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Access to assistive technology for persons with disabilities: a critical review from Nepal, India and Bangladesh

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ABSTRACT

Purpose: The purpose of this paper is to analyse and critically reflect on access to Assistive Technology (AT) for persons with disabilities (PWD) in Nepal, India and Bangladesh. This analysis aims to guide the development of a contextualised generic AT service delivery model suitable for these countries, based on the best practices identified.

Materials and methods: This paper is based on a comprehensive study conducted in Nepal, India and Bangladesh, observing mobility and hearing-related AT service delivery centres run by the government, as well as private and nongovernmental organisations, and interviews with key informants: policymakers (5), AT service providers (20) and AT service users (20) between December 2019 to February 2020. A descriptive, qualitative exploratory study design was followed. A quality assessment framework was used to structure the analysis and interpret the findings.

Results: AT service provisions are poorly developed in all three countries. On all quality indicators assessed, the systems show major weaknesses. AT users have very limited awareness about their rights to these services and the availability of AT services, the range of services available is very limited, and eligibility is dependent on medical criteria related to visible and severe disabilities.

Conclusions: Lack of accessibility, eligibility, reachability and affordability are the main barriers to access AT services for PWD in Nepal, India and Bangladesh. Increased community level awareness, increased Government funding and a community based, medically informed flexible social model of AT services is a way forward to ensure access to AT services for PWD in these countries.

➤ **IMPLICATIONS FOR REHABILITATION**

- Increased community awareness is necessary to increase access to Assistive Technology Services for Persons with Disabilities.
- Increased and flexible funding from the Government and philanthropists will improve rehabilitation.
- Establishment of community based Assistive Technology Services centres will increase access and improve rehabilitation.

Introduction

Assistive Technology maintains or improves an individual's functioning and independence to facilitate participation and to enhance overall well-being [1,2]. Many persons with disabilities rely on AT services to carry out their daily activities [3]. Assistive Technology has huge potential for reducing difficulties faced by persons with disabilities (PWDs) in their day to day lives [4]. AT opens up opportunities that are closed to PWDs without AT services. Access to AT services is a fundamental human right, which is guaranteed by the UN through its Convention on the Rights of Persons with Disabilities (UNCRPD), which is a legally binding document that has described disability in a rights based approach [5]. The UNCRPD is considered to be a strong human right instrument that mandates the right of PWDs to have equitable access to mainstream programmes, social protection programmes and disability specific programmes such as rehabilitation and AT [6].

The UNCRPD has been ratified by Nepal, India and Bangladesh, committing by the respective Governments to ensure availability of AT services to those who need AT.

The World Health Organisation (WHO) defines AT as "Assistive technology is an umbrella term covering the systems and services related to the delivery of assistive products and services. Assistive products maintain or improve an individual's functioning and independence, thereby promoting their well-being. Hearing aids, wheelchairs, communication aids, spectacles, prostheses, pill organisers and memory aids are all examples of assistive products" [7,8]. The use and benefit of these devices varies from person to person based on their personal aspirations and individual characteristics.

The complexity of AT services, along with the competing priorities of Governments, makes access to AT services difficult for PWDs in these three countries. Considering the UNCRPD and the

right of PWDs to access AT services, the overall human rights situation of PWDs who need AT services is under-researched in Nepal, India and Bangladesh. Understanding the prevalence of AT use and the prevalence of AT need helps to make informed decisions on appropriate AT policies and the implementation of those policies [9].

This article presents the status of access to AT services for persons living with disabilities in Nepal, India and Bangladesh by answering the following research questions:

i. Awareness: To what extent is the system, scheme or process known, communicated and clearly understood by the people who need AT?
ii. Eligibility: To what extent is the system, scheme or process accessible for anyone who needs AT?
iii. Reachability: To what extent is the system, scheme or process provided in locations that are easily reachable, physically accessible and at reasonable times available to the people who need AT?
iv. Affordability: To what extent is the system, scheme or process financially affordable by the people who need AT?

Background

The World Report on Disability [10] states that about 15% of the world's population lives with some form of disability whereas 2–4% of the world's population have severe difficulties in functioning without use of Assistive Technology. As discussed below (in section Context: PWD and AT policies), the prevalence of disability is often under-reported in Low- and Middle-Income Countries (LMICs). The WHO report predicts that the number of people living with disability will double by 2050 [2]. Assistive technology enables people to live healthy, productive, independent, and dignified lives, and to participate in education, the labour market and civic life. Furthermore, AT reduces the need for formal health and support services, long-term care and the work of caregivers. Without AT, people are often excluded, isolated, and locked into poverty, thereby increasing the impact of disease and disability on a person, their family, and society" [7]. The WHO estimates that currently 85 to 95% of those who could benefit from the use of AT do not have access to such services. The majority of people who do not have access to AT live in LMICs. For example, in many LMICs, only 5–15% of people who require assistive devices and technologies have access to them, and hearing aid production meets only 10% of global need and 3% of the need in these countries [7]. Seventy million people in LMICs need a wheelchair, but only 5–15% have access to one [2].

