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Barriers to Walking After Cardiac Surgery

Barreiras à Deambulação em Indivíduos Após Cirurgia

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Background: Phase I cardiac rehabilitation aims to decrease respiratory, cardiovascular, and musculoskeletal complications by stimulating mobilization and autonomy. Some barriers associated with hospitalization can influence gait, and being aware of them can minimize the resulting decrease in free physical activity during this period. **Objectives:** The purpose of this study was to describe the self-reported walking barriers, verify if the number of steps was different with these barriers, and if they occurred more frequently in specific clinical, surgical, and anthropometric characteristics of patients in phase I cardiac rehabilitation. **Methods:** This descriptive cross-sectional study included adult individuals during the postoperative period after elective cardiac surgery between January and September 2019 in a cardiovascular referral hospital in Salvador, Bahia, Brazil. After the surgery, the patients received a pedometer to count the number of steps for 5 days. After the device was removed, a questionnaire on walking barriers was applied. **Results:** Forty-two patients were included. A total of 66.7% of the individuals described one or more factors related to walking barriers, followed by insecurity (35.7%), fear (28.6%), and pain (23.8%). The reporting of walking barriers, the number of steps, and the surgical and anthropometric characteristics were similar. **Conclusion:** Individuals that have undergone cardiac surgery have different mobility during the postoperative period, and factors beyond physical limitations are often self-reported by patients.
Keywords: Cardiac Rehabilitation; Number of Steps; Mobility.

Introdução: a fase I da reabilitação cardíaca tem como objetivo reduzir complicações respiratórias, cardiovasculares e musculoesqueléticas através do estímulo à mobilização e autonomia do indivíduo. Algumas barreiras associadas à hospitalização podem influenciar na realização da marcha, e conhecê-las pode minimizar a consequente redução da atividade física livre dos indivíduos nesse período. **Objetivos:** descrever as barreiras autorrelatadas à deambulação, verificar se existe diferença no número de passos com a presença dessas barreiras e se são mais frequentes em determinadas características clínicas, cirúrgicas e antropométricas dos pacientes na reabilitação cardíaca fase I. **Metodologia:** estudo de coorte transversal de caráter descritivo em que foram incluídos indivíduos adultos, em pós-operatório de cirurgia cardíaca eletiva, entre janeiro e setembro de 2019, em um hospital de referência cardiovascular, em Salvador, Bahia, Brasil. Após o procedimento cirúrgico foi entregue aos pacientes do estudo um pedômetro para contabilizar o número de passos durante 5 dias, e, no momento da retirada do dispositivo, foi aplicado o questionário sobre barreiras à deambulação. **Resultados:** foram incluídos na pesquisa 42 participantes. Quanto às barreiras à deambulação, 66,7% dos indivíduos descreveram um ou mais fatores, sendo os mais

pontuados a insegurança (35,7%), o medo (28,6%) e a dor (23,8%). Não houve diferença significativa quanto ao relato de barreiras à deambulação e o número de passos, bem como às características cirúrgicas ou antropométricas.
Conclusão: indivíduos submetidos à cirurgia cardíaca possuem mobilidade diferenciada no período pós-operatório e fatores que não são ligados apenas a limitações físicas são frequentemente autorrelatadas pelos pacientes.
<u>Palavras-chave</u>: Reabilitação Cardíaca; Número de Passos; Mobilidade.

Introduction

Cardiac surgery is an invasive therapeutic procedure increasingly directed at populations with critical and complex clinical situations. Moreover, to reduce mortality and hospital length of stay,[1] patients must be included in a cardiac rehabilitation program through physiotherapeutic treatment to support enhancing functionality in the postoperative period while they are still in the hospital.[1-3] Therefore, physical exercises during postoperative cardiac surgery have become extremely important so individuals can promptly return to their social life and daily activities.[2,3]

According to the Brazilian Society of Cardiology, physical activities are vital to treating patients with some types of heart disease, especially during the postoperative period, as they enhance physical and mental health and social conditions.[4] Studies show that cardiac rehabilitation plays a key role in improving these individuals' physical quality and functional capacity, increasing the survival rate by up to 88%.[1,3,4]

However, other factors not directly related to physical condition, such as hospital length of stay and distance from social life, can cause limitations to individuals and somehow modify their mobility.[3] Some studies have reported that relevant emotional alterations may occur during cardiac rehabilitation in the hospital phase, including sadness, fear, constant crying, and pain.[1-3] Such behavioral alterations associated with insecurities from the hospital stay and anguish can represent cardiac rehabilitation and prognosis barriers.[4-7]

Therefore, this study aims to describe the self-reported walking barriers and verify if there is any relation between such barriers, the number of steps, and the patient's clinical characteristics in phase I cardiac rehabilitation.

