Users' Satisfaction with Prosthetic and Orthotic Assistive Devices in the Lao People's Democratic Republic: a Cross-sectional Study

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ABSTRACT

Purpose: *User satisfaction with assistive devices is a predictor of use and an important outcome measure. This study evaluated client satisfaction with prosthetic and orthotic assistive devices and services in three provinces in the Lao People's Democratic Republic.*

Method: *A cross-sectional study was done, using the Quebec User Evaluation of Satisfaction with Assistive Technology questionnaire. The sample was drawn from the client register of three of the five Rehabilitation Centres in the country which are under the Ministry of Health's Centre for Medical Rehabilitation. Clients were eligible if they had received their device in the 12 months prior to the study. Based on the number of registered clients, the sample size was calculated as 274 with a 95% confidence interval, with the final sample N = 266. Qualitative semi-structured interviews were also conducted (N = 34).*

Results: *Most of the assistive devices were in use at the time of the survey and were reported to be in good condition (n = 177, 66.5%). The total mean score for satisfaction (services and device combined) was 3.80 (SD 0.55). Statistically significant differences were observed in satisfaction between gender and location of residence. Effectiveness and comfort were rated as the two most important factors when using a device; at the same time, these were the most common reasons for dissatisfaction and sub-optimal use.*

Conclusion and Implications: *Clients were quite satisfied with the assistive device and services provided, yet many reported barriers to optimal device use and difficulties in accessing follow-up services. There is a need to examine how prosthetic and orthotic devices can be improved further for better comfort and*

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ambulation on uneven ground in low-resource contexts and to address access barriers.

Key words: *User satisfaction; prosthetic devices; orthotic devices; QUEST 2.0; low-income country; Lao PDR*

INTRODUCTION

The Convention on the Rights of Persons with Disabilities (CRPD) obliges States Parties to progressively ensure the right to health (Article 25) and to rehabilitation services (Article 26) for people with disability (United Nations, 2008). The Lao People's Democratic Republic (PDR), a lower-middle income country in South East Asia, is a State Party to the CRPD and has established a cross-ministerial body, the National Committee for Disabled Persons (NCDP), to act as the national focal point on disability (Prime Ministerial Decree No. 18/1995). The decree on the Rights of Persons with Disabilities provides for equitable access to healthcare, rehabilitation and assistive devices (Section 3). Little is known, however, about the rehabilitation and assistive device needs of people with disabilities (Epprecht et al, 2008), the extent to which devices function well and are maintained, or about client satisfaction with the services and devices they receive. Understanding satisfaction is important because it is a key predictor of assistive technology abandonment and participation (Simon and Patrick, 1997; Demers et al, 1999; Demers et al, 2002; Bosmans et al, 2009). While studies have been undertaken in high-income countries, few studies have examined user satisfaction in lower-income countries and this has been identified as a critical gap in the research (Matsen, 1999; Jensen et al, 2005; Magnusson et al, 2013, 2014).

User satisfaction reflects a client's needs, perceptions of the quality of the service and the device, and the extent to which client's priorities are aligned with his/her experience (Demers et al, 2002; Bosmans et al, 2009; Magnusson et al, 2013). It includes the technically correct manufacturing of the device, cosmetic appearance, comfort and functioning relative to needs (Bosmans et al, 2009; Peaco et al, 2011; Magnusson et al, 2014). Factors that affect client satisfaction with healthcare services include provider competence, being treated with respect, provision of information, emotional support, efficiency and structure and facilities (Donelan et al, 1999; Jennings et al, 2005; Sofaer and Firminger, 2005).

Objective

The purpose of the present study was to investigate clients' satisfaction with their prosthetic or orthotic device and related service delivery in the Lao PDR. The study is an important contribution to the emerging body of empirical evidence on user satisfaction of health- related services in lower-income settings.

METHOD

The study used a cross-sectional design with the Quebec User Evaluation of Satisfaction with Assistive Technology - QUEST 2.0 questionnaire (Demers et al, 1999) to measure satisfaction. This tool was chosen because it is relatively simple to administer in a low-resource environment, and has a clear and standardised methodology (Demers et al, 2002). The QUEST has been used with diverse population groups who use assistive devices to compensate for physical impairments, and its reliability and validity are well established (Wessels and De Witte, 2003; Bosmans et al, 2009). A detailed description of the measure can be found in the QUEST 2.0 manual. In this study, assistive device refers to prostheses or orthotic devices.