Globally, PWDs have less access to health and education opportunities, and lower economic opportunities, compared to their peers without disabilities [11]. PWDs are often the most disadvantaged in society and are the victims of deprivation [12]. Since the prevalence of disability is higher in LMICs, the disparities in access to AT are also higher given that access to health care, in general, is a well-known problem. Even though the current Sustainable Development Goals (SDGs) do not directly address AT for PWDs, as Tebbutt and others [13] argue, AT services are essential to meet all 17 SDGs if they really mean to "Leave No One Behind", as the SDGs claim. The lack of access to assistive devices in LMICs is due to a variety of factors including high costs, limited availability, lack of awareness, lack of suitably trained personnel, lack of governance, and inadequate financing [1,2,4].

Context: PWD and at policies

Disabilities are still treated with social stigma and as taboo in Nepal, India and Bangladesh. They are often viewed as family curses imposed by the unseen force for some past sin performed by the person with disability or the family. This encourages family members to hide the PWD in the family and not to report the disability, making them invisible to the outside world. Furthermore, disabilities are not captured on birth certificates. The resulting under-reporting can be clearly seen in the prevalence rates of PWDs reported in the respective country's census data, which is far lower than the worldwide estimate of PWDs. The discrepancies in disability prevalence are both because of under reporting and inconsistency in the definitions of disabilities internationally [14,15]. For example, the respective 2011 censuses in Nepal, India and Bangladesh use 7 categories of disabilities in Nepal, 8 in India and 6 in Bangladesh, making the data incomparable with each other and internationally. Another fundamental flaw in the prevalence of disability reporting is that it is still impairment focussed rather than considering functionality [14]. Furthermore, disability and AT user statistics are not included in routine health data collection in these countries. This makes it hard to ensure AT and other services are provided to PWDs in practice, even if they are guaranteed by the respective country's constitution, laws and acts. Disability started to be included in legislation in these countries in 1981, 1987 and 1995 respectively in Nepal, India and Bangladesh. However, none of these three countries have an AT service act yet. Further details on disabilities and AT provision in each country are presented in the subsequent paragraphs.

Nepal

The prevalence of disability in Nepal, as reported by the 2011 census, is 1.94% (2.18% of males; 1.71% of females). The National Living Standards Survey (2011) reported the prevalence of disability as 3.6%. Both of these figures are significantly lower than the WHO's estimate of worldwide prevalence of disabilities which is roughly 15% among the general population. It is widely suspected that prevalence in Nepal is under-reported. A survey carried out by specific impairment groups among school age children in five districts of Nepal reported that 16.6% children had some form of hearing impairment [5]. Anecdotal evidence suggests that the Maoist insurgency from 1996 to 2006 [16], the 2015 earthquake [17], high incidence of natural disasters every year [18,19], increased traffic accidents [20], fall injuries [21] and deafness [22] have contributed to a higher prevalence of disabilities in Nepal compared to some other LMICs.

Even though the 2015 constitution guarantees the rights of PWDs to equal opportunities and federal law clearly prohibits discrimination against any forms of disability, there is still multifaceted and widespread discrimination against PWDs in Nepal affecting their access to health, education, employment and AT services. The Disabled Protection and Welfare Regulation (2051/1994), the ratification of the UNCRPD in 2010, the constitution of Nepal 2015 and the Disability Rights Act 2017 are some of the major milestone polices the Government of Nepal has adopted in relation to PWDs. All of these policies and commitments prohibit any form of discrimination.

Starting from the National Policy and Plan of Action (2007), Nepal introduced the provision of access to AT services for PWDs. In addition to this, the Government of Nepal produced a comprehensive list of AT products based on the WHO Global Cooperation on Assistive Technology (GATE) initiative and the Nepal Disability Rights Act 2017. This list is currently being piloted

with the newly formed local-level Government stakeholders who now hold the budget for PWDs and AT-related interventions. There is mandatory annual budget allocation to AT provision at the local level and a 5% reservation of all jobs within the Government, private and NGO sectors for PWDs. The Government of Nepal charges lower import duties on AT devices [10]. Still, a study conducted in 2016 reported that only one in 8 PWDs had access to AT [5]. The implementation of the initiatives described is still weak, but, with increased access to budget at the local level, the government's commitment to the rights of PWDs, and increased awareness among AT users, access to AT services is improving. But there still a long way to go to ensure AT services are available to everyone who needs them in Nepal.

India

The prevalence of disability in India according to the 2011 census is 2.21% (2011 Census India) [23]. As in all other South Asian countries the prevalence of disability is under reported in India. For example, a study by the World Bank in 2007 reported that the prevalence of disability in India might be 1.5 times higher than reported in the census, and if all types of disabilities are included it might go as high as 3 times the census reported prevalence [24]. The prevalence of disability is higher among poorer people, women and people living in rural areas [15,25].

The constitution of India mandates an inclusive society for all, including PWDs. As a result of the provisions of the various policies and acts for PWDs there have been positive changes in the perception of PWDs in Indian society. Access to health, education, employment opportunities and rehabilitation measures, including access to AT services, have increased. India was one of the early signatories of the UNCRPD. Disability is a priority area for the Government. As a result the budget for PWDs has grown and government reservations for employment have been increased to 4%. The Department of Empowerment for Persons with Disabilities (DEPWD), under the Ministry of Social Justice and Empowerment, is responsible for PWDs in India, but the Ministry of Health and Family Welfare is responsible for assessment of the degree of disability of PWDs.

