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Perceived Barriers and Facilitators for the Practice of Physical Exercise by People with Spinal Cord Injury in Maputo-Mozambique

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Abstract

Background: People with activity limitations, such as spinal cord injury, are more likely to lead asedentary lifestyle. Physical exercise and sport programs are an effective strategy for promoting rehabilitation in a broad sense of the term, as it accelerates the rehabilitation process by promoting:physical and health improvements, psychological gains, social inclusion, resulting in increased quality of life.

Objective: This study sought to know the barriers and facilitators perceived by people with spinalcord injury for the practice of physical exercise in Maputo city.

Methods: This is qualitative research, with semi-structured interviews carried out with 26 people with spinal cord injury, using thematic analysis as a methodological tool.

Results: Most participants reported that, before the spinal cord injury, they practiced physical exercises either at home, outdoors, gyms and expressed an interest in becoming active ormaintaining an active lifestyle. Several barriers were identified for the practice of physical exercises: accessibility to sidewalks, gyms, fields, bathrooms; lack of public transport; distances traveled to find a gym, field; reliance on third parties to get around; lack of specific personnel to train them and fear of injuries. All participants think positively about physical exercise, associating it with well-being, health, social interaction, improved functionality in general, prevention of secondary conditions such as pressure ulcers.

Conclusion: People with spinal cord injury face several barriers to physical exercise. The removal of these barriers, associated with the promotion of facilitating factors, is crucial to improve the opportunities for people with spinal cord injuries to practice physical exercises and reduce the risk of costly secondary conditions in this population group.

Keywords: Barriers, Facilitators, Exercises, Spinal cord injury

BACKGROUND

Spinal Cord Injury (SCI) is a devastating neurological event that changes the life of the affected person, with an impact not only on the individual, but also on the people closest to him, namely family members and caregivers [1-4].

Studies indicate that the person with SCI becomes sedentary, has a high lipid index, has limited independence, tends to have low self-confidence, has loss of muscle mass, has respiratory and cardiovascular problems, premature aging among many other factors harmful to your health and wellbeing [5-10].

Physical exercise has been shown to decrease the risk of many of the secondary conditions associated with SCI, including osteoporosis, cardiovascular disease, pressure ulcers, urinary tract infections, diabetes, and arthritis, although this population is rarely targeted by health promotion efforts [9,11].

Upon returning to the community after rehabilitation, people with activity limitations, such as SCI, are less likely to be physically active compared to the non-disabled population [12].

Health promotion for people with disabilities (PwD) has been a neglected area of interest by the health community in general. The goals of a health promotion program for PwD are to reduce secondary conditions (e.g., obesity,

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hypertension, pressure ulcers), maintain functional independence, provide an opportunity for leisure and fun, and improve the overall quality of life by reducing environmental barriers to good health [6].

Little has been investigated about why most people with disabilities are unable to integrate regular physical activity into their lifestyle. Understanding the likely barriers and facilitators that affect the participation of these people could provide important and necessary information for the development of interventions that are more likely to be successful [9,13].

The justification for the study was based on the scarcity of specific information on barriers and facilitators for the practice of physical exercise by people with SCI in Mozambique, and considering that this information is essential for the development of effective interventions that contribute to improving lives. of people with disabilities, being a new, important and interesting study. Therefore, its relevance is centered on contributing to the definition of adequate strategies (based on evidence) for the formulation of plans and public policies to be adopted by official entities, researchers, health professionals, physical education professionals, advocates and volunteers involved with the disability issue with a vision of a world of inclusion and contribute so that everyone is able to live a life of health, comfort and dignity by increasing participation in physical exercise programs after SCI.

In view of the above, the objective of this study was to identify the perceived barriers and facilitators for the practice of physical exercise by people with SCI in Maputo city.

METHODOLOGY

We carried out a cross-sectional study of an exploratory and descriptive nature through semi- structured interviews. The treatment and interpretation of data were carried out based on thematic analysis. The study involved 26 people with SCI, followed at Physical Medicine and Rehabilitation services and living in Maputo. Participants were selected by convenience. For the inclusion criteria, we applied: people with SCI of any etiology, with more than one year of evolution, aged 18 years or over and who agreed to sign the informed consent form. Data collection took place in March and April 2022.