Setting

Prosthetic and orthotic services in the Lao PDR are provided by the Ministry of Health, under the Centre for Medical Rehabilitation (CMR), in cooperation with the non-governmental organisation COPE. There are five rehabilitation centres, each in urban provincial centres, with each one providing services that include prosthetics, orthotics, physical therapy and occupational therapy. Services are free of charge at point of use, funded mainly through international support. Clients presenting at the facilities are reimbursed for the cost of their travel, including for one companion or carer, and receive a small living allowance while staying at the facility.

This study was undertaken in three of the Centre's facilities: Vientiane in the centre, Savannakhet in the south, and Xieng Khouang in the north. Many of the lower limb prosthetic users have been injured by unexploded ordnance (UXO) or a landmine, as a result of armed conflict during the Second Indo-China War (National Regulatory Authority, 2009). Other reasons for use of prosthetic or orthotic devices include leprosy or road or industrial injuries.

Study Participants

The sample was drawn from the client register at each of the three facilities. Clients were eligible if they had received prosthetic and/or orthotic treatment at the centre in the 12 months prior to the study. Based on the number of clients in the registers, the sample size was calculated as 274 with a 95% confidence interval, using the proportion of satisfaction as 50% in the absence of baseline data (Toole, 2004). The intent was to use the facility records to systematically select a random sample. As the facility data and contact details were often inaccurate, however, the authors also relied on local rehabilitation staff and village leaders to assist in contacting potential respondents to reach the desired sample size. Efforts were made to ensure that the sample was representative of the proportion of male and female clients and category of devices provided, based on available data. Table 1 shows the demographic details of the final sample (N = 266). In addition, 34 clients were purposively identified for qualitative interviews to complement the survey data (Creswell, 2009; Mertens, 2010).

Table 1: Number of Participants included in the Study

	Prosthetic	Orthotic	Clubfoot	General	Total
VTE	57 (57)	49 (50)	22 (27)	29 (29)	157 (163)
SVK	53 (58)	3 (3)	5 (5)	2 (2)	63 (68)
XK	30 (30)	5 (5)	10 (6)	1 (1)	46 (43)
Total	140 (145)	57 (57)	47 (38)	32 (32)	266 (274)

Calculate sample size=274

Actual sample size=266, thus the response rate was 97.1%.

Data Collection

The QUEST comprises 12 items, of which 8 items relate to user satisfaction with assistive devices and 4 items relate to services. Responses for the QUEST items are based on a 5-level response scale, with 1- Not satisfied at all; 2 - Not very satisfied; 3 - More or less satisfied; 4 - Quite satisfied; and 5 - Very satisfied (20). Additionally, questions related to demographics and the training provided, including duration and type of training, were included. The questionnaire was administrated by trained enumerators from the University of Health Sciences, Lao PDR, in face-to-face interviews which lasted for approximately 20 minutes. Face-to-face interviews are a common survey method in the Lao PDR. This

method was chosen as many of the respondents were in rural areas and there were concerns that illiteracy would prevent potential respondents from being able to complete the survey (Toole, 2004).

Permission was received to translate the English version of QUEST 2.0 into Lao. The questionnaire was independently translated by a Lao language native speaker with a high proficiency in English and extensive experience in research among rural communities in the Lao PDR. The translated version was independently checked by another proficient Lao and English speaker to ensure that it retained the meaning of the original version. The items were also checked by CMR and COPE staff to ensure technical terms were translated correctly and in a way that would be understood by rural populations. Following this, the questionnaire was piloted with a small group of respondents.

Qualitative interviews used a semi-structured interview guide related to the domains of satisfaction included in the QUEST. Interviews were conducted in the Lao language, in a location convenient to the participant. When a participant preferred to use the local ethnic language, interviews were conducted with the aid of a Lao- speaking interpreter. Interviews took approximately 45 minutes, were audio-recorded with permission and transcribed by a Lao transcriptionist.