Despite all the Government commitments, policies and acts, anecdotal evidences suggest that the unmet need for AT services in India might be similar to that in Bangladesh, which is 71% [26]. The lack of accurate data on prevalence of disability and AT users poses a challenge to formulating policies and programmes for PWDs in India.

Bangladesh

The prevalence of disability in Bangladesh reported in the 2011 census is 1.4%, which is significantly lower than estimated by the Bangladesh Household Income and Expenditure Survey (HIES) 2010, which was 9.01%, and far lower than the WHO estimated 15% worldwide. There is no comprehensive system of registering either disability or the use of AT in Bangladesh [27], and the infrastructure and facilities for people with disability who could benefit from AT is weak [12].

The Government of Bangladesh has formulated various disability related laws, acts and policies and has also signed and ratified the UNCRPD. These policies and acts guarantee the rights of PWDs to access the same quality of services as people without disabilities, to access AT services, disability allowances, educational allowances and subsidised public transportation [6].

However, most PWDs are not aware of these policies and their rights, and sometimes do not even realise that the use of AT service can improve their life. Compared to Nepal and India the stigma towards PWDs is even worse in Bangladesh and parents often do not want to disclose their disabled family members, making it even more difficult to access AT services. Only about 1% of the AT services in the country are provided by the Government; the rest are provided by NGOs, community and voluntary organisations [27].

Although all three countries are committed to non-discrimination and to ensuring AT access for those who need it, the reality is very different. AT services are often unavailable or inaccessible, and PWDs often have low levels of knowledge of their rights and of the services available to them. This points to the need for more empirical research on AT provision, to which this paper aims to contribute.

Method of enquiry

A descriptive exploratory qualitative study design was used. The aim of this research was to critically review the available AT provisions in Nepal, India and Bangladesh and to further develop and recommend a generic service delivery model suitable to the three countries, if not a universal service delivery model. A qualitative research method was chosen because this research needed an in-depth understanding of AT services and users' experiences. To gather data on existing models of service provision and use of AT, 15 Key Informant Interviews (KIIs) were conducted in India (IN), 16 in Bangladesh (BD) and 14 in Nepal (NP) with Government officials (5 – ATPM), service providers (20 – ATSP) and service users (20 – ATSU) between December 2019 to February 2020. Observational notes were made during visits to service delivery centres. These visits were intended to observe the process of access to AT services, to observe the manufacturing process and to observe the involvement of the AT users themselves in the manufacturing process. Research assistants working with in country partners in Nepal, India and Bangladesh helped to find participants to interview and organised visits to service delivery centres.

Sample

Since this research focussed on mobility and hearing related Assistive Technologies the KII participants were purposively selected by the in-country partners to enable the researcher to gather rich information about mobility and hearing related AT and existing models of AT service delivery. In all three countries, three groups of participants were interviewed: (i) AT service policy makers/implementers (mostly current or retired Government employees); (ii) AT service providers (mostly Government/NGO AT service providers); (iii) AT service users (mostly mobility and hearing aid related AT service users). Possible participants from these three categories were contacted by the in-country partners, the research was explained to them, and they were asked whether they were interested and prepared to be interviewed by the researcher.

Ethical consideration

Ethical approvals were obtained prior to data collection from the University of Sheffield (UK), Nepal Health Research Council (Nepal), the Ethics Review Board of Bangalore Baptist Hospital (India), and the Ethics Review Board of the Centre for Injury

Prevention and Research (Bangladesh). Participants were informed about the research, their voluntary participation and their right to withdraw at any time from the interview. The interviews were conducted at places convenient for the participants, either at their workplace or their homes. The researcher was always accompanied by a research assistant during the interviews. Written consent was always obtained before the start of each interview and verbal consent was also obtained to record the interview.

Data collection

The data collection tools were piloted before starting the full study and necessary changes were made. The interviews were transcribed verbatim and translated from the local language to English. Some of the transcripts were back translated to ensure no meanings were lost during the translation process.

Data analysis

The interview transcripts were analysed against the research questions adapted from the AT service delivery quality framework suggested by Andrich et al. [28] using NVivo 12 qualitative data management software. The framework used was adapted from a quality framework used in assessing access to AT services in different countries in Europe [8,29–32]. The framework assesses AT service delivery by critically looking at the system's accessibility, competence, coordination, efficiency, flexibility, user centeredness and infrastructure - each of which are further divided into four subcategories. This paper focuses only on accessibility as this is the most basic criterion. The intention of the framework is not to provide a judgement of the system in place but analyse and discuss the quality of the system. In this study, this analysis is based on observation of AT service centres, the interviews conducted and observational notes.

Results

We have summarised our findings in the form of how access to AT service delivery is understood by policy makers, service providers and the service users. These are presented as the quality of the AT services as judged by respondents against the accessibility component of the quality assessment framework we used. In this section, we present respondents' perspectives on whether the AT services are known and understood by the prospective users or not (awareness), who is eligible to access these services when they need them (eligibility), where they are available (reachability), and whether they are affordable to those who need such services (affordability).