The data collection instrument consisted of three parts: the first part was socio-demographic information with data characterizing the subjects and identification variables; the second part clinical information/injury data and closed-ended questions; the third and last part was a questionnaire related to physical exercise. The data collection instrument was tested by 5 people with SCI.

Although most existing post-SCI exercise research has been conducted in a controlled setting, through a structured exercise program, using a number of standardized means to measure exercise, including a structured reporting scale [14,15], a validated self-report instrument [16], an activity monitor [12] or providing exercise parameters to use for self-identification (e.g. 30 minutes a day, etc.) [17], in contrast, this study took into account the individual's perception of physical exerciseand not pre-defined categories.

Consequently, in this article, we will use the term exercise to refer to both formalized exercise activities and physical activity performed at home. This understanding of exercise reflects the recommendation by the Centers for Disease Control and Prevention and the American College ofSports Medicine that both low-intensity activity and vigorous exercise are beneficial in reducing the risk of heart disease and increasing overall fitness levels (USDHHS: Physical activity and health APUD Kehn and Kroll) [9].

Each interview lasted an average of 30 minutes and the answers were recorded in the interview script. After a thorough reading of the interview scripts, the speeches of the study participants were subjected to thematic analysis. To preserve anonymity, the interviews were coded, we used the letter E followed by a number to identify the participants' statements.

We respect all ethical aspects throughout the study and the protocol was approved by the Institutional Committee on Bioethics in Health of the Faculty of Medicine/Maputo Central Hospital (CIBS FM & HCM) under the number CIBSFM & HCM/102/2021.

RESULTS

Socio-demographic and clinical characterization of study participants

Although we do not work with generalizations, we found that the participants are distributed in a wide age group between 20 and 63 years old. The mean age of participants was 39 (±17) years. Most participants were aged between 31 and 40 years (n=9) **(Figure 1)**.

Regarding gender, 69.2% were male and 30.8% were female **(Figure 2)**. Most participants were paraplegic(17/65%), with trauma as the main cause of injury with 65.4% **(Figure 3)**. When analyzing the group of traumatic injuries, most were caused by a road accident with 64.7%. Regarding non-traumatic causes, 66.7% were caused by Pott's disease.

Experience in relation to physical exercises before SCI

Before SCI, most of the study participants (76.9%) reported that they practiced physical exercises whether outdoors, at home, in gyms or sports fields, as reported below:

- I liked sports, in fact I still do, I was physically active, I played basketball in my city regularly and I would like to play sports again (E-06, 45 years old, male, paraplegia, completeSCI)

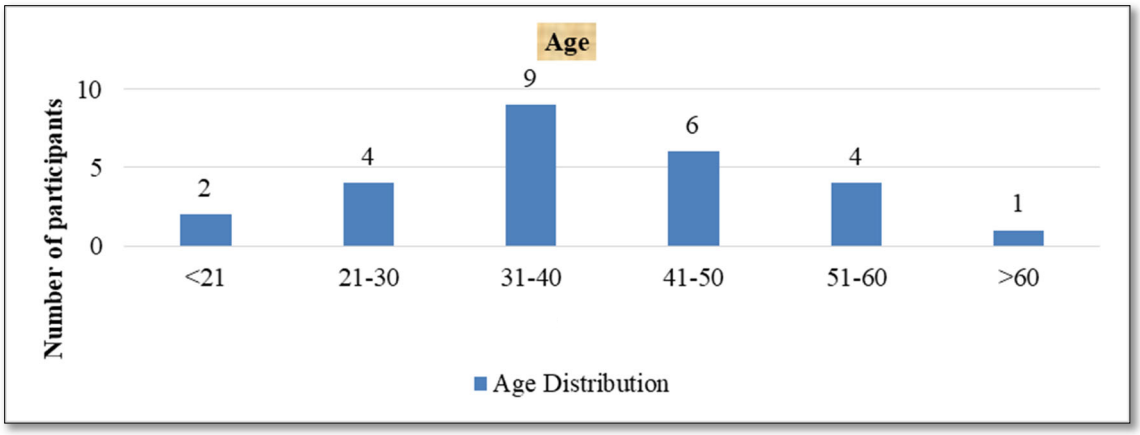

Figure 1. Age distribution.

