The Impact of physical rehabilitation on the lives of persons with physical impairments in Myanmar: Research Report

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Executive Summary

Study Background:

People with disabilities have often been shown to be poorer, and experience lower quality of life, than their peers. This can be a consequence of lower access to education, healthcare and paid employment, greater frequency of health shocks, lower assets and living conditions, and greater barriers to inclusion in their societies.

Physical rehabilitation can play a key role in facilitating inclusion of people with disabilities in their societies, given the potential impact of improved physical functioning and independence on economic status and quality of life. This is particularly the case in post-conflict settings such as Myanmar, where risk of disability through trauma and injury is higher.

Study Aim:

To assess the impact of physical rehabilitation on the physical functioning, economic status and quality of life of people with physical impairments in Myanmar.

Photo 1: Building new prostheses in HORC

Study Objectives:

- To measure changes in physical functioning, quality of life and economic status amongst people with physical disabilities before and one year after receiving physical rehabilitation for the first time
- To compare these indicators to people without disabilities
- To understand the changes persons with disabilities gave experienced after their accident and after rehabilitation

Study Design:

1) A quantitative observational impact case-control study with 108 persons with physical impairments and 104 age and sex matched controls
2) A qualitative investigation of the impact of physical impairment and rehabilitation in Myanmar

Study Setting:

Cases were identified via two physical rehabilitation service centres: The National Rehabilitation Hospital in Yangon (NRH, operated by the Myanmar Ministry of Health), and the Hpa-An Orthopedic and Rehabilitation Centre in Hpa-An (HORC, operated by the Myanmar Red Cross Society).

Key Findings:

Baseline (prior to physical rehabilitation):

- Persons with physical impairments had much lower physical functioning than persons without physical impairments. Persons with physical impairments also had lower quality of life overall and across each sub-domain of quality of life compared to persons without.

- Per capita expenditure, income and assets were similar between persons with and without physical impairments, but persons with physical impairments had higher expenditure on health care than persons without physical impairments

- Both persons with and without physical impairments had negative savings at baseline (i.e. income minus expenditure is negative, which creates debt). However, the gap between earning and spending - the “income gap” – was much bigger for persons with physical impairments (USD $30 per capita gap per month), compared to persons without (USD $5) – suggesting that persons with physical impairments were in much greater debt

- Persons without physical impairments spent approximately 7 hours per day engaged in productive activities, compared to 1 hour per day for persons with physical impairments.

- 37% of persons with physical impairments required assistance to perform at least one activity, persons without disabilities did need any assistance to perform their activities.

Follow Up:

- Persons with physical impairments twelve months after receiving physical rehabilitation services spent on average 4 hours per day engaged in productive activities, which was significantly higher than at baseline but still remains lower than persons without physical impairments

- Persons with physical impairments at twelve months were more independent than at baseline: only 15% required assistance to perform at least one activity

- Physical functioning improved significantly for persons with physical impairments 3 weeks, 6 months and 12 months after rehabilitation but was still lower than persons without physical impairments 12 months after fitting
- Persons with physical impairments at twelve months had lower per capita monthly expenditure overall compared to baseline, but higher expenditure on food, higher income and a much lower income gap which was no longer different from persons without physical impairments

- There was no change in overall quality of life between persons with physical impairments at baseline and 12 months post fitting, and quality of life was still lower than persons without physical impairments overall and across all sub-domains except social relationships

Conclusion:

Current physical rehabilitation services delivered in these two centres in Myanmar provide substantial support to persons with physical impairments and have an impact in terms of their physical functioning and the financial security of themselves and their families. Comprehensive physical rehabilitation service design should continue to focus on providing opportunities to work for persons with physical impairments, and more nuanced and longer term tools are needed to further explore the impact of physical rehabilitation on quality of life of persons with physical impairments.

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1. Introduction

This project investigated the impact of physical rehabilitation on the lives of persons with physical impairments in Myanmar between January 2015 – December 2016. We assessed physical functioning, socio-economic status and quality of life before and after persons with physical impairments received physical rehabilitation services. Quantitative and qualitative data were collected, and a review of Quality of Life tools was undertaken as part of this research, which is reported separately. This report summarises the background, aims, objectives and methods of the study, and the main study findings.

2. Study Background

2.1 Disability and rehabilitation

Persons with disabilities are defined in the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) as persons with “long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, may hinder [a person’s] full and effective participation in society on an equal basis with others”[1].

Persons with disabilities have been shown in many studies to be more vulnerable to poverty and to experience lower quality of life than people without disabilities in their societies[2, 3]. Persons with disabilities in many countries have lower access to education and paid employment, greater frequency of health shocks, lower assets, worse living conditions, and greater barriers to inclusion in their societies [4, 5]. Article 26 of the UNCRPD outlines the right of persons with disabilities to *appropriate measures to attain and maintain their maximum independence and full physical, mental, social and vocational ability, for full inclusion and participation in their societies and without barriers* [6].

One mechanism to support persons with disabilities in achieving their maximum independence, is rehabilitation. Rehabilitation is defined in the World Health Organisation (WHO)’s 2011 World Report on Disability as *a set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environments*[7]. Physical rehabilitation is a key component of rehabilitation and inclusion, given the potential impact on economic independence, quality of life and physical functioning. Despite this, the impact of physical rehabilitation on the lives of persons with disabilities has not previously been measured in low-income countries or, more specifically, in conflict-affected and post-conflict countries[7, 8].

There is very little quantitative data on the direct effect of conflict on disability, but anecdotal and qualitative reports suggest increased risk of physical impairments (a major component of disability) in conflict and post-conflict settings through trauma and injury[7, 9]. Additionally, a recent study in post-conflict Rwanda determined that 28% of identified physical impairment was due to trauma, although did not state whether this was conflict-related [10].

2.2 Disability in Myanmar

Figure 1: Map of Myanmar

Myanmar is located in South East Asia, bordering China, Laos, Thailand, India and Bangladesh. It has an ethnically diverse population estimated at 51.4 million people[11]. Indicators of poverty and poor health in the country are high, with WHO data from 2012 stating that just 1.8% of the country's Gross Domestic Product (GDP) is spent on health, leading to out-of-pocket health expenditure being amongst the highest in the world [12, 13].

Following nearly 50 years of military rule, a civilian government was elected in Myanmar in 2011, and the country has been undergoing complex political and economic transformation since. Despite continued progress, numerous humanitarian challenges remain, including those related to vulnerability to natural disasters, poverty, ethnic divisions and protracted conflicts[14]. In such circumstances, persons with disabilities are particularly vulnerable.

According to the 2014 census,[11] the national prevalence of disability in Myanmar is 4.6%, with 1.9% of the population reporting a physical impairment. Unintentional injury remains a significant cause of disability[15, 16]. Road accidents, falls and mechanical force injuries all contribute to acquired physical impairment[17]. In addition, there is a high incidence of land mine injury due to historical conflicts in the country [18, 19]. Myanmar is one of just a small number of countries with increasing rates of landmine casualties [18, 20]. Such acquired trauma often leads to lower limb amputation, which is indicated in cases where the extent of traumatic injury means that the extremity is non-salvageable.

Peripheral vascular disease (PVD) is the other leading cause of lower limb amputation worldwide. In Myanmar, diabetes mellitus (DM), hypertension and tobacco use are among the top five risk factors that contribute to the greatest disease burden and are all associated with an increased risk of developing PVD and critical limb ischaemia[17,21, 22].

2.3 Rehabilitation Services in Myanmar

Institution-based rehabilitation services have been provided in Myanmar since 1958. There are currently thirty Physical Medicine and Rehabilitation departments in general hospitals, but not all are fully equipped with inpatient and physiotherapy facilities. There are 69 additional physiotherapist-led departments across various townships. Community-based rehabilitation (CBR) initiatives have also been set up to provide assistance and education in people's homes[23.] However there is still reliance on national and international non-governmental organisations (NGOs) to provide additional support,[24] particularly for prosthetic and orthotic services, which are lacking.

The International Committee of the Red Cross (ICRC) has become a lead organisation in the provision of physical rehabilitation services in conflict and post-conflict settings. The ICRC has a long history of providing humanitarian assistance to the population of Myanmar and in recent years, has begun expanding its activities in the country, including the support of a Physical Rehabilitation Programme (PRP) to help those with lower limb amputations.

Since 2013, around 6,000 people have received artificial limbs at designated centres across Myanmar[25]. These services include fitting prosthetic and orthotic devices, wheelchairs, physiotherapies and vocational support. However, the impact of ICRC physical rehabilitation programmes on service users has not been documented. It is important for ICRC to be able to assess the impact of physical rehabilitation services, to make programmatic decisions on how to orientate their efforts and investments and demonstrate the long-term impact of ICRC support on local physical rehabilitation centres.

Photo 2: A study participant displays her prosthetic device

In order to effectively evaluate this service, it is important to explore both the impact of physical disability, and the impact of physical rehabilitation, among the target population. Developing a comprehensive understanding of the impact of acquiring a physical disability allows services to be designed to mitigate barriers and promote universal access, thus maximising outcomes and inclusion of those in need of rehabilitation. Understanding the impact of physical rehabilitation services allows us to monitor and evaluate how well these needs are being met.

3. Study Aim and objectives

Study Aim: To assess the impact of physical rehabilitation on the physical functioning, economic status and quality of life of persons with physical impairments in Myanmar.

Study Objectives:

1) To measure changes in physical functioning, quality of life and economic status amongst persons with physical impairments before and one year after receiving physical rehabilitation for the first time
2) To compare these indicators to persons without physical impairments
3) To understand the changes persons with disabilities experienced after their accident and after rehabilitation

4. Methods

The study incorporated three broad components, which are described in order below.

1) A quantitative observational impact case-control study
2) A qualitative investigation of the impact of physical impairment and rehabilitation in Myanmar

4.1 Quantitative Study

4.1.1 Study Design and sample size calculation

The quantitative component of the study is classified as an observational impact case-control study.

No previous studies of the impact of physical rehabilitation (in any country) amongst persons with physical disabilities were identified in the prevailing literature. This prevented us from determining the sample size needed to achieve statistical power based on previous estimates of effect size[26]. Consequently, the study followed Norman et al.'s recommendation that a sample size of 64 per group would identify a medium effect size of 0.5[27]. Accounting for prospective drop out of up to 40% at one year post follow up, a sample of 100 cases and 100 controls were recruited.

The study aimed to recruit 100 persons with physical impairments ("cases") before they received physical rehabilitation for the first time to collect baseline data on their physical functioning, economic status and quality of life, alongside 100 community "controls" (i.e. people of the same sex, age and community of each person with a physical impairment, but without a physical impairment themselves). By comparing case and control data, we can see the ways that having a physical impairment impacts on the lives of people in Myanmar.

The study then collected further data once the person with a physical disability had received physical rehabilitation (specifically, a prosthetic or orthotic device) at six and twelve months post fitting. By comparing case data before and after physical rehabilitation, we can see the ways that physical rehabilitation impacts on the lives of persons with physical disabilities in Myanmar.

To be able to clearly define “pre” and “post” rehabilitation service status, the study focused on the impact of fitted prostheses or orthoses (i.e. pre and post device fitting). Other types of physical rehabilitation (for example wheelchair fitting, or physiotherapy) were not included in the study design.

The study consisted of the following stages:

- Recruitment of persons with and without physical impairments
- Baseline interviews before rehabilitation service provision
- Post-service interview of cases at centres
- Midpoint (6 month) Interview of cases and controls
- Endpoint (12 month) Interview of cases and controls

4.1.2. Participant Recruitment

Persons with physical impairments were recruited from two rehabilitation centres – the National Rehabilitation Centre in Yangon (NRH, operated by the Myanmar Ministry of Health), and the Hpa-An Orthopedic and Rehabilitation Centre in Hpa-An (HORC, operated by the Myanmar Red Cross Society).

Participants were eligible for enrolment in the study if they met the following criteria:

- Aged 18 and above
- Had never before been fitted with a prosthesis or orthotic assistive device
- According to a trained physiotherapist, need to be fitted with either a prosthesis or orthotic device
- Was able to communicate with the data collectors either independently or via a translator
- Did not plan to migrate outside of Myanmar within the following 12 months

Clients of NRH and HORC meeting the above criteria were provided information about the study and asked if they wished to participate. Participants were assured that they had the right not to participate and that this would not affect the services they received.

