OPINION

Navigating the Nexus of Policy, Practice and Equity in Assistive Technology: A Critical Appraisal of JEFI Special Issue

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Abstract

This commentary provides a focused scholarly appreciation of the recent assistive technology special issue published by the Journal of Epidemiology Foundation of India and situates its contributions within the broader discourse on inclusive health systems, public health equity, and rehabilitation. The collection of articles collectively advances conceptual clarity, policy relevance, and implementation awareness surrounding assistive technology across diverse population and service contexts. By synthesising the thematic scope, methodological orientations, and translational relevance of the featured works, the commentary highlights the special issue's role in strengthening evidence-informed dialogue between research, practice, and policy. It further underscores the importance of interdisciplinary collaboration, context-responsive innovation, and sustained systems thinking to accelerate equitable access to assistive technology, particularly within low- and middle-income settings. Overall, the special issue represents a timely and meaningful contribution to the evolving global assistive technology landscape and offers a valuable knowledge platform for researchers, clinicians, programme leaders, and policymakers engaged in disability-inclusive development and health systems strengthening.

Keywords

Assistive technology; Inclusive health systems; Public health; Equity; Rehabilitation; Policy translation; Low- and middle-income countries.

Introduction

Assistive technology (AT) is increasingly recognized as essential for inclusive health systems, yet global demand significantly exceeds supply. The World Health Organization estimates that over 2.5 billion

people require one or more assistive products, but only approximately 10% have access.(1,2) Similarly, Panda and Gaddam report that about one-third of the global population needs AT, with unmet needs exacerbated by factors such as age, rural residence, and poverty.(3) The recent special issue of the *Journal of the Epidemiology Foundation of India* (JEFI) on Assistive Technology (AT) is a timely initiative that addresses a frequently overlooked area within public health and rehabilitation. The articles and accompanying commentary collectively position AT as a critical component of inclusive health systems.(4) This appraisal synthesizes the principal themes, evaluates the strengths and limitations of the issue, and proposes an evidence-based research and policy agenda to advance the field.

Thematic Synthesis: Unpacking the AT Imperative: The contributions in the special issue converge around four interconnected thematic areas that are essential for a comprehensive understanding of AT in the Indian context: policy frameworks, user-centered design, access barriers, and the socio-economic imperative of equity. These areas are not only linked but also influence one another dynamically. For instance, effective policy can enable user-centered design by mandating inclusivity, while equitable access depends significantly on breaking down socio-economic barriers. Such interplay provides a cohesive roadmap, fostering a comprehensive synthesis in the appraisal that follows.

1. **Policy Architectures and the EtD Framework:** Grover(2) identifies the Evidence-to-Decision (EtD) framework as essential for the inclusion of AT. The transition from determining "what works" to focusing on "how to make it work" is significant. The EtD framework enables a transparent and systematic approach to AT procurement and coverage by considering values, resources, equity, and feasibility. This methodology aligns with global efforts to promote evidence-based policymaking in AT, particularly within the context of Universal Health Coverage (UHC).(1,5) Institutionalizing the EtD framework in national health planning can justify AT budgets and standardize inclusion criteria, which is especially important in resource-limited settings.
2. **Ergonomics and the Human-Technology Interface:** Shukla and Badhal(6) emphasize that user-centered ergonomics in orthotic design extends beyond technical considerations, highlighting the importance of integrating AT into users' daily lives. Their focus on biomechanical alignment, comfort, usability, and psychosocial acceptance demonstrates that AT should promote participation and well-being rather than solely address functional deficits. As noted in the commentary, this patient-centered approach reframes AT design as "patient-centered care" rather than a "technology-driven" process.(4) This perspective is crucial for reducing device abandonment, a widespread issue globally.
3. **Multifaceted Barriers and the Assessment Conundrum:** Badhal et al.(7) and Panda and Gaddam(3) provide a comprehensive analysis of the primary barriers to AT access in India, including policy gaps, economic constraints, fragmented services, social stigma, and inadequate technological infrastructure. Among these, policy gaps are identified as the central obstacle. Addressing these gaps could facilitate improvements in other areas by establishing clearer guidelines for funding allocation, stakeholder responsibilities, and the integration of assistive technology within existing healthcare frameworks. The authors also examine established assessment tools such as WHO-GReAT, QUEST, PIADS, and ATLAS, highlighting their significant underutilization in India.(7) This disconnect between available tools and their application impedes evidence-based program development and policy advancement.
4. **Equity as an Economic and Ethical Imperative:** Singh et al.(8) highlight both the economic and ethical justifications for equitable AT provision. By demonstrating substantial returns on investment for assistive products, they position AT as a strategic investment in human capital rather than merely a welfare expense.

