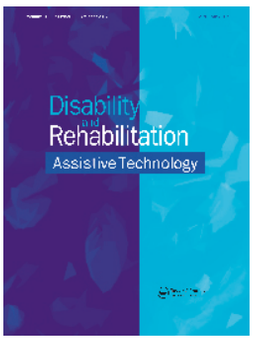

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ORIGINAL RESEARCH

A description of assistive technology sources, services and outcomes of use in a number of African settings

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ABSTRACT

Purpose statement: The article explores assistive technology sources, services and outcomes in South Africa, Namibia, Malawi and Sudan.

Methods: A survey was done in purposively selected sites of the study countries. Cluster sampling followed by random sampling served to identify 400–500 households (HHs) with members with disabilities per country. A HH questionnaire and individual questionnaire was completed. Country level analysis was limited to descriptive statistics.

Results: Walking mobility aids was most commonly bought/provided (46.3%), followed by visual aids (42.6%). The most common sources for assistive technology were government health services (37.8%), "other" (29.8%), and private health services (22.9%). Out of the participants, 59.3% received full information in how to use the device. Maintenance was mostly done by users and their families (37.3%). Devices helped a lot in 73.3% of cases and improved quality of life for 67.9% of participants, while 39.1% experienced functional difficulties despite the devices.

Conclusion: Although there is variation between the study settings, the main impression is that of fragmented or absent systems of provision of assistive technology.

➤ IMPLICATIONS FOR REHABILITATION

- Provision of assistive technology and services varied between countries, but the overall impression was of poor provision and fragmented services.
- The limited provision of assistive technology for personal care and handling products is of concern as many of these devices requires little training and ongoing support while they can make big functional differences.
- Rural respondents experienced more difficulties when using the device and received less information on use and maintenance of the device than their urban counterparts.
- A lack of government responsibility for assistive device services correlated with a lack of information and/or training of participants and maintenance of devices.

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Assistive technology; Africa; sources; services; outcomes

Introduction

Appropriate assistive technology/devices[1] can assist people with disabilities to achieve greater independence, community integration and improved quality of life [1,2] and as such is the key focus of a recent WHO initiative, the Global cooperation on Assistive Health Technology (GATE).[3,4] However, access to appropriate assistive technology and services is often poor in low and middle income countries (LMICs) as found in Africa. In addition there is paucity of evidence on assistive technology provision in LMICs that hampers the development of policy and implementation of practice.[2,5,6] This article explores assistive technology sources, services and outcomes in various settings in South Africa, Namibia, Malawi and Sudan.

Literature review

The importance of the provision of appropriate assistive technology to persons with disabilities is underscored by leading documents on disability such as the World Disability Report,[1] the GATE concept note,[3] the Joint Position Paper of Disabled People's International, the Community Based Rehabilitation Global Network on Inclusive Sustainable Development,[7] and the United Nation's Convention on the Rights of Disabled People (UNCRPD).[8] Articles 4 and 26 of the Convention make it clear that ultimately, governments are responsible to ensure that appropriate assistive technology is available and that users are trained to use assistive devices; thus including a supply and services component.[8] Furthermore, device-specific international policy and guidelines, such as the WHO guidelines on wheelchair provision in

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less resourced settings [9] and guidelines for the provision of prosthetic services of high quality in Africa,[10] provide direction for the delivery of assistive devices and related services. The little evidence available suggests that African governments often struggle to fulfil their responsibilities to supply assistive technology and provide the necessary support services.[11–13]

According to the Gate concept note [3] worldwide about one out of ten persons who require an assistive device/s has access to these. The unmet need is bigger in less resourced settings such as Africa due to individual and country level poverty, environmental barriers, poor procurement systems, a lack of support services as well as a shortage of service providers and inadequate training of the available service providers.[3] Khasnabis et al. [4] identified seven areas, i.e., assessment, procurement, technology, environment, usability, sustainability and realization of rights around the central hub of policy, as key in the provision of assistive devices.