For each client who agreed to participate (“cases”) we identified one matched “control” who:

- Did not have a physical impairment
- Was the same sex as the Case
- Between 5 years younger and 5 years older than the Case

- From the same village as the Case
- Was able to communicate with the data collectors either independently or via a translator
- Did not plan to migrate outside of Myanmar within the preceding 12 months

4.1.3 Data Collection

Data were collected for cases and controls at baseline, directly post device-fitting (cases only), six months post fitting and twelve months post fitting (see Figure 2, below).

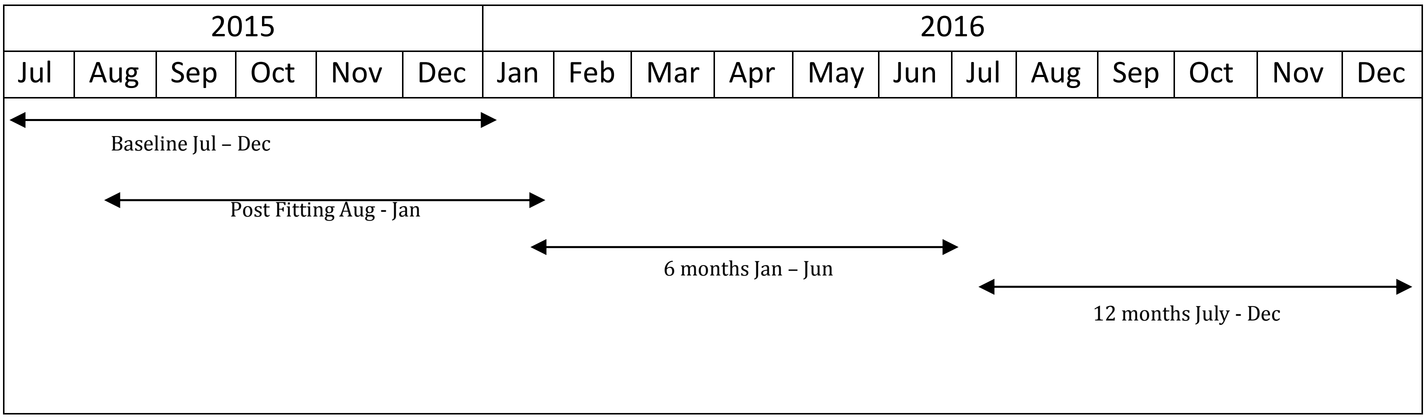


Figure 2: Data Collection Timeline

In 2010, LSHTM conducted a systematic review on "Evaluating the Impact of Rehabilitation in the Lives of People with Disabilities and their Families in Low and Middle Income Countries; a Review of Tools" [28]. This review identified the following domains as important for measuring impact of rehabilitation: activities, participation, quality of life, and poverty. The tools selected for inclusion in this study reflect the findings of the systematic review.

Basic demographic data

Basic demographic data such as gender, age, ethnicity and location were collected on a coversheet for the questionnaire.

Physical Functioning Assessment (PFA)

A Physical Functioning Assessment (PFA) was conducted using two standardised tools. The Physical Performance Test (PPT) was originally designed to assess degrees of difficulty in multiple domains of physical functioning amongst older people[29]. The 9 item performance test reflects activities of daily living, and can be conducted by a non-clinical field worker, with validated scoring to assess mild and moderate functional limitation[30]. The Two Minute Walk Test (2MWT) measures distance ambulated over two minutes, and has been widely validated as a test of aerobic capacity and endurance in the rehabilitation of patients post stroke, spinal cord injury and amputation [31-33].

Physical Impairment Diagnosis and Treatment Tool (RAM)

Photo 3: A pair of prostheses

Amongst cases only; aetiology, algorithm-based diagnosis and treatment previously received and currently needed were recorded using the Rapid Assessment of Musculoskeletal Impairment (RAM) Tool developed and validated by members of the International Centre for Evidence in Disability (ICED) at LSHTM [34, 35]. Basic data on service received and follow up information provided by the service provider are also included.

Overall functional limitation Tool

The United Nations Washington Group on Disability Statistics was established by the World Bank to develop comparable and robust data collection tools to measure functional limitation in a given population[36]. An extended set of 16 questions related to core functional has been developed for use in Census or surveys. This tool was used to screen overall reported functional limitations amongst cases and controls.

Quality of Life

Quality of Life was measured using two separate tools identified via our previous review: 1) The WHOQOL-BREF and 2) the Stylised Activity List developed as part of the World Bank Living Standards Measurement Survey (LSMS).

The WHOQoL-BREF instrument was developed by the WHO. The tool consists of 26 items related to physical, psychological, social and environmental domains of quality of life, and has shown excellent reliability and validity in more than 20 countries[37].

The '*stylised activity list*' developed as part of the LSMS was used to measure activities, including time spent in productive activities (both paid and non-paid activities contributing to the household economy), leisure activities, inactivity and assistance from others in completing activities[38]. This tool has previously been used by members of our group in assessing the long term impact of cataract surgery in Bangladesh, Philippines and Kenya [39].

Socio-economic Status

The impact of physical rehabilitation on socio-economic status was measured in three ways: i) Household Income, ii) Asset ownership and iii) household expenditure. All questions related to socio-economic status were asked directly to the household head/person in the household with primary responsibility for the household's finances.

Household Income was measured directly as average monthly income in the household.

Asset ownership was measured using a pre-tested asset list to assess the number and type of assets owned by the household (e.g. furniture, vehicles, cattle) and key characteristics of the household structure (e.g. building materials, number of rooms). These assets lists were used to derive a household-level relative index via Principle Components Analysis [40].

Personal Consumption Expenditure (PCE) was measured across a variety of items related to household expenditure on food (including value via home production/received in kind or as gifts), education, health, household and personal items and rent. A pre-validated list of 85 items was pilot tested and adapted for cultural relevance [41].

Table 1, below, provides an outline of data collected at each stage of the project timeline for cases and controls.

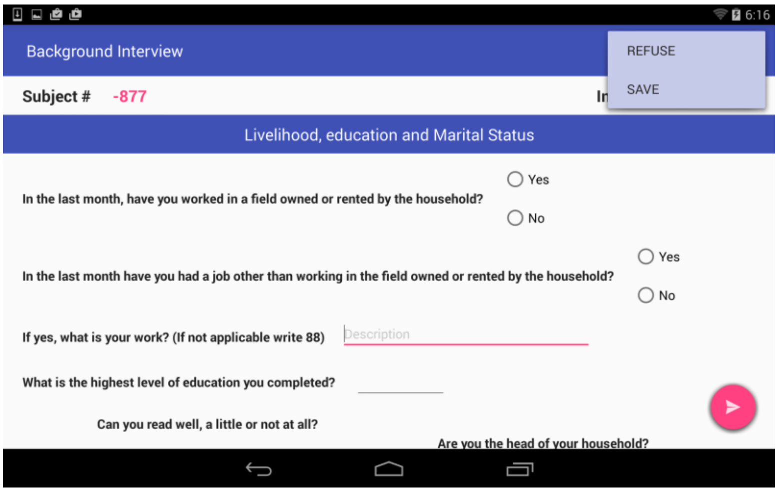
Table 1: Data Collection Outline for Cases and Controls

		Cases	**Controls**
Service Centre Questionnaire		Conduct when arrive at service centre to determine eligibility for study: - Cause of impairment - Diagnosis - Treatment received previously - Treatment needed	Not applicable
Main Questionnaire	Baseline	Before pre-fitting training & fitting: - Demographic data - Physical functioning - Overall functioning - Livelihood data - Quality of life - Socio-economic status	At the same time the case is fitted with their device: - Demographic data - Physical functioning - Overall functioning - Livelihood data - Quality of life - Socio-economic status
	Post Fitting	Post device fitting and device-fitting training: - Physical functioning - Quality of Assistive Device	Not Applicable
	6 Months	6 months after device is fitted: - Physical functioning - Assistive Device User Data	6 months later: - Physical Functioning
	12 Months	12 months after device is fitted: - Physical functioning - Quality of Life	12 months later: - Physical Functioning - Quality of Life

		- Socio-Economic-Status - Assistive Device user data	- Socio-Economic-Status

Mobile Data Collection

A bespoke Android application for data collection, storage and management was developed by a freelance developer, using Python coding. The app was deployed using Google Nexus tablets, and allowed cloud-based data storage and management by the project leads.



Subject # -877

Livelihood, education and Marital Status

In the last month, have you worked in a field owned or rented by the household? ○ Yes ○ No

In the last month have you had a job other than working in the field owned or rented by the household? ○ Yes ○ No

If yes, what is your work? (If not applicable write 88) Description

What is the highest level of education you completed?

Can you read well, a little or not at all?

Are you the head of your household?

Figure 3: Mobile Application Example Screen

4.1.4 Data Collection Team

Mid-level rehabilitation professionals (e.g. orthopaedic technicians, physiotherapists or physiotherapist assistant) at NRH and HORC were provided training to assist data collection through:

- Recruiting eligible clients
- Physical assessment of recruited clients
- Assessment of the quality of assistive devices

In addition, six full-time research assistants were recruited from local universities. A two-week training course was held in early July 2015, jointly coordinated by UPH and LSHTM. Training modules included:

- Disability Sensitisation (led by a local disabled persons' advocate)
- Project Protocol and Questionnaires
- Informed Consent and Ethics

- Study logistics and recruitment
- Data Collection (including practice)
- Safety and Security in the field (led by the Myanmar Red Cross)
- Pilot testing

Ten volunteers were recruited from NRH for training, and ten further volunteers were identified in the community for pilot-testing.

A three-day qualitative training was held in October 2015. This was led by a senior lecturer at UPH and comprised of:

- Introduction to qualitative techniques
- Generation of appropriate open-ended questions for project aims and objectives
- Practice of qualitative techniques and interviewing

4.1.5 Data Analysis

Data were cleaned and analysed in Stata 14.0.

At baseline, a Chi-squared test of association was used to determine whether there were differences in socio-demographic characteristics between cases and controls, whilst descriptive statistics were used to describe case service-centre details.

The Physical Functioning Assessment (PFA) and the Two Minute Walk Test (TMWT) were used separately to assess baseline physical functioning amongst both cases and controls. The PFA involves nine tasks (such as simulated eating, gripping, standing from sitting etc.) and is scored between 0 – 36 based on the time it takes the participant to complete each task. A score of 0 relates to inability to complete a task, with higher scores for quicker completion rates. PFA scores were divided into crude thirds (0-12, 13-24 and 25-36 – 0 lowest and 36 highest functioning). PFA tertile scores and TMWT average distance were compared between cases and controls using Chi-squared and student t-tests of association/difference respectively.

Per Capita Expenditure (PCE) was explored using an in-depth question set related to household expenditure on just under 100 specific items by expenditure type over the last month (food expenditure was reported per week and then multiplied by four). These were then combined for analysis into aggregate expenditure, converted into US dollars for ease of interpretation and divided by household size to estimate expenditure per capita.

Per Capita Income (PCI) was estimated through reported overall monthly household income divided by household size.

Principal Component Analysis (PCA) was used to estimate household wealth based on presence of specific household assets such as vehicles, durables etc. PCA involves a statistical calculation of the relative weight of different assets, producing a total score per household.

Follow up data was compared with baseline data using paired t-test and Chi-squared tests of association.

4.2 Qualitative Study

4.2.1 Study Design

A total of 18 semi-structured interviews were conducted with service users. Interviews were recorded and transcribed in Burmese with consent for further analysis. Extracts were subsequently translated into English, to provide information in the domains listed in Table 2. These were informed by aspects of living with a disability widely described in the literature.

Table 2: Qualitative Data Extraction Themes

Medical history	Feelings of depression and suicidality
Employment pre and post-accident	Economic and social impact on family
Access to water, hygiene and sanitation (WASH)	Family and community safety nets
Access to healthcare and rehabilitation services	Perspective of family members

4.2.2 Participant Recruitment

Participants for the qualitative component were purposively selected from amongst persons with physical impairments recruited for the quantitative study.

All interviews took place before service users were fitted with prostheses. These individuals all had lower limb amputations performed some months prior to their participation in the study and admission to the rehabilitation centres.

4.2.3 Data analysis

Thematic analysis was undertaken. This qualitative technique is concerned with identifying and interpreting patterns across a dataset and is not limited by theoretical frameworks, as is the case with other qualitative methods.[42] A contextualist approach was employed, which recognises the reality of individual experiences in a wider social context.

