



Short Report

Solution-Focused Approach towards Improved Access to Assistive Mobility Technology and Devices in Low and Middle-income Countries: A Narrative Review

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Abstract

Background: The article focuses on the main challenges for low and middle-income countries (LMICs) and approaches that need to be implemented to achieve assistive mobility devices for all. World Health Organization (WHO) estimates that about one billion (15%) of the world's population lives with some form of disability, with projections for the same to double by 2050, a significant proportion (approx.840 million) of them residing in low- and middle-income countries. As per WHO, it is estimated that only 5-15% of the people requiring assistive technology have access to it. In low and middle-income countries, the rate of accessibility is expected to be worse due to the high cost of the products, diminished awareness, lack of trained personnel, inadequate availability, and ineffective policy implementation due to lack of funds. The current developments in assistive mobility technologies and devices available at a high cost for consumers in high-income countries have neglected the requirement of persons with disabilities in low and middle-income countries. The improved rehabilitation methods of assistive mobility devices may deliver economic and health benefits to individuals and lessen the financial burden on governments in the future. Therefore, multidisciplinary research is greatly needed to measure and prove the effectiveness of rehabilitation treatment methods and to develop an evidence-based sustainable treatment, particularly in LMICs. Also, a detailed service model assessment can identify the lack of current service provision. The online databases were searched to find relevant articles for the purpose.

Key Words: Assistive Devices, Mobility, LMICs, Rehabilitation, Disability

INTRODUCTION

Assistive technology is a product system or software that enables and improves the independence of an individual with any form of disability/inability, like physical, mental, visual, hearing, etc., to achieve optimal functioning and access to society and the environment.¹The World Health Organization (WHO) estimates that about one billion (15%) of the world's population lives with some form of disability, with projections for the same to double by 2050, a significant proportion (approx.840 million) of them residing in low- and middle-income countries.² As per WHO, it is estimated that only 5-15% of the people in the world requiring

assistive technology have access to it.^{3,4} In low and middle-income countries, the rate of accessibility is expected to be worse due to the high cost of the products, diminished awareness and lack of trained personnel, inadequate availability, and ineffective policy implementation due to lack of funds.⁵ For example, in India, only two percent (2%) of persons with disabilities have access to rehabilitative services.⁶

People with disabilities have greater rates of poverty, poorer economic conditions, weaker health outcomes, and lower education achievements than ordinary people. The barrier

in accessing the environment and services is one of the critical factors for people with disabilities to achieve near-normal functioning.⁷ Considering the local factors (like conflict, traffic injuries, other prevalent diseases, and good trauma care), it has been estimated that 0.5% (35-40 million) of the world population requires prosthetic and orthotic rehabilitative treatments.^{4,8} By 2050, only the prosthetic and orthotic rehabilitation service requirement is estimated to be close to 1% of the world population. The increased human life expectancy will increase the aging population with the high demand for assistive mobility devices (such as prostheses, orthoses, and wheelchairs) to achieve their functional life. The significant increase in noncommunicable diseases such as stroke, diabetes, etc., and musculoskeletal conditions is likely to increase the need for such devices and technology, thus, aggravating the challenges of low and middle-income countries.⁹ For example, over 70-75 million people (about 1% of the world's population) need wheelchairs.¹⁰

Mobility is the first and foremost requirement to enjoy fundamental rights such as food, shelter, education, and a job. Assistive mobility devices, like orthoses, prostheses, wheelchairs, crutches, walkers, etc., empower persons with disability to become ambulant and remain active. With the help of the devices, people with disability go for schooling, skill development, or earning their livelihood.¹¹ Ideally, assistive mobility devices should be prescribed after individual assessment, and fitting, training, and follow-up are required by a qualified professional to ensure the users' efficient and secure use of the devices.¹² Environmental accessibility is a precondition for using assistive mobility devices. The lack of an appropriate environment, substandard assistive device provision, and inadequate repair and maintenance facilities may lead to the rejection of assistive devices and adverse effects on the health of device users.^{13,14} The population with disabilities residing in low and middle-income countries must be addressed with the appropriate healthcare system and technology to achieve the United Nations Sustainable Development Goals of no poverty and good health and well-being.²

Assistive mobility devices not only improve the body structure and function for activities and

active participation of the users in society but also give them freedom of choice.^{1,2} Personal mobility is a fundamental human right of persons with disabilities. The signatory states are committed to implementing the provisions of the United Nations Convention on Rights of Persons with Disabilities (UNCRPD) to promote personal mobility and train the personnel involved in service provision to people with disabilities.¹⁵ More than 170 countries have ratified the convention and are obliged to ensure appropriate, high-quality, affordable assistive mobility devices for people with disabilities.⁹ The WHO global strategy and action plan on aging and health recognized that the demand and supply of assistive technology are lower in low and middle-income countries (LMICs) compared to its need. For example, falls are a significant cause of disability in the geriatric population, but they remain a neglected health issue in low and middle-income countries.¹⁶ The present article describes and synthesizes the available literature to find challenges for LMICs and approaches that need to be implemented to achieve assistive mobility devices for all.

