



Original

Users' Satisfaction with Wheeled Mobility Assistive in Kinshasa and Goma, Democratic Republic of Congo

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ABSTRACT

Background: Wheeled mobility assistive devices greatly assist individuals with disabilities. In the Democratic Republic of Congo (DRC), a country in armed conflict, no study has been conducted to describe the satisfaction with mobility assistive devices in adults with chronic spinal cord injuries (ACSCI). The aim of this study was to describe the level of satisfaction related to adult with spinal cord injury use of wheeled mobility assistive devices.

Methods: This descriptive cross-sectional study involves 126 ACSCI in Goma and Kinshasa between January 2020 and June 2021. The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) was used to assess the intrinsic qualities and services of wheeled mobility assistive devices. Statistical analysis included the chi-squared test or Fisher's exact test with post-hoc Bonferroni correction.

Results: Overall, participants reported being moderately satisfied with intrinsic qualities. Notably, they expressed high satisfaction with solidity (32.5%, $p=0.003$) and general satisfaction with efficacy (48.3%, $p=0.036$). However, there was notable dissatisfaction with dimensions and weight (equality: 33.3%, $p<0.001$). Regarding services, adult with spinal cord injury participants demonstrated a significant level of dissatisfaction with the cost (54.8%, $p<0.001$).

Conclusion: The study highlights significant disparities in the provision and use of WMADs among ACSCIs. While users were generally moderate in their satisfaction with the intrinsic qualities of the devices, they were not satisfied with the service-related aspects. To address these issues, a user-centred national strategy is essential to ensure equitable access to affordable, locally appropriate mobility aids supported by qualified professionals.

Keywords: Users' satisfaction, Wheeled mobility assistive devices, Wheelchair, Democratic Republic of Congo



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INTRODUCTION

Wheeled mobility assistive devices (WMADs), such as manual wheelchairs (MWC) and manual tricycles (MT), improve mobility and promote independence for people with disabilities.¹ WMADs play a crucial role in enabling users to participate in daily activities. Manual wheelchairs are particularly suitable for home use, while manual tricycles are preferred for long-distance travel. According to Rushton, these products also encourage community engagement and greater social participation.² However, the provision of WMADs, including MTs, requires a structured and regulated approach, as misuse can adversely affect users' functioning and well-being. Visagie,³ emphasizes the importance of comprehensive services and appropriate regulation to prevent such problems. The World Health Organization (WHO) also recommends a four-step process for providing reasoned, user-focused care.⁴

According to the literature, the prevalence of wheelchair users varies considerably around the world. While around 1% of people in developed countries use a wheelchair, this proportion is much lower in low-income countries, where the need is greater.⁵ Despite efforts by international, non-governmental and local organizations to promote access to mobility aids for people with disabilities in low-income countries, access to these aids remains a major challenge.⁶ It is estimated that only 5–15% of people with disabilities in these countries have access to the aids they need.^{5,7} Challenges include the scarcity or absence of supply services, the high cost of mainly imported products, the lack of repairs and spare parts, and unsuitable environmental conditions.⁸⁻¹⁰

Thanks to the Convention on the Rights of Persons with Disabilities (CRPD), mobility is now recognized as a right. Consequently, any state that recognizes this right is automatically committed to promoting the mobility of this group by implementing legislation that makes assistive technology products more accessible and affordable.¹¹ Multisectoral collaboration is therefore essential to make the system more operational, particularly in less developed countries.¹² Assistive technology products must undoubtedly be designed to satisfy users by meeting their daily needs.¹³ This satisfaction influences individual expectations and values, enabling the product to be used as an extension of the body.¹⁴ Satisfaction is therefore a multidimensional concept composed of two

components: the intrinsic qualities of mobility aids, and the services associated with acquiring and using them.¹⁴

However, in sub-Saharan Africa, particularly in the DRC, aside from a few journalistic reports describing the distribution and production of mobility aids,^{15,16} there is a notable lack of research on WMADs. This prompted the launch of this study, which aimed to describe the level of satisfaction related to the daily use of WMADs among adults with chronic spinal cord injuries (ACSCI) in the DRC. The hypothesis posits that, in low-income countries such as the DRC, satisfaction relating to intrinsic qualities is higher than satisfaction relating to the services provided.