Analysis proceeded deductively, as the data were provided based on pre-determined criteria. This method provides a less rich description of the overall dataset, but allows specific aspects of the data to be examined in greater detail and the impact of disability to be explored across multiple domains. The final analysis was conducted using Nvivo 11 software.

5. Quantitative Results

Key Findings:

Baseline:

- Persons with physical impairments had much lower physical functioning than persons without physical impairments. Persons with physical impairments also had lower quality of life overall and across each sub-domain of quality of life compared to persons without.
- Per capita expenditure, income and assets were similar between persons with and without physical impairments, but persons with physical impairments had higher expenditure on health care, and a much higher income gap ($-30 per capita per month, versus $-5) than persons without, suggesting much higher debt.
- Persons without physical impairments spent approximately 7 hours per day engaged in productive activities, compared to 1 hour for persons with physical impairments.
- 37% of persons with physical impairments required assistance to perform at least one activity, compared to no persons without

Follow Up:

- Physical functioning improved significantly for persons with physical impairments 3 weeks, 6 months and 12 months after fitting but was still lower than persons without physical impairments 12 months after fitting
- There was no change in overall quality of life between persons with physical impairments at baseline and 12 months post fitting, and quality of life was still lower than persons without physical impairments overall and across all sub-domains except social relationships
- Persons with physical impairments at twelve months had lower per capita monthly expenditure overall compared to baseline, but higher expenditure on food, higher income and a much lower income gap which was no longer different from persons without physical impairments
- Persons with physical impairments at twelve months on average spent 4 hours per day engaged in productive activities, which was significantly higher than at baseline but still lower than persons without physical impairments
- Persons with physical impairments were more independent than at baseline: only 15% requiring assistance to perform at least one activity
-

5.1 Baseline Study

Baseline Participant Characteristics

Table 3 presents the socio-demographic characteristics of study participants at baseline (before physical rehabilitation). 104 matched pairs of persons with and without physical impairments were recruited. Pairs were well matched on age and gender. 89% of recruited participants with physical impairments were male. There were no differences in marital status, religion, ethnicity or literacy between persons with and without physical impairments. However, persons with physical impairments were much more likely (69% versus 6%) not to be working (either in the field or in a job) than persons without physical impairments, and were also less likely (57% vs 75%) to be the head of their household.

Table 3 Baseline Socio-Demographic Characteristics of participants (%)

		Cases (n= 108)	Controls (n=104)	P-value (χ^2)	Age-Sex adj OR (95% CI)
		%	%		
Gender	Male	89%	89%	0.9	Ref.
	Female	11%	11%		1.0 (0.4 – 2.5)
Age	18 – 39	43%	42%	1.0	Ref.
	40 – 59	44%	44%		1.1 (0.5 – 1.7)
	60+	14%	13%		1.0 (0.5 – 1.7)
Marital Status	Married	64%	72%	0.2	Ref.
	Not Married	36%	28%		1.6 (0.9 – 2.9)
Religion	Theravada Buddhism	90%	93%	0.3	1.6 (0.6 – 4.3)
	Other	10%	6%		Ref.
Ethnicity	Bamar	76%	80%	0.9	Ref.
	Kayin	12%	10%		1.3 (0.6 – 3.2)
	Rakhine	6%	6%		1.0 (0.3 – 3.3)
	Other	7%	5%		1.4 (0.4 – 4.6)
Literacy	Reads well	77%	88%	0.1	Ref.
	Reads a little	16%	10%		1.9 (0.8 – 4.5)
	Does not read at all	7%	3%		3.1 (0.8 - 12.1)
Employment status	In the field only	5%	36%	<0.01	0.3 (0.1 – 0.8)
	Job other than in the field	26%%	59%		Ref.
	No job and no work in the field	69%	6%		27.4 (10.6 – 70.7)
Head of household	Yes	57%	74%	<0.05	Ref.
	No	43%	26%		3.7 (1.7 – 8.0)

Baseline Case Impairment and Service Centre information and history

Slightly more (58% vs 43%) persons with physical impairments were recruited from the national rehabilitation centre in Yangon (NRH) than the Red Cross rehabilitation centre in Hpa-An (HORC) - Table 4. The majority (56%) of persons recruited with physical impairments reported the cause of their impairment as acquired traumatic, and 23% as acquired non traumatic. The remaining reported causes included infection (10%), neurological (8%) and congenital/genetic (2%). 93% of persons with physical impairments recruited into the study were amputees: 53% with below knee amputation and 40% with above knee amputation.

All participants reported that services at both HORC and NRH were free (Table 5). Participants recruited from NRH were more likely to be seen immediately following registration (85% vs 7%), whilst the majority of participants (54%) recruited from HORC were seen by a rehabilitation professional between one and three months after being referred (p<0.001).

Table 4 Baseline Case Impairment info and history (n=108)

		%
Service Centre	Red Cross Centre (HORC)	43%
	National Rehabilitation Centre (NRH)	58%
Time since physical impairment acquired	Since birth	1%
	0 – 15 years old	1%
	16 – 39 years old	46%
	40+	52%
Origin of impairment	Congenital/ Genetic	2%
	Infection	10%
	Acquired Trauma	56%
	Neurological	8%
	Acquired Non Traumatic	23%
Amputee	Yes	98%
	No	2%
Device Fitted	Below Knee (BK)	53%
	Above Knee (AK)	40%
	Knee Disarticulation (KD)	4%
	Above Elbow (AE)	3%
	Orthosis (AFO, KAFO or Milwaukee)	2%

Table 5 Baseline Case Service Centre Information (n=108)

		International NGO (n=46)	National Rehabilitation (n=62)	P-value (χ^2)
Choice of service centre	Referred	100%	89%	0.06
	Nearest Service	-	2%	
	Other	-	10%	
Payment for services	Yes	0	0	0.24
	No	100%	100%	
Waiting time between registration and first consultation	Immediate	7%	85%	<0.001
	Less than one month	28%	10%	
	One to Three months	54%	5%	
	More than three months	11%	0	
Travel time from residence to centre	Less than three hours	28%	21%	0.4
	Three to six hours	22%	24%	
	Six to twelve hours	37%	31%	
	More than twelve hours	13%	24%	

Baseline Physical Functioning

Physical functioning at baseline was measured using the Physical Functioning Assessment (PFA) and the Two Minute Walk Test (2MWT), as shown in Table 6.

Each participant's PFA score was calculated and categorised into tertiles (lowest third, middle third, highest third). 100% of persons without physical impairments scored in the highest third, compared to less than half of persons without physical impairments. Average scores for persons with physical impairments were also significantly lower than for persons without physical impairments (p<0.001).

On average, the distance that persons with physical impairments were able to walk in two minutes was less than half the average distance that persons without physical impairments were able to walk. In addition, 95% of persons with physical impairments required the use of an assistive device to walk compared with none of the control group.

Table 6: Baseline Physical Functioning – PFA

		Cases (n=108)	Controls (n=104)	P-value (χ^2)
Physical Functioning Assessment Score (PFA)	0-12 (lowest)	10%	0	<0.001
	13-24	46%	0	
	25-36 (highest)	44%	100%	
	Mean score	22.6	33.1	<0.001
	Standard deviation (sd.)	6.3	2.0	<0.001
2 Minute Walk Test (metres)	0	5%	0	<0.001
	1 – 50	24%	4%	
	51 – 100	62%	57%	
	101 – 200	9%	25%	
	201+	0	14%	
	Uses Assistive Device	95%	0	<0.001
	Mean Distance	65.6	133.5	<0.001
	Standard deviation (sd.)	29.5	102.7	

Baseline Quality of Life Scores

Table 7 and Graph 1 show the baseline quality of life characteristics for persons with and without physical impairments as a percentage of the maximum score available (i.e. highest quality of life). Persons with physical impairments had lower quality of life overall and in each sub-category of quality of life than persons without physical impairments (p<0.001). However, the difference between means was never greater than 10 percentage points.

Table7: Baseline Quality of Life Characteristics (%)

	Cases (n=108)		Controls (n=104)		Difference between means	P-value[a]
	Mean (95% CI)	SD	Mean (95% CI)	SD		
General QoL Rating	59.6 (56.6 – 62.7)	16.0	66.0 (63.5 – 68.4)	12.4	6.4	<0.001
General Health Rating	66.4 (52.5 – 70.2)	20.3	75.8 (72.9 – 78.7)	14.9	9.4	<0.001
Physical Health	38.1 (36.1 – 40.1)	10.4	44.7 (42.5 – 46.9)	11.3	6.6	<0.001
Psychological	55.1 (52.6 – 57.6)	13.0	64.5 (62.6 – 66.5)	10.1	9.4	<0.001
Social Relationships	69.5 (67.0 – 72.1)	13.4	76.9 (75.9 – 78.8)	10.2	7.4	<0.001
Environment	69.7 (66.9 – 72.4)	14.4	78.6 (76.1 – 81.0)	12.5	8.9	<0.001

[a] Student T Test

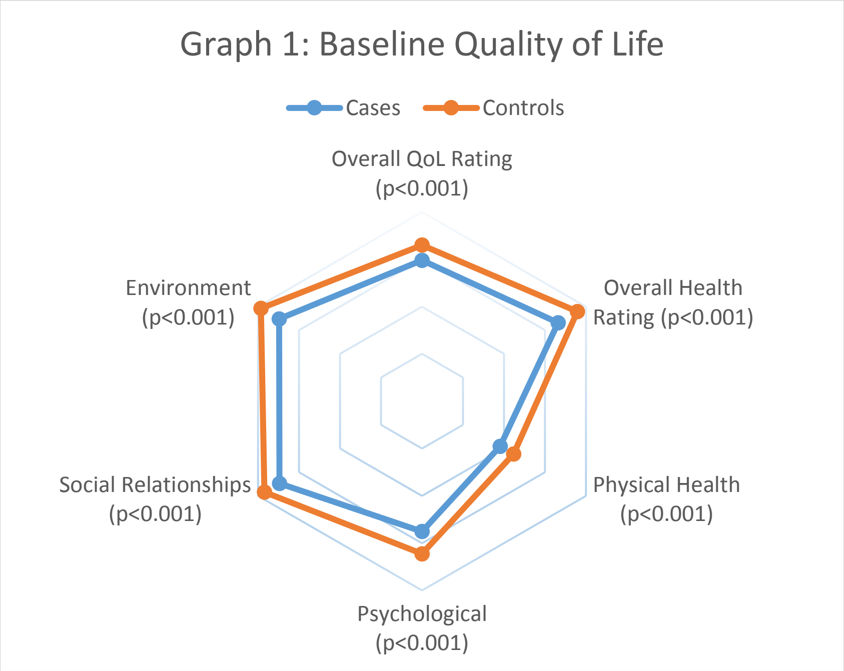


Table 8 presents the results of multivariate linear regression analysis, to predict indicators of lower quality of life amongst persons with physical impairments. Amongst persons with physical impairments, lower quality of life scores were related to not working, lower per capita income (PCI) and lower per capita expenditure (PCE).