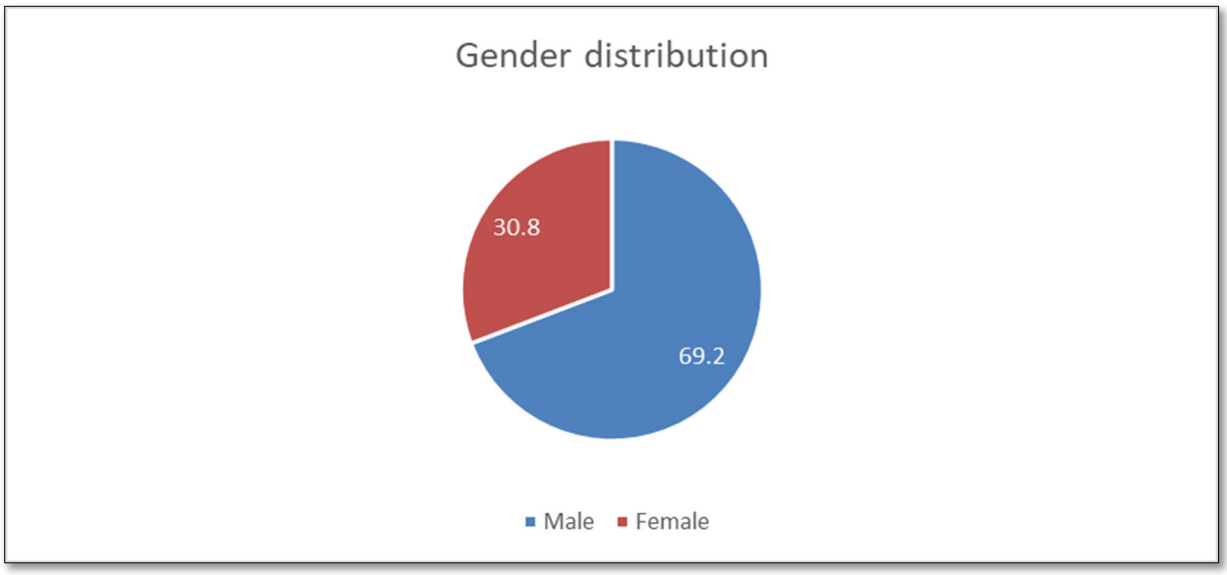

Figure 2. Gender distribution.

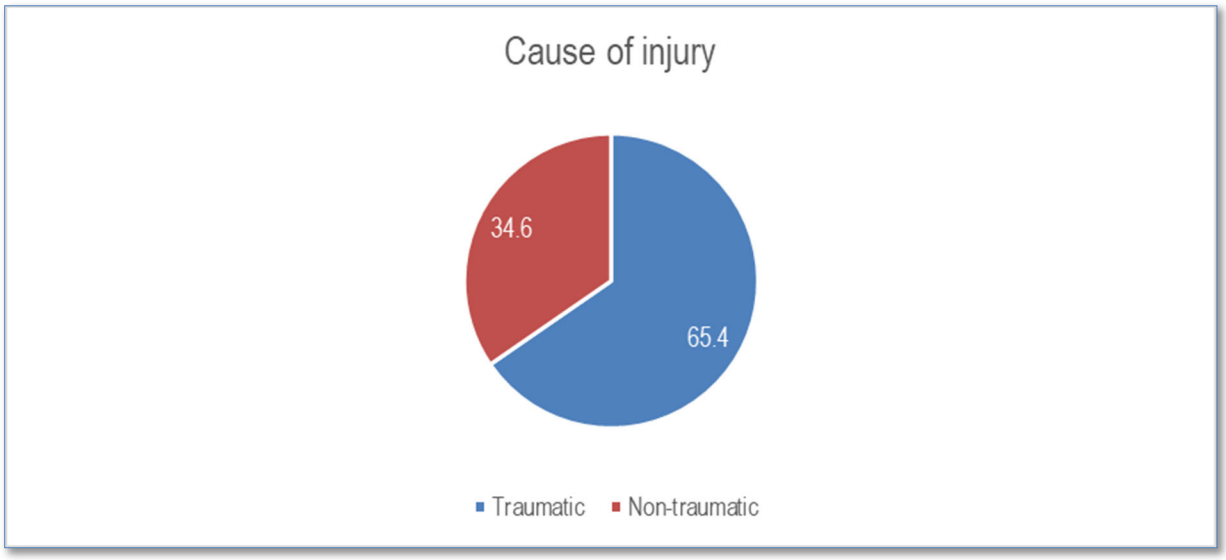

Figure 3. Cause of injury.