Data Analysis

Data was entered into SPSS for analysis. The total score and sub-scores of the items related to satisfaction with services and satisfaction with the assistive device were calculated by averaging the valid responses to the assigned items (range 1–5). Descriptive statistics were generated and the mean, standard deviations (SDs) and medians were calculated. As the distribution of the data was normal, sub-groups in the study population (sex, rural/urban location, treatment location, device type -orthotic/ prosthetic) were compared using one-way ANOVA with regard to the following variables: number of hours spent using the assistive device, satisfaction with the assistive device and services. A p-value of $<.05$ was taken to indicate a statistically significant association. Qualitative data was transcribed into English and coded manually by two of the researchers, looking for both similarities and differences between the qualitative data and the survey data, and seeking explanatory data (Creswell, 2009; Miles et al, 2014). Coding and analysis continued throughout the writing process (Miles et al, 2014). Findings were presented to CMR and COPE programme staff in a workshop, as a way of checking findings and obtaining recommendations.

Ethics

The study was approved by the National Ethics Committee for Health Research, Ministry of Health, the Lao PDR. All the contacted clients were provided with information about the aim and design of the study, and informed consent was obtained. Potential client respondents were informed that there would be no direct benefit to them, but where travel was required compensation for travel expenses would be provided. In the case of respondents below 15 years of age, the main caregiver was interviewed.

RESULTS

Socio-demographic Characteristics of Participants

Of the 266 participants, 183 (68.8%) were male and 83 (31.2%) were female, as indicated in Table 2. Just over half (N = 149, 56%) were from rural locations. Only 36 (13.5%) had completed secondary school. Just under half of the participants gave their occupation as being 'at home' (N = 119, 44.7%).

Table 2: Socio-demographic Characteristics of Participants

Variables	N (266)	Percentage
Sex		
Male	183	68.8
Female	83	31.2
Age (Mean; Min; Max)	48.23 years+23.53	(Min = 3 months; Max = 90 yrs)
Median	53 years	
Province		
Vientiane	157	59.0
Savannakhet	63	23.7
Xieng Khouang	46	17.3
District		
8 districts in Vientiane	161	60.5
8 districts in Savannakhet	63	23.7
5 districts in Xieng Khouang	42	25.8
Urban/Rural		
Urban	117	44.0

Rural	149	56.0
Distance from CMR centre in KM	Mean=32.38	Min=1
	SD=36.36	Max=218
Ethnicity		
Lao	218	82.0
Khamu	23	8.6
Hmong	18	6.8
Taiphouane	4	1.5
PhouTai	2	0.8
Tai Deng	1	0.4
Highest level of education		
No schooling	80	30.1
Some primary school	70	26.3
Completed primary school	53	19.9
Some secondary school	27	10.2
Completed secondary school	14	5.3
Above secondary school	3	1.1
Vocational training	19	7.1
Occupation		
At home	119	44.7
Farmers	6	2.3
Pension	36	13.5
Workers	25	9.4
Government officer	20	7.5
Sellers, small business	14	5.3
Students	7	2.6
Child	33	12.4
Soldier/Police	5	1.9
Monk/Nun	1	0.4

Of the 34 qualitative participants, 22 were male and 13 were female, with a mean age of 46.5 years, and had completed at least some primary schooling. Fifteen of the respondents were from Vientiane, 10 were from Savannakhet, and 10 were from Xieng Khouang.

Assistive Devices and Use

Table 3 presents the underlying cause of disability and the type of assistive device. The most common causes of disability for prosthetic users were UXO/ mine/war injury (N= 88, 61.5%), followed by road traffic injury (N = 26, 18.2%) and poor healthcare (N = 15, 10.5%). The most common causes of disability for orthotic users were congenital (N = 39, 31.2%), followed by unknown cause (N = 36, 31.2%) and accidents (N = 31, 24.8%). Most of the devices were in use at the time of the survey and were reported to be in good condition (N = 177, 66.5%), although approximately 16.2% (N= 43) that were in use needed repairs. On average, clients used their device for 7.21 hours (SD=5.67) per day. There were no statistically significant differences between prosthetic and orthotic clients in terms of satisfaction.

Table 3: Cause of Disability, type and use of Assistive Device

Variables	N	%
Cause of disability for prosthetic users (N=143)		
UXO/mine/war injury	88	61.5
Road traffic injury	26	18.2
Congenital	2	1.4
Cancer	2	1.4
Diabetes	2	1.4
Poor healthcare	15	10.5
Snake bites	3	2.1
Violence	4	2.8
Unknown	1	0.7
Cause of disability for orthotic users (N=123)		
Polio	12	9.8
Accident	30	24.4
Stroke	1	0.8
Unknown	36	29.3
Congenital	39	31.7
War	5	4.1
Type of assistive device		
Trans-femoral prosthesis	37	13.9
Bilateral prosthesis	1	0.4
Trans-tibial prosthesis	98	36.8