Procurement challenges were quantified for Namibia, Zambia, Malawi and Zimbabwe by Eide and Oderud [11] where, respectively, 49.7, 20, 42.7 and 38.9% of persons with disabilities who needed assistive devices did not have the devices. Those who did have devices indicated that they were provided through a variety of sources. In Namibia the government (59.1) and private sources (29.1) were the main providers of assistive devices. In the other three countries government provided between 14% and 27% of assistive devices, while private (36.1%) and other sources (30.1%) provided the bulk of assistive devices. Other sources often include international humanitarian aid, development, charity and religious organizations.[11]

While undoubtedly a big source of assistive devices in Africa, the devices provided through other sources are often of inferior quality and not suitable to user needs and environmental requirements. Donor organizations largely measure outcomes in number of devices delivered, not in end user function or participation and often fail to provide support services.[9] Where support services are lacking, negative outcomes such as poorer functional and community integration, injury of the user, secondary complications, breakdown of the device or devices being discarded are common.[9–11,14,15] In addition these sources might not be sustainable since donors have no obligation to provide a service on an ongoing basis.[10,16,17] Eide and Oderud [11] analysed several service delivery quality indicators and showed that the service delivery systems among the four African countries were fragmented, devices were of poor quality, maintenance was left to the user and often devices were not maintained. The situation was least challenging in Namibia and most challenging in Malawi.

Evidence on the provision of assistive technology and assistive technology services in Africa is scarce. A 2016 scoping review showed 20 studies in this regard from middle, east and North Africa and 53 from sub Saharan Africa.[6] Further baseline data is needed if GATE is to implement its core functions as set out in the GATE concept note.[3] The aim of this article is to add to the body of evidence by describing sources, selected services and outcomes of use of assistive devices in a number of African settings as presented in Figure 1.

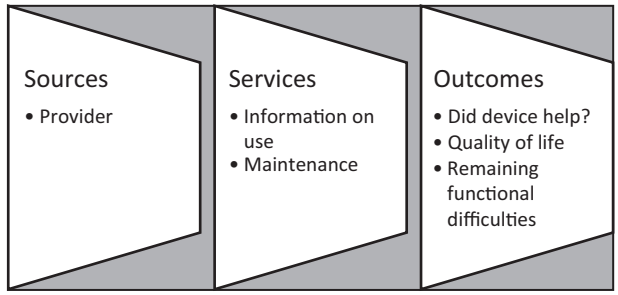

Figure 1. The areas related to assistive technology provision explored.

Methods

The study was carried out in late 2011 and early 2012 in four different sites in each of South Africa, Sudan and Malawi, and five sites in Namibia (Table 1). The selection of study sites was done at country level, with the purpose of including populations with different characteristics, while at the same time highlighting particular characteristics of each country (e.g., displaced or dispersed populations, poor populations and those with inequitable access to health care) that had been pre-defined during the development of the Equitable[2] project. Site selection did not aim to be nationally representative, but to capture specific vulnerable populations in each country.

Selection of clusters within sites was decided by the country teams based on the predefined characteristics as well as practical considerations. Further details on the study design including sampling can be found in Eide et al.[18]

Data were collected through a survey. The sampling was carried out with small variations between the countries. The sample size was set to 400–500 households (HHs) per site in each country, or 1600–2000 per participating country. The research team estimated that a sample of that size should have the necessary power to both test broad hypotheses and more context specific ones that may emerge. Participants were identified through two-stage cluster sampling. During the first phase the four country teams, in dialogue with the Project Leader and the Project Team, decided on geographical areas in each country and how to define clusters in the respective contexts. The clusters had to be clearly defined geographical areas (for instance Enumeration Areas, EAs). All members older than five in every HH in each cluster were screened for disability, using the activity limitation based Washington Group on Disability Statistics 6 questions.[19] Answer categories included "no difficulty", "some difficulty", "a lot of difficulty" and "unable to do" for the domains "seeing", "hearing", "walking or climbing", "remembering", "self-care", and "communicating". Answering "some difficulty" on two domains or at least "a lot of difficulty" on one domain was required to qualify as being disabled. Following this the required number of HHs (400–500) with at least one member with a disability was randomly sampled.