- I played football and had a lot of fun (E-15, 23 years old, male, tetraplegia, incomplete SCI)
- I practiced bodybuilding, I was a model and I had to keep my shape, I still keep my photos from that time, good memories (E-10, 32 years old, male, tetraplegia, incomplete SCI)
- Not regularly, but walking in the neighborhood with my friends (E-24, 27 years old, female, paraplegia, incomplete SCI)
- My profession forced me to exercise, and it was regularly to keep in shape, I ran, I played football (E-02, 32 years old, male, paraplegia, complete SCI)
- We observed that before SCI most participants had a life referred to as physically active regardless of the concept of physical exercise
- My life was a hustle I consider it to be physically active (E-12, 34 years old, female, paraplegia, complete SCI).

The word physically active was used in the participants' discourse to express the perception of physical exercise.

Experience of physical exercise after SCI

However, not all pre-injury exercisers continued to exercise after injury and some pre-injury non- active participants became active after SCI. Of the participants who reported physical activity before the injury, only 6 reported physical exercise after the injury and of those who did not report physical exercise before the injury, 3 reported physical exercises after the injury.

Some study participants stopped exercising due to injuries or complications associated with their condition, or other priorities. The interviews conducted revealed a wide range of factors that were identified as impediments for individuals with SCI to become physically active and prevent secondary conditions.

The thematic analysis identified four main factors acting as barriers and perceived facilitators forthe practice of physical exercises: environmental, social, personal and structural or process factors **(Table 1).**

Table 1. Barriers and facilitators perceived by participants.

Barriers	Facilitators
Environmental factors	
Lack of public transport	Sports facilities, gyms close to home
Accessibility	Own transport
Long distances to find sports facilities	
Public transport cost	
Social factors	
Lack of family/friend's support	Family/friends support
Lack of information received after discharge from rehabilitation	Socialization
Negative social attitude	Support from health professionals
Personal factors	
Fear of worsening your condition/psychological barrier	Fun
Dependence on third parties to get around	Pleasure, feel good
Motor condition (tetraplegia/paraplegia)	Improve health
Lack of knowledge and experience about physical exercise	
Secondary conditions	
Financial costs	
Lack of time	
Avoid secondary conditions	
Process factors	
Lack of proper equipment	Existence of specific programs for PwD
Lack of trained personnel to accompany them in training/physical exercises	Availability of qualified personnel to train them

Environmental factors

As reported by the participants, several barriers related to the environment were reported: lack oftransport to go to training camps, long distances to access a field, gym, accessibility to public spaces, including access to bathrooms.

The transcripts of our interviewees below reveal the barriers described above:

- Very difficult to take public transport with my chair, I have to pay myself and my chair, not everyone accepts

to take us at the stops… (E-20, 29 years old, female, Paraplegia, incomplete SCI)

- In my area the playing field that exists there, for me to get there I have to be carried, there is a lot of sand to get there… (E-17, 42 years old, male, paraplegia, incomplete SCI)
- I tried to go to the gym, but there are so many steps that I can't, the door is narrow, the effortthey make to carry me is enormous, there are many steps (E-11, 43 years old, female, tetraplegia,incomplete SCI)
- If I can get to the field/gym I have no access to the changing rooms and I have to go to school, how I will change… (E-16, 23 years old, female, paraplegia, incomplete SCI).

As facilitators, the fact that they have their own transport and drive their own car and the proximity of a field, gym, were reported.

- I drive my car myself, go out and go to the gym despite the difficulties of accessing the changing rooms… (E-9, 45 years old, male, paraplegia, complete SCI)
- I go out and exercise in the field next to my house, with the help of a physical education teacher… (E-14, 35 years old, male, paraplegia, completes SCI).