MATERIALS AND METHODS

Research Design: This descriptive study was conducted in Kinshasa and Goma between January 2020 and June 2021.

Study Area: The Democratic Republic of the Congo (DRC), the second largest country in Africa with more than 112 million inhabitants,¹⁷ has 13.7% of its population living with a disability.¹⁸ For three decades, armed conflicts, particularly in the east, have caused insecurity, mass displacement, and socio-economic decline, increasing the need for humanitarian assistance, especially mobility aids. Recurrent health crises (Ebola, cholera, poliomyelitis, measles) have further weakened the health system, which is marked by high infant mortality and malnutrition.

Rehabilitation services (physiotherapy, orthopaedic fitting, physical rehabilitation, and speech therapy) are coordinated by the National Community-Based Rehabilitation Programme (PNRBC), which covers only a limited geographical area. Despite the relatively large number of physiotherapists, the country faces a severe shortage of rehabilitation professionals, with fewer than ten orthopaedic technicians, occupational therapists, speech therapists, and specialists in physical medicine trained and rehabilitation since 2003.

Since 2015, several reforms have been undertaken, including the ratification of the Convention on the Rights of Persons with Disabilities, the creation of a dedicated ministry, and the adoption of an organic law in favour of people living with disabilities.¹⁹ However, accessibility to buildings, sanitary facilities, and public transport remains highly inadequate.

Local production of mobility aids is limited to four workshops located in Kinshasa, Goma, and Bukavu. Tricycles are manufactured on request, with long waiting times, while manual wheelchairs are assembled from imported parts, purchased on the market, or distributed free of charge, often outside WHO standards. Between 2013 and 2015, the PNRBC trained 162 professionals to improve the prescription and use of manual wheelchairs.

Study Setting: Kinshasa, the capital, spans 9,965 km² with a 2018 population of ~13.9 million across 24 municipalities. It has two MWC assembly workshops and four P&O centres meeting ISPO standards.

Goma, in North Kivu, covers 66.45 km² with ~744,000 inhabitants. The terrain is rugged due to volcanic activity, complicating wheelchair mobility. The city lacks state-run disability agencies. Active DPOs include Paraplegic Solidarity (SOLIPARA) and the Association for the Social Integration of the Physically Disabled (ASHIP).

Study Population/Participants: Participants were ACSCI living in Goma or Kinshasa who had used a MWC or MT daily for at least six months.

Participant recruitment and Sampling Method: Participants were ACSCI living in Goma and Kinshasa who had used a MWC or MT daily for at least six months. The SOLIPARA and APK (Kinshasa's DPO) registries were used for recruitment. SOLIPARA listed 132 individuals, of whom 86 met the criteria. The APK registry listed 92 individuals, of whom 53 met the criteria. Thirteen individuals were lost to follow-up due to a change of address, hospital readmission, death and refusal of participation. Participants were contacted by phone to arrange home or DPO headquarters interviews. A final sample convenience of 126 individuals was obtained: 81 from Goma (64%) and 45 from Kinshasa (36%).

Inclusion Criteria: Age 18–80; Chronic SCI, stabilized for at least 6 months; Residing in Kinshasa or Goma during the study; Daily MWC/MT use for ≥6 months; have signed an informed consent form.

Exclusion Criteria: Any SCI patient not meeting the above criteria

Data Collection: A structured questionnaire was administered directly by trained teams. The Goma team (two physiotherapists and a social worker) was led by a physiotherapist trained in Kinshasa. The Kinshasa team was led by the first author.