Ankle-foot orthosis	8	3.0
Knee-ankle-foot orthosis	20	7.5
Double knee-ankle-foot orthosis	24	9.0
Body Corset	52	19.5
Bilateral transhumeral prosthesis	1	0.4
Transradial prosthesis	1	0.4
Wheelchair	11	4.1
Foot orthosis	10	3.8
Hand prosthesis	2	0.8
Neck orthosis	1	0.4
Duration of receiving the device from CMR/provincial rehabilitation centre		
Less than 3 months	9	3.4
3-5 months	17	6.4
5-7 months	6	2.3
More than 7 months	234	88.0
Duration since receiving last treatment at CMR/provincial rehabilitation centre		
Less than 3 months	30	11.3
3-5 months	27	10.2
5-7 months	16	6.0
More than 7 months	193	72.6
General condition of device		
Never used	8	3.0
Broken, cannot be used	4	1.5
In use, but needs repair	43	16.2
In use, good condition	177	66.5
Have been used, but not used currently	34	12.8
Average no. of hours in a day for wearing the assistive device	Mean=7.2 SD=5.67	Min=0 Max=24

The most common reasons given for not using a device, or using a device sub-optimally, related to comfort and included pain, wounds or sores, too hot to wear, poor fit, or the assistive device had broken. Where the assistive device was not being used, respondents managed by improvising; where the assistive device was

broken, they attempted to repair it themselves. Participants frequently mentioned how they valued the fact that the service enabled them to be more mobile, earn a living, feel less shy or self-conscious when going out, and improved their self-esteem and sense of well-being.

Satisfaction with Assistive Device and Service

Overall, the clients were quite satisfied with the assistive device and services provided. The total mean score for satisfaction (services and device combined) was 3.80 (SD 0.55). Table 4 shows clients' satisfaction with their assistive device and with services received, as per the criteria included in the QUEST 2.0.

Table 4: Satisfaction with Assistive Devices and Services (N=266)

Client satisfaction with assistive devices					
Variables	**Not satisfied at all N (%)**	**Not satisfied N (%)**	**More or less satisfied N (%)**	**Quite satisfied N (%)**	**Very satisfied N (%)**
Dimensions (size, height, length, width)		16(6.0)	62(23.3)	138(51.9)	50(18.8)
Weight		12(4.5)	83(31.2)	140 (52.6)	31 (11.7)
Ease in adjusting (fixing, fastening)		13 (4.9)	76 (28.6)	151 (56.8)	25 (9.8)
Safe and secure		15 (5.6)	56 (21.1)	164 (61.7)	31 (11.7)
Durability (endurance, resistance to wear)		5 (1.9)	55 (20.7)	171 (64.3)	35 (13.2)
Easy to use		9 (3.4)	69 (25.9)	169 (63.5)	19 (7.1)
Comfortable		16 (6.0)	69 (25.9)	153 (57.5)	28 (10.5)
Effective (the degree to which your device meets your needs)		16 (6.0)	55 (20.7)	158 (59.4)	37 (13.9)

Client satisfaction with the services					
Variables	**Not satisfied at all N (%)**	**Not satisfied N (%)**	**More or less satisfied N (%)**	**Quite satisfied N (%)**	**Very satisfied N (%)**
Service delivery programme			26 (9.8)	182 (68.4)	58 (21.8)
Repairs and servicing		2 (0.8)	42 (15.8)	182 (68.4)	40 (15.0)
Quality of the professional services (information, attention)		1 (0.4)	39 (14.7)	193 (72.6)	33 (12.4)
follow-up services (continuing support services)		9 (3.4)	61 (22.9)	173 (65.0)	23 (8.6)
Variables	**N**	**Mean+SD**	**Min**	**Max**	
Device subscale score (Q1-8)	266	3.77+0.60	2.0	5.0	
Services subscale score (Q9-12)	266	3.84+0.51	2.25	5.0	
Total Quest score (Q1-12)	266	3.80+0.55	2.13	5.0	

Table 5 shows the frequency of the important satisfaction items in relation to the assistive device.