Theme: awareness

Our interviews and observations suggest that in all three countries the awareness level for AT service delivery among policy makers and service providers is higher compared to AT service users. Access to information operates on a top down, supply-driven model: policies are formulated at the Government ministry level and passed to the service providers, and it is often presumed that the information will trickle down to (potential) AT users. However, that is rarely the case, mainly because of the lack of awareness among AT service users. An AT service provider in Bangladesh shares his experience as:

> The number one problem is that people still have very little understanding about AT, even about their need and the requirement. Their very need, that people need this kind of technological support to live an independent and productive life, that is totally absent from people's mind. So, I think right now, we probably, according to

government data, maybe 6-7 percent of the population are facing this problem. (ATSP_BD_1)

Even the limited understanding people have about AT is very minimal and they often understand AT only as mobility related aids such as wheelchairs.

> But still people misunderstand physical rehabilitation services as wheelchair and crutch only. People are unknown about the accessibility of this service. (ATSP_NP_1)

Because of delay in PWDs and/or their families becoming aware of AT services, many people who would benefit from them do not access such services for many years. As well as a lack of knowledge of available services, prospective AT users often have very limited understanding of their own problems, developments in AT, and their rights to such services. Sometimes, PWD do not even know that their condition could be improved with the use of AT. This leads to complications, ill health and reduced life expectancy. There is a lack of mechanisms to inform people about the availability of the AT services.

> Only after 2-4 years of cutting legs did they know about AT and get the service. The system which is developed here is not known to most of the PWDs. The first reason is no identification of disability itself, also no one understand the value of such services. (ATSP_NP_1)

> Firstly, information are not reached to differently able people. There is a lack of information. Without such information, people aren't aware that if they got orthosis and prosthesis, their day-to-day life would be easier. (ATSP_NP_5).

Often the level of awareness that exists is gained through peer groups, family members and neighbours. For example, a hard of hearing person in Bangladesh who currently works as a service provider in an NGO shared his experience as:

> I have problem in hearing, I have this since my childhood. When I was in my primary school, I felt I have problem in hearing. I used to feel everything around me is so silent, I was very young to understand the problem actually, after my (Secondary School Certificate) SSC I went to my maternal uncle's place during the holiday, he took me to the market and there he bought me a hearing aid machine without testing or anything. (ATSU_BD_1)

Lack of awareness among the service providers as well as service users limits access to AT services for people with disability. Often the implementation of a policy is a further hurdle in this process.

> There is problem in policy itself. In one hand, the problem in policy is every differently able people should get service, should have facility of insurance and free access to service which should be mentioned in policy. On the other hand, people still lack awareness. (ATSP_NP_1)

However, in the case of Nepal, there is some evidence that awareness is gradually increasing since the government of Nepal has made provision for a physiotherapist post in district hospitals, which will increase awareness among the health workers and patients, leading to increased awareness and communication about AT services too.

Compared to Nepal and Bangladesh the accessibility to AT service in India seemed more developed and reliable, in particular in pro-actively going out and finding potential users, rather than waiting for PWD to hear about it and come for help. The DDRC (District Disability Rehabilitation Centre) is a government initiative under the Ministry of Social Justice and Empowerment. This programme provides a holistic rehabilitation service, including AT services to PWD at the community level. Community based volunteer Village Rehabilitation Workers (VRW), who are AT users themselves, work at the community level and are responsible for case finding and reporting to the DDRC. Once VRWs report a certain number of cases, DDRC organises a screening camp at the

community level to diagnose the degree of disability, to find required treatment, and to find the types of AT services they need. Basic treatments are provided at the community level and other cases are referred to DDRC and higher centres as required.

This structure helps to pro-actively identify PWD, screen them, and help them to access the necessary AT services. However, there are still challenges of identification of PWD that need AT services.

> In general, the visible disability can be identified easily. But if the disability is not visible, it is very difficult to identify. For example, children with developmental issues are a challenge to identify. Usually the identification of disability in the early stage is difficult. When a child is grown and starts schooling only many things like low vision, hearing problems can be identified by the teacher. (ATSP_IN_2).

In India there are good provisions for assessing disability in children and providing them the interventions they need to address their difficulties, including providing AT services. Often AT services are provided by professionals and follow appropriate pro-cedures. Prospective AT users, as well as their family members in the case of children, are provided necessary information about their disability and possible AT services:

> There are 14 domain assessments in APD (Assessment of Persons with Disability). After that we do the need analysis and find out what are the problems. Then we will discuss the plan with the family members or the caretaker. When we identify a child with disability, we will put them in to Anganwadi (a type of rural childcare centre in India) which is the early education centre for children. (ATSP_IN_2)

These findings suggest that, despite Government's continued effort to address the rights of PWD and provide health and AT services, there is still a huge gap between policy and practice, which applies to all three countries. There are gaps in awareness among the policy makers, general public, AT service providers, people with disability, their family and AT service users. However, the policy makers and service providers have better knowledge of issues compared to the PWDs and their families. Access to AT services depends to a great extent on awareness of them. PWDs who are already disadvantaged due to their disability are less likely to be aware of their rights or the availability of AT services without a very concentrated effort from all levels. However, the situation is improving – most notably in India, which has adopted a more pro-active (if still imperfect) approach to identifying those in need of AT. An integrated multisector approach of addressing disability and AT service is in need to increase the knowledge amongst communities.