In addition to the screening instrument (Washington Group 6 questions [19]), data from two other questionnaires are used:

a. HH questionnaire mapping a series of indicators on living conditions at HH level.
b. Individual questionnaire completed with the identified individual with disability.

The questionnaires were all based on previous experience with large scale studies of living conditions among people with disabilities in southern Africa [20] and adapted to the particular purpose of the study. With regard to assistive technology information on the full spectrum of assistive technology devices were sought as shown by the answer options on the question that asked users to specify which devices they have:

- Hearing aids
- Visual aids e.g., eye glasses, magnifying glass, telescopic lenses/glasses, enlarged print, Braille, etc.
- Computer assistive technology: Keyboard for the blind, screen reader, synthetic speech, etc.

Table 1. Characteristics of study sites and countries.

Country	Particular characteristics	Sites	Descriptive information
Sudan	Proportions of population internally displaced	White Nile (Rabak; Eastern bank of the White Nile)	• Urban rural mix • Sugar scheme workers live in labourers compounds • Some health services available
		Kordofan (Central Sudan)	• Years of severe droughts • Food shortages and famine
		Umbada (Western part of Khartoum state)	• Desert/semi desert • Urban rural mix • Densely populated • Varying socio economic status • High numbers of internally displaced people • Government, private and traditional health care
		Kassala (Eastern Sudan)	• Urban rural mix • Different ethnic groups • Large refugee population • Government teaching hospital and refugee hospital
Namibia	Dispersed population	Khomas (Central region)	• Urban; hosts Namibia's capital • Diverse population representing ethnic groups from all over the country • Informal settlements • Private and government health services
		Kunene (Northwest)	• Mountainous inaccessible geography • Arid • Remote rural • Himba minority ethnic group • Little infrastructure
		Omasati (North)	• Rural • Seasonal flooding • Government and religious organisations provide health care
		Caprivi (Northeast. Popularly known as the "arm" of Namibia)	• Seasonal flooding • Rural • High levels of poverty • High prevalence of vision impairment
		Hardap (South)	• Desert and savannah • Occasional flooding • Rural • Dispersed population
Malawi	Chronic poverty and high disease burden	Rumphi (Northern region)	• Mountainous • Seasonal flooding • No bridges at river crossings • Rural • Little infrastructure, • Informal dwellings • Government health services and mission hospital
		Ntchisi (Central region)	• Rural • Little infrastructure • Informal dwellings • Zion church has large presence
		Phalombe (Southern region)	• Rural • Little infrastructure • Informal dwellings
		Blantyre (Southern region)	• Mountainous • More urban • Specialist hospital
South Africa	Relatively wealthy, but universal, equitable access to health care is not attained	Gugulethu (Western Cape province)	• Flat and sandy • Urban • High population density • High levels of poverty • Well-developed services and infrastructure • Government, private and traditional health care providers
		Worcester (Western Cape province)	• Fertile valley • Rather densely populated rural community • Varying socio economic status • Well-developed infrastructure and services • Well catered for deaf and blind communities • Government and private health care services
		Fraserburg (Northern Cape province)	• Remote, rural • Low population density • Varying socio economic status • Little infrastructure and lack of services

(*continued*)

Table 1. Continued

Country	Particular characteristics	Sites	Descriptive information
		Madwaleni (Eastern Cape Province)	• Government health care • Hilly and mountainous • Wet and dry seasons • Remote rural • Traditional Xhosa community • High poverty levels • Poor infrastructure and service delivery • Government and traditional health care services

Table 2. Age and gender distribution of assistive device users in sample of persons with disability.