Table 5: Frequency of the important Satisfaction Items

Variables	N (266)	Percentage (Yes)
Device		
Effectiveness	102	38.3
Comfort	94	35.3
Durability	82	30.8
Dimensions	66	24.8
Safety	66	24.8
Weight	48	18.0
Easy to use	38	14.3
Adjustability	37	13.9

Services		
Service delivery (e.g. procedures, length of time)	170	63.9
Professional service	105	39.5
Repairs	76	28.6
Follow-up	20	

The most common themes in the qualitative data related to comfort, and broadly reflected the themes in the QUEST in terms of comfort and the extent to which the assistive device was aligned to the clients' expectations and needs. Common complaints were that it was difficult to walk long distances or uphill using their assistive device due to the weight and/or poor flexibility of the device, their discomfort and pain, as well as wounds and skin irritations. These limitations prevented optimal use and led, in some cases, to abandonment. The common complaints were:

> *"It's difficult to walk, I need it (prosthetic device) to be more flexible and lighter - when I walk for a long time, it is painful, hot to wear and it feels heavy"*(P2_PV).
>
> *"It is so uncomfortable when I breathe and it does not seem to be the right size"* (P1_GV).
>
> *"She dislikes using it (club foot orthotic) because it is painful so she uses for only about 1 hour per day"* (P2_CV).

A statistically significant difference was observed between satisfaction with assistive device and male and female clients (M = 3.85+.56, F = 3.60+.65, p =.006). A one-way ANOVA was used to examine differences between rural and urban places of residence and reported satisfaction with the assistive device, and showed a statistically significant difference (p =.04, mean for rural location 3.87, SD.56, and for urban location 3.65, SD.63). A statistically significant association was also observed between device satisfaction and location of treatment (p =.001, mean satisfaction Vientiane 3.69, SD.57; Xieng Khouang 3.85, SD.59; Savannakhet 3.9, SD.67).

An ANOVA was performed to investigate differences between number of hours of assistive device use by the population sub-groups of sex (male/female), residential location (rural/urban) and location of treatment (Vientiane/Xieng Khouang/Savannakhet). A statistically significant association was observed (p =.001) between males (mean = 8.26, SD 5.57) and females (mean=… SD …), and

urban/rural location of residence (p =.038, rural mean = 7.85, SD 5.31, urban mean = 6.4, SD 6.07).

In terms of satisfaction with services, most of the participants (N = 207, 77.8%) felt they had been treated with respect at the prosthetic and orthotic facility. The factors that participants appreciated most about the services were that the staff were generally pleasant, the service was free of charge and the cost of transportation was reimbursed. Given the ethno-linguistic diversity in the Lao PDR, the respondents were also asked if the prosthetic and orthotic staff spoke the same language as they did. Approximately two-thirds(N = 178, 66.9%) reported that the staff spoke enough to communicate, and 88 (33.1%) said they spoke a little or not at all and this acted as a barrier to accessing services. In such cases, a male carer would often accompany the female client and translate. Some female clients said they felt shy or embarrassed being measured for their device by a male worker. In the qualitative interviews, respondents were generally happy about the technical skills of the staff but a few expressed their reservations, especially where the device did not meet their expectations either in use or durability. For most respondents, more important than technical skills was the feeling of being treated with respect and dignity, and in a timely fashion. In terms of the physical environment, women said they would prefer to have separate latrines and washing facilities, especially when they had to stay overnight in the facility.

In rural areas, capacity to travel was affected by the harvest and planting seasons, with accessibility further curtailed during the rainy season. Other difficulties included poor access to appropriate and affordable transport, time constraints of the persons with the disability or their supporters, and the opportunity costs also involved with travel to a facility.

"My house is very far from the service centre. I don't have enough money (for the transport) and my Lao language is weak and the person who accompanies me to the service centre is often busy" (P2_PK).

"Mostly, I don't have time to go and there is no one to take me to the service centre, my house is far from the centre, the road in the rain season is bad and I don't have much money"(P3_PK).

"It is just the distance – it is so far... about 130 km and I have no transportation" (PG_S).