Theme: eligibility

One of the common phenomena of AT services in all three coun-tries is that, until very recently, NGOs were the main players in providing AT services for PWDs. This is still the case in all three countries, but the difference in India is that the Government con-tracts out some AT services to civil society organisations, while in the other two countries these are either provided directly by the Government or through CSOs' (Civil Society Organisation) own ini-tiatives. Access to the services provided by NGOs and CSOs is not uniform in the types of AT services and geography where they are provided. The Governments in each country have policies to provide these services uniformly, but the implementation of these policies is very weak. These issues have affected access to AT services.

The availability of AT services is different in different states of India. AT service provision in the state of Karnataka is better than in some other states.

> Most of them [PWD in Karnataka?], 70-80% of disabled people are getting the assistive technology device. They are trying to provide either wheelchair or 4 wheelers scooter to the disabled one for their mobility. Because of MP Fund, MLA fund, Corporation fund many people received scooters. Apart from that, many assistive technology devices like spectacles, dentures etc. is also provided by the Government. (ATPM_IN_1).

In India, the Government provides AT devices to people depending upon the degree of their disability. Therefore, only those who fit in the pre-determined criteria are eligible, which stops many people who need AT services from accessing them. Since only people with higher degrees of disability get Government subsidy for AT services, many people are left without AT. Furthermore, because of the lack of funding, only some of the eligible people get AT from the Government because, compared to other services, AT services is not a priority area for the Government.

> In a total of 22,000 disabled people in Bangalore, 50% of them are in need of aids and appliances (AT services). But the Government is not able to provide it completely within years' time. (ATPM_IN_2)

There are many PWDs in Bangladesh who still do not have access to AT services. Neither the Government nor the charity sec-tor have been able to meet the even increasing demand even for very basic AT devices such as Wheelchair. An AT user in Bangladesh shares his frustration of not being able to access a wheelchair for his colleague:

> There are two disabled persons in a same home, one is crucially disabled girl aged 18, cannot walk and cannot even eat by herself, she needs a wheelchair, now I cannot ask twice for the same home, but she really needs one. (ATSU_BD_2)

There are some organisations which provide a complete AT services in Bangladesh. An AT user in Bangladesh who also works with a charity in Bangladesh that provide AT services shares their process of providing AT services as:

> We don't have any steps here, step means you have to get admitted here in sector, if they feel anything is needed, we have everything to assist them. We first listen to their demands, then we check what is actually needed, then if we see they needed a crutch or hearing aid, we have our office for the paper works, they file an application with necessary documents, then when CRP (Centre for the Rehabilitation of the Paralysed) sends the devices we provide them from there if we need to get something from outside then we provide them those devices from outside resources. (ATSU_BD_3)

Even though demand for AT services are very high, use of AT services is still very low among the PWDs. An AT user in Bangladesh who also works with a charity that provides AT serv-ices shares her experience that not many people use AT services because these are not available to them:

> Last month I was in a meeting in BRAC Center (name of a place), there I saw 25 people with disability but none of them use any assistive technology. They had problems with legs or hands but none of them were using any assistive technology. (ATSU_BD_8)

These findings suggest that there are still challenges to access the system, scheme or process for anyone who needs AT in Nepal, India and Bangladesh but the situation is improving slowly.

Theme: reachability

AT facilities are centred around urban areas in all three countries, which limits access to these services for people living in the rural parts of these countries. However, in India, preliminary identifica-tion of the people with disability and assessment of prospective users of AT services is done at the community level, including in

rural areas, through regular camps organised by District Disability Rehabilitation Centres (DDRC). The existing health system staff such as the ASHA workers and Anganwadi workers (community nursery workers) are the first point of contact who notice people with disability and refer them to the higher centres. Furthermore, there is a separate special cadre of volunteers called VRW (Village Rehabilitation Workers) in each community, who are responsible for up to 100 PWDs (prospective AT users). These VRWs refer prospective AT users to the MRWs (Multi Rehabilitation Worker) who forward the details of the disability and possible AT services to the DDRC and the higher centres. Therefore, from the basic identification point of view, prospective AT service users are identified at the community level, but to access the AT services they still have to travel to the district headquarters (DDRC) or higher centres.

> In the community level Anganwadi workers, ASHA workers are helping to identify the disabled people and they will be assessed by the professionals through the camps. Then they will be provided appropriate assistive technology device. (ATPM_IN_1)

In Nepal and Bangladesh, especially in rural areas, most of the assessment, screening services and AT service delivery follow a temporary camp-based model. Where local government authorities or local groups get in touch with service providers for assessment and distribution of AT, the providers visit the area with required logistics and human resources. Often these camps assess people with disabilities for appropriate AT, take measurements, and provide AT if available – otherwise they fabricate or purchase those and send them to the required places.

> We organize mobile camps in different districts. Before doing mobile camp, in local level such as wards of rural municipality and municipality we have F.M. and we send pamphlets to the members of ward. And then we work in one area. (ATSP_NP_7)

However, compared to few years ago, access to AT services for those who need them is improving in Nepal. The Federal government is introducing various Acts and rules to address the rights of the people who need AT. Both local and federal Governments are allocating resources, prioritising AT services, more people are becoming aware about the needs, and the people who need AT services are organising themselves and claiming their rights. Since local governments are allocating regular funding for PWDs some of the services related to them are being provided at the local level through camps. As a result it is getting easier for PWDs, even in rural areas, to access AT services.

