ORIGINAL RESEARCH PAPER

Community Medicine

STATUS OF ASSISTIVE DEVICES AND TECHNOLOGIES IN INDIA

KEY WORDS: Assistive devices, disability, policies, unmet needs

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ABSTRACT

Assistive devices (AD) are the products build to help people to make their daily work accomplished and technologies are means by which they can use those devices to accomplish their routine work. AD is needed by a variety of people to overcome their disabilities which can happen due to senile change, accidents, congenital malformations, or an outcome of some chronic disease in the form of loss of limb or any other organ. With an increase in the non-communicable diseases, an increase in the proportion of the population in the geriatric age group, and an increase in the life expectancy of human beings the need for AD has increased many folds. With the advancement in technology, the imagination of developing prototype devices has reached far but the production of the same on large scale to suffice the needs of the needy is a major challenge till now. The unmet need of assistive devices for those who require them is very high (90% as per WHO in 2019) and most of those who get it stops using it in the future because of problems with its design, adaptability, flexibility, maintenance cost or other related issues. Developing assistive devices and technologies should involve the novelty of reaching to the needy at an affordable cost in purchasing and maintenance and easy use technology. The government of India has taken many measures (policies, assistance schemes, research for generating knowledge) to meet the need for assistive devices in the country but a lot more things need to be done to achieve Universal health coverage.

Assistive products are "any external products including devices, equipment, instruments or software especially produced or generally available, the primary purpose of which is to maintain or improve an individual's functioning and independence and thereby promote their well-being".(World Health Organization, 2016) Assistive technology is the application of organized knowledge and skills related to assistive products including systems and services. Attributable diseases are related to the disabilities attributed to medical (chronic diseases) or non-medical reasons (war, rage, accidents) and can affect any age group. Besides disabilities, the AD is used to overcome the functional-loss related to senile changes such as a decrease in vision or hearing or locomotor disability in the human body. (Grimmer et al., 2019) Most of the AD have focused on overcoming disabilities owing to intellectual or learning disabilities. (Young, 2013) The assistive products are essential for compensating impairment, minimize the need for caregivers, lower health, and welfare cost.(Organization, 2016) The proportion of various disabilities in India in 2018 was only locomotor disability 1.2%, only visual disability 0.2%, only hearing disability 0.2%, only speech and language disability 0.1%, only mental retardation/ intellectual disability 0.1%, only mental illness 0.1%, multiple disabilities 0.2%, and disability 2.2%. (Ministry of statistics and program implementation: National Statistical Office, 2018)

The origin and use of assistive devices and technology by humankind is unknown and may be considered back to prehistoric times. A simple walking cane knowingly or unknowingly could have been used by humans which is an assistive device and the origin/first time-usage of which is unknown. In the industrialization era, the invention and manufacturing of newer kinds of assistive devices start escalating/ gathered pace. The integration of technology with assistive devices has brought a revolution in this field.

ADIP scheme was launched by the Ministry of Social Justice and Empowerment in 2005 for assisting a disabled person for purchase/fitting of aids/appliances at minimum cost with various types of disabilities under the Person with Disability (Equal opportunities, protection of rights and full participation) Act, 1995.(Ministry of Social Justice and Empowerment, 2005) The scheme was later updated in 2014 with changes in the criteria of beneficiaries and expanding the scope of the scheme.(Ministry of Social Justice & Empowerment, 2014)

In addition to the development of assistive devices, the world starts considering the rights of people with disabilities (PwDs). In December 2006, the convention on rights of persons with disabilities to protect the right and dignity of people with disabilities was drafted, which India ratified in 2007 when it was opened for ratification.(*GENERAL ASSEMBLY*, n.d.; National Disability Network, 2017) In 2016, India passed disability legislation, Right of Person with Disability Act which was commenced in June 2017.(*Ministry of Law and Justice | GoI*, n.d.) Before that the country has Person with Disability (Equal opportunities, protection of rights and full participation) Act, 1995 which became functional in 1996.(Ministry of law, 1996) The characteristic of assistive devices is that they must be Affordable to those who are in need, Accessible through its equitable distribution, Adaptable as per the needs of the users, Acceptable by the users, Availability in the market and the Quality of the assistive devices should not be compromised.