Study Instrument: The abridged Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0)(14) was translated into Lingala (Kinshasa) and basic Swahili (Goma). The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST) 2.0 is a 12-question validated questionnaire developed by Demers et al.,¹⁴ It is used to assess user satisfaction with the intrinsic qualities of assistive technology and associated services.

Socio-demographic, clinical, and wheelchair usage data were collected beforehand.

Variables: The main variable of the study was satisfaction including the intrinsic qualities of the WMADs and the services offered by users.

Bias: There would be a selection bias because people with spinal cord injuries who were not registered with the two associations were excluded from the study.

Data Analysis: Data were imported from Excel into SPSS 28.0. Distribution was assessed using the Shapiro–Wilk test. Age was reported as mean ± SD. Categorical variables (e.g., gender, location, device type, satisfaction) were expressed as frequencies and percentages. Fisher's exact or Chi-squared tests with Bonferroni post hoc corrections assessed associations between satisfaction levels and variables such as device type, quality, cost, and services. A significance threshold of $p \leq 0.05$ was applied.

Validity/Reliability of Instrument: Prior to the survey, a pilot study was conducted to gain a better understanding of the participants' views. Nine adults with spinal cord injury (SCI), whose data were not included in this study, completed QUEST 2.0 twice within seven days of each other. The tracking item in the second part of the questionnaire was replaced by cost. This was done in order to retain the original 12 items. The Cronbach's coefficient, which was 0.73, indicated the validity of the tool used.

RESULTS

Table 1: Sociodemographic characteristics

Variable	Category	N = 126	%
Site	Goma	81	64,3
	Kinshasa	45	35,7
Gender	Male	72	57,1
	Female	54	42,9
Age (years)	Mean age	40,6±13	
	less 20	1	0,8
	20 - 40	64	50
	40 - 60	55	43,7
	60 - 80	7	5,6
School level	Unschoolled	5	4
	Primary	68	54
	Secondary	42	33,3
	University	11	8,7
Occupations	Senior or intermediary managers	8	6,3
	Liberal and Skilled Worker	4	3,2
	Service staff and Craftsman	30	23,8
	Unskilled and Miscellaneous workers	25	19,8
	Unemployed	59	46,8

Table I shows that over 60% of participants were from Goma. The sex ratio was 1.3. and the average age was 40.6±13 years with half aged between 20 and 40 years. A majority (58%) had no or only primary education, and 46.8% were unemployed.

According to Table II, 60.3% used MWCs, 26.2% used MTs, and 13.5% used both. Most (57.9%) used imported WMADs, while 26.2% used hybrid devices (imported MWCs adapted locally). Half the participants reported using WMADs for over 6 hours daily. Only 14.3% engaged in regular physical activity.

Table 2: Daily use of WMADs

Variable	Category	N = 126	%
Type of technology	MWC	76	60.32
	MT	33	26.19
	MWC+MT	17	13.49
Kind of technology	Local	38	30.20
	Imported	73	57.90
	Modified	15	11.90
Number of hours on WMADs	< to 1 hours	19	15.02
	1 to 6 hours	44	34.92
	> to 6 hours	63	50.0
Sport practice	Yes	18	14.30
	No	108	85.70

Legend: MWC: Manual Wheelchair; MT: Manual Tricycle; MWC+MT: Manual Wheelchair and Manual Tricycle; WMADs: Wheeled Mobility Assistive Devices

As shown in Figure 1, satisfaction with intrinsic WMAD qualities was moderate. “Ease of use” was rated most positively (73%), followed by comfort (56.3%), safety (55.6%), durability (52.4%), adjustability (48.4%), weight (45.3%), and dimensions (44.4%). Efficiency was considered satisfactory by 48.4% of respondents.

