emphasis on evidence strength was achieved by prioritizing:  
Narrative reviews, Systematic reviews and meta-analyses,  
Randomized controlled trials,  
Large observational studies, with explicit acknowledgment of evidence gaps and heterogeneity. This approach is now described in the Methods section (Lines; 91–105) and reflected in the Results and Discussion.
- 13. Comment** P 6, L 101: Number of articles, study designs, baseline findings  
How many articles were identified? How many study designs were involved? Can baseline findings be provided?
- Response** To maintain methodological integrity of a narrative review, we have avoided numerical claims suggesting systematic screening. Instead, the Results section has been revised to:
- Describe types of evidence included (narrative reviews, systematic reviews, RCTs, observational studies, guidelines),
  - Summarize baseline thematic findings across neurological, musculoskeletal, and LMIC-specific contexts,
  - Clearly state that the review provides a thematic synthesis, not a quantitative inventory of studies (Results, Lines; 107–212).
- This revision prevents misinterpretation of the review as a systematic analysis.
- We thank Reviewer E for highlighting critical inconsistencies that required correction. These comments were instrumental in improving the manuscript’s methodological clarity, internal consistency, and academic rigor. We believe the revised version now accurately reflects its narrative review design and meets publication standards.

## Reviewer F: Palash Chandra Banik, ORCID: 0000-0003-2395-9049

We sincerely thank Reviewer F for the thorough, insightful, and highly constructive review. We appreciate the reviewer's recognition of the manuscript's relevance and its LMIC perspective, as well as the detailed guidance on how to strengthen methodological clarity, analytical depth, and policy relevance. In response, we have substantially revised the manuscript. Our point-by-point responses are provided below.

- |                    |   |
|--------------------|---|
| <b>10. Comment</b> | <p><b>Methodology &amp; Reporting Rigor</b></p> <p>The manuscript is framed as a systematic review but lacks PRISMA flow, PICO/PECO framework, risk-of-bias assessment, and detailed search strings. Consider reframing as a scoping or narrative review.</p>   |
| <b>Response</b>    | <p>We fully agree with this assessment. Following this and similar feedback from other reviewers, the manuscript has been explicitly reframed as narrative review, not a systematic review. Accordingly:</p> <ul style="list-style-type: none"> <li>• All references to “systematic review” have been removed from the title, abstract, and Methods section.</li> <li>• PRISMA flow diagram, PICO/PECO framework, formal risk-of-bias assessment, and screening software are no longer implied or claimed, as these are not requirements of narrative reviews.</li> <li>• The Methods section now clearly explains that a thematic, evidence-weighted narrative synthesis approach was used, prioritizing systematic reviews, meta-analyses, and RCTs where available, with explicit acknowledgment of heterogeneity and limitations.</li> </ul> <p>This revision resolves the methodological mismatch and aligns reporting rigor with the chosen study design.</p> |
| <b>11. Comment</b> | <p><b>Search strategy lacks exact search strings and combinations.</b></p>  |
| <b>Response</b>    | <p>To maintain methodological integrity of a narrative review, we have described the search domains, databases, timeframe, and key terms, but deliberately avoided presenting exhaustive Boolean strings or database-specific syntax, which could misleadingly imply a systematic review. This clarification has been added to the Methods section. We believe this strikes an appropriate balance between transparency and correct methodological classification.</p>  |
| <b>12. Comment</b> | <p><b>BMU robotic rehabilitation center – Need for More Empirical Data</b></p> <p>The BMU case study reads more like a program description; quantitative data and operational details are needed.</p>   |
| <b>Response</b>    | <p>We agree and have strengthened this section while remaining cautious not to overstate preliminary findings. Specifically:</p> <ul style="list-style-type: none"> <li>• The BMU section has been reframed as a descriptive, early-phase institutional case study focused on feasibility, implementation, and service delivery.</li> <li>• Language suggesting definitive clinical effectiveness has been removed.</li> <li>• We now explicitly state that outcome analyses are ongoing observational studies, and that current data are preliminary.</li> </ul>   |
| <b>13. Comment</b> | <p><b>Provide quantitative outcome data (patient numbers, functional measures).</b></p>   |
| <b>Response</b>    | <p>Where available, we have clarified:</p> <ul style="list-style-type: none"> <li>• That BMU has initiated prospective observational data collection using validated scales (e.g., FIM, Fugl-Meyer, Barthel Index, 6MWT).</li> <li>• That early experience relates primarily to feasibility, patient engagement, and service uptake, not comparative effectiveness.</li> </ul> <p>We intentionally avoid presenting incomplete numerical outcomes to prevent misinterpretation, and instead clearly state this as a limitation and future research priority.</p>  |
| <b>13. Comment</b> | <p><b>Clarify “57 robots” and “22 AI-generated”.</b></p>  |
| <b>Response</b>    | <p>This has been clarified. The manuscript now specifies that:</p> <ul style="list-style-type: none"> <li>• The centre houses total 62 devices, among them 57 are robotic rehabilitation devices.</li> <li>• Among 57 robotic rehabilitation devices, 22 are AI-enabled, not AI-generated,</li> <li>• Devices are categorized by clinical application (upper limb, lower limb, multi-joint, early mobilization).</li> </ul> <p>Terminology has been corrected throughout to avoid ambiguity.</p>  |
| <b>13. Comment</b> | <p><b>Include cost-recovery, patient satisfaction, or barriers.</b></p>   |
| <b>Response</b>    | <p>A new subsection now discusses:</p> <ul style="list-style-type: none"> <li>• Early observations on patient acceptance and motivation,</li> <li>• Subsidized service models and affordability challenges,</li> <li>• Operational barriers (maintenance, training, scheduling).</li> </ul>   |
| <b>13. Comment</b> | <p><b>The synthesis is largely descriptive; add analytical depth and balance.</b></p>   |
| <b>Response</b>    | <p>We have revised the Results and Discussion to improve analytical depth by:</p> <p>Grouping evidence by strength of evidence (strong for stroke, moderate for SCI, emerging for TBI and others),</p> <p>Explicitly acknowledging heterogeneity, modest effect sizes, and contradictory findings,</p> <p>Discussing clinical meaningfulness, emphasizing functional relevance over statistical significance where data allow.</p> <p>This strengthens critical appraisal while remaining appropriate for a narrative review.</p>   |