Social factors

Of these, it is worth highlighting the lack of information received from professionals after discharge from rehabilitation, lack of family/friend's support, negative social attitude as follows in the following speeches:

- After discharge from rehabilitation I did not have any information on how to keep myself physically active, so whenever they talked about being discharged, I did not want to, at the risk ofdoing nothing else and developing complications…(E-13; 36 years old, male, tetraplegia, incomplete SCI)
- My family does not accept that I go to the gym or walk, I rarely leave the house, they say that otherwise I will make my condition worse…(E-1, 45 years old, male, paraplegia, complete SCI)

Three of the participants made comments that dictate the behavior of society, that it is not preparedor has completely wrong attitudes when we think of someone with a disability:

- I used to go out to play basketball, when they asked, I said I'm going to play basketball and my family, neighbors and friends said what do you mean, you in a wheelchair? You are crazy? And my family members started to forbid me to go there, claiming that I am sick and my conditionwill worsen and I ended up not going anymore…(E-25, 35 years old, male, paraplegia, complete SCI; E-26, 21 years old, male, paraplegia, incomplete SCI);

Among the social facilitators, support from family and/or friends, encouragement from health professionals, socialization.

- My family supports me accompany me to the field and there I train and have a lot of fun, Iexpanded my circle of friendships… (E-3, 20 years old, female, paraplegia, complete SCI);
- When I was discharged, they encouraged me to practice regular physical exercises, the support of the rehabilitation staff was very important to me and today I can't live without physical exercise… (E-21, 46 years old, female, tetraplegia, incomplete SCI).

Personal factors

Several factors were mentioned as personal barriers to the practice of physical exercises: dependence on others to get around, fear of worsening health/psychological barrier, neuromotor condition (quadriplegia or paraplegia), lack of knowledge and experience about physical exercise, lack of time, lack of money to pay for a gym/economic cost. Physical aspects that were mentioned as barriers to the practice of physical exercises included having an injury or a complication associated with the condition and tiredness.

- I depend on third parties to leave the house, so I can't leave the house alone, I don't have fullmovements in my upper and lower limbs, and I have difficulty using my hands, like going to the gymlike this… (E-19, 42 years old, male, tetraplegia, incomplete SCI);
- When exercising in the backyard, I had a fall and fractured my leg bone, now I'm afraid to exercise; I used to do it regularly every morning… (E-7, 25 years old, male, paraplegia, completeSCI);
- I would like to practice physical exercises, but I don't know where to go, I went to a gym in my area and they told me that they don't have conditions for a person like me, in a wheelchair, other gyms are far from mine house, and they are expensive I will not be able to pay… (E-23, 18 years old, female, paraplegia, incomplete SCI).

Another factor considered as a barrier to the practice of physical exercise was lack of time.

- I would say because of my daily activities I don't have time to exercise regularly. I go to work,wake up at 4 am to prepare for work, and I don't come home until 8 pm Monday through Friday. The weekend is coming, I'm tired, and I just really want to rest… (E-05, 45 years old, male, paraplegia,completes SCI).

Most participants, who exercise reported doing so to prevent secondary conditions, particularly pressure ulcers, urinary tract infections and muscle wasting, as well as improve

bowel movement. Regarding the facilitators, the participants mentioned the taste for physical exercises, fun, pleasure, avoiding secondary conditions caused by a sedentary lifestyle, according to the following reports:

- Mentally I feel better for being accomplishing something and not just lying down… (E-7, 25years old, male, paraplegia, complete SCI)
- I like sports, I like bodybuilding and I like to see my body well defined, physical exercise gives me a good mood, increases my self-esteem, gives me joy and happiness… (E-10, 32 years old, male, tetraplegia, incomplete SCI)
- A sedentary lifestyle makes me obese, so I have to stay active… (E-8, 38 years old, male, paraplegia, incomplete SCI)
- Physical exercise makes me an independent person; it has given me and continues to give memore agility to do my daily activities, drastically reducing the dependence on personal assistance… (E-12, 34 years old, female, paraplegia, incomplete SCI).

Another aspect said to facilitate was the control of intestinal transit:

- When I don't exercise, I have intestinal problems with difficulty in evacuating, going days without doing it, but with the exercises and correct diet, consuming a lot of water, I solve the problem… (E-12, 34 years old, female, paraplegia, incomplete SCI).

Process or program factors

When we look at process or program related factors, we refer to organizational issues such as specific programs, trained personnel, adequate equipment, etc.