Table 8: Multivariate Linear Regression Analysis of Baseline Case QoL Scores

		General QoL Rating	General Health	Physical Health	Psychological Health
		Average Score (95% CI)	Average Score (95% CI)	Average Score (95% CI)	Average Score (95% CI)
Age Group	18 – 49	57.6 (53.7 – 61.6)	64.7 (59.7 – 69.7)	37.7 (35.3 – 40.0)	56.0 (52.9 – 59.0)
	50+	63.1 (58.2 – 67.9)	69.2 (62.9 – 75.5)	38.9 (35.1 – 42.6)	53.7 (49.2 – 58.1)
	p for trend	0.3	0.3	0.7	0.5
Work	Yes	61.2 (56.2 – 66.2)	73.3 (67.3 – 79.4)	36.9 (34.3 – 39.5)	59.5 (55.7 – 63.3)
	No	58.9 (55.0 – 62.8)	63.2 (58.4 – 68.1)	40.9 (38.4 – 43.5)	53.1 (50.1 – 56.2)
	p for trend	0.6	<0.05	0.1	<0.05
Proportion of day spent resting (no activity)	Lowest	62.2 (56.8 – 67.6)	66.5 (59.8 – 73.2)	36.9 (34.1 – 39.7)	57.6 (53.9 – 61.2)
	Middle	57.1 (51.3 – 62.9)	68.0 (61.5 – 74.5)	39.3 (35.6 – 43.1)	53.5 (49.9 – 57.1)
	Highest	59.4 (54.3 – 64.6)	64.6 (56.9 – 72.2)	39.3 (35.8 – 42.8)	55.7 (50.9 – 60.5)
	p for trend	0.5	0.8	0.2	0.5
Proportion of day spent in productive activities	Lowest	58.4 (53.6 – 61.2)	67.3 (61.5 – 73.2)	39.1 (36.1 – 42.1)	56.1 (52.5 – 59.8)
	Middle	55.8 (58.7 – 69.5)	62.5 (54.5 – 70.5)	36.8 (32.2 – 41.3)	50.0 (46.4 – 53.6)
	Highest	61.1 (58.7 – 69.5)	67.4 (60.2 – 75.1)	38.8 (35.9 – 41.6)	58.8 (54.8 – 62.9)
	p for trend	1.0	1.0	0.8	0.4
Physical Functioning Score	Lowest	52.7 (43.7 – 61.8)	60.0 (45.3 – 74.7)	36.5 (31.2 – 41.9)	51.9 (41.2 – 62.4)
	Middle	59.2 (54.9 – 63.5)	64.0 (58.1 – 69.9)	38.6 (35.9 – 41.2)	55.5 (52.2 – 58.8)
	Highest	61.7 (56.6 – 66.9)	70.4 (64.7 – 76.1)	38.0 (34.4 – 41.5)	55.3 (51.4 – 59.5)
	p for trend	0.1	0.06	0.8	0.4
PCA[a] Tertile	Lowest	57.4 (52.1 – 62.6)	65.2 (59.3 – 71.1)	37.9 (34.9 – 40.9)	54.3 (49.9 – 58.8)
	Middle	60.6 (55.1 – 66.2)	67.7 (61.0 – 74.5)	39.1 (36.5 – 41.8)	57.4 (53.7 – 61.0)
	Highest	62.0 (56.7 – 67.3)	66.7 (58.0 – 75.3)	37.4 (32.4 – 42.5)	54.0 (49.5 – 58.5)
	p for trend	0.19	0.7	0.5	0.7

PCE[b] Quartile	Q1 (Lowest)	49.6 (42.3 – 56.9)	65.2 (56.5 – 74.0)	36.0 (31.8 – 40.3)	48.7 (44.4 – 52.9)
	Q2	64.6 (58.4 – 70.8)	68.5 (60.8 – 76.1)	35.0 (31.0 – 39.0)	55.2 (49.3 – 61.1)
	Q3	61.9 (56.5 – 67.4)	60.0 (52.7 – 67.3)	39.0 (35.7 – 42.1)	55.6 (50.7 – 60.6)
	Q4 (Highest)	60.7 (55.2 – 66.3)	72.6 (64.3 – 80.8)	42.1 (37.3 – 46.8)	59.8 (55.6 – 64.0)
	p for trend	<0.05	0.5	<0.05	<0.01
PCI[c] Quartile	Q1 (Lowest)	57.1 (52.1 – 62.2)	61.9 (55.8 – 68.0)	37.7 (35.3 – 40.2)	53.4 (49.9 – 56.8)
	Q2	60.8 (54.1 – 67.4)	66.2 (58.3 – 74.0)	36.0 (30.9 – 41.1)	54.7 (47.7 – 61.7)
	Q3	56.5 (49.9 – 63.0)	64.7 (52.9 – 76.5)	37.8 (33.4 – 42.2)	57.1 (51.4 – 62.7)
	Q4 (Highest)	65.5 (58.1 – 72.8)	76.4 (68.3 – 84.4)	41.6 (36.2 – 47.1)	57.4 (52.4 – 62.5)
	p for trend	0.14	<0.05	0.3	0.09
Income Gap	Yes	60.0 (56.34 – 63.7)	68.9 (62.3 – 75.4)	38.6 (36.5 – 40.7)	54.0 (49.0 – 58.9)
	No	58.9 (2.9 – 64.7)	65.1 (60.2 – 70.0)	37.2 (32.8 – 41.5)	55.7 (52.9 – 58.5)
	(χ^2)	0.3	0.7	0.3	0.6
Model P value		<0.001	0.14	0.2	<0.01
Model R^2		29.8%	21.6%	19.5%	30.0%
[a]Principal Component Analysis; [b]Per Capita Expenditure; [c]Per Capita Income					

Baseline Socio-Economic Status

Per capita monthly income and expenditure, and the difference between the two (the “income gap”) were calculated for persons with and without physical impairments. A Principal Component Analysis (PCA) was also undertaken, which was used to estimate household wealth based on presence of specific household assets such as vehicles, durables etc. PCA involves a statistical calculation of the relative weight of different assets, producing a total score per household, which is then categorised into tertiles from poorest to richest.

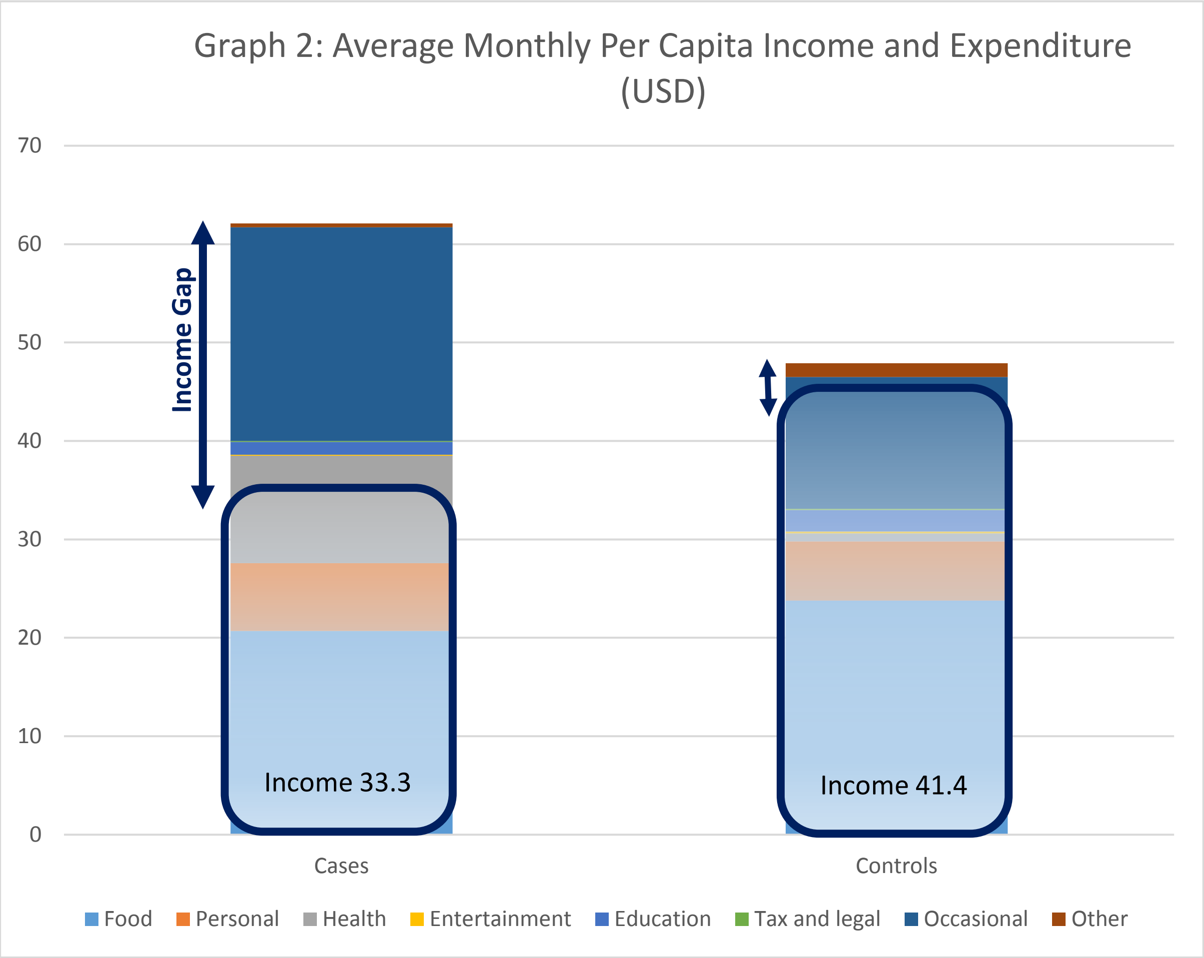
Overall, there were no significant differences in per capita expenditure, income or principal component analysis (PCA) tertile between persons with and without physical impairments at baseline (Table 9). However, persons with physical impairments had higher expenditure on health care (on average $10.9 per capita per month, compared to $0.8 for persons without physical impairments, p=0.05), and the income gap (the difference between per capita income and expenditure) was therefore much higher amongst persons with physical impairments. On average, persons with physical impairments spent $30 per capita per month more than their income, whilst persons without physical impairments on average spent $5 more than their income.

Table 9 Baseline Per Capita Socio-Economic Indicators

		Cases (n=108)		Controls (n=104)		P-value (t-test)
		Mean (95% CI)	SD	Mean (95% CI)	SD	
Per Capita Expenditure (US$, monthly)	Total	61.8 (40.4 – 83.2)	112.3	46.9 (40.3 – 83.2)	37.5	0.2
	Food	20.7 (18.3 – 23.2)	12.8	23.8 (20.2 – 27.3)	18.4	0.2
	Personal	6.9 (1.5 – 12.4)	28.5	6.0 (4.4 – 7.5)	8.1	0.7
	Health	10.9 (0.9 – 20.8)	52.3	0.8 (0.2 – 1.5)	3.1	0.05
	Entertainment	0.1 (0.1 – 0.2)	0.3	0.2 (0.1 – 0.3)	0.5	0.1
	Education	1.3 (0.6 – 2.0)	3.7	2.2 (0.4 – 3.9)	9.0	0.4
	Tax and legal	0.1 (0.01 – 0.1)	0.4	0.1 (0.01 – 0.1)	0.2	0.6
	Occasional	21.7 (5.1 – 38.2)	86.9	13.4 (8.1 – 18.6)	27.0	0.4
	Other	0.4 (0.1 – 0.6)	0.6	1.4 (0.1 – 3.6)	6.3	0.4
Per Capita Income (US$, monthly)		33.3 (27.7 – 38.9)	29.1	41.4 (34.3 – 48.6)	36.7	0.07
Income Gap (US$, monthly)		-30.2 (-50.8 – -9.6)	10.6.4	-5.0 (-14.8 – -4.9)	50.4	<0.05

Table 10: Baseline Principal Component Analysis

		Cases (n=108)		Controls (n=104)		P-value (t-test)
		Mean (95% CI)	SD	Mean (95% CI)	SD	
Principal Component Analysis	PCA score	-0.2 (-0.7 – 0.2)	2.5	0.2 (-0.2 – 0.7)	2.4	0.1
						P-value (χ^2)
	Tertile 1 (poorest)	42.6%		33.7%		0.4
	Tertile 2 (middle)	29.6%		33.7%		
	Tertile 3 (richest)	27.8%		32.7%		


Graph 2: Average Monthly Per Capita Income and Expenditure (USD)

