Current status of prosthetic and orthotic rehabilitation services in India: Its issues and challenges

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ABSTRACT

Introduction: The study purpose is to identify the issues and challenges of the prosthetic and orthotic (P&O) rehabilitation services in India.

Material and Methods: The online search strategy included electronic search engine databases: Google Scholar, PubMed, Google, and Medline along with websites search of world Health Organization, Government of India relevant Ministries, and Rehabilitation Council of India. All relevant articles were included and included in the present study. The articles, reports, web materials included in the study after full article review by authors and the keywords prosthetic, orthotic, rehabilitation services, India, challenges, policy, disability, issues used for the same.

Results: In the future, the population growth, older population, increased risk of accidents and other complications may result in more prosthetic and orthotic service demand. To improve their access to the environment and income prosthetic and orthotic rehabilitation needs to be endorsed at the grassroots level. Health care expenses can be reduced through better Prosthetic and Orthotic rehabilitation services. And the users’ quality of life may enhance through improved movement.

Conclusion: Policymakers and the leaders of health, rehabilitation, and social care providers should facilitate access to appropriate prosthetic and orthotic technology that provides functional and economic independence. As functioning prosthetic and orthotic device will promote social acceptance to the physically challenged and improve their quality of life, satisfaction, education, and job opportunities.

INTRODUCTION

To access and enjoy equal opportunity, education, or citizenship mobility is the first condition. Assistive devices like prosthesis, orthosis, and mobility aids play a crucial role in transforming differently-abled and make them mobile [1]. Prosthetics and Orthotics are medical and health care specialty deals with design, fabrication, and application of medical prosthetic and orthotic devices and research and development. Prosthetic and orthotic rehabilitation services provide complete care of rehabilitation services with promotion, prevention, and assistance to lost or weaken body parts [2].

Prosthetic and Orthotic devices are assessed, prescribed, fabricated, and, fitted to the patients to provide mobility and stability. It reduces complications and results in a better outcome in the ADL (Activity of Daily Living) of users [3]. Studies evident that prosthetic and orthotic rehabilitation services improve quality of life, health status and bring functional, societal, and psychological support to the users [4, 5]. About 1.5% of the world population may require prosthetic and orthotic interventions for their well-being. Also, only 5-15% (each 10th individual) of the population has access to prosthetic and orthotic devices [6]. However, the government and society's attitudes towards the inclusion of differently-abled are of prime concern despite passing disability acts and awareness respectively to improve function and quality of life among prosthetic and orthotic users [7].

The study aims to identify the issues and challenges of the Prosthetic and Orthotic (P&O) Rehabilitation
services in India and its recommended measures.

**MATERIAL AND METHODS**

The present study aimed to collect and synthesize the findings of issues, challenges of a prosthesis, and orthosis users in India and tried to find out the implacable recommendations.

**Search strategy**

The search strategy included electronic search engine databases: Google Scholar, PubMed, Google, and Medline. No language and region restriction was applied to the search to enable a complete database of research in the area to be established. In combination with that, a search on websites of key organizations, including Indian Government Ministries, World Health Organization (WHO), and Rehabilitation Council of India (RCI) was conducted and included in the study. Hand searches of libraries were not conducted as part of the present article.

**Study Selection**

The present review included articles published in peer-reviewed English language journals, reports of Indian government ministries, and websites pertaining to issues and challenges of prosthetic and orthotic users. All kinds of relevant articles were included in the present review.

**Data Extraction**

All the relevant abstracts and sites were reviewed by the investigators and full text of these abstracts, reports, and websites were searched. Upon careful reading, these were synthesized and included in the present study.

**RESULTS**

**Cost of disability**

In contrast to the normal population persons with disabilities experience a poor level of health which leads to secondary complications due to non-mobility, weight gain, and lack of environmental access [9]. A wide range of factors like environmental, socioeconomic, working and living conditions and availability of health-care facilities to them influence the health status [9]. Social and cultural barriers in a certain region also responsible for accessing health services to specific differently-abled groups like the elderly, children, and women [10]. Also, the attitude of rehabilitation and health professionals impact the quality of services to the differently-abled [11].