		Percentage of individuals with disability using assistive devices				
Country	*n*	Total	Men	Women	Mean age among users of assistive devices	Mean age in total sample of persons with disability
South Africa	1050	18.9	18.1	19.3	57.3	53.0
Malawi	1496	2.8	4.0	1.7	52.4	29.3
Namibia	1118	29.6	29.2	29.9	55.7	48.8
Sudan	724	19.6	28.5	16.4	50.9	42.6

- Communication: Sign language interpreter, fax, portable writer, computer, picture boards, cards, etc.
- Walking mobility aids e.g., crutches, walking sticks, white cane, guide, standing frame, etc.
- Wheeled mobility aids
- Orthoses and prostheses (e.g., artificial limb).
- HH items: Flashing light on doorbell, amplified telephone, vibrating alarm clock, etc.
- Personal care and protection: Special fasteners, bath and shower seats, toilet seat raiser, commode chairs, safety rails, eating aids, etc.
- For handling products and goods: Gripping tongs, aids for opening containers, tools for gardening, etc.
- Other

Data collection was carried out by teams of interviewers led by a supervisor who checked and verified each completed questionnaire. The specific data presented in this article revolve around assistive devices. The findings are based on information from users. No observations or assessments were done. Analysis was limited to descriptive statistics. Due to the characteristics of the sample, differences between the countries were not tested statistically. Rather, the main point with the analyses is to reveal patterns on selected indicators on the assistive technology service system in the different contexts.

Ethics

Ethical clearance was obtained from the responsible authority in each of the participating countries; The Research and Ethical Committee, Afhad University, and The National Scientific and Research Committee, Federal Ministry of Health (Sudan), Health Research Ethics Committee, Stellenbosch University (South Africa), Office of the Permanent Secretary, Ministry of Health and Social Services (Namibia), the National Health Sciences Research Committee (Malawi), as well as the Norwegian Social Science Data Services (NSD). Participation was voluntary and written informed consent was obtained before data collection commenced.

Results

The proportion of individuals with disability confirming that they use an assistive device varied from 29.6% in the Namibian sample to 2.8% in the Malawian sample. The site with the highest percentage of assistive device users is Khomas (23%) in Namibia and the one with the lowest percentage of users is Phalombe (0.01%) in Malawi. While these figures should not be taken as representative country estimates, Table 2 is intended to describe characteristics on the different samples. A significant gender difference was found in the Sudan sample only, with 12.1% more men using assistive devices than women. In all four samples, the mean age of users of assistive devices was higher than the mean age of the total sample of individuals with disability.

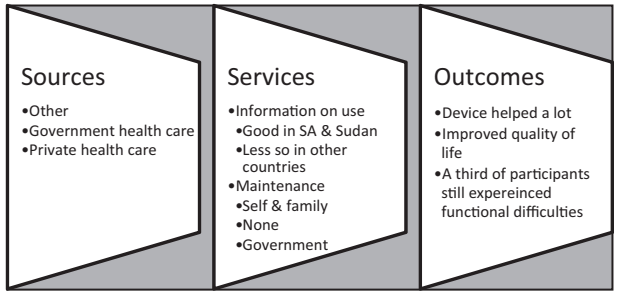

Figure 2. A summary of the main findings in each of the explored areas.

Findings indicated that walking mobility aids was the device most commonly bought/provided (46.3%). The variation between countries was however substantial, with 60.5% of Malawian assistive device users being the highest and 31.3% of South African users being the lowest. The second most common type of device was visual aids, reported by 42.6%. The highest figure here was for South Africa with 60.6% and the lowest was Sudan with 23.7%. Hearing aids came out as the third most often mentioned, with an overall figure of 9.2%. Highest was Sudan with 26.0% and lowest South Africa and Namibia with 3.0%. Other types of devices scored very low, with the exception of wheeled mobility reaching 5.0% in the sub-sample from South Africa.