> The Act has explained assistive device as their right. Assistive device should be made easily available at required time. Policy and legal arrangement are made for this. So now federal state, provincial state and local state are motivated by such guideline. (ATU_NP_4)

AT services are not accessible at a place where the PWD or their family could easily visit. Often these people are sent from one place to another which costs money. This discourages PWDs and their families to access AT and other related services. A mother of a disabled boy in Bangladesh shares her experience as:

> From here we took him to Dhanmondi (name of a place), there they said it will be late, then we went to Shyamoli Adabor (name of a place), there they told us to go to Mahakhali (name of a place), there they said first they will see the test results then only they will talk, now I am an uneducated person, I don't know much, and we just spent days running this way. (ATU_BD_9)

Lack of information is one of the barriers to access AT services in Bangladesh. For example, many PWDs are not aware of the existence of disable person's Identity card. One participant shares his experience as:

> I went to the District Social Welfare Office, I told them I need an ID card, they gave me a form I filled it up accordingly, and submitted some papers and you know government office is very painful to deal with whatever that's a different story, after waiting a while I got my ID card, though they told me I was the first one to ask for the ID card nobody took it before me there. (ATSU_BD_1)

Even though the situation is improving, there are still various challenges for PWDs to reach AT services. Physical distance, lack of mobility due to their disability, lack of support from family members and the cost of travel hinders their reachability to AT services.

Theme: affordability

The common understanding among policy makers, AT service providers and service users in all three countries is that it is the responsibility of the Government to provide AT services to those who need such services. It is also common in all three countries that a prospective AT user might receive their AT devices in three ways: they might purchase them themselves from a private provider; get them from the Government; or them get through a charity. The resources provided by the Government are insufficient to meet even a fraction of the demand for AT services. That is where the charity sector steps in, but those services are also very limited. This ultimately forces most AT users to purchase services from out of their pockets or not to use AT services at all. An AT service provider in Nepal shares:

> The next thing is we have limited resources. We talk about those services as well as providing such services, we even know about its necessity, but we don't have resources. Resources should be either provided by provider or the services are purchased by the users themselves. (ATSP_NP_1)

AT services are expensive, often not available and even if they are available, they are not accessible for people living in the rural part of these countries. Often repair and maintenance is not locally available. A hearing aid user in Nepal shares his experience as:

> I use a hearing aid, I got it from an NGO, somehow it is extremely expensive, therefore, only people having money and job can afford this whereas people from villages can't afford this. Also, I haven't seen any place nearby for repair of this machine, not in Kathmandu. Machine is used till it is in working condition, once it is damaged it has no value. (ATU_NP_1)

AT users in Bangladesh shared their experiences that the devices are expensive and they have difficulty if it breaks. Often, they get these devices from the charitable organisation and once it breaks, they have to keep exploring for such supports.

> One time my hearing aid was completely damaged and unusable, and neither my family could afford or showed any interest to get me a new device, and also I understood all the institutions that train computer will be just lecturing for all the participants they might not care specially about me if I cannot listen properly. So, I started searching any helping organization or institution that can help people like me to learn computer. (ATSU_BD_1)

All three countries have provisions of financial support to persons with disabilities who need AT services. In India, prospective AT users can get free medical treatment of up to 100,000 INR (USD 1300), a free AT device (for example, an improvised 4-wheeler scooter), a subsidised loan to start a local business, and monthly allowances. One AT service provider in India said:

> The Government provides medical benefits upto 1 lakh (USD 1300) to the disabled person. After the surgery or treatment, they can produce the medical bills to the Govt and get the reimbursement. There is a scheme called Aadhara Yojana (support programme) through which the

disabled people can get a loan amount to start a small-scale business. They can get maximum of 1 lakh in which 50% of total amount will be considered as subsidy. These people are assessed by selection team. (ATSP_IN_5)

The Government of India has made it mandatory for each Government department to allocate at least 5% of their budget for people with disabilities, some of which can be used for AT services.

Similarly, the Government of Nepal has mandated the local Government to allocate some funding annually for people with disabilities. Nepal also provides monthly allowances to people with disabilities, which they can use to purchase the AT services and in some special cases they can also get free AT devices from the Government and charitable organisations

The government of Bangladesh also allocates some resources regularly, but these are not as systematic as in Nepal and India. Often AT devices are beyond the reach of the poor people because of the its price. A participant from Bangladesh shares a story about his friend who cannot buy the hearing aid device because it is too expensive.

One of my disabled sisters needs a hearing aid machine now, if she has to buy it then it will be cost around 5 to 7 thousand taka, which she cannot afford. I have said to her that I will be talking to some charity people, if they could get her this machine. (ATSU_BD_2)

Despite these efforts from the Government and non-Government sectors in these countries, AT services are not still financially affordable by the people who need these services in these countries.