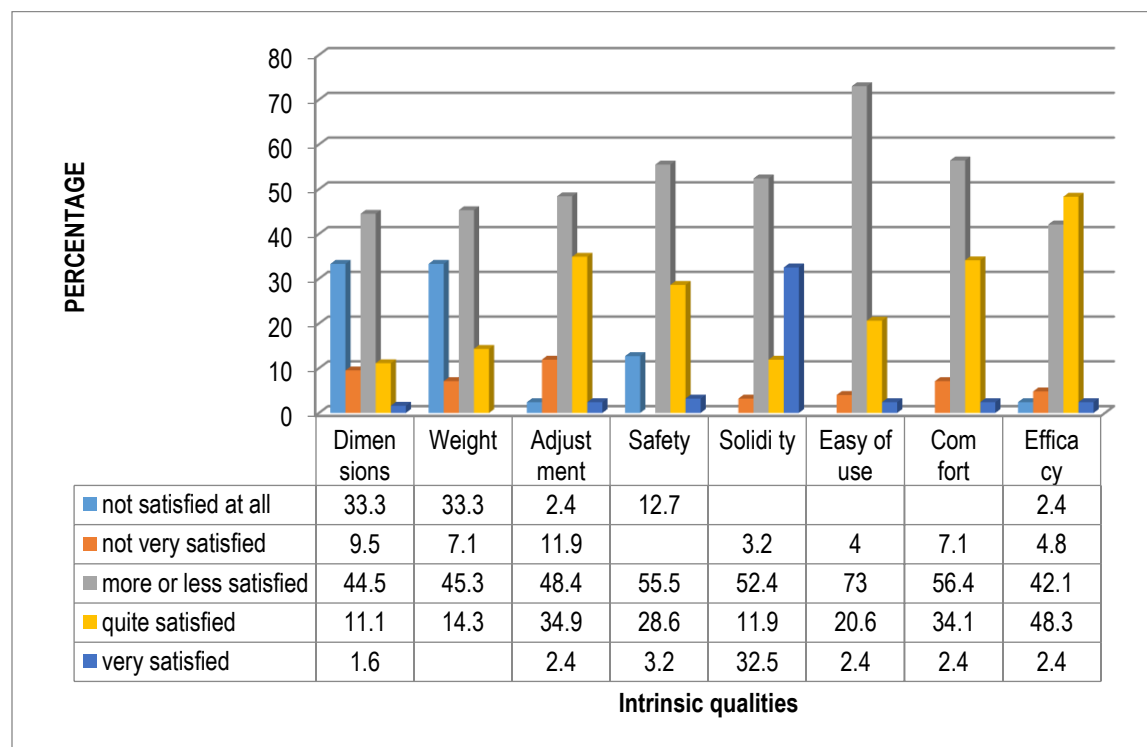


Figure 1 : Quest sub-scale: Intrinsic qualities

Services Related to WMAD Provision

Figure 2 highlights user dissatisfaction with service components. Repair services were rated “not very satisfactory” by 59.5%, administrative procedures as “more or less satisfactory” by 70.6%, and professional services as “quite satisfactory” by 43.7%. The cost of WMADs received the lowest satisfaction, with 54.8% “not at all satisfied.”