Further analyses revealed that visual aids were more common in urban areas and among females, and walking mobility aids more common in rural areas and among males. Figure 2 summarizes the main findings regarding sources, services and outcomes.

The most common sources for assistive devices were government health services (37.8%), followed by "other" (29.48%) and private health services (22.9%). The "other" category is assumed to

Table 3. Sources of assistive devices according to sites (all figures are in percentages).

Country	Site	Private health	Government health service	Government other	NGO	Other
Sudan ($n = 150$)	White Nile ($n = 51$)	7.8	70.6	3.9	2.0	15.7
	Kordofan ($n = 34$)	23.5	44.1	0.0	20.6	11.8
	Umbada ($n = 36$)	55.6	41.7	0.0	2.7	0.0
	Kassala ($n = 29$)	51.7	48.3	0.0	0.0	0.0
	Total	31.3	53.3	1.3	6.0	8.0
Namibia ($n = 327$)	Khomas ($n = 163$)	41.1	24.5	5.5	6.1	22.7
	Kunene ($n = 27$)	0.0	44.5	0.0	0.0	55.6
	Omusati ($n = 78$)	0.0	17.9	1.3	5.1	75.6
	Caprivi ($n = 17$)	17.6	47.1	11.8	0.0	23.5
	Hardap ($n = 42$)	19.0	31.0	2.4	7.1	40.5
	Total	23.9	26.6	4.0	5.2	40.4
Malawi ($n = 39$)	Rumphi ($n = 14$)	7.1	35.7	0.0	14.3	42.9
	Ntchisi ($n = 8$)	0.0	0.0	0.0	12.5	87.5
	Phalombe ($n = 5$)	20.0	0.0	0.0	0.0	80.0
	Blantyre ($n = 12$)	0.0	33.3	0.0	16.7	50.0
	Total	5.1	23.1	0.0	12.8	59.0
South Africa ($n = 196$)	Guguletu ($n = 79$)	49.4	49.4	0.0	1.3	0.0
	Worcester ($n = 22$)	22.7	22.7	0.0	31.8	22.7
	Fraserburg ($n = 54$)	25.9	35.2	5.6	7.4	25.9
	Madwaleni ($n = 41$)	9.8	75.6	4.9	0.0	9.8
	Total	31.6	48.0	2.6	6.1	11.7
Total	$n = 712$	22.9	37.8	2.0	7.5	29.8

Table 4. Information provided on use.

Country	Site	Full information	Some information	No information
Sudan	White Nile	59.2	16.3	24.5
	North Kordofan	84.4	12.5	3.1
	Umbada	100.0	0.0	0.0
	Kassala	92.9	3.6	3.6
	Total	81.3	9.0	9.7
Namibia	Khomas	65.0	16.9	18.1
	Kunene	25.9	29.6	44.4
	Omusati	27.0	9.5	63.5
	Caprivi	58.8	5.9	35.3
	Hardap	43.9	17.1	39.0
	Total	49.8	15.7	34.5
Malawi	Rumphi	23.0	46.2	30.8
	Ntchisi	0.0	0.0	100.0
	Phalombe	20.0	0.0	80.0
	Blantyre	58.3	0.0	41.7
	Total	28.9	15.8	55.3
South Africa	Guguletu	96.1	2.6	1.3
	Worcester	75.0	20.0	5.0
	Fraserburg	59.3	9.3	31.5
	Madwaleni	64.1	20.5	15.4
	Total	76.8	10.0	13.2
Total	$n = 712$	59.2	12.6	28.2

cover mostly faith based organizations and donations from various sources. According to Table 3 there are substantial differences between the countries, notably the Sudan and South African samples are particularly high on government health services (53.3 and 48.0%, respectively) and private health services (31.3 and 31.6%, respectively). In Sudan only Kordofan site (a site with severe droughts and famine) shows "other" and NGOs as important sources. Worcester in South Africa, a setting that has a long tradition for services and accommodation of persons with vision and hearing impairments, shows high percentages of NGOs and "other" as source. Malawian sites are particularly low on private health services (5.1%), and high on "other" (59%) as source.