Participants were asked to choose what they considered were the 3 most

important items among the 12 items included in QUEST 2.0. They chose service delivery (N = 170, 63.9%), quality of the professional services (N = 105, 39.5%) and effectiveness in meeting their needs (N = 102, 38.8%). Most of the participants were 'more or less satisfied' with the training they received (N= 169, 63.5%), 29% (n = 77) were 'quite or very satisfied', and 20 (7.5%) were 'not satisfied' with the training. A one-way ANOVA was conducted to examine differences in satisfaction with the service received between males and females. There was a statistically significant difference (p -=.006, males mean = 3.89, SD.49, females mean = 3.71, SD.55). A one-way ANOVA undertaken to explore differences between reported satisfaction with services revealed a statistically significant difference (p =.001) between urban-based residents (scoring a mean of 3.72, SD.52) and rural-based residents (scoring a mean of 3.93, SD.49). Reported satisfaction with services and location of treatment were also investigated, witha statistically significant association observed (p =.001, Vientiane mean = 3.74, SD.47; Xieng Khouang = 3.90, SD.54; Savannakhet = 3.84, SD.51). A comparison of the type of device (prosthetic or orthotic) revealed there was no statistically significant difference between the number of hours people reported wearing their device, satisfaction with the device or service.

Despite some of the real or perceived limitations of their assistive device, one of the most important benefits reported was the improved level of autonomy they experienced since using one.

"My life has changed.. I can go out and work and earn money and go out to meet other people" (P10_GS).

"I can go anywhere, it made me want to be alive.... I can earn a living and also work by myself"(P4_KP).

Suggestions from respondents for improving assistive devices and services referred to the use of more flexible material to improve comfort, provision of more information about the service, helping clients to navigate through the systems, as well as having staff who were more friendly and polite. Other comments related to improving access to repairs and assistive device maintenance services.

DISCUSSION

As far as the authors are aware, this study is the first in the Lao PDR that has looked at client satisfaction with prosthetic and orthotic devices. The findings show that clients were quite satisfied with their assistive device, although the

reported level of satisfaction was less than has been observed in other developing countries (van Brakel et al, 2010; Magnusson et al, 2013; Lee, 2014). In each of the studies, the polypropylene technology developed by the International Committee of the Red Cross is used in the manufacture of assistive devices.

While respondents reported being quite satisfied with their device, this must be tempered by the fact that about 17.3% of participants reported that their device was in need of repair, only 66.5% of devices in use were reported to be in good condition, 12.8% said they were not currently using their device, and some of them had not used their device at all. Furthermore, effectiveness and comfort were rated as the two most important factors in device use, and were also the most common reasons for dissatisfaction. Some caution is needed, therefore, in interpreting the high satisfaction score. It is likely that factors contributing to satisfaction include the absence of alternative services, and that services and devices are provided free of charge, including the costs of travel and meals while at the facility (Chen et al, 2014). Considering this, it is possible that participants felt that negative evaluations would be construed as ingratitude, especially given the high out-of-pocket expenses for other healthcare services (Patcharanarumol et al, 2009; Wagstaff and Lindelow, 2010; Akkhavong et al, 2014). Moreover, most of the participants had low levels of education, which has been associated with having lower expectations of healthcare services (Hall and Dornan, 1990). Lower limb devices in particular did not always meet clients' functional needs. The devices were reported to be very rigid, and this may explain some of the difficulties regarding walking on uneven or sloping ground. This has been documented as a common complaint in other low-resource contexts (Magnusson et al, 2013). Other causes of dissatisfaction with, or reasons for sub-optimal assistive device use or even abandonment, included pain and wounds. In Malawi, Magnusson et al (2013) also found that pain and difficulties in ambulating on uneven surfaces were important barriers to optimal assistive device use. While the durability provided by polypropylene technology for assistive devices is important, especially in low-resource contexts, durability considerations should be balanced with user priorities of effectiveness and comfort, and more attention should be given to device design in relation to the user's environment. Providers also need to pay attention to whether devices cause the client any discomfort or pain (Chen et al, 2014).

Improved client training may also enhance comfort and satisfaction with assistive devices. In this study, longer training was associated with longer device use. Training should include ensuring that clients have an understanding of the optimal

usage of the device, as well as ensuring they have alternative mobility options (e.g., crutches or wheelchairs). Also important is managing client expectations so that they are aware of the benefits of the device, as well as any limitations. Unlike the Malawi study (Magnusson et al, 2013), but similar to a study in Sierra Leone (Magnusson et al, 2014), the present study demonstrated statistically significant differences between reported levels of satisfaction with assistive device between female and male clients. This suggests the need for a better understanding of the requirements of women in relation to their assistive device, although the broader literature suggests that socio-demographic characteristics such as gender are only minor predictors of satisfaction (Chen et al, 2014). None of the respondents in the present study expressed dissatisfaction with the cosmetic aspects of their assistive device.