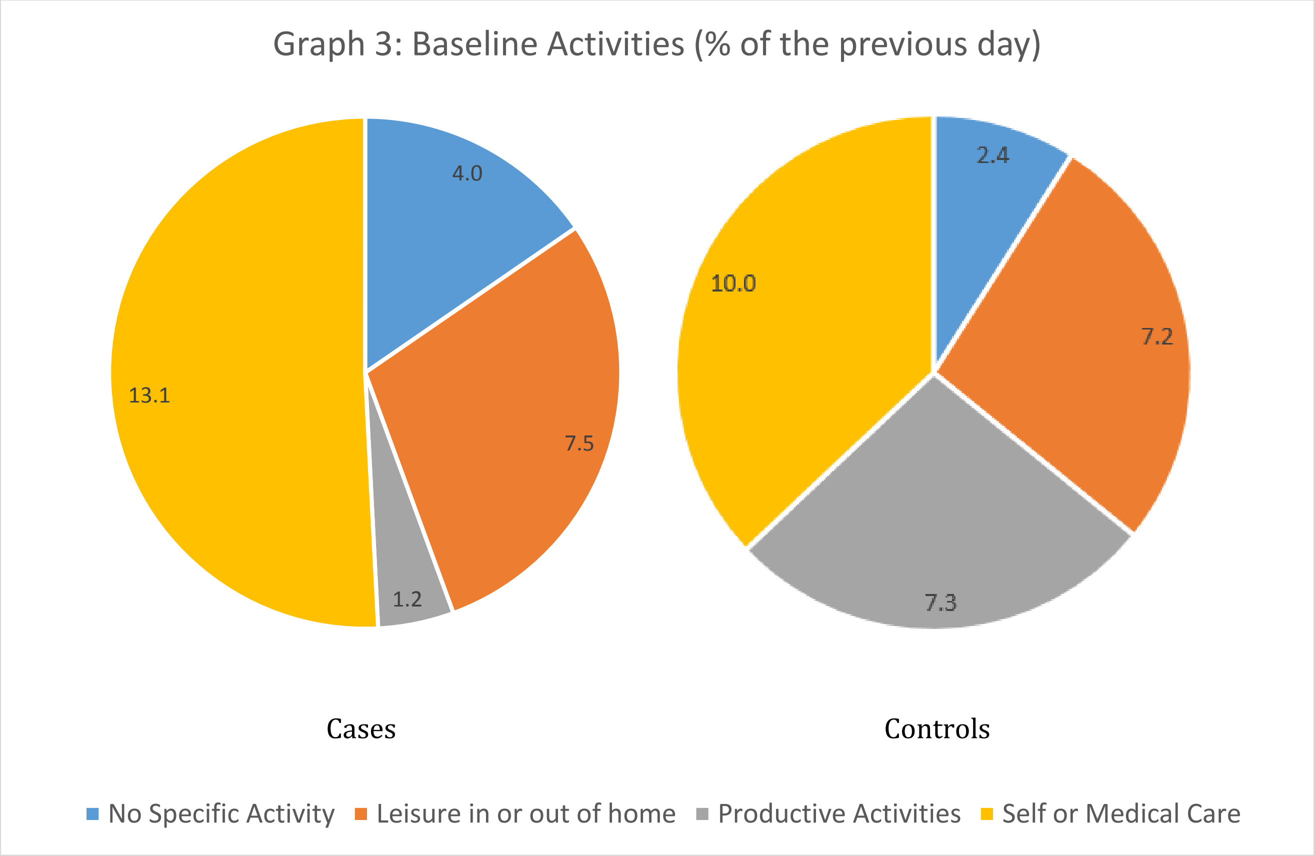
Baseline Activities

Table 11 shows the time spent on different activities the previous day for persons with and without physical impairments. Persons with physical impairments on average had spent only 33 minutes the previous day working, compared with over six hours for persons without physical impairments. In contrast, persons with physical impairments had spent longer on both medical care, and resting (no specific activity) the previous day than persons without physical impairments.

Graph 3 summarises these results, highlighting a similar amount of time spent on leisure for persons with and without physical impairments, but lower time spent on productive activities and more time spent on self/medical care and resting, amongst persons with physical impairments. In addition, 37% of persons with physical impairments reported needing assistance to undertake one or more activity, compared with no persons without physical impairments.

Table 11: Baseline Mean Proportion of time spent the previous day on different activities (hrs and minutes)

	Cases (n=104)	Controls (n=103)	P-value (t-test)
	Hours (average)	Hours (average)	
Personal/self care	10:05	09:34	<0.05
Medical care	03:00	00:23	<0.001
Household Work	00:41	01:01	0.06
Paid Work or Work for Own Use	00:33	06:16	<0.001
Leisure out of the home	03:02	04:10	0.4
Leisure in the home	04:26	03:03	<0.001
No specific activity	03:58	02:25	<0.001



5.2 Three Weeks Post Baseline – Cases Only

Three weeks after being fitted with a prosthetic or orthotic device, persons with physical impairments were followed up to assess their physical functioning and collect data about their new device. 13 cases were lost at three week follow up (12%) therefore the following analysis (n=95) is restricted to those for whom both sets of values are non-missing.

Three Weeks Post-Fitting Physical Functioning

Three weeks after having been fitted with their new device, persons with physical impairments showed significant improvement in physical functioning: 79% were in the highest Physical Functioning Assessment (PFA) tertile compared to 46% at baseline (before fitting). There was no difference between the mean distance cases were able to walk in two minutes between baseline and three weeks.

Three Weeks Post-Fitting Device Data

Persons with physical impairments who were recruited from HORC were more likely to report that their device was "very comfortable" (31% vs 10%), and that they were "very satisfied" (40% vs 14%) with the device than those recruited at the NRH (Table 12). 72% of cases reported high mobility around the community using their device, with no difference between rehabilitation centres.

	Table 12: Case Device Data (n=93*)				
		Overall (n=93)	International NGO (n=42)	National Rehabilitation (n=53)	P-value (Fishers Exact)
Device Comfort	Very Comfortable	19%	31%	10%	<0.001
	Comfortable	71%	50%	88%	
	More or Less	8%	17%	0	
	Not at all	2%	2%	2%	
Expectations of Device	Very satisfied	26%	40%	14%	<0.01
	Quite satisfied	67%	50%	80%	
	More or Less	5%	7%	4%	
	Not at all	2%	2%	2%	
Average hours per day spent wearing device	Mean	04:56	05:20	04:40	<0.05
	s.d.	1.7	1.5	1.8	
	High	20%	26%	16%	0.5

Reported ambulation capacity *without* device	Limited within the community	56%	50%	61%	
	Limited only within household	23%	24%	22%	
	No ambulation capacity	1%	0	1%	
Reported ambulation capacity *with* device	High	72%	74%	71%	0.75
	Limited within the community	26%	24%	27%	
	Limited only within household	1%	2%	0	
	No ambulation capacity	0	0	0	
*Data incomplete for two cases					

5.3 Six Months Post Baseline Follow Up (Cases and Controls)

At 6 months, we have data for 85 cases (79%) and 87 controls (84%)

Six Months Post Baseline Physical Functioning

Table 13 reports physical functioning for i) cases at baseline versus cases at follow up ii) controls at baseline versus controls at follow up iii) cases versus controls at baseline iii) cases versus controls at follow up. Compared to baseline, persons with physical impairments were more likely to be in the highest tertile of Physical Functioning (86% versus 47%) but due to small cell-sizes this was not statistically significant. However, average PFA score (28.9 vs. 22.7) was significantly higher for persons with physical impairments than at baseline, and they were able to walk significantly farther in 2 minutes (83.2 metres) than at baseline (65.7 metres).

Compared to controls at six months, cases were still less likely to be in the highest PFA tertile, and were able to walk significantly less far in two minutes

Table 13: 6 Month Follow Up Physical Functioning Cases and Control

		Baseline Cases (n=85)	Follow Up Cases (n=85)	Follow Up Controls N=87)	p-value Baseline Cases versus Follow Up cases	p-value Follow up Cases versus Follow Up Controls
Physical Functioning Score (PFA)	0-12 (lowest)	12%	0	0	0.4[a]	<0.001[a]
	13-24	42%	14%	0		
	25-36 (highest)	47%	86%	100%		
	Mean Score	22.7	28.9	33.1	<0.001[b]	<0.001[c]
	Standard deviation (sd.)	6.6	4.9	1.6		
2 Minute Walk Test (metres)	0	5%	2%	0	<0.05[a]	<0.001[a]
	1 – 50	25%	7%	0		
	51 – 100	62%	72%	54%		
	101 – 200	8%	15%	33%		
	201+	0	4%	13%		
	Uses Assistive Device	95%	95%	1%	0.2[b]	-
	Mean Distance (metres)	65.7	83.2	131.6	<0.01[b]	<0.001[c]
	Standard deviation (sd.)	30.3	42.4	73.7		

[a] Fishers Exact Test; [b]Paired t-test; [c]Two Sample T-test

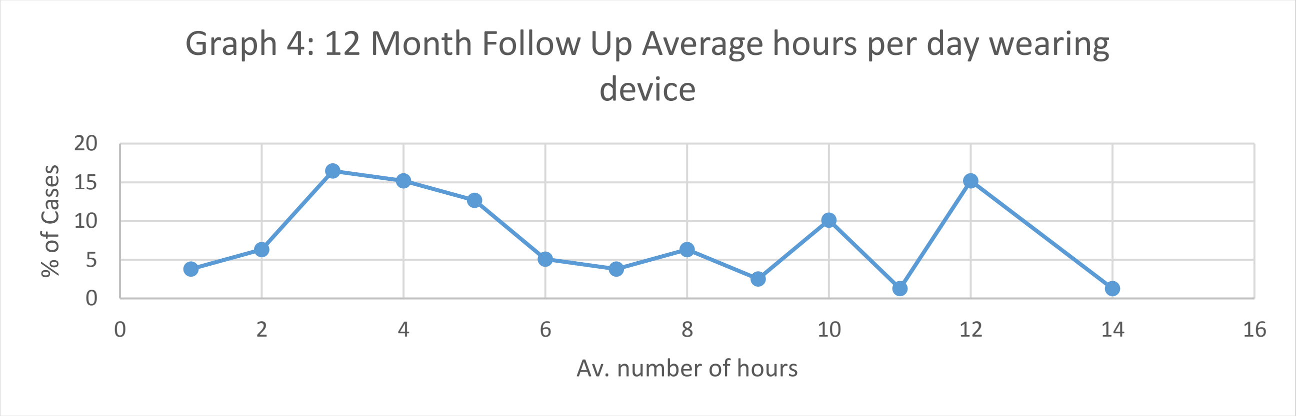
Six Months Post Baseline Device Data

At six months post fitting, there were no differences in the average hours per day the device was worn by cases recruited at either HORC or NRH. However, compared to NRH, devices issued at HORC were more likely to be of acceptable quality, to correspond to recognised concepts, and to suit purpose than devices produced at NRH. 21% of devices were in need of repair, and 8% of devices needed replacement at 6 months, and there was no difference by service centre[1].

5.4 Twelve Months Post-Fitting

At Twelve Months, we have data on 80 persons with physical impairments (75%) and 82 persons without (79%). There were no differences in socio-demographic variables, per capita expenditure, income or PCA between persons with physical impairments in the follow up cohort compared with those lost to follow up.

Twelve Months Post Baseline Device Data



Graph 4 and Table 14 show device data for persons with physical impairments at twelve-months post-fitting. There were no differences in amount of time persons with physical impairments spent wearing their device at 12 months compared to 6 months, and the proportion of devices needing repair or replacement was lower at 12 months compared to 6 months post-fitting, which suggest some follow up support between the two intervals.