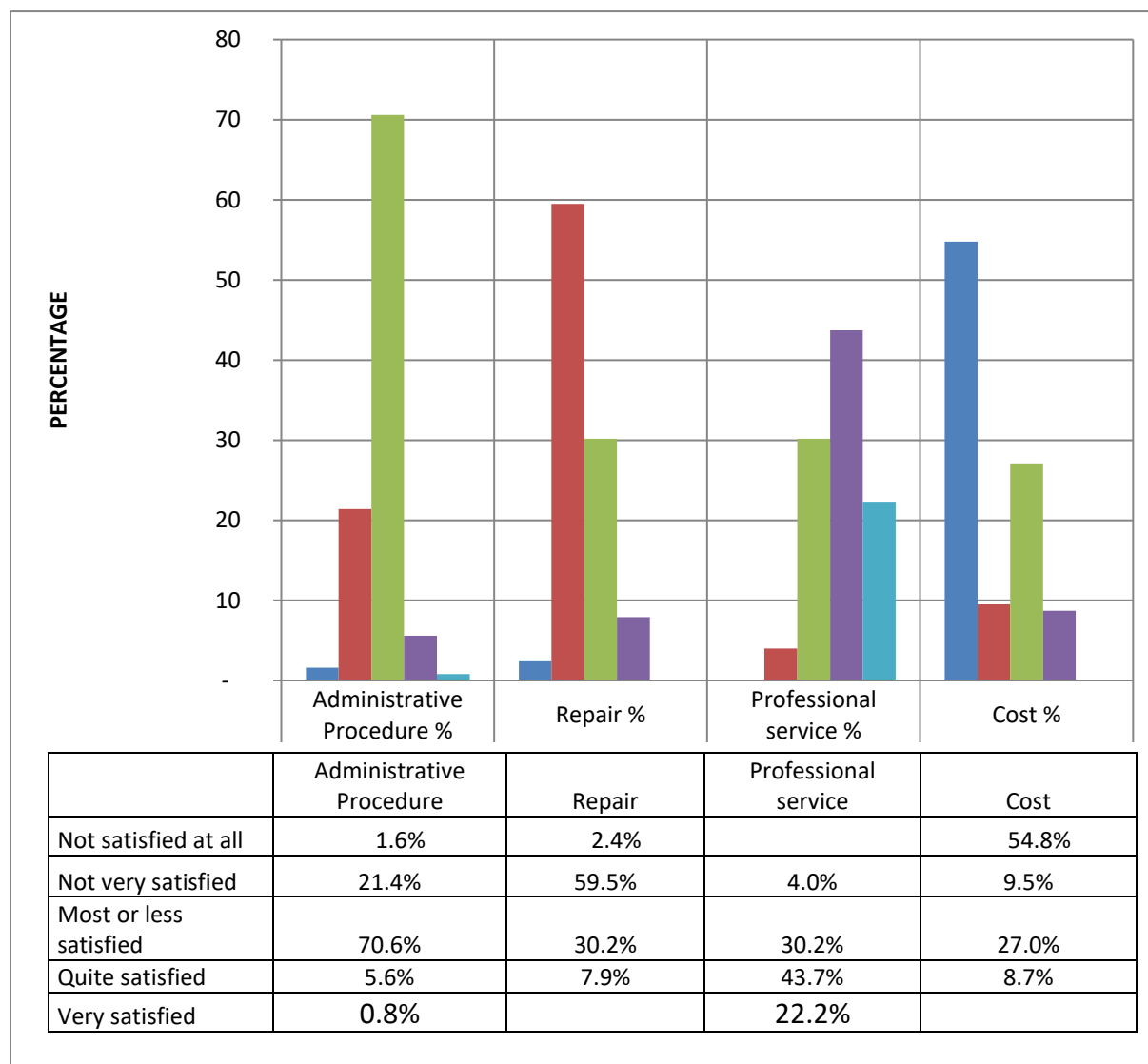


Table 3 shows a significant association between satisfaction and the cost of WMAD acquisition ($p = 0.000$), and between satisfaction and the intrinsic qualities of the devices ($p = 0.036$).

No significant associations were found between satisfaction with services and WMAD type ($p = 0.482$), device quality ($p = 0.83$), or type of service received ($p = 0.646$).