While actual numbers of devices issued are similar in the various sites of Malawi and Sudan differences could be seen in South Africa and Namibia with more devices being issued in the two urban sites (Guguletu and Khomas) of these countries (Table 3). Further analyses revealed that private health services were more common as a source of assistive devices in urban areas and among females and that more rural and male respondents answered "other" to this question.

Just over half of the sample (59.2%) reported receiving full information and assistance in how to use the device. Full information was not defined as such but was part of a scale with the following values; full information, some information and no information. There is again substantial variation between the countries and sites as shown in Table 4, with all sites in Sudan and South Africa scoring above 50% on full information, while in Malawi only Blantyre (the more urban site) scored above 50% for full information and Ntchisi scored 100% for no information.

Those who reported private health and government health services/other government services as source of the device most often responded positively to the question about information and training, and those who reported "other sources" responded least positively to this question. Urban respondents tended to have received more information than rural respondents, but no significant gender difference was found.

Just over a third (37.3%) of participants stated that they or their family maintained the device. Self-maintenance varies from 31.6% (Malawi) to 41.2% (Sudan) between the four countries. No maintenance was highest in Namibia (27.6%) and Malawi (26.3%) and lowest in South Africa (11.1%). The large majority of assistive devices were reported to be in good working order (81.0%). The biggest challenge with working order of devices was experienced in Malawi where two thirds (66.7%) were reported to be in good working order. This is followed by South Africa (77.9%), Namibia (83.2%) and finally Sudan with 83.8% of devices being in good working order. No noteworthy differences between working order of the device and location or gender were found.

Relatively few (13.2%) of the total sample stated that the device helped slightly or not at all, while a large majority of 73.3% reported that the device had helped quite a lot or very much. The samples from South Africa and Namibia scored relatively high on this indicator (SA: 75.5%, Namibia: 82.9%), while Malawi was on the low side (52.6%). Urban/rural and gender differences were marginal.

More than half of participants experienced no difficulty or only slight difficulty in functioning even when using the device (60.9%) (Table 5). Difficulties were especially pronounced amongst rural respondents. Private health services as a source of device was associated with fewer difficulties when using the device, and "other sources" with the most.

Table 5. Experienced difficulty in functioning even when using the device.

Country	Site	No/slight difficulty	Moderate difficulty	A lot of difficulty
Sudan	White Nile	54.9	5.9	39.2
	North Kordofan	75.8	9.1	15.1
	Umbada	77.8	2.8	19.4
	Kassala	93.1	6.9	0.0
	Total	72.4	6.0	21.5
Namibia	Khomas	79.7	12.3	8.0
	Kunene	60.7	10.7	28.5
	Omusati	51.4	32.9	15.7
	Caprivi	62.5	37.5	0.0
	Hardap	61.4	15.9	22.7
	Total	68.2	18.7	13.2
Malawi	Rumphi	42.8	14.3	42.8
	Ntchisi	12.5	12.5	75.0
	Phalombe	20.0	20.0	60.0
	Blantyre	41.6	8.3	50.0
	Total	33.3	12.8	53.8
South Africa	Guguletu	83.5	5.1	11.4
	Worcester	76.2	9.5	14.3
	Fraserburg	59.2	13.0	27.8
	Madwaleni	53.7	2.4	44.0
	Total	69.8	7.2	23.1
Total	$n = 712$	60.9	11.2	27.9

Table 6. Quality of life of participants.