Overall, respondents were ambivalent about their level of satisfaction in terms of service delivery. Reasons for this were related to well-documented health service demand- and supply- barriers, including accessibility (e.g., poor road access, lack of transportation), acceptability (e.g., long waits, differing languages) and upfront cost of transportation and opportunity costs (Matsen, 1999; Lawthers et al, 2003; Samuelsson and Wressle, 2008; Bosmans et al, 2009; Magnusson et al, 2013; Lee, 2014, 2014b; Borg and Östergren, 2015; Kam et al, 2015; Weerasinghe et al, 2015).The rehabilitation sector is particularly under-resourced and this almost inevitably affects the quality of care that clients receive (Akkhavong et al, 2014). Low levels of satisfaction with access to repairs probably relate to the aforementioned demand- and supply-side barriers, and the fact that over 50% of respondents had devices in need of repair. It is a matter of urgency to find ways to follow-up with clients and address any issues before they decide to abandon the assistive device. While in some cases this may be possible by telephone, many of the registered clients did not have phone numbers. Community outreach teams may provide a more effective option. Village level leaders or volunteers could also help in client follow- up by providing information and help with assistive device maintenance. While rural clients and those treated in the provincial centres were more satisfied than those treated in the capital Vientiane, some caution is needed in interpreting this finding due to difficulties in locating clients in the provincial centres of Xieng Khouang and Savannakhet. In these two provinces, the research team was introduced to potential respondents by facility staff, which may have brought in an element of bias. It is also likely that clients from Vientiane had higher expectations than their provincial counterparts (Kark and Simmons, 2011).

Limitations

This study has a few limitations which must be acknowledged. One significant limitation was the non-probability sampling design, due to insufficient contact details in the client register. This makes the findings less generalisable. Secondly, the possibility of bias cannot be discounted in cases where the research team was introduced to clients by the rehabilitation centre. It is possible that this introduced an element of social desirability bias, whereby participants respond in a way that they think is expected or is acceptable to the interviewer, especially given the relatively low levels of education, and social norms can prevents clients from expressing dissatisfaction (Béhague et al, 2008). In addition, because the intention was to include a range of device users, a more nuanced perspective may not have been gained, given the very different device types.

Also of note is that the qualitative data was translated from Lao to English, and inevitably some of the more nuanced meanings may have been lost (Jones et al, 2001; Choi et al, 2012). The translation was undertaken by a native Lao speaker with extensive experience of research in rural communities in the Lao PDR and checked by CMR and COPE staff to help ensure cultural and linguistic appropriateness; however, due to resource constraints, it was not possible to back translate the questionnaire. Finally, it is important to note that the survey reports clients' self-reported subjective assessment of their satisfaction with dimensions of services and device, rather than an assessment of the technical quality or improved functioning and quality of life. The tool is, however, simple to administer in the Lao context, and has demonstrated reliability (Magnusson et al, 2013; Chen et al, 2014).

The many elements of care that may influence a client's level of satisfaction mean that quantifying satisfaction is challenging, and high satisfaction scores should not be construed as evidence of well-performing services (Worthington, 2005). Developing, implementing and evaluating technical quality standards or benchmarks for services and devices could provide a measure of technical quality and complement clients' self-reported subjective satisfaction. The CMR is currently developing such standards.

CONCLUSION and IMPLICATIONS

Continued monitoring of client satisfaction and integration of client perspectives is an important part of client-centred care, consistent with the CRPD. This

study supports the suggestion by other studies that further research needs to be conducted to develop assistive device technology in lower-income countries, taking into account client needs for improved comfort and ambulation on uneven and sloping ground (Magnusson et al, 2013; Weerasinghe et al, 2015). Provision of further training, both to staff and clients, could also facilitate improvements in effectiveness and ease of use (Weerasinghe et al, 2015). Increasing access services, especially follow-up at the community level and repairs, is also important. In rural Thailand, village health volunteers helped to increase access to information and referral to rehabilitative services (Nualnetr and Sakhornkhan, 2012). Given current demands on village health workers, however, a community outreach model may be more appropriate in the Lao PDR.

Improving access to effective assistive devices is a prerequisite for the fulfilment of the CRPD. Investment in assistive device technology would make it available, affordable and effective for users in low- and middle-income countries. Access to effective facilities would enable people with disability to participate more fully in society. Further research is also needed into the dimensions of satisfaction as defined by the voices of clients in low-income countries.

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