15. **Comment** Include effect sizes or summary tables for stroke.
- Response** Given space constraints and the reviewer's recommendation for a shorter manuscript, we opted not to add new quantitative summary tables. Instead, effect magnitude is qualitatively summarized with references to high-quality meta-analyses. This approach maintains readability while directing readers to detailed quantitative sources.
15. **Comment** Tables and Visual Presentation  
Tables could be reorganized by clinical application, cost, and evidence level.
- Response** Tables have been revised to improve clinical utility, with:
- Devices grouped by functional application
  - Indications and contraindications clarified
  - Narrative discussion highlighting appropriateness for LMIC settings.
- Indicative cost ranges and formal evidence grading were not added to avoid speculative estimates, but economic considerations are discussed in the text.
15. **Comment** Research gaps should be more actionable.
- Response** We have expanded the Future Directions section to propose:
- Priority LMIC-focused study designs (pragmatic trials, hybrid effectiveness-implementation studies)
  - Feasible outcome measures for LMIC contexts
  - The need for culturally adapted patient-reported outcomes
  - Opportunities for shared registries.
15. **Comment** Policy recommendations should be more specific.
- Response** The Policy section has been strengthened with actionable recommendations addressing:  
Integration of rehabilitation into national health strategies,  
Inclusion of advanced rehabilitation within public financing schemes,  
Regulatory oversight for robotic device safety,  
The role of academic institutions like BMU in evidence-to-policy translation.
13. **Comment** Inconsistent terminology, transitions, and objective alignment.
- Response** The manuscript has undergone careful editorial revision to ensure:
- Consistent terminology (e.g., "robotic rehabilitation", "LMICs"),
  - Improved transitions between global evidence and the BMU case study,
- Clear alignment between stated objectives and manuscript structure.
13. **Comment** Consider health economic models, SWOT analysis, and comparisons.
- Response** We agree these are valuable. Given the reviewer's recommendation for a shortened manuscript (<2000 words), these analyses have been incorporated conceptually within the Discussion rather than as standalone sections. They are explicitly identified as future research and policy priorities.
13. **Comment** Suggested for a shorter version within 2000 words.
- Response** We appreciate this recommendation. The manuscript has been substantially condensed, with removal of redundancy, tighter synthesis, and clearer focus on key messages, while preserving essential methodological, clinical, and policy content.
- We sincerely thank Reviewer F for the depth, balance, and scholarly insight of this review. The comments significantly strengthened the manuscript's methodological clarity, analytical rigor, and implementation relevance. We believe the revised version now presents a coherent, appropriately framed narrative review with a meaningful LMIC case study contribution.

**Responsible editor: M Mostafa Zaman, ORCID: 0000-0002-1736-1342**

15. **Comment** Could you revise the Abstract by making the Background shorter (which should include a statement of the abstract) and removing the separate "objective" heading? Additional texts on a brief concluding remark are necessary under the heading of "Conclusion".
- Response**
1. Study format: We have revised the manuscript to explicitly align with a narrative review format. The title, abstract, methods, and overall structure have been updated accordingly, and all elements implying a systematic review have been removed.
  2. Manuscript length: The manuscript has been substantially condensed to approximately 2000 words, with redundancy eliminated and the core message sharpened to improve clarity, readability, and impact.
  3. Revised submission: We will submit the revised manuscript along with a detailed point-by-point response to all reviewers' and editorial comments.
- Thank you again for your valuable feedback and for considering our work.