Country	Site	Worse	No change	Slightly better	A lot/much better
Sudan	White Nile	3.9	7.8	9.8	78.5
	North Kordofan	0.0	3.0	21.2	75.8
	Umbada	2.0	0.0	5.7	91.4
	Kassala	0.0	0.0	13.8	86.2
	Total	2.0	3.4	12.2	82.4
Namibia	Khomas	1.2	2.5	14.7	81.6
	Kunene	7.1	3.6	25.0	64.3
	Omusati	0.0	2.6	33.8	63.6
	Caprivi	0.0	0.0	31.3	68.8
	Hardap	0.0	6.8	20.5	72.7
	Total	1.2	3.0	21.6	74.1
Malawi	Rumphi	0.0	7.1	57.1	35.7
	Ntchisi	0.0	25.0	62.5	12.5
	Phalombe	20.0	0.0	60.0	20.0
	Blantyre	0.0	0.0	58.3	41.6
	Total	2.6	7.7	59.0	30.7
South Africa	Guguletu	1.3	0.0	10.3	88.4
	Worcester	0.0	4.8	23.8	71.4
	Fraserburg	0.0	3.7	5.6	90.7
	Madwaleni	4.9	9.8	9.8	75.6
	Total	1.5	3.6	10.3	84.5
Total	$n = 712$	1.8	4.4	25.8	67.9

The majority (67.9%) of the respondents stated that the device had improved their quality of life either quite a lot or very much (Table 6). On the lower end of the scale, 3.1% said that the device had either made their lives worse or yielded no change. The rank order between the countries is the same as for the other indicators. For instance, for Malawi, 30.7% report that the device has made their lives either quite a lot or much better, while the corresponding figure for South Africa is 84.5% and 82.4% for Sudan. A tendency was found in that higher quality of life improvements were reported among those who received their devices from private health or other government services. Improved quality of life was more pronounced among the urban respondents.

Discussion

This study in four sub-Saharan countries has demonstrated large discrepancies in assistive device supply and services, and with substantial differences between and within the four countries.

The devices most commonly issued (i.e., walking mobility devices, visual aids and hearing aids) are often associated with functional impairments related to increased age. The predominance of these devices might explain why persons with devices are older than those without devices in all four countries. In two of the sites i.e., Caprivi in Namibia and Worcester in South Africa the prevalence of visual impairments are known to be high. This might have increased the number of visual aids that were provided.

Basic visual and walking mobility aids are relatively inexpensive and can be provided and used effectively with little training and ongoing support. At the same time they can make a big functional difference which might relate positively to productive activity. For instance males in rural areas often perform farming activities for a living that might include a lot of walking, which can be assisted by walking mobility devices in the face of joint impairments.

This might provide an explanation for the finding that respondents' assessments of their devices were largely positive and the opinion that the devices improved their quality of life. Existing knowledge about assistive devices in sub-Saharan Africa [5,10,11,14,21] strongly indicates substantial quality problems with both devices and services. However, in poor contexts where demand for assistive devices are not met, even access to devices that are not of prime quality or the most appropriate may be seen as advantageous compared to not having access.[14,22] The finding that a third of the participants had difficulties even when using their device may indicate support for such an interpretation or may be because not all devices were in good working order.

Rural respondents experienced more difficulties even when using the device than urban respondents. More severe natural environmental barriers and seasonal flooding as found in some sites in Sudan, Namibia and South Africa might have aggravated the difficulties experienced by rural users. However, they also received less information on use and maintenance of the device than their urban counterparts. Thus they might have lacked the knowledge to properly use the device. People living in rural areas usually struggle more to access services and support than urban dwellers and might be more dependent on their own knowledge and skills to maintain devices. It is therefore very important that they receive the necessary training when issued with an assistive device.