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Their focus on vulnerable groups—including rural residents, women, older adults, and individuals experiencing poverty(8,9)—reinforces the ethical imperative for equitable access. Integrating AT into India's UHC framework is identified as essential for achieving the Sustainable Development Goals (SDGs) and promoting inclusive development.(8)

Critical Appraisal: Strengths and Unaddressed Gaps: A principal strength of the JEFI special issue is its conceptual elevation of AT, repositioning it from a peripheral charitable concern to a central health system priority and a fundamental human right. This perspective aligns with international frameworks such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and the Sustainable Development Goals (SDGs).(2,9) The multidisciplinary approach, encompassing policy, engineering, public health, and economics, provides a comprehensive perspective on the AT ecosystem. By contextualizing global evidence within Indian data and challenges, the issue achieves high relevance for local policymakers and practitioners. However, a closer examination reveals several important limitations, many of which are acknowledged in the accompanying commentary.(7)

- **Paucity of Empirical Implementation Data:** The special issue relies primarily on narrative reviews and conceptual frameworks rather than primary empirical studies. The commentary highlights the "scarcity of empirical implementation data" and the limited number of "primary studies or evaluations". This results in a significant gap, as robust evidence regarding the real-world effectiveness, scalability, and sustainability of AT interventions in India remains insufficient.
- **Under-Application of Standardized Assessment Tools:** Although several validated international assessment tools are identified, their systematic use and validation in India are largely absent from the published literature. The commentary notes that these tools are "recognized but under-used",(7) which limits the generation of comparable, evidence-based outcomes necessary for policy advancement.
- **Limited Intersectional Analysis of Equity:** Although equity is a recurring theme, there is limited intersectional analysis of how factors such as caste, socio-economic status, and regional differences influence AT access and outcomes. The commentary observes that current analyses "do not disaggregate by caste, socio-economic status or regional variations",(7) which is essential for designing targeted interventions. Addressing this gap between conceptual frameworks and practical, scalable solutions is necessary to bridge the divide between "what works" and "how to make it work."

A Forward-Looking Research and Policy Agenda for JEFI

To build upon the strong foundation established by this special issue and address its limitations, a three-part agenda is proposed for future JEFI contributions and for the broader AT research and policy community in India.

1. **Prioritizing Implementation Science and Economic Evaluations of AT Interventions:** Future issues should prioritize the publication of rigorous empirical studies employing implementation science methodologies. This includes the following areas.
    - **Effectiveness-Implementation Hybrid Designs:** Research evaluating the effectiveness of AT interventions while simultaneously studying the implementation process.(10)
    - **Cost-Effectiveness and Cost-Benefit Analyses:** Comprehensive economic evaluations of different AT provision models (e.g., community-based vs. centralized, local manufacturing vs. import) to inform resource allocation decisions, building on the economic arguments presented by Singh et al..(8)
    - **Longitudinal Studies on AT Outcomes:** Research tracking long-term AT adoption, adherence, functional gains, and psychosocial impact, particularly in LMICs where such data are scarce.(7)

2. **Fostering the Validation and Routine Application of Culturally Adapted Outcome Measures:** JEFI should encourage and publish research focused on adapting and validating international AT assessment tools (such as WHO-GReAT, QUEST, PIADS, and MPT) for diverse Indian populations. This is essential for generating reliable, comparable data on user satisfaction, independence, and psychosocial impact.(7) The journal should also support the integration of these validated measures into all national and state AT programs to establish a robust national data repository for ongoing evaluation and policy improvement.
3. **Driving Intersectional Equity and User-Led Innovation through Participatory Research:** Future research should move beyond aggregated data to conduct detailed intersectional analyses of AT access and outcomes. This requires the following approaches.
    - **Community-Based Participatory Research (CBPR):** Studies employing CBPR approaches to co-design, develop, and evaluate AT solutions with marginalized communities, ensuring cultural appropriateness and user ownership.(11,12) This directly addresses the call for user-centered design(6) and the need for culturally appropriate AT.(7)
    - **Evaluation of Local Manufacturing Ecosystems:** Research assessing the impact of local AT manufacturing hubs on affordability, accessibility, repairability, and economic empowerment, particularly in rural areas.(3,13)
    - **Policy Implementation Research:** Studies examining the effectiveness of specific policy interventions (e.g., targeted subsidies, digital platforms like Ayushman Bharat Digital Mission) in reducing inequities in AT access among specific vulnerable groups.(8)

Conclusion

The JEFI special issue on Assistive Technology represents a significant milestone, articulating a clear vision for AT as an integral component of India's health and disability systems. By delineating policy needs, design considerations, access barriers, and economic arguments, it establishes a robust foundation. The next step for JEFI and the AT community is to translate this vision into concrete, evidence-based action. Through implementation science, systematic outcome measurement, and a sustained focus on equitable, user-led innovation, assistive technology can enhance autonomy, participation, and dignity for all in India. This will further strengthen JEFI's role as a leading platform for AT research and policy.

Authors Contribution

All authors have contributed equally.

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Conflict of Interest

There are no conflicts of interest.

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The author has not used any generative AI/AI assisted technologies in the writing process

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