In this regard, to educate the health professionals about disability, the rehabilitation council of India (RCI) implemented a national program [12]. Cost (70.5%), improper services (52.3%), and transportation (20.5%) were the top three barriers for health care service in Uttar Pradesh and Tamilnadu in India [13].

Disability also has some direct and indirect costs to the family. The direct cost includes transportation, education, medical expenses, caregiver, and especially required service. A survey of income and program participation in 1997 found that child disability reduces employment notably among mothers and it varies according to the child's disability, medical expense, and time required for caregiving [14].

Currently, four national institutes are exclusively involved in prosthetic and orthotic rehabilitation and resource development and research & development for the service delivery out of its nine institutes across the country which serves different kinds of disabilities which are including National Institute for Locomotors Disabilities (NILD), Kolkata; Swami Vivekananda National Institute of the Rehabilitation Training and Research (SVNIRTAR), Cuttack; Pt. Deendayal Upadhyaya National Institute for Persons with Physical Disabilities (PDUNIPPD), Delhi; and National Institute for Empowerment of Persons with Multiple Disabilities (NIEPMD), Chennai.

Nineteen composite regional center (CRCs) for skill development, rehabilitation & empowerment of persons with disabilities are also involved in rehabilitation and fulfilling prosthetic and orthotic requirements of differently-abled as an extended arm of national institutes under the Ministry of Social Justice and Empowerment [15], and All India institute of physical medicine and rehabilitation (AIIPMR), Mumbai, is serving the disability under the Ministry of Family and Welfare [16]. However, an inclusive approach is adopted for participation, empowerment, sustainability, and advocacy of a person with disabilities through various other ways like the establishment of district disability rehabilitation center (DDRC), district rehabilitation center (DRC), regional rehabilitation training center (RRTC) to generate awareness, conduct survey, identification, assessment and provision of prosthetic and orthotic devices [17]. Besides, artificial limb manufacturing corporation of India (ALIMCO) has been involved in the manufacturing and distribution of prosthetic and orthotic and assistive devices through camps across the country [18].

**Policy and programs**

The UNCRPD was adopted in December 2006 and opened for signature on 30 March 2007, which is the first legal international treaty that gives the right of equality to persons with disabilities. India signed this treaty on 01 October 2007 and this ensures non-discrimination of persons with disabilities on the basis of caste, region, and religion in contrast to others [19, 20].
The national policy for persons with disabilities, 2006 recognizes persons with disabilities as human resources for the country and advocates equal opportunity as others for a better quality of life. The silent features include physical rehabilitation with early detection and intervention and provision of appropriate devices. It also advocates educational and economic rehabilitation for a dignified life in the society [21].

The rehabilitation council of India (RCI), Act 1992 regulates and monitors the service is given to persons with disabilities. It also regulates the professional educational standard serves the person with a disability and maintain a central register for them [22].

Rights for persons with disabilities (RPwD) Act, 2016 defines the person with benchmark disability and justify the propriety of persons with disabilities (PwDs) without discrimination and ensure inclusion in society [23].

In addition to that Govt. of India run many schemes to serve the disabled like ADIP, DRRS, SIPDA, etc. to empower them through providing prosthetic and orthotic devices, and accessible environment, skill development, and in-service training [24].

**Professional competence and availability for service delivery**

As per World Health Organization (WHO), in low and middle-income countries such as India, only 10 percent of the population has access to needed prosthetic, orthotic, and assistive devices [25]. The prevalence of locomotors disability in India is around 20% who may need prosthetic and orthotic devices to reach optimal independence [26]. To deliver the prosthetic and orthotic services, each service modalities/unit least require one Prosthetic and Orthotic clinician supported by two (2) non-clinician [2]; and a country needs 5-10 clinical prosthetists and orthotist per million population. However, only 1 per million population of clinician availability in low and middle-income countries hampers the quality service to the patients [27].