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[1] Reasons repair was needed: cracks in device, wrong size (too long or too short), limited flex

Reasons replacement was needed: Painful if used for more than a few hours, the stump has atrophied and no longer fits the prosthetic

Table 14: Twelve Month Post Baseline Case Device Data (n=80)

		Cases at 6 months	Cases at 12 Months	P Value
Average hours per day spent wearing device	Mean	6.2	6.4	0.5[a]
	s.d.	3.8	3.6	
Spare available	Yes	11%	8%	0.5[b]
Client taking care of device	Yes	80%	82%	<0.01
Device Design				
Acceptable Quality Standards	Yes	57%	59%	<0.001
Corresponds to recognised concepts	Yes	70%	71%	<0.05
Properly adjusted/comfortable to wear	Yes	67%	61%	<0.001
Participant appropriately trained for using device	Yes	99%	96%	1.0
Device Functional	Yes	85%	75%	<0.01
Prescription appropriate	Yes	81%	75%	<0.001
Device Suits Purpose	Yes	78%	85%	<0.001
Device Needs Repair	Yes	21%	16%	<0.05
Device needs replacement	Yes	8%	5%	0.3

[a] p-value from student t-test (shapiro-wilks test for normality achieved normality)

[b] P-value from Fishers Exact

Twelve Month Physical Functioning

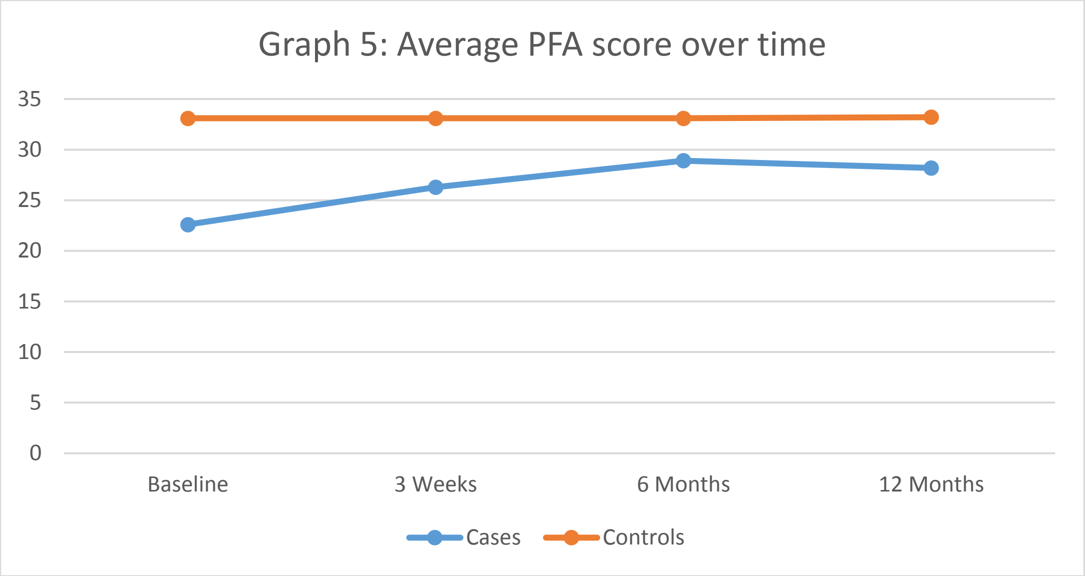
Compared to baseline, persons with physical impairments at twelve months experienced significantly higher physical functioning in terms of their PFA tertile, their average PFA score and the 2 minute walk test (Table 15). 83% were in the highest PFA tertile at twelve months, compared with 43% at baseline.

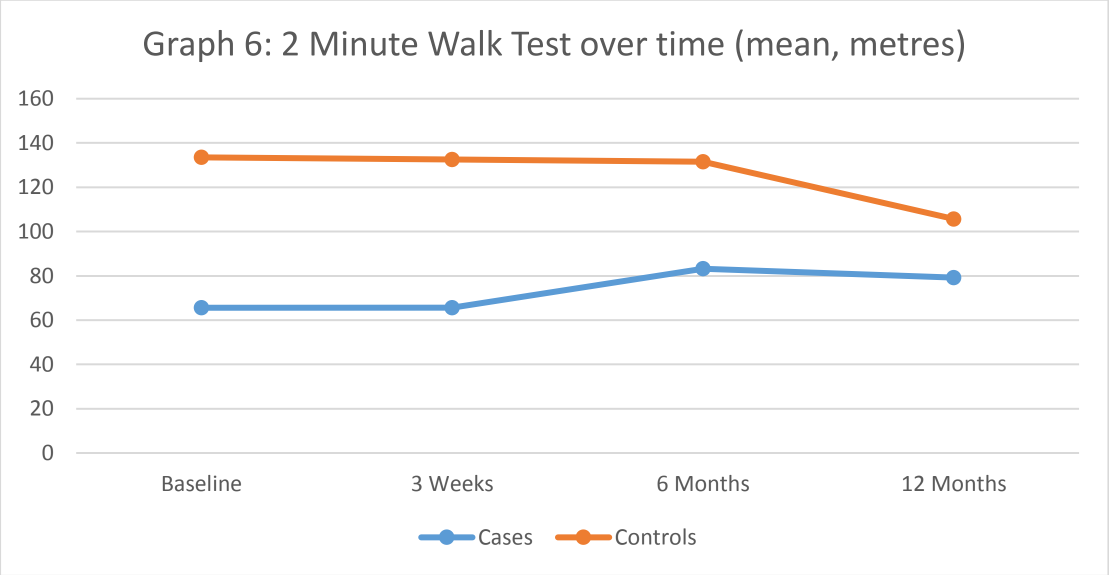
Table 15: Twelve Month Post Baseline Physical Functioning Cases and Control

		Baseline Cases (n=80)	Follow Up Cases (n=80)	Follow Up Controls N=82)	p-value Baseline Cases versus Follow Up cases	p-value Follow up Cases versus Follow Up Controls
Physical Functioning Score (PFA)	0-12 (lowest)	11%	1%	0	<0.001[a]	<0.001[a]
	13-24	46%	16%	0		
	25-36 (highest)	43%	83%	100%		
	Mean Score	22.5	28.2	33.2	<0.001[b]	<0.001[c]
	Standard deviation (sd.)	6.5	4.9	1.9		
2 Minute Walk Test (metres)	0	5%	3%	0	<0.001[a]	<0.001[a]
	1 – 50	26%	19%	0		
	51 – 100	60%	65%	63%		
	101 – 200	9%	13%	37%		
	201+	0	1%	0		
	Uses Assistive Device	94%	96%	0	0.3[b]	-
	Mean Distance (metres)	64.9	79.2	105.7	<0.14[b]	<0.01[c]
	Standard deviation (sd.)	30.9	83.4	24.1		

[a] Fishers Exact Test; [b]Paired t-test; [c]Two Sample T-test

Graph 5 and 6 show PFA score and 2MWT results for persons with and without physical impairments across the different time points. Average PFA score for cases peaked 6 months after fitting and declined slightly between 6 and 12 months – however the difference between 6 and 12 months was not statistically significant.





Twelve Months Post Baseline Quality of Life

There was no change in overall quality of life amongst persons with physical impairments at 12 months compared to baseline, except slightly lower physical health rating at 12 months (Table 16, next page). Comparing persons with and without physical impairments at 12 months, persons without physical impairments reported higher quality of life overall and in all domains except social relationships.

Twelve Months Post Baseline Socio-Economic Status

Compared to baseline, persons with physical impairments at follow up had lower per capita monthly expenditure overall ($39.0 vs $56.9), higher expenditure on food, higher income and a much lower income gap ($2.6 vs $22.9) at 12 months. Persons with physical impairments also had much lower expenditure on health than they did at baseline ($1.2 vs $12.3) but this was not statistically significant.

There were no significant differences in income or expenditure between persons with and without physical impairments at 12 months, and the amount and pattern of expenditure is similar, suggesting that out-of-pocket costs for health at 12 months have been eradicated and persons with impairments are no longer in debt 12 months post-fitting.

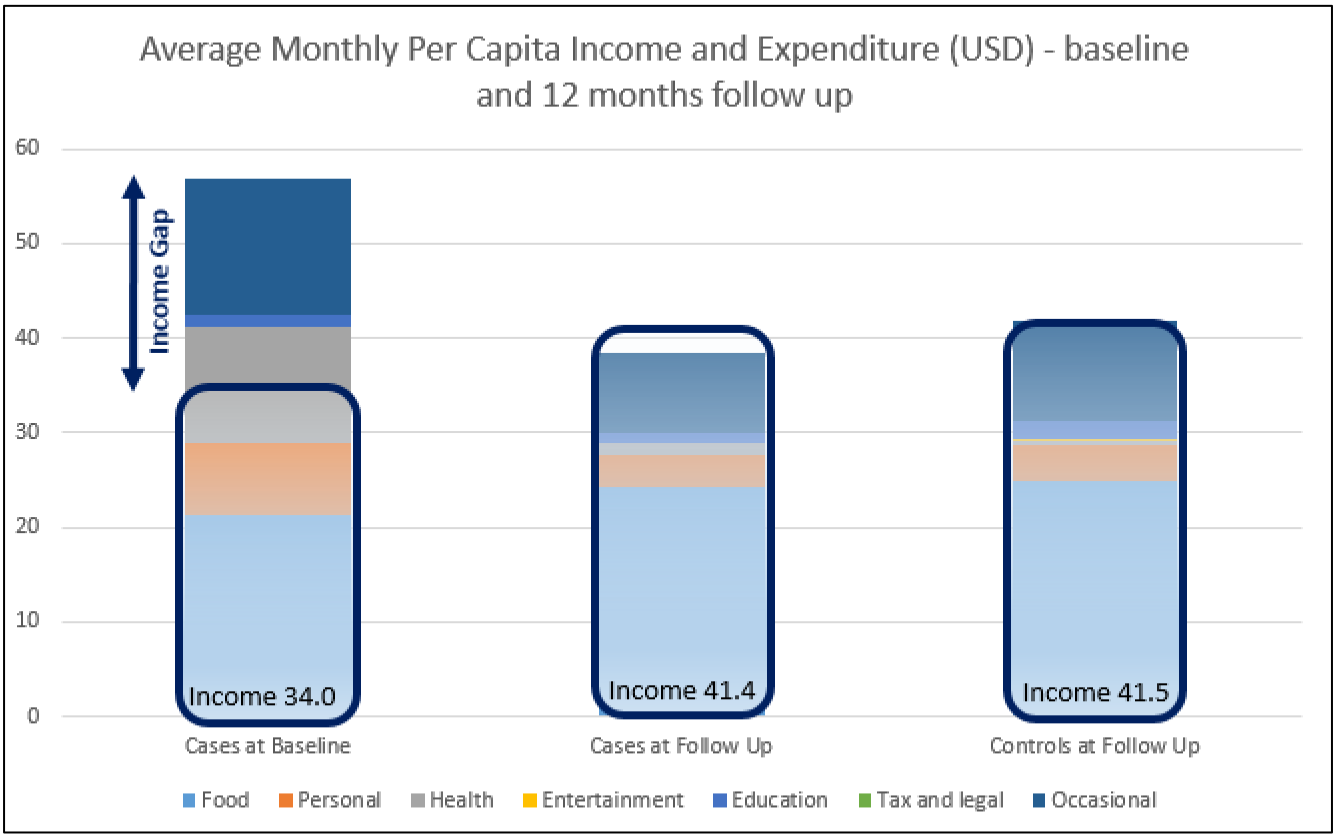


Table 16: Twelve Month Post Baseline Quality of Life Characteristics

	Max. Score	Baseline Cases (n=81)		Follow Up Cases (n=81)		Follow Up Controls n=82)		p-value Baseline Cases versus Follow Up Cases	p-value Follow up Cases versus Follow Up Controls
		Mean (95% CI)	SD	Mean (95% CI)	SD	Mean (95% CI)	SD		
General QoL Rating	100	61.8 (58.2 – 65.4)	15.9	62.8 (59.4 – 66.2)	15.0	74.9 (72.7 – 77.0)	9.8	0.6	<0.001
General Health Rating	100	68.2 (64.8 – 72.6)	19.5	65.9 (61.6 – 70.2)	19.1	79.5 (78.1 – 80.9)	6.3	0.4	<0.001
Physical Health	100	38.7 (36.3 – 41.0)	10.4	35.6 (33.4 – 37.7)	9.8	40.8 (40.1 – 41.6)	3.6	<0.05	<0.001
Psychological	100	55.5 (52.4 – 58.5)	13.4	56.7 (54.0 – 59.4)	12.2	66.3 (64.4 – 68.2)	8.5	0.6	<0.001
Social Relationships	100	68.9 (65.9 – 72.0)	13.8	70.8 (68.2 – 73.4)	11.9	72.3 (70.8 – 73.9)	7.0	0.3	0.3
Environment	100	69.4 (66.1 – 72.7)	14.8	68.0 (65.0 – 71.0)	13.4	78.9 (77.3 – 80.5)	7.1	0.5	<0.001