CHALLENGES

Access and Environment. An appropriate wheelchair needs to be given after a proper assessment. A well-designed and suitable wheelchair enhances movement in the environment, opening the door for independent living, education, social life, and work. However, in low-and middle-income countries, only very few needy have access, and wheelchairs are inappropriate due to the unavailability of required items and products, insufficient production, mass distribution without proper assessment, and absence of local-level service support.¹⁷ The current development in assistive mobility technologies and devices available at a high cost for consumers in high-income countries has neglected the requirement of persons with disabilities in low and middle-income countries. The changed terrain and environmental settings in low and middle-income countries is another challenge resulting in the faulty performance of the devices and, therefore, rejection of the assistive mobility devices.²

Awareness and Resources. The studies in LMICs have found limited resource availability and lack of awareness, affordable services, poorly trained rehabilitation professionals and workers, transportation and geographical limitations, inappropriate assistive devices and social marginalization, and poor economic conditions, which are similar for all.¹⁸ These issues also have national economic impacts due to consequent loss of productivity. The disability may increase the risk of poverty and burden through lack of education and employment opportunities, lower wages, and high costs of health, transportation, and living.¹⁹

Device Customization. The varied physical, environmental, and individual needs of persons with disabilities are unique. Hence, assistive mobility devices and services cannot be delivered generically.²⁰ The personnel involved directly or indirectly in the rehabilitation and service provision process of assessment, prescription, fabrication, and follow-up of assistive mobility technology and devices must possess high competency, knowledge, and skill for good practice.²¹ Assistive mobility devices provide essential mobility required to attend school and perform daily activities at home and social involvement.²² Every individual with a locomotor disability has different needs in terms of assistive mobility technology and devices for their mobility, seating, posture support, and optimal limb function.^{20,23} For example, children with cerebral palsy have the highest and most customized demand for orthosis, seating, and posture support. The CRPD and Rights of Persons with Disabilities (RPWD) Act 2016 advocates the obligation of States to provide education, health, and lifestyle to people with disabilities.²⁴

Technology and Manpower. Insufficient mobility technology and devices result in diminished quality of life, poor physical health and safety, and low educational and economic status. The reasons for inappropriateness and insufficiency are multifaceted. The lack of a skilled and capable professional workforce for rehabilitation service provision is one of the acceptable reasons.²⁵ The gap will remain in the system if the nation does not take the initiative to strengthen the professionals involved in the service provision of mobility device

rehabilitation, particularly in LMICs, even if the availability and affordability of prosthetics, orthotics, and other mobility devices are addressed successfully.^{25,26} For example, a country should have at least 5-10 prosthetic and orthotic clinicians per million population, which shortfalls badly in LMICs; the number may be as low as only one per million. In high-income countries, the corresponding number usually is fifteen to twenty per million population.^{24,27} As per the WHO standard prosthetic orthotic service norms, a prosthetic or orthotic clinician, supported by two nonclinical personnel, can deliver complete rehabilitation service to 300-600 users per year with respect to new fitment, replacement, repairs, and maintenance. In LMICs, the low number of professionals may be an additional reason for poor service delivery due to increased work pressure.²⁷ The varied environmental limitation and lifestyle needs in LMICs require frequent maintenance of technology imported from high-income countries and are often responsible for rejecting mobility devices.²⁸ The success and meeting the needs of persons with disabilities in rehabilitation jeopardized due to inefficient address and attention to research problems of rehabilitation and service delivery, administrative and institutional issues.²⁹ The appropriate and affordable technologies acceptable to the users environment must be a prerequisite in LMICs. The products like Jaipur foot, shape and roll foot and propylene used in prosthetic and orthotic fabrication are good examples of low-cost affordable items used in LMICs to provide mobility devices such as prosthesis, orthoses, etc..³⁰