Table 3: Association between satisfaction level with quality and type of technology

Parameter	Not satisfied at all	Quite satisfied	More or less satisfied	Satisfied	Total	Plus-value
Kind of technologies						
Cost Satisfaction						
Local	43 (62.3)	2 (16.6)	4 (11.8)	8 (72.7)	57 (45.2)	0.000
Imported	26 (37.7)	5 (41.7)	21 (61.7)	2 (18.2)	54 (42.9)	
Modified	0 (0.0)	5 (41.7)	9 (26.5)	1 (9.1)	15 (11.9)	

Parameter	Not satisfied at all	Quite satisfied	More or less satisfied	Satisfied	Total	Plus-value
Total	69 (100)	12 (100)	34 (100)	11 (100)	126 (100)	
<i>Satisfaction with intrinsic qualities</i>						
Local		0 (0.0)	46 (46.5)	11 (47.8)	57 (45.2)	0.036
Imported		2 (50.0)	40 (40.4)	12 (52.2)	54 (42.9)	
Modified		2 (50.0)	13 (13.1)	0 (0.0)	15 (11.9)	
Total		4 (100)	99 (100)	23 (100)	126 (100)	
<i>Satisfaction with services</i>						
Local		1 (11.1)	50 (46.3)	6 (66.7)	57 (45.2)	0.83
Imported		5 (55.6)	47 (43.5)	2 (22.2)	54 (42.9)	
Modified		3 (33.3)	11 (10.2)	1 (11.1)	15 (11.9)	
Total		9 (100)	108 (100)	9 (100)	126 (100)	
Type of technologies						
<i>Cost Satisfaction</i>						
MWC	33 (47.8)	11 (91.7)	32 (94.1)	7 (63.6)	83 (65.9)	0.000
MT	34 (49.3)	1 (8.3)	2 (5.9)	4 (36.4)	41 (32.5)	
MWC+MT	2 (2.9)	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.6)	
Total	69 (100)	12 (100)	34 (100)	11 (100)	126 (100)	
<i>Satisfaction with intrinsic qualities</i>						
MWC		4 (100.0)	62 (62.6)	17 (73.9)	83 (65.9)	0.482
MT		0 (0.0)	35 (35.4)	6 (26.1)	41 (32.5)	
MWC+MT		0 (0.0)	2 (2.0)	0 (0.0)	2 (1.6)	
Total		4 (100)	99 (100)	23 (100)	126 (100)	
<i>Satisfaction with Services</i>						
MWC		8 (88.9)	69 (63.9)	6 (66.7)	83 (65.9)	0.646
MT		1 (11.1)	37 (34.3)	3 (33.3)	41 (32.5)	
MWC+MT		0 (0.0)	2 (1.8)	0 (0.0)	2 (1.6)	
Total		9 (100)	108 (100)	9 (100)	126 (100)	

Legend: MWC: Manual Wheelchair, MT: Manual Tricycle, MWC+MT: Manual Wheelchair and Manual Tricycle

DISCUSSION

The aim of this study was to describe the level of satisfaction with the daily use of WMADs among people with ACSCI in Goma and Kinshasa.

As previous studies,^{3,19-21} the sample was predominantly male, with this predominance attributed to men's greater exposure to high-risk activities.²² Half of the participants were unemployed, reflecting widespread socioeconomic hardship in the DRC. In Kinshasa, Lelo and Tshimanga,²³ reported that 74.6% of residents were unemployed or engaged in informal employment. These conditions are likely to be worse for individuals with mobility impairments and are consistent with findings in India and Peru.²⁴

Despite 50% of participants using their WMADs for over 6 hours daily—suggesting high reliance—overall

satisfaction was only moderate. This contradiction may certainly stem from acquisition methods that frequently disregard WHO guidelines.²⁵ Most devices are donated or purchased informally without prescription or proper prior assessment, which may lead to poor fit and dissatisfaction or even abandonment^{3, 26} also stressed that lacking support services negatively affects satisfaction.

According to WMAD users of these studies intrinsic qualities were more important than services. The lack of a structured system for procurement, maintenance, and follow-up is likely one of the reasons for this. A similar situation occurred in Uganda, where Musenyente et al. reported that the lack of repair and maintenance services reduced satisfaction with comfort, safety, and functionality.²⁷

Furthermore, in both Goma and Kinshasa, very few participants used adapted WMADs, contrasting with findings by Kamaraj.²⁸ This could be explained by a lack of skilled personnel to perform such task and by use of under-equipped informal workshop for specific WMAD adaptation. Unsurprisingly, these workshops could not produce the expected result.