Table 17: Twelve Month Post Baseline Per Capita Socio-Economic Characteristics

		Baseline Cases (n=81)		Follow Up Cases (n=81)		Follow Up Controls (n=82)		p-value Baseline Cases versus Follow Up Cases[a]	p-value Follow up Cases versus Follow Up Controls[b]
		Mean (95% CI)	SD	Mean (95% CI)	SD	Mean (95% CI)	SD		
Per Capita Expenditure (US$, monthly)	Total	56.9 (39.7 – 74.2)	77.4	39.0 (34.6 – 43.4)	19.7	41.9 (36.3 – 47.5)	25.5	<0.05	0.4
	Food	21.2 (18.5 – 23.8)	11.8	24.3 (21.3 – 27.2)	13.2	25.0 (22.2 – 27.8)	12.7	<0.05	0.7
	Personal	7.7 (0.3 – 15.0)	33.0	3.4 (2.7 – 4.0)	2.8	3.7 (3.0 – 4.3)	2.9	0.2	0.5
	Health	12.3 (0.0 – 25.5)	59.5	1.2 (0 – 2.6)	6.1	0.5 (0.3 – 0.8)	1.2	0.1	0.3
	Entertainment	0.1 (0.06 – 0.2)	0.3	0.1 (0.03 – 13.0)	0.2	0.2 (0.1 – 0.3)	0.4	0.1	0.05
	Education	1.1 (0.5 – 1.7)	2.7	1.0 (0.4 – 1.5)	2.4	1.8 (0.5 – 3.0)	5.7	06	0.2
	Tax and legal	0.1 (-.03 – 0.2)	0.4	0.01 (0.01 – 0.04)	0.1	0.01 (0|01 – 0.3)	0.1	0.3	0.8
	Occasional	14.4 (9.6 – 19.3)	21.8	8.5 (6.6 – 10.3)	8.2	10.6 (7.6 – 13.6)	13.7	<0.05	0.2
Per Capita Income (US$, monthly)		34.0 (27.3 – 40.7)	29.6	41.4 (33.3 – 49.4)	36.2	41.5 (35.1 – 47.9)	29.1	<0.05	1.0
Income Gap (US$, monthly)		-22.9 (041.2 - -4.6)	81.3	-2.6 (-5.1 – 10.3)	34.6	-0.4 (-6.4 - 5.2)	27.0	<0.01	0.5

[a] Two Sample T-test [b] Paired ttest

Twelve Months Post Baseline Follow-Up Activities

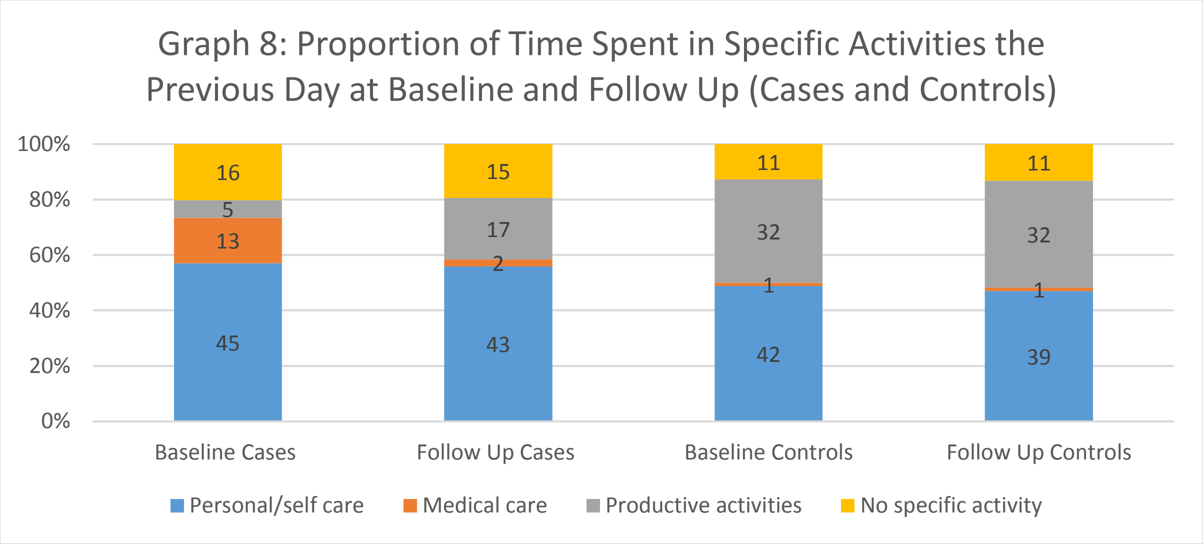
Table 18 and Graph 8 show baseline and follow up activities for persons with and without physical impairments.

Compared to baseline, significantly more (68% vs 17%) cases had participated in paid work or work for their own use in the past week, and had spent on average three hours the previous day in paid work/work (compared to 42 minutes at baseline), and significantly less time on personal/self-care or medical care. However, compared to controls at follow up, cases still spent significantly more time on personal and medical care, and less time in productive activities. The proportion of cases receiving support twelve months post fitting was much lower (15%) than at baseline (37%).

Table 18: Twelve Month Post Baseline Mean Proportion of time spent the previous day on different activities (hrs and minutes)

	Baseline Cases (n=77)	Follow Up Cases (n=77)	Follow Up Controls (n=81)	p-value Baseline Cases versus Follow Up cases[a]	p-value Follow up Cases versus Follow Up Controls[b]
	Hours (average)	Hours (average)	Hours (average)		
Personal/self care	10:17	10:00	09:26	0.2	<0.05
Medical care	03:01	00:32	00:20	<0.001	<0.05
Household Work	00:41	01:00	01:08	0.1	0.4
Paid Work or Work for Own Use	00:42	02:56	06:25	<0.001	<0.001
Leisure out of the home	02:48	01:15	00:44	<0.05	<0.05
Leisure in the home	04:17	03:48	02:55	0.1	<0.001
No specific activity	03:41	03:28	02:42	0.4	<0.05

[a]Two Sample T-test [b] Paired ttest



6. Qualitative Results

The average age of those interviewed was 39.6 years (range: 19-63). Only two participants were female.

Table 19: Level of amputation			
	Below knee	Above knee	Hip disarticulation
Unilateral	11	4	1
Bilateral	1	1	0

The most common type of amputation was unilateral below knee (n=11) and above knee (n=4). Levels of amputation are outlined in Table 19. 11 amputations occurred as a consequence of trauma, 2 of which were due to landmine injuries, and 7 were indicated for medical reasons (see Table 20).

Table 20: Causes of amputation			
Medical		Surgical	
Indication	Number	Indication	Number
Diabetes mellitus	1	Train accident	2
Peripheral vascular disease	6	Occupational accident	7
		Landmine	2

The median time between the date of surgical amputation and time of interview was 10.5 months. The range was from 3-11 months and so the sample encompasses both those newly adjusting to the loss of a limb and those who have lived with more long-term consequences of amputation.

15 participants had family members present at the time of interview and their views were also recorded to provide additional context to better understand the impact of disability at the household level.

Thematic analysis elicited a number of important themes relating to the impact of disability on the individual, following lower limb amputation. Participants were interviewed on a broad range of topics and the dataset reflects changes to multiple domains, namely economic, psychological and social aspects of daily life.

6.1 Economic impact

Loss of income

The majority of those interviewed were previously employed in manual labour, which provided the main source of income for their families. In the absence of alternative employment options or access to employment support services, persons with physical disabilities can struggle to integrate into the labour market. Some respondents relied on family members, including partners and siblings for financial support and others borrowed money from members of their community, incurring debt.

"The main difficulty is we do not have income. Previously, I led the flower plantation which was the main source of family income. Now no one can do that and we had to borrow from other people. We are in debt."

[Female, 48 years]

"We had to borrow nearly 2000,000 from other people. We plan to sell our farm and give them back."

[Male, 29 years]

Reduced assets

Some participants struggled to finance hospital care and had already paid significant amounts of money to cover medical bills. Others had borrowed money to compensate for unemployment and to meet the costs of daily living. In such situations, selling personal property and other assets may become necessary to make repayments for accrued debts.

"Our family was asked to move out from rented house. This would become more of a burden because our immense financial troubles would be worsen and would also create disadvantages when moving from one place to another as I became disabled person."

[Male, 48 years]

Concerns were expressed regarding the future consequences of financial insecurity and the ability to provide for their families. Some became unable to afford the costs of schooling for their children and others could no longer improve their living standards as planned, both of which increases vulnerability to poverty.

"I planned to rebuild the house. I already bought some logs for rebuilding the house. Because of this illness, it could not be done."

[Male, 63 years]

"As I cannot work, I feel really sorry for my four children. The eldest is twelve and youngest is only one year old. I am really worried for their future."

[Male, 29 years]

Acquisition of new skills

Some respondents had found alternative sources of income after acquiring their physical impairment, sometimes assisted by local NGOs with initial start-up costs. Others, who had only recently become disabled, discussed future employment options and learning vocational skills such as hairdressing and basket weaving. Attitudes on the whole were positive, although not everyone had found new employment at the time of interview.

"With the support from Shwe Min Thar foundation (local NGO), I bought a sewing machine. I made purses by using beads and crystals. That was also taught by that foundation. I try to make in different design and pattern which people love to buy, so I can earn for my family."

[Female, 33 years]

6.2 Psychological impact

Identity

A person’s identity is comprised of multiple interacting factors occurring in the wider context of their lives, including occupation, household position and community participation. The loss of a limb has life-altering consequences in these domains, requiring significant psychological adjustment, which partly concerns the loss of physical function, but social discomfort, body image anxiety and cosmetic factors are also important.

"I am always finding my old high heels. I love a variety of high heels so now whenever I see them, I feel odd."

[Female, 33 years]

Many of those interviewed considered themselves to be head of the household, as they previously provided the main source of income, but had since taken on more domestic roles, with their partners or children finding new occupations to support the family. This change in family dynamic may exacerbate feelings of worthlessness, particularly in the context of reduced material wealth.

"As I am a head of the household, I told myself all the time that I shouldn't be depressed. If I become depressed, the whole family will be in trouble."

[Male, 48 years]

"Mother is essential for us. She is the decision-maker at home. Mother was once a very active woman and I am so sorry to see her like this, depressed and immobile."

[Daughter of 48 year old female]

Loss of independence

This theme relates to limitations imposed on the individual in how they access their environment and the difficulties faced in maintaining an independent life. Difficulties and frustration were described regarding the rehabilitation process and restoring levels of physical function.

"I am not use to standing with one leg. Sometimes I step with that limb and fall down."

[Male, 31 years]

Respondents also identified physical barriers, including accessing WASH and other local facilities. These were often initial challenges, which were overcome as time elapsed and adaptations or assistive devices were provided with assistance from family and friends, highlighting the importance of such measures in the goals of rehabilitation.

"Soon after discharge from hospital, family member helped me to go to toilet. Now, I am used to with crutches. I can move around with it."

[Male, 24 years]

Mood

Feelings of low mood, hopelessness and frustration were widely described with respondents making direct comparisons to how their lives were previously. Some expressed suicidal ideation. Generally, these symptoms appeared to relate to reduced physical function or activity levels. In other words, not being able to do the things that they could do before. Some of these feelings centred around the uncertainty of the future and concerns about the consequences of not being able to provide for their families and take an active role in the household.

"I am depressed. I often thought that it would be better to die instead of living as a disabled."

[Male, 44 years]

"As I could not move as I want, I sometime exhibit outburst of anger by throwing away the things beside me (although I know myself, I should not) to those who are helping me and providing care."

[Female, 33 years]

"Actually, I had planned for rebuilding of house. As I could not do now I feel really sorry. Whenever I go up to this building, which is going to collapse soon, I feel so sad because I could not repair it."

[Male, 31 years]

6.3 Social impact

Social participation

Many of those interviewed stated that their disability hindered them and sometimes prevented them from socialising with others. Most still maintained contact with friends, but were reliant on being visited by them. Some environmental barriers were described, such as the presence of stairs, and one respondent was unable to continue playing sports due to his physical impairment.

"I really love to play volleyball. I was playing it whenever I had time to play. Now, I feel so sorry that I cannot participate in volleyball matches organised by the Church."

[Male, 31 years]

Some participants could no longer attend their regular place of religious worship. Not only does this reduce community participation, but for many people, spirituality may form an important part of coming to terms with limb loss and coping with illness.

"It is really painful to use the stairs. The amputated stump felt discomfort and painful. If I go to Monastery, I have to use the stairs. So, I do not usually go there."

[Male, 57 years]

Stigma

Some of those interviewed expressed feelings of inferiority with respect to how they thought others perceived their disability, which limited participation in the local community and access to social events. One participant stated that although his friends had not changed their view of him, some stopped visiting as they felt guilty about him seeing them walking.

"I did not go to monastery because I do not want to bother other people. If I go there other people had to help me a lot."

[Male, 63 years]

Stigma also seemed to play a role in people's ability to maintain relationships. One individual stated how her parents discouraged her from marrying, as they were concerned about the way in which the community viewed her disability and how the marriage would reflect on the entire household. Another planned to divorce his wife as he felt his disability would have a detrimental impact on the family's future.

"Actually, I had planned for marriage. But, my parents urged not to because of loss of legs. So, I did not marry."