APPROACH

Mobility is the most important to bring out a positive attitude among the locomotor disabled, as it improves physical fitness and increases social participation, quality of life, and overall well-being.³¹ To achieve optimal mobility, we must empower persons with locomotor disabilities to eliminate their barriers and actively participate in all life activities such as education, wealth, and rights.⁷ To measure and prove the effectiveness of rehabilitation treatment methods and to develop an evidence-

based sustainable treatment, multidisciplinary research is greatly needed, particularly in LMICs. Also, the lack of current service provision can be identified through a detailed service model assessment.²⁸ The improved rehabilitation methods of assistive mobility devices may deliver economic and health benefits to individuals and lessen the financial burden on governments in the future.²⁸ The governments, society, NGOs, and PwDs organizations are the main stakeholders that can play their roles in creating an accessible environment, framing policies, making legislation amendments, research, training, awareness, social protection, and rehabilitation services to persons with disabilities.⁷ The enhanced healthcare facilities set up is mandatory to minimize the risk of the poor health of people with disabilities. Routine health care services like vaccination, emergency measures, and treatment for noncommunicable diseases may lessen or delay the need for mobility technology and devices.³²

The UNCRPD member states must seriously comply with the right of access to affordable mobility technology and devices for persons with locomotor disabilities irrespective of age, gender, and disability.³³ The LMICs may adopt the following criteria for providing assistive technology in their respective domains:

1. Policy: National Assistive Technology
2. Assessment: Train and increase the skilled personnel to assess and prescribe assistive products
3. Procurement: Provision of quality affordable products as per demand
4. Rights: Realization of rights of PWDs to assistive products
5. Technology: Periodic follow-up and continuous research to measure the product function
6. Sustainability: Maintain enough resources to repair and followup on the assistive devices
7. Environment: Availability and accessibility of the facilitators
8. Usability: Measuring user satisfaction with assistive devices⁴

Along with this, the 5A's and Q, i.e., availability, accessibility, acceptability, adaptability, affordability, and quality, should be incorporated in policy and planning to maximize the

accessibility of assistive devices in healthcare in LMICs.¹⁶ The emphasis on access to health services and universal health coverage(UHC), including assistive mobility technology and devices without any financial obligation, that is, a new sustainable development vision, can improve the financial condition and physical mobility of persons with disabilities in LMICs.⁵ Assistive mobility technology and device rehabilitation must be considered under health strategy in LMICs for equitable access to persons with disabilities, as equal opportunities and rights for persons with disabilities and mobility is a worldwide concern.³² The CRPD member states need to frame additional policies and legislation and mobilize resources, provisions, and personnel to be integrated into the primary health care system to broaden the horizon of assistive mobility device services in LMICs at early stages.³⁴

The range of coverage and awareness for access in LMICs needs positive attention from print, electronic and social media, highlighting the success stories of persons with disabilities using effective assistive mobility technology and devices to remove the primitive myth of stigma.²⁸ The approach of mainstreaming disability management, that is, access to services and programs like health screening, vaccination on an equal basis as compared to others, and targeted programs to address the particular needs of persons with disabilities, like delivery of prostheses, orthoses, wheelchair, etc. have a significant impact on improving the quality of life to persons with disabilities in LMICs.³² The United Nations provides technical support to the member states in compliance with the rule of equalization of opportunities for persons with disabilities in health, education, work, and social participation to implement the provision of adequate medical care for a healthy life, rehabilitation services for optimal independence, promotion of development and supply of support services to exercise the rights of persons with disabilities effectively. The LMICs must adhere to the four comprehensive and reliable solutions of Global Cooperation on Assistive Technology (GATE) to improve access. These are the formulation of national policy for assistive technology, product development of affordable assistive products through various schemes,

capacity building of professionals and workforce involved in the service provision, and integration of the assistive mobility service in the health care system for persons with disabilities.¹⁶ A better understanding of the effectiveness and cost-effectiveness of mobility device intervention is required to bring positive changes in the lives and health of persons with disabilities. The user and family opinions may help in shaping the rehabilitation services.³⁵

Equally, the professional training system needs to be strengthened in LMICs to reduce the gap compared to that in high-income countries.¹⁵

CONCLUSION

The social theories of disability in LMICs state that a disability exists physically and socially. A scientific, positive, and indiscriminate approach is necessary to promote equality in LMICs. There is a pressing need for better assistive mobility service modalities in low-and middle-income countries to provide appropriate orthotic, prosthetic, and assistive devices to persons with disabilities to make them able to lead a productive, dignified, and superior quality life. Suitable, customized, and accessible devices may assist individuals in accessing health, education, and livelihood and benefit them at individual, family, and community levels. It will also result in direct and indirect economic gain at the national level through savings on social welfare and an increase in the gross domestic product (GDP). Further research is needed considering the context of LMICs, like geography, economy, and disability prevalence of persons with disabilities, to minimize the barriers and facilitate access and effective use of assistive mobility devices. The implication review results are also related to the other allied and health research, services, and practice, which are yet unvalued under health services in LMICs.

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Conflicts of interest

The author declares no conflict of interest.

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