This study found that MWCs were used more frequently than MTs, most likely because they were more readily available on the local market. However, MT production is limited, with units requiring pre-order, resulting in long lead times and high costs.

In addition, their metal frames were highly appreciated for their durability, which proved ideal for tackling the rocky terrain and rugged infrastructure of Goma and Kinshasa.²⁶ Adaptability and comfort were also considered important. Despite moderate satisfaction, this choice was justified by their ease of assembly and manoeuvrability.

The study also noted that efficiency is the top priority, followed by durability, fit and comfort. These results differ from those obtained in South Africa,²¹ where users prioritised weight, safety and durability, and from those in Zimbabwe,²⁹ where comfort was the main consideration.

However, there has been some dissatisfaction expressed regarding the weight and size of WMADs, particularly with regard to MTs, which are bulky and rigid. Furthermore, they are best suited to users with sufficient upper-limb strength. MTs are also difficult to store in the cramped housing typical of Kinshasa and Goma²³ and are unable to use public transport due to their size and the lack of accessible infrastructure.

Even foldable, lightweight MWCs pose problems: taxis charge a surcharge to carry them. This restricts the travel of users who already face economic hardship.³⁰

Furthermore, people with spinal cord injuries have low physical strength and require a lot of energy to use WMADs, which leads to them getting tired quickly.²⁶

Similar findings regarding dissatisfaction with repairs have been observed in low-income countries where imported spare parts are scarce and expensive.³¹⁻³³ Poor maintenance and unsuitable WMADs further increase the frequency of breakdown,³² a phenomenon exacerbated by a lack of qualified personnel and an inaccessible environmental context.

Cost was the most dissatisfying aspect of WMAD use, highlighting the link between disability and poverty,^{8,30,34} as well as users' exclusion from society.

Only the association between satisfaction and intrinsic qualities, as well as cost, was statistically significant ($p = 0.000$). This confirms that cost remains a critical factor for access and satisfaction, in accordance with Williams et al..³⁴

Study Strengths: This is the first study on the satisfaction of people with SCI in the DRC, which identified major gaps in service delivery. It could serve as a basis for future national or comparative studies.

Limitations: The results should be interpreted with caution due to the limited geographic scope of the study (two urban provinces out of 26). Furthermore, many participants had limited knowledge of their medical history, which limited the ability to delve deeper into clinical aspects.

People with spinal cord injuries who were not registered with the two associations' registries were automatically excluded from the study. This introduced a selection bias, meaning the results could not be applied to the general population.

Implications of the findings

The results of this study suggest implementing a user-centred national strategy to ensure equitable access to affordable, locally adapted mobility aids supported by qualified professionals. In accordance with the Convention on the Rights of Persons with Disabilities, the DRC government must establish long-term, sustainable mechanisms to finance services, support local production, train staff and provide follow-up care. Strengthening the autonomy, participation and quality of life of people with disabilities is essential, as is the case in technologically advanced countries.

CONCLUSION

This study highlights significant disparities in the provision and use of WMAD among ACSCI in Kinshasa and Goma. Although users generally expressed moderate satisfaction with the intrinsic qualities of the devices, such as durability, comfort and effectiveness, they did not rate service-related aspects, such as procurement processes, repairs and cost, as highly. As in other low-resource countries, these findings suggest an absence of a system that aligns with WHO guidelines, and emphasize the ongoing link between disability and

poverty, a significant barrier to accessing assistive technologies.

Declarations

Conflict of interest declaration: None declared.

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Ethical conformity statement: The protocol for this study was submitted to the National Ethics Committee of the Health Ministry and approved by Opinion No. 221/CNES/BP/PMMF/2020 du 1/12/2020. In accordance with the Declaration of Helsinki, each participant signed an informed consent form and consented to completing the questionnaire.

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