Various national programs are also functioning at the national level which provides various types of assistive devices (eyeglasses, hearing aids, walking slippers, etc.) to the people.

WHO has developed Global cooperation on Assistive Technology (GATE) developed in 2014 and based on the model of WHO essential medicine list GATE released the first global Priority Assistive Products List in 2016.(Organization, 2016) A list of priority assistive product list in 2014 on the lines of an essential list of medicines, which was subjected to be modified as per the need of the country. India doesn't have any list of assistive product list yet. India doesn't have the Assistive product list yet.

While writing this review, various documents from the international and national databases were consulted. Following databases (reports and websites) were consulted 1) Website of Ministry of Social Justice and Empowerment 2)

Person with disabilities in India: National Sample Survey 76th round by Ministry of statistics and program implementation: National Statistical Office, Government of India 3)The National Trust scheme guidelines for the welfare of persons with Autism, cerebral palsy, mental retardation and multiple disabilities: Sambhav Aids and Assistive devices by Ministry of Social Justice and Empowerment 4) Scheme of assistance to a disabled person for purchase/fitting of aids/appliances (ADIP Scheme) by the ministry of social justice and empowerment, Government of India 5) Manufacturer's Directory of Enabling Aids and Assistive Devices for Persons with Disabilities by Ministry of Social justice and Empowerment, Government of India, 6) Priority assistive product list,WHO the GATE initiative, 2016, 7) Census of India, 2011, 8) Community based rehabilitation Network, India

Globally 1 billion people need one or more assistive devices which is expected to rise to 2 billion by the year 2030. About 10 percent of the people in need of assistive devices have access to them because of either high cost, lack of awareness, availability, lack of policies or financing issues for manufacturing the Assistive devices.(*Assistive Technology*, n.d.)

A study by Lee et al, 2018, found that mild, moderate and severe disabilities were 17%, 35%, 16% in India, 14%, 56%, 23% in Lao's people democratic republic and 24%, 25% and 8% in Tajikistan respectively. The PwDs (severe) using Assistive devices were 39% in India, 19% in Lao's and 60% In Tajikistan. The reasons for not having assistive products were the complicacy of using the devices as per the Indian people besides the affordability of devices by the people of Loa's and the people of Tajikistan found the assistive devices of not useful.(Borg, 2019)

A study compared the national database collection tools for measuring the met and unmet assistive technology needs at the national level of 8 nations including Argentina, Australia, Brazil, Canada, Columbia, India, Ireland, Zimbabwe and found that the AD-related data varies from no data collection to 70 names of assistive products for Canada. The study found that the tool being used in India collect partial AT use data and partial data on unmet needs of AT.(Borg, 2019)

Initiatives by India on improving accessibility and availability of Assistive Devices

In seventy-first, world health assembly emphasis were laid on comprehensive, sustainable and multisectoral approach to improve access to assistive technology and to prepare a global report on effective access to assistive technology, to provide necessary technical and capacity building support for member states and to develop minimum standards to priority assistive products.(Assembly, 2018)

The number of people with disabilities in India who required assistive devices for their living is increasing day by day. In a report by the National Sample Survey, the proportion of people with disabilities in India was 2.2% (rural 2.3%, urban 2.0%). (Ministry of statistics and program implementation: National Statistical Office, 2018) The census of India, 2011 enumerated the proportion of people with disabilities 2.21. (*Census of India: Disabled Population*, n.d.) Though there is not much change in the percentage there is a huge increase in the absolute numbers of people who need assistive devices. As the number of people requiring ADs is increasing so is the proportion of PwDs with unmet needs of ADs because of 1) limited resources for producing the ADs 2) increase in production cost as by the market laws and 3) decreased affordability of Ads.