In India, the RCI is the regulatory body of prosthetists and orthotist. The professionals acquire 4.5 years of bachelor’s degree in prosthetics and orthotics to possess the assessment and prescription right for the prosthetic and orthotic devices [28]. However, only 942 professionals qualifying equal to or above the bachelor’s degree are registered with RCI.

**Issue and challenges**

In India, 44% of patients come from a very poor family background with low income, as reported by statistics from AIIPMR and Sahasrabudhe and Sancheti [29]. Low operational cost, weak institutional coordination, low utilization of fund, poor coverage and records and maintenance of devices increases the challenges to the prosthetic and orthotic user across the country, especially those who belong to rural areas [30]. Only 44% of differently-abled having access to the fitting of aids and appliances (ADIP) scheme, which needs to make it more flexible and to be implemented at the village level [31], and less than 50% of funds allocated to concern states for the device distribution due to lack of funds [30]. Besides, the increased cost of prosthetic and orthotic products and service delivery aspects of professional and high-quality products with increasing demand due to the increase in life expectancy and peripheral vascular diseases (PVD) is a near-future challenge [32].

**DISCUSSION**

In the future, the population growth, older population, increased risk of accidents and other complications may result in more prosthetic and orthotic service demand. Hence, to accommodate the present and future demand immediate action is needed [33]. The person with disabilities experiences less quality of life in contrast to the general population in terms of physical, psychological, and environmental realm/sphere. To improve their access to the environment and income prosthetic and orthotic rehabilitation needs to be endorsed at the grassroots level [25]. Besides, follow-up and repair facilities to prosthesis and orthosis are of prime concern for the patients and must be addressed properly for a better outcome [34]. Health care expenses can be reduced through better prosthetic and orthotic rehabilitation services [35, 36]. The user’s quality of life may enhance through improved movement [37]. Prosthetic users had a lower hospital admission rate in contrast to patients not using a prosthetic device. This results in low medicare expenses for acute care [3]. Apart from that the human resources for health-related rehabilitation services are not much evident and less number of skilled health and rehabilitation professionals are available in low and middle-income countries around the geographical and economic countries groupings [41]. In low and middle-income countries the available number of prosthetic and orthotic professionals per million population is only one. However, the average no should be 5-10 per million population [27].

**CONCLUSION**

Lack of prosthetic and orthotic facilities and inappropriate services not only affect the individual physically but also presents a major challenge for the nation. Provision of high-quality economic prosthetic and orthotic services are crucial to ensure the independence and social integration of person with disabilities. A functioning prosthetic and orthotic
device will promote social acceptance to the physically challenged and improve their quality of life, satisfaction, education, and job opportunities. Policymakers and the leaders of health, rehabilitation, and social care providers should facilitate access to appropriate prosthetic and orthotic technology that provides functional and economic independence and allows them to contribute to the nation’s aspiration of becoming a developed nation.

**Recommendation**

Direct establishment of prosthetic and orthotic service modalities at the district level under central and state government and recruitment of permanent service providers as recommended by WHO to cater to the services at the grass-root level.

A fully equipped prosthetic and orthotic service van may be provided to district service modalities to deliver follow-up/repair services to the remote areas.

In the establishment of prosthetic and orthotic modalities, WHO guidelines of Prosthetic and orthotic standards may be followed to establish lab tools and equipment.

Each state capital should have a state head monitoring office to monitor and support the services such as the supply of required materials and consumables for the smooth production and repair of prosthetic and orthotic devices in respective state districts.

Restructuring of prosthetic and orthotic service management cadre for smooth functioning and improving nations prosthetic and orthotic service demand.

Provide the opportunity to private clinicians to a partnership with government establishment to develop new and cost-effective technologies to achieve successful treatment outcomes.

Micro-studies should be promoted and carried out in different parts of the country to find the usefulness of prosthetic and orthotic devices among the users and count future course of research and development.

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