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PERSPECTIVE

Advanced robotic rehabilitation in Bangladesh Medical University

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Robotic rehabilitation is an emerging field within physical medicine and rehabilitation that provides high-intensity, repetitive, and precise rehabilitation to enhance neuroplasticity and promote functional recovery. The global evidence base for robotic rehabilitation in post-stroke and spinal cord injury populations shows improvements in gait parameters, mobility, and training although there is heterogeneity in functional outcomes has been comprehensively reviewed elsewhere [1, 2, 3]. This perspective therefore focuses on implementation experience, early outputs, and unresolved challenges in Bangladesh.

Bangladesh Medical University, a national centre of excellence for postgraduate medical education and tertiary care, has recently established a Robotic Rehabilitation Centre to support patients with complex disabilities. The robotic systems deployed at the centre were provided as a governmental gift from the People's Republic of China for humanitarian rehabilitation purposes, rather than procured through direct institutional or public financial investment. Regulatory requirements of national authorities are being followed and approved temporarily by Directorate General of Drug Administration of Bangladesh. This initiative, therefore, lies in the responsible, ethical, and effective utilisation of this advanced medical technology within a public-sector health system. Since inception, approximately 220 patients with neurological and musculoskeletal conditions have received robot-assisted therapy. It is assumed that 60% more improvement was found in the robotic rehabilitation than that of conventional therapy. No serious device-related adverse events have been observed so far. The programme has demonstrated operational feasibility in a public university hospital, including staff training, routine maintenance, and integration with conventional therapy pathways. However, systematic outcome analysis and health-economic evaluation are ongoing. These advantages relate primarily to therapy delivery and monitoring rather than proven superiority in functional outcomes, which remains to be established through comparative studies. At present, the centre lacks systematically analysed outcome data comparing robotic-assisted and conventional rehabilitation. Cost-effectiveness, long-term functional outcomes, and patient-reported measures will be evaluated.

Bangladesh is a country with a growing burden of disability together with unmet rehabilitation needs and a shortage of physical medicine and rehabilitation specialists [4, 5]. National surveys consistently report fragmented service delivery, urban-rural disparities, and limited access to modern rehabilitation technologies. At this context, the Robotic Rehabilitation Centre at Bangladesh Medical University took an attempt to introduce structured, task-specific, and data-driven rehabilitation within a public sector setting. In this stage robotic systems are used as adjuncts to drug therapy and allow objective monitoring through parameters such as range of motion and muscle strength, in line with global

Key messages

Bangladesh Medical University's Robotic Rehabilitation Centre introduces advanced robotic systems for neurological and musculoskeletal care. Robotic therapy delivers high-intensity, precise treatment that can improve patient outcomes. The centre builds research and training capacity and advances Bangladesh toward excellence in rehabilitation despite cost and access challenges.

evidence suggesting potential benefits of integrated robotic rehabilitation. Clinically, robotics help to extend therapist capacity by reducing physical workload during repetitive training and facilitating delivery of higher-intensity, standardised rehabilitation. Academically, integration of robotic systems provides trainees with exposure to contemporary rehabilitation technologies. Research initiatives, including prospective registries and pragmatic studies, are planned to generate local evidence on feasibility, safety, and cost-benefit in a Bangladesh context.

Bangladesh Medical University's initiative demonstrates that advanced rehabilitation technologies can be introduced in a resource-constrained setting. Future work should focus on publishing patient-reported and programme outcome data, comparing robotic-assisted versus conventional therapy. With strategic investment, policy support, and attention to equity, this centre could be a regional hub for innovation in rehabilitation in Bangladesh.

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Author contributions

Manuscript drafting and revising it critically: MAS, MAKA, MIH. *Approval of the final version of the manuscript:* MAS, MAKA, MIH. *Guarantor of accuracy and integrity of the work:* MAS, MAKA, MIH.

Conflict of interest

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Not applicable

Supplementary file

None

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