The Ministry of Social Justice and Empowerment under its department of Empowerment of Persons with Disabilities (Divyangjan) has promoted various assistive devices that are limited in number and are too costly for the people to afford them.(*Aids and Assistive Devices : Ministry of Social Justice and Empowerment (MSJE)*, n.d.) The ministry has opened an information center, Sambhav center, for providing information on the aid and assistive devices available under the national trust Act. Currently, the center is working in New Delhi which showcase the sample bedrooms, kitchen, bathroom, a toilet which are disabled friendly. The ministry has proposed to open these Sambhav centers in cities with a population of more than 5 million as per the 2011 census.(*Ministry of Social Justice, n.d.)*

The Artificial Limb Manufacturing Corporation of India (ALIMCO) is a Government of India Undertaking under the Ministry of Social Justice and Empowerment, Department of Empowerment of person with disabilities which provide the artificial limbs and other assistive devices (behind the ear hearing aid digital, motorized tricycle, two-wheeler with a retro kit, wheelchair, axilla and elbow crutches, tricycles, etc.) to the needy people through its distributors.(Ministry of Social justice and Empowerment, n.d.) The people with disabilities can get Assistive devices under the AIDP scheme. in the year 2019-20, the total number of beneficiaries registered under ALMICO was 106578 with 78587 males, 27954 females, and 37 others. The beneficiaries from the AIDP scheme were 46796 and ADIP SPL was 59782.(*Home Page: Artificial Limbs,* n.d.)

Other agencies working for assistive devices for PwDs in India is the seamless affordable assistive technology for health (SAATH) which is a resource center by the National Trust and is a Joint venture between India (IIT Kanpur and IISc Bangalore) and Sweden (KTH Sweden and Gavle University) aims to develop physical activity monitoring and diagnostic tools for assessing the mobility and motor skills of the elderly person. If this falls below a critical threshold, design, and test a variety of assistive solutions for helping elderly persons maintain/ improve levels of physical activity for full, active, and independent lives. The center involves in developing/ fitting inertial motion tracking/ gait analysis technologies for long term monitoring at home, developing a range of assistive solutions (smart walking sticks to restraint type lower-body exoskeletons), investigate the technical challenges in ensuring the stability of the assisted elderly persons, testing the prototypes and preparing commercialization plans for implementation in India and Sweden with full compliance to regulatory requirements.(*Seamless Affordable Assistive Technology for Health (SAATH)*, n.d.)

Sugamya Bharat Abhiyan or Accessible India campaign is a program launched in 2015 to serve the differently-abled people in India. The campaign aims at providing equal opportunities to persons with disabilities to participate in all the aspects of life and live independently. The campaign has three core components 1) build environment accessibility 2)transportation system accessibility 3) information and communication ecosystem accessibility. A *Sugamya Bharat* mobile app will be launched under the scheme which will provide information on disabled-friendly public facilities in a city. The Reserve Bank of India asked banks to offer doorstep banking facilities to people above 70 years of age and differently-abled people. In 2016, *Sugamya Pustakalya*, an online library by the department of Empowerment of Persons with Disabilities in collaboration with the National Institute of visually handicapped, Daisy forum of India, Book share and TCS access was launched. Distribution of motorized tricycles, disable friendly buildings, accessible police station, accessible hospitals, accessible tourism are also part of this Abhiyaan under Persons with Disabilities (Equal Opportunities. Protection of Rights and Full Participation) Act 1995.(*Accessible India Campaign | National Portal of India*, n.d.)

The Community Based Rehabilitation (CBR) promotes demystifying and communication of rehabilitation technology in a simple and locally appropriate way to reach the people with disabilities in rural areas. CBR network promotes community-based rehabilitation of persons with disabilities and ensures that no person should be disintegrated from the families and community. It contributes to the technical support organization at Bangalore University and Karnataka open University. They develop resource material, manuals for parents, teachers, doctors, and health workers on rehabilitation, epilepsy, and care of senior citizens. (*Community Based Rehabilitation, India*, n.d.)

ICMR is one of the oldest medical research bodies in the world with a vision to promote better health in India through research. In 2017 ICMR received 473 health-related technologies from various sectors at various stages of development and included import substitutes, those that have been already commercialized by startups, ready for commercialization, those undergoing clinical validation or animal studies, and prototypes. The vision of the event was to showcase disruptive technologies of public health importance developed indigenously under the "Make in India" effort and help them to reach the end-users. (Division of Innovation and Translation Research, 2017)

IIT Madras, TTK center for rehabilitation research and device development (R2D2) has come up with the GRID (Grant, research, Industry, and Dissemination) Model for developing ADs in developing countries where there are challenges in developing quality devices such as low purchasing power, donation market and no demand from user side. The center has developed a standing wheelchair (ARISE) and indoor and outdoor mobility solutions in 2019. (Sujatha et al., 2019)

Assistive devices, Universal health coverage, and Sustainable development Goals.