Discussion

Our findings suggest that there are significant similarities in the accessibility (and lack of accessibility) of AT services in Nepal, India and Bangladesh. We found that there is a good degree of awareness among policy makers and service providers about relevant policies, practices and availability of AT services in all three countries. However, awareness levels are relatively low among potential AT users and hugely varied depending upon their access to information, their mobility and their place of living. People living in remote areas with lower mobility and limited access to information such as mobile phones, radio and television know less about AT services, whereas those living in cities with better access to such information have a higher degree of awareness. Such lack of awareness results in non-use of AT services even if they are available [33] and disparities in access to AT services limiting their life opportunities [34].

Since the severity of the disabilities are categorised in each country, not all PWDs who could benefit from the use of AT are eligible for the AT services and allowances provided by the Government and charitable organisations. This leaves the majority of PWDs without AT. They have to buy those services out of their own pockets. It is common in all three countries that, until recently, AT services were provided mostly by charitable organisations. However, this is changing and governments are gradually taking responsibility for AT services. With increased government funding access has improved. Still, the accessibility of the AT services is very patchy in all three countries. Urban centric AT policies and practices have left most of the people living in the rural parts of these countries without access to AT services. A temporary ORC (Outreach camp) model of AT service is common in all three countries, meaning often there are very few regular AT service provisions. Because of the social, economic and cultural practices it is still a common among AT users to rely on the government or

charity sector to get financial support to purchase AT. This phenomenon is changing with the allocation of funding at the local level both in Nepal and India, but it still remains the same in Bangladesh. Therefore, accessibility to AT services for PWDs is still a challenge in Nepal, India and Bangladesh.

The study was conducted in Kathmandu (Nepal), Bangalore (India) and Dhaka (Bangladesh), all three of which have relatively better AT service provisions compared to the rural areas of these countries. Therefore, the results will not be generalisable throughout all the districts of each country. Similarly, interview participants were purposively selected to obtain wide and in-depth information of AT service in these countries, which resulted in selecting participants who were readily accessible for interviews. Therefore, the views expressed in this research will not represent the voices of all PWDs and AT users in these countries. As a result, the findings and recommendations do not automatically imply that these are valid for the whole country but need to be contextualised. Since the interview participants were selected by the AT service implementing organisations in respective countries, the participant's responses might have been biased to suit the implementing organisation's interest. Most of the AT users who participated in this research are from the forefront, receiving AT services. Therefore, the views of the PWDs living in the rural part of all three countries might be different than those presented in this research.

This study also shows that it is only very recently that the understanding of access to AT services for PWDs in Nepal, India and Bangladesh has started to shift from a welfare mindset to a right based approach. Since the ratification of the UNCRPD by all three countries, policy makers and AT service providers have started to become more aware of the PWDs' rights, and the respective governments have included provisions on rights to equal access for PWDs in legislation. For example, the Rights of Persons with Disabilities Rules 2017 in India, the Act Relating to the Rights of Persons with Disabilities 2017 in Nepal, and The National Action Plan on Disability 2019 in Bangladesh all include some provisions to ensure the rights of PWDs to access quality services. However, this does not always translate into those rights being realised on the ground. As a consequence, very few users who participated in the study were aware of their rights, and the welfare model still prevailed at user level.

We would like to make the following recommendations on each thematic areas presented in this research:

- Awareness: There should be more awareness programmes at the community level on PWD's right for AT services.
- Eligibility: The criteria for accessing Government funding to purchase required AT services by PWDs needs to be more flexible to increase the % of PWDs accessing such services.
- Reachability: Government should facilitate the establishment of AT centres locally at rural communities and encourage those centres to provide personalised AT services rather than always providing such services through temporary camps.
- Affordability: The Government funding allocated each year for AT services for PWDs needs to reach to the rural community where PWDs are still not aware of the availability of such funding.

Conclusions

The Governments of Nepal, India and Bangladesh should ensure that the policies regarding PWDs and AT services are translated into practices to address the unmet needs for AT services. Our findings suggest that there are significant discrepancies in

available AT service provisions for people living in the urban and rural areas of each country. This can be improved by establishing more AT centres, posting more AT professionals and by integrating AT services with government health centres, even within the available resources. It is important to involve AT users, their representative organisations and advocacy groups in the process of formulating AT polices, designing the interventions, and implementing the AT services. There has been some increase in financial resources through the local Government in India and Nepal, but this is still insufficient. Therefore, the Governments should significantly increase their budgets for PWDs related activities and AT services. AT services are still treated as charities in all three countries rather than as a fulfilment of PWDs' rights. This needs to change at the system level as well as in practices.

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References

[1] Rohwerder B. Assistive technologies in developing countries. K4D Helpdesk Report. Brighton (UK): Institute of Development Studies; 2018. p. 24.

[2] Tangcharoensathien V, Witthayapipopsakul W, Viriyathorn S, et al. Improving access to assistive technologies: challenges and solutions in low- and middle-income countries. WHO South East Asia J Public Health. 2018;7(2):84–89.

[3] Brandt Å, Hansen EM, Christensen JR. The effects of assistive technology service delivery processes and factors associated with positive outcomes – a systematic review. Disabil Rehabil Assist Technol. 2020;15(5):590–603.