The importance of non-governmental sources for the provision and services of assistive devices revealed in the study is worth some consideration. While international donations from charity organizations, international non-governmental organizations (NGOs) and other private sources are well meant and cater for some of the needs of their partner/recipient individuals and organizations, this may easily turn into a disservice to individuals in need.[10,11,14,16,17] Users from Umbada and Kassala in Sudan who mainly received their devices through formal health care providers received complete information, and showed on the whole less difficulty in functioning when using the devices and better quality of life outcomes than users from Ntchisi in Malawi who received devices from NGOs and other sources only. NGOs and other sources do not have national responsibility for services. In many cases donations are not followed by services due to either limited scope of the support and/or lack of integration in existing services at country level. Donators might exclude the end user from market processes and may undermine the responsibility of the government. Co-ordinated efforts by communities, service providers, researchers NGOs, DPOs, charity organizations, the private sector and government is required to improve the situation and ensure everybody in need access to devices and proper services.[14]

The lack of information and/or training of participants and proper maintenance shown in the study results strongly indicate problems with service delivery. Support in how to use and regular follow up and maintenance is of great importance for effective use of the devices in many cases and reduce possibilities for development of even more serious health problems and activity limitations due to improper use, poor fitting, insufficient adjustments and lack of repairs.[2,10,11] It is suggested that the source of such problems lay in lack of responsibility for assistive device services. While the data reveal large variation between the country samples, it seems that the described problems are associated with the level of government and private health care involvement in provision of devices. South African and Sudanese participants, of whom the majority received assistive devices through government health services, indicated less challenges in this regard than participants from other countries. While different models for public–-private partnership in service provision may be drawn up, clearly the governments through their relevant ministries is or should be responsible for ensuring implementation of a proper assistive device service provision system. This is for instance stated in the CRPD, which all four countries included in the study have ratified. Country level policy, the hub around which provision of assistive technology rotates according to Khasnabis et al.,[4] were mostly lacking, except for South Africa where National Guidelines for use in the public sector is available.[23]

Finally the lack of provision of technology for personal care (e.g., bath and shower chairs, commodes and grab rails) and for handling products confirmed findings by Eide and Oderud [11] and Cawood and Visagie.[24] This is of concern as conditions such as arthritis and stroke that can negatively impact mobility also often have a negative impact on doing personal care and HH tasks. Research from resourced countries showed that higher percentages of these devices (up to 100% for grab rails in a Danish study) were issued to study participants who had a stroke.[25,26]

Conclusion and recommendations

Even though there is huge variation between the study settings and countries, and for instance that the situation appears to be more favourable in the South African and Sudanese sample and less in the Malawian sample, a main impression is that of a fragmented system of provision, or even an absence of a system in some of the study contexts.

Technology for personal care and handling products can similar to walking mobility devices and visual aids be provided relatively cheaply and used with little training and ongoing support while improving function markedly. Awareness of these devices and their role must be increased. A large proportion of assistive devices were provided through other sources. There is a need to explore these sources through further studies and to assess the role these providers can play in ensuring high quality service delivery, especially since the study findings showed challenges with service related aspects such as training in use and maintenance of devices. Governments, through health systems, need to take responsibility for the provision of appropriate assistive devices and support services of good quality.

Limitations

As already explained the study population were not nationally representative in any of the countries. The results are representative for the different geographical areas in which the study was undertaken rather than representative for the different countries. It is for instance of importance to note that the urban/rural balance varies substantially, with the Malawi sample being almost entirely rural. In addition, purposive sampling of sites led to the selection of sites where a higher concentration of vulnerable individuals was found which may have influenced the results. Thus while we can describe trends from the data, no generalizations with regard to national situations can be made. A further limitation of this study is that we did not explore the number of persons with disabilities who needed assistive devices but did not get them.

Notes

1. The terms technology and devices will be used interchangeably in the text.
2. EquitAble is a four-year EU funded collaborative research project on access to health care for vulnerable people in resource poor settings in Sudan, Namibia, Malawi and South Africa, carried out in 2010–2014. The survey reported in this article was one of three research components in Equitable.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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