Universal health coverage focuses in reducing inequalities among people living with impairments also. It can be advanced inclusively only if people can access quality assistive products when and where they need them. Addressing the unmet need of assistive products is crucial to achieve the Sustainable Development Goals, to provide UHC, and to implement the UN Convention on the Rights of Persons with Disabilities, ratified by 177 countries. WHO through its GATE initiative has a mission to assist member states to improve the access to assistive technology as a part of Universal Health Coverage. ("WHO | Global Cooperation on Assistive Technology - About Us," 2018) Another component of universal health coverage is the cost of protection for disables while purchasing assistive devices. In sixty-seventh, World Health Assembly emphasis was laid on the health intervention and technology assessment in support of Universal Health Coverage. (Assembly, 2014) The 2030 agenda for sustainable development goals ensures that all human beings can fulfill their potential in dignity and equality in a healthy environment. Further, they can enjoy prosperously and fulfill lives, and that economic, social, and technological progress occurs in harmony with nature. (*Transforming Our World,* n.d.) The agenda also focuses on 'Leaving no one behind'. A study by Tebbutt et al, 2016 illustrated the achievement of Sustainable Development Goals (SGD) and the use of assistive devices by providing examples of achieving specific targets through the use of assistive devices. (Tebbutt et al., n.d.) All SDGs are interlinked with each other and the inability to achieve one goal will certainly impact the achievement of others.

Challenges:

Providing assistive devices to the needy is a difficult job as it is dependent upon multiple factors the importance of which are Leadership and governance. Since the development of the priority assistive product list in 2016, India is not able to develop the APL. Similarly, there is no provision of assistive devices in the National health policy 2017 and the Ayushmaan Bharat Scheme. (*Home | Ayushman Bharat | National Health Authority | GoI*, n.d.; Ministry of Health and Family Welfare, 2018) Financing is another biggest issue to decide the availability and affordability of assistive devices. in recent budget 2019-20, Allocation for institutes for sign language, institutes for research and technologies for persons with disabilities, assistive device both ADIP and ALIMCO has been reduced. (Ramamoorthy, 2020) Allocation remained 0.04% of the total expenditure of government, which is constant for the last 3 years. Affordability of AD is another major issue. The high cost of assistive devices in India and of course in the world is making them less affordable and in return being used by the disabled. Lack of trained personnel (human resources) for providing information to the needy regarding using the assistive devices is another challenge being faced by the users. Very few large units are producing assistive devices and the smaller units are not able to meet up with the requirements.

Recommendations And Way Forward:

1.Need: There is a need for National data to record both met and unmet needs that are being captured partially. The number of people demanding mobility devices and not receiving them, receiving inadequate or inappropriate devices should also need to be captured

2.People: Involving people and their families to help the disabled in using the assistive device is important.

3.Policy: National policy and programs should ensure that everyone, everywhere can access the assistive products and technology. There should be guidance on the preparation and implementation of the priority Assistive product list

4.Products: India still has to develop a list of Assistive Product List. There need to be strong guidance to enhance production, procurement and service provision, reimbursement policies to shape markets

5.Provision: Integration of assistive products service provision into the health system and network of specialist centers connected to PHC infrastructure should be there.

6.Personnel: Training packages on the provision of a range of Assistive products, assessment, and prescription, fitting and user training, follow up, maintenance and repairs

7. Funding And Affordability: Budget for assistive devices should be a part of the regular budget and needs to be revised every year to meet the cost of production and thus remains affordable to the users.

8.Establish Mutual Partnerships: There is a need to strengthen the existing mutual partnerships between ministries of health, rehabilitation, social welfare, education, transport, and employment as well as non-governmental organizations to ensure the availability and use of Assistive devices.

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