According to the reports of the study participants, the barriers mentioned were the lack of trained personnel to accompany them and the lack of adequate equipment.

- In gyms there is a lack of knowledge about what is possible for people with physical disabilities, they don't have time to support you and keep an eye on you, so I stopped going there and I do my exercises at home, I have dumbbells and I lift weight… (E-4, 25 years old, male, paraplegia, incomplete SCI)
- I was at the gym in the area, I did exercises that only worsened my condition, I lifted a lot ofweight and I had a spine surgery, I have irons I ended up not going there anymore… (E-25, 45 years old, male, paraplegia, incomplete SCI)
- We had a basketball team two or three years ago and we used our own wheelchairs and thosechairs are expensive and if they break down, we can't move, those chairs are our legs so I stopped… (E-17, 42 years old, male, paraplegia, completes SCI).

Regarding the facilitating factors, mention should be made of the existence of specific programs and trained personnel.

- We have a sports program and we have been training regularly at the Faculty of Physical Education and Sports with trained staff and with full monitoring and this motivates us… (E-11, 43 years old, female, tetraplegia, incomplete SCI; E-26, 21 years old, female, paraplegia, incomplete SCI and E-16, 23 years old, female, paraplegia, incomplete SCI)
- We have appropriate wheelchairs although in a very small number only 2, they help us and weexchange with each other so we don't have to sacrifice our wheelchairs… (E-11, 43 years old, female, tetraplegia, completes SCI).

Perceived health benefits of physical exercise

The result of the study showed that all individuals think positively about physical exercise, associating it with well-being, health, social interaction, improvement of functionality in general, prevention of secondary conditions such as pressure ulcers.

- Physical exercise is health, improves agility, gives us more dispositions, and strengthens the muscles… (E-6, 45 years old, male, paraplegia, incomplete SCI)
- Being physically active is good for the body, improves circulation, and prevents muscle pain… (E-24, 27 years old, female, paraplegia, incomplete SCI)
- It is good psychologically, improves my self-esteem and strengthens my muscles giving me strength to push my wheelchair… (E-19; 42 years old, male, tetraplegia, incomplete SCI).

Other benefits were observed in relation to general cardiovascular and respiratory fitness. Being physically active was also seen as improving motor control and maintaining strength.

- It gives more agility to carry out the activities of daily living, it reduces the bad mood, I controlmy movements better… (E-1, 45 years old, male, paraplegia, incomplete SCI).

As we see in the testimonies, there is a common feeling in relation to the positive effect of physical exercise on health: preventing injuries, improving quality of life, improving agility, avoiding cardiovascular problems and providing psychological well-being.

PwD constitutes a somewhat strategic group on the global agenda, aiming at their full and effective participation in society and on an equal basis with others.

This qualitative study showed that there are several factors including environmental, social, personal and process that

can be a barrier or facilitator for people with SCI to remain physically active. Some barriers found are not specific to people with SCI but found in the general population.

The main environmental barriers perceived for the practice of physical exercises were: the problem of public transport, accessibility and the lack of sports infrastructure in all rural and urban environments. This finding is consistent with a study carried out in the Western Cape province of South Africa where lack of transport, followed by accessibility issues and lack of sports infrastructure in all environments were the main barriers identified [17].

The issue of accessibility was also reported in a study developed by the Rehabilitation and Research Training Center (RRTC) on Spinal Cord Injury [9].

Maputo city has serious public transport and accessibility problems. This problem largely affects PwD and in particular people with SCI who depend on their wheelchairs to get around.

It is evident that there is a permanent imperative to strengthen policies aimed at reducing barriersin the physical environment and incorporating universal design principles for the benefit of all users [18].

The location of sports facilities or the location where programs are offered also plays a role as a barrier to individuals with SCI becoming physically active. However, the lack of transport contributes to the problem.

The identification of environmental barriers, especially those related to accessibility, are not exclusive to the problem of physical exercise, and were reported in conjunction with access to health services [9].

When we look at environmental facilitators, our results refer to the proximity of their homes to sports facilities and the fact that they are independent, having their own transport. The ease of finding a sports infrastructure as a facilitating factor was also reported by a study carried out in South Africa [17].