[Female, 33 years]

"He requested his wife for divorce as he didn't want her to get in trouble because of his disability. He said that he could not earn for family anymore. He didn't have confidence to work again even with the prosthesis."

[Brother in law of 32 year old male]

Community and family support

Support and acceptance from the local community can have a significant impact on the physical and mental wellbeing of individuals with physical disabilities. On the whole, those interviewed reported positive support from friends, family and members of the local community, including physical, emotional and financial assistance. Some did experience a diminished social circle, stating that certain friends no longer visited, but that others were still remained supportive.

"One friend helped him a lot. He always says I will be your friend whether you have limbs or not. As he owns car, he gave a ride whenever he needed."

[Mother of 35 year old male]

"He has been dutiful to family. Within these eight years he has been the breadwinner and looked after the family. This is enough, and now it is his younger brother's duty to look after all of us."

[Father of 29 year old male]

Family members were widely supportive. Many provided financial aid to help with costs of living. They also gave practical assistance, such as fetching water for the household and help completing other daily tasks. Some had made efforts to improve the home environment, through basic adaptations such as installing water pumps and making toilet facilities more accessible.

"He was not comfortable to lie down on the floor. So, we had to modify for his bed. We also built the toilet attached to the house."

[Father of 29 year old male]

"My daughter was working as house maid and she supported us. My nephews carry water to my home as I cannot go to draw the water from the well. I have to use that water for shower."

[Male, 57 years]

6.4 Access to healthcare and rehabilitation services

Those who experienced traumatic injury clearly required immediate hospitalisation and urgent amputation. Participants whose disabilities arose through medical consequences however, often experienced multiple hospital admissions, prior to surgical amputation. One participant with Buerger's disease was hospitalised three times and could not afford to be investigated further on these occasions. His condition subsequently deteriorated and amputation became necessary. Another had experienced multiple hospital admission for intense foot pain, before the limb was amputated. Some of those interviewed had initially sought help from traditional healers in the community before accessing primary or secondary care services.

Some participants cited cost as a barrier to healthcare. In some cases of occupational accidents, the employers had paid the initial hospital fees or made a contribution. For example, a plantation owner provided a wheelchair following the occupational accident of one participant. However subsequent costs were met by the individuals, using personal savings or through borrowing from others, amassing debt. One participant was working across the border in Thailand at the time of his accident and the private hospital fees there were particularly high.

There appeared to be some misinformation about the provision of prostheses. One participant was told they were only available privately at significant cost and others were unaware of the service, having been initially discharged from hospital without a referral to a rehabilitation centre. However, some were successfully referred by smaller hospitals in the region. Many of those interviewed had been informed of the service by NGO workers, or were made aware via word of mouth, either through friends or relatives.

Many highlighted the benefits of being surrounded by other people with amputation at the rehabilitation centre and how it changed their view of their own disability. One participant described how the service users all encouraged each other in the rehabilitation process.

Participants were overwhelmingly positive regarding the prospect of receiving a prosthetic limb and many were optimistic about the future, hoping they would be able to return to employment following rehabilitation.

6.5 Limitations of analysis

The main limitation of this report is that the interview transcripts were not available in their entirety in the English language. Only extracts considered to be relevant by the research team in Myanmar were translated from Burmese. Although this process was carried out according to predetermined criteria agreed by all involved in the project, a key part of thematic analysis is immersion in the data, which was not possible due to these practical constraints. Some additional context and nuanced meanings may have been lost. However, the themes identified from the data still provide valuable insight and discussion among the research team ensured that the themes identified were relevant and captured the entirety of the dataset.

Photo 4: Selection of vintage prostheses on display at HORC

7. Discussion and conclusion

This report shares the findings of a longitudinal research programme in Myanmar, documenting the impact both of physical impairment and physical rehabilitation on people's lives. The implication of these findings are discussed below.

7.1 Socio-demographics of persons with physical impairments in Myanmar

108 persons with physical impairments, and 104 age and gender matched controls were recruited into the quantitative component of the study (from which the qualitative sample was also drawn). Persons with and without physical impairments were well matched on age and gender, and there were no differences in marital status, religion, ethnicity or literacy. 89% of participants were male. This may be a reflection of the fact that statistically, men possess a higher risk of limb loss than women, particularly in cases of traumatic injury.[22] Males may also exhibit higher rates of risk-taking behaviour. Smoking, for example, is six times more prevalent among men than women in Myanamr.[23] However there may be gender imbalances inherent to society in Myanmar that result in women being less likely to seek healthcare and access appropriate services. Further research into this area would be very useful.

7.2 The situation of persons with physical impairments in Myanmar: Baseline Data

Evidence from both the quantitative and qualitative baseline data, collected before persons with physical impairments had been fitted for a prosthetic device, highlight key outcomes for persons with physical impairment in Myanmar.

Cause of impairment, and access to healthcare and rehabilitation services

The majority (56%) of persons recruited with physical impairments reported the cause of their impairment as acquired traumatic (for example due to traffic or work accidents, or landmines), and 23% as acquired non traumatic (often peripheral vascular disease [PVD]). 93% of persons with physical impairments recruited into the study were amputees: 53% with below knee amputation and 40% with above knee amputation. The vast majority of these amputations therefore are preventable or avoidable, requiring policies that minimise risk of acquired trauma and that support persons with acquired health conditions to minimise risk of amputation.

The qualitative data, for example, showed that participants with medical conditions such as PVD, often experienced multiple hospital admissions, which may represent delays in diagnosis and poor early recognition and management. Such delays can lead to clinical deterioration. Amputations arising through the consequences of unrecognised or poorly controlled medical conditions can potentially be avoided, if identified at an early stage, where preventative treatment can be initiated.[43]

Some respondents sought help from traditional healers before consulting medical professionals. The use of traditional and complementary medicine is widespread in low and middle income settings, due to its affordability and cultural acceptability.[44, 45] In addition, in rural areas, access to conventional health practitioners and secondary care services can be limited.[44] This may further delay diagnosis and management.

Physical Functioning amongst persons with physical impairments

Unsurprisingly, persons with physical impairments had much lower physical functioning than persons without physical impairments at baseline. On average, persons with physical impairments could walk half the distance in two minutes as persons without impairments, and only 44% were in the highest tertile of scores for Physical Function Assessment (PFA) compared with 100% of matched controls. This highlights the physical impact of impairment on the person’s functioning.

Wellbeing of persons with physical impairments

At baseline, persons with physical impairments reported consistently lower quality of life compared to persons without physical impairments, both overall and in each sub-domain (general health, physical health, psychological health, social relationships and environment).

This finding is underlined from the qualitative component which identified psychological adjustment to amputation affecting mood, body image, social participation, independence and identity. A review by Horgan and MacLachlan[46] of predominantly cross-sectional data emphasises the complexity in adapting to multiple aspects of daily life following limb loss. They found that symptoms of low mood and anxiety are present in the initial post-amputation phase, but begin to dissipate 2-10 years later to levels found in the general population. This may represent an adjustment reaction to limb loss and sudden disability, which subsequently improves.[47] However there can be long lasting problems relating to amputation, including residual limb issues, phantom pain and pressure sores,[48] which may increase the likelihood and persistence of depression and anxiety.[49]

In addition, the psychosocial sequelae of amputation may vary according to cause. The sudden loss of a limb through accidental trauma or infection is likely to affect an individual differently to if it occurs within the context of chronic disease, where there may be an element of planning or expectation. Indeed, rates of post-traumatic stress disorder are higher following traumatic amputation compared to those arising through chronic illness.[49]

Photo 5: The child of a study participant waits outside the home

The impact of physical impairment on access to work and other activities

Loss of job and therefore income was reported as a significant concern among those interviewed in the qualitative component, with many struggling to find employment post-amputation. Feelings of inferiority were described, and disability status was perceived as a barrier to securing paid work.[50]

The effect of physical impairment on access to paid work was confirmed in the quantitative data, which also showed major differences between access to work when comparing people with and without physical impairments at baseline. 69% of persons with physical impairments were not working at baseline, compared with 6% of persons without. In addition, persons without physical impairments spent approximately 7hours per day engaged in productive activities, compared to 1 hour for persons with physical impairments. In contrast, persons with physical impairments at baseline spent more time on medical care, and resting (no specific activity) than controls.

Household Socio-Economic Status amongst persons with physical impairments

Per capita expenditure, income and asset data collected in the quantitative component were similar between persons with and without physical impairments, but persons with physical impairments had higher expenditure on health care, and a much higher income gap ($-30 per capita per month, versus $-5) than persons without.

Although the rehabilitation service was provided without charge for all participants at both NRH and HORC, many of those interviewed in the qualitative component had amassed significant personal debt through previous hospitalisation and the associated cost of treatment. This income-gap was also apparent in the quantitative component, suggesting catastrophic socio-economic costs associated with acquired physical impairment in Myanmar.

7.3 The impact of physical rehabilitation on persons with physical impairments in Myanmar: Follow Up data

Physical Functioning

Physical functioning improved significantly for persons with physical impairments 3 weeks, 6 months and 12 months after fitting. Most gains in physical functioning were made within the first six months post-fitting. However, physical functioning at twelve months for persons with physical impairments was still lower than persons without physical impairments. This shows that there are major direct gains in functioning as a result of physical rehabilitation, but that this does not completely alleviate the impact of the impairment on the person's range of function. In addition, at twelve months post fitting, 16% of devices needed repair and 5% needed replacement, warranting reflection on service support to persons with physical impairments following physical rehabilitation.

Photo 6: A participant riding his motorcycle whilst wearing his prosthesis

Socio-economic status and access to work

Persons with physical impairments at twelve months had lower per capita monthly expenditure overall compared to baseline, due to lower expenditure on health services. In addition, they had higher expenditure on food, higher income and a much lower income gap which was no longer different from persons without physical impairments. This finding is very important, showing the positive impact of physical rehabilitation on the household's socio-economic status.

There are two main reasons for this change: first, the lower expenditure on health services shows that persons with physical impairments, despite receiving free physical rehabilitation services, were paying out-of-pocket for related health costs at baseline that they are no longer paying at follow up. Second, persons with physical impairments at twelve months on average spent 4 hours per day engaged in productive activities, which was significantly higher than at baseline. This shows clearly that provision of physical rehabilitation has a positive impact on access to work. However, more needs to be done to ensure that persons with physical impairments have equal access to work compared to those without as this is still much lower than persons without physical impairments.

In rural Myanmar in particular, the majority of the population are engaged in casual manual labour or agricultural activities.[51] Following lower limb amputation, such physical work becomes very challenging and in the absence of alternative vocational opportunities, unemployment is an inevitable consequence for many. With appropriate job matching, workplace support and mobility aids, persons with physical impairments are able to achieve meaningful employment. In settings where such barriers are diminished or absent, levels of mobility are not associated with better employment outcomes[52].

Several participants in the qualitative sample had been able to learn new skills post-amputation, such as basket weaving, with initial assistance from NGOs, demonstrating the value of providing vocational rehabilitation and how the expectations of those with lower limb amputations can be positively shifted. An important goal of rehabilitation is to promote access to occupational opportunities, either through returning individuals to previous employment or exploring new avenues. This ensures financial independence for persons with disabilities and their families. Community based rehabilitation programmes can also help initiate income-generating schemes for families utilising local

Photo 7: Woven basket made by a participant

resources, alongside providing education and physiotherapy[23].

Wellbeing and quality of life

There was no change in overall quality of life amongst persons with physical impairments at 12 months compared to baseline, except slightly lower physical health rating at 12 months. This result may appear somewhat surprising given the positive impact seen in physical functioning and socio-economic status. However, previous studies have shown associations between amputation and lower quality of life even following physical rehabilitation, often related to both phantom limb and stump pain[53]. In addition, it may be that generic quality of life tools such as the WHOQOL-BREF used in this study, do not adequately capture specific issues related to amputation and physical functioning. The review of quality of life tools undertaken as part of this research did not identify any rehabilitation-specific quality of life tools available in the literature, suggesting that this is an important area of further exploration.

8. Conclusion

Current physical rehabilitation services in Myanmar provide substantial support to persons with physical impairments in terms of their physical functioning and the financial security of themselves and their families. Comprehensive physical rehabilitation service design should continue to focus on providing opportunities to work for persons with physical impairments, and more nuanced tools are needed to further explore the impact of physical rehabilitation on quality of life of persons with physical impairments.

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