[4] Thapaliya M. A report on disability in Nepal. Sydney (Australia): Australian Himalayan Foundation (AHF) . 2016. 1–24.

[5] Eide AH, Neupane S, Hem KG. Living conditions among people with disability in Nepal. SINTEF Report. 2016. Trondheim: SINTEF.

[6] Nuri RP, Ghahari S, Aldersey HM, et al. Exploring access to government-led support for children with disabilities in Bangladesh. PLoS One. 2020;15(7):e0235439.

[7] WHO. Assistive technology key facts. Geneva: World Health Organization; 2018; 2020.

[8] WHO. Improving access to assistive technology report by the director-general seventy-first world health assembly. Geneva: World Health Organization; 2018.

[9] Layton N, Smith E, Battistella L, et al. Measuring met and unmet assistive technology needs at the national level: comparing national database collection tools across eight case countries. Global perspectives on assistive technology Proceedings of the GReAT Consultation. 2019. p. 24–35.

[10] WHO. World report on disability 2011. World Health Organisation World Bank. 2011;91:549.

[11] Safdar S, Khan S, Azam N, et al. Need assessment of assistive technology in children with multiple disabilities. Pak Armed Forces Med J. 2019;69(Suppl-2):S229–S234.

[12] Shahen MA. The social and family attitude toward disabled student: a study on Rajshahi city corporation area, Bangladesh. International Journal of Innovative Science and Research Technology. 2020;5:1.

[13] Tebbutt E, Brodmann R, Borg J, et al. Assistive products and the sustainable development goals (SDGS). Global Health. 2016;12(1):79

[14] Gudlavalleti VSM. Challenges in accessing health care for people with disability in the south Asian context: a review. IJERPH. 2018;15(11):2366.

[15] Saikia N, Bora JK, Jasilionis D, et al. Disability divides in India: evidence from the 2011 census. PLoS One. 2016; 11(8):e0159809.

[16] Bogati S. Assessing inclusivity in post-war army integration process in Nepal. IPS Paper. 2015;11: 1–15.

[17] Groves C, Poudel M, Baniya M, et al. Descriptive study of earthquake-related spinal cord injury in Nepal. Spinal Cord. 2017;55(7):705–710.

[18] Landry M, Sheppard P, Leung K, et al. The 2015 Nepal earthquake(s): lessons learned from the disability and rehabilitation sector's preparation for, and response to, natural disasters. Phys Ther. 2016;96(11):1714–1723.

[19] Landry MD, Salvador EC, Sheppard PS, et al. Rehabilitation following natural disasters: three important lessons from the 2015 earthquake in Nepal. PPR. 2016;37(2):69–72.

[20] Mytton J, Bhatta S, Thorne M, et al. Understanding the burden of injuries in Nepal: a systematic review of published studies. Cogent Med. 2019;6(1):1673613–1673654.

[21] Gupta S, Wong EG, Nepal S, et al. Injury prevalence and causality in developing nations: results from a countrywide population-based survey in Nepal. Surgery. 2015;157(5): 843–849.

[22] Little P, Bridges A, Guragain R, et al. Hearing impairment and ear pathology in Nepal. J Laryngol Otol. 1993;107(5): 395–400.

[23] Desai S, Mantha S, Phalle V. Assistive technology solution for disabled population of India. International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC). 2017.

[24] Sarkar R. Supporting participation and inclusion of individuals with disabilities through assistive technology. Res Rev Int J Multidiscip. 2015;3:8.

[25] Mishra R, Mohanthy S. Socioeconomic and health correlates disability in India. Int J Community Med Public Health. 2018;5(2):600–610.

[26] Pryor W, Nguyen L, Islam QN, et al. Unmet needs and use of assistive products in two districts of bangladesh: findings from a household survey. IJERPH. 2018;15(12):2901.

[27] Borg J, Östergren P-O. Users' perspectives on the provision of assistive technologies in Bangladesh: awareness, providers, costs and barriers. Disabil Rehabil Assist Technol. 2015;10(4):301–308.

[28] Andrich R, Norman G, Mavrou K, et al. Towards a global quality framework for assistive technology service delivery. Global Perspect Assistive Technol. 2019;2:263–269.

[29] Andrich R, Besio S. Assistive technology: bridging end-users and technology. Chin J Rehabil Theory Pract. 2011;17:10.

[30] Andrich R. Cost analysis of assistive technology. PORTALE SIVA sulle tecnologie per la disabilità e l'autonomia. 2013;5:1–21.

[31] Salatino C, Pigini L, Andrich R. How to measure the impact of assistive technology solutions on the person's quality of life? Proceedings of the 4th EAI International Conference on Smart Objects and Technologies for Social Good. 2018;18:238–242.

[32] Andrich R, Mathiassen N-E, Hoogerwerf E-J, et al. Service delivery systems for assistive technology in Europe: an AAATE/EASTIN position paper. TAD. 2013;25(3):127–146.

[33] Boger J, Quraishi M, Turcotte N, et al. The identification of assistive technologies being used to support the daily occupations of community-dwelling older adults with dementia: a cross-sectional pilot study. Disabil Rehabil Assist Technol. 2014;9(1):17–30.

[34] Gustafson D, Penton V. Access to assistive technology and single entry point programs. CJDS. 2014;3(1):93.