As for social barriers and facilitators, our results do not differ from the results found in other studies.

One of the barriers reported in our study was the lack of information regarding sport after the injury. This finding is consistent with a study by Malone et al. [19] where he found that people with physical disabilities do not receive adequate information regarding sport.

Limited family and social support have also been reported in studies as a barrier to the practice of physical exercise by people with SCI [20].

As for the facilitators, the literature consulted reports that sport is a powerful tool for the person's reintegration into social life, in addition to providing good mood, increasing self-esteem, expanding the cycle of friendships, happiness and joy to continue in the fight for the achievementof your space [21].

The support of family, friends and the behavior of the professional responsible for promoting physical exercise are important facilitating factors for people with motor disabilities to become physically active [14].

Socialization and the increase in the cycle of friendships were reported in other studies as facilitators for the practice of physical exercises, in Kenya [22] and the Netherlands [23].

Regarding personal barriers, our findings are consistent with the literature consulted [12,17,24]. Secondary conditions are often the cause of re-hospitalizations, subsequent bed rest and physical inactivity. It is important that these barriers are eliminated to improve the health and well-being of people with SCI [24].

Lack of time and financial conditions were also reported as barriers for people with SCI to becomephysically active [25].

Regarding perceived personal facilitators, they also coincide with what is found in the literature in which feeling good, having fun and improving skills were reported [17].

When we look at the process barriers reported here, the lack of trained staff to monitor, the lack ofaccessible gyms both in terms of architecture and financial costs and the lack of specific programs,these findings were also reported in other studies.

In the literature consulted, we found the cost of exercise programs as a barrier [19]; lack of experience of staff working in gyms in caring for people with SCI [26] and lack of adequate equipment for people with SCI [27].

As facilitators, the fact of having specific programs with trained personnel to accompany them and the existence of adequate equipment was also found in other studies [9,17].

Being a person with a disability is not just about medical issues, but more importantly social and inclusion issues [28].

Regarding the perceived benefits of physical exercise, our findings coincide with those found in other studies [10,19]. Physical exercise improves general health, well-being and prevents secondary conditions, especially pressure ulcers, in addition to improving circulation, breathing, and agility.

STRENGTHS AND LIMITATIONS

This is the first study that deals with barriers and facilitators for the practice of physical exercises perceived by people with SCI in Maputo-Mozambique. However, some limitations of the study were found. Its qualitative nature does not allow the results to be generalized to a larger population. The methodology used does not allow conclusions to be drawn about which barriers and facilitators have the greatest impact. Another limitation of this study

was the fact that we used individual perception in relation to physical exercise and not pre-defined categories.

IMPLICATIONS

The results of this study provided an overview of the main barriers and facilitators for the practice of physical exercises perceived by people with SCI in the city of Maputo that can contribute to the elaboration of a multisectoral plan to promote the participation of PwD in general in the practice of physical exercises.

It can also serve as a baseline for future quantitative studies with larger samples evaluating associations between different barriers (personal, social, environmental and process) and physical exercise in this population. It is important that this study be replicated at both rural and urban levels, taking into account the differences between them. The present study can also be replicated in people with other types of disabilities.

CONCLUSION

Based on the results of the study, it is evident that there are several barriers and facilitators perceived by people with SCI for the practice of physical exercises. The barriers encountered are multiple and result from a combination of environmental, social, personal and process factors.

Among the barriers found the lack of public transport, accessibility, lack of family and/or friends support, dependence on third parties stand out. Accessibility does not refer only to the sports environment, but also to other social spaces, which is a right that has not been guaranteed. Socialization, improved functionality in general and improved quality of life was mentioned as facilitators.

The removal of these barriers, associated with the promotion of facilitating factors, is crucial to improve the opportunities for people with SCI to practice physical exercises and reduce the risk of costly secondary conditions in this population group.

When physical inactivity is not addressed within people with SCI, health and well-being are not achieved, quality of life is affected and affected individuals are predisposed to many other comorbidities and secondary health conditions.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

LP was the principal investigator of this study and involved in the original protocol design. LP, ES and LM developed the semi-structured interview guide together.

All interviews were conducted by LP. Interview transcriptions, subsequent analysis and development of this manuscript were performed by LP and ES. All authors approved this final manuscript.

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