Materials and Methods

This was a descriptive and analytical cross-sectional study associated with a master's project within a graduate program in Medicine and Human Health from Bahiana School of Medicine and Public Health, the "*Diário de caminhada na reabilitação cardíaca fase I*" (Walking journal during phase I cardiac rehabilitation). The study followed a sequential non-probabilistic sampling of individuals undergoing cardiac surgery, including patients in the preoperative period for elective myocardial revascularization and/or valve replacement (male and female, aged 18 years or over). We excluded patients who underwent other surgeries, developed a stroke and returned to the ICU during the same hospital stay, and had complications that limited walking before or after surgery, such as medical recommendations for complete bed rest and neurological complications that impacted the independent walking.

Data collection took place in the ward of a tertiary hospital, referral for the care of patients with cardiovascular diseases, in Salvador, Bahia, from January to September 2019. A physiotherapist conducted the activity as the research group leader, specialized physiotherapists, and physiotherapy graduate and undergraduate students, all previously trained for all study stages.

The study was conducted in the postoperative period, starting with informed consent, then collecting sociodemographic, anthropometric, and clinical information and measuring the step length for setting the pedometer. After the surgery, each participant received a pedometer to count the number of steps on the day of medical discharge from the ICU. They were instructed to wear the pedometer from the iliac crest attached to their clothing throughout the day, only removing it for

showering and sleeping. They wore the device for five consecutive days. However, only three days were included since the first and last days were discarded due to the time variation regarding the delivery and removal of the device.

The research group monitored the participants for the days that they used the pedometer. Monitoring happened through visits at random times twice daily to ensure they were using the device correctly. On the fifth day, the pedometer was removed, and the number of steps counted. Then, a questionnaire created by the group of researchers to verify possible walking barriers was applied. The individuals scored according to their postoperative experience. To complete the questionnaire, each participant could identify one or more walking barriers and report other causes not described in the options.

Originally written in Portuguese, the questionnaire presented a question followed by ten options: what kept you from walking more/getting out of bed?
1. Pain
2. Fear
3. Insecurity
4. Demotivation/unwillingness
5. Medical team advice (doctors/nurses/nursing technicians/physiotherapists)
6. Discomfort caused by the clothing
7. Lack of companion
8. I only walk with the physiotherapy
9. I would rather stay in the room using my cellphone or watching TV
10. Other situations: _____

In order to analyze the relation between the number of steps and the barriers described, the study sample was divided into two groups according to the description of the most mentioned barriers: group 1, composed of individuals that reported pain, fear, and insecurity; and group 2, composed of those who did not report pain, fear, and insecurity.

For the elaboration of the database and descriptive and analytical approaches, we used the software Statistical Package for Social Sciences (SPSS), 14.0 version for Windows. The normality of variables was verified with the Kolmogorov-Smirnov test, descriptive statistics, and graphical analysis. Age was categorized as young (18 to 24 years old), adults (25 to 59 years old), and older adults (> 60 years old). The results were represented through tables and figures, where the categorical variables (self-described reports of barriers) were expressed in absolute values and percentage - n (%), and the numerical variables of asymmetric distribution (number of steps), expressed in interquartile range (IQR). We used the Chi-square test and Fisher's exact test to assess the relation of the sociodemographic, anthropometric, and clinical characteristics with walking barriers and the Mann-Whitney test to compare the medians of the number of steps between groups of walking barriers. The level of significance was $p < 0.05$.

Results

During the data collection, 94 individuals were selected according to the eligibility criteria. Those patients discharged when there was no research group member available to apply the questionnaire on walking barriers were considered losses (Figure 1).

Therefore, 42 individuals were included; 81% were male, 54.8% were old, and 52.4% underwent myocardial revascularization surgery (Table 1).

Regarding the barriers, 66.7% of individuals reported that one or more factors limited their walking activity. Besides the barriers mentioned in the questionnaire, the studied population also described laziness, dizziness, undergoing medical tests, fatigue, previous cardiac surgeries, tired legs, and drowsiness as hindering factors (Table 2).

The analysis of sociodemographic, anthropometric, and clinical variables associated with the most described walking barriers revealed a significant difference between ICU length of stay and fear (p 0.048) (Table 3).

Figure 1. Flowchart of selected participants regarding walking barriers after cardiac surgery, Salvador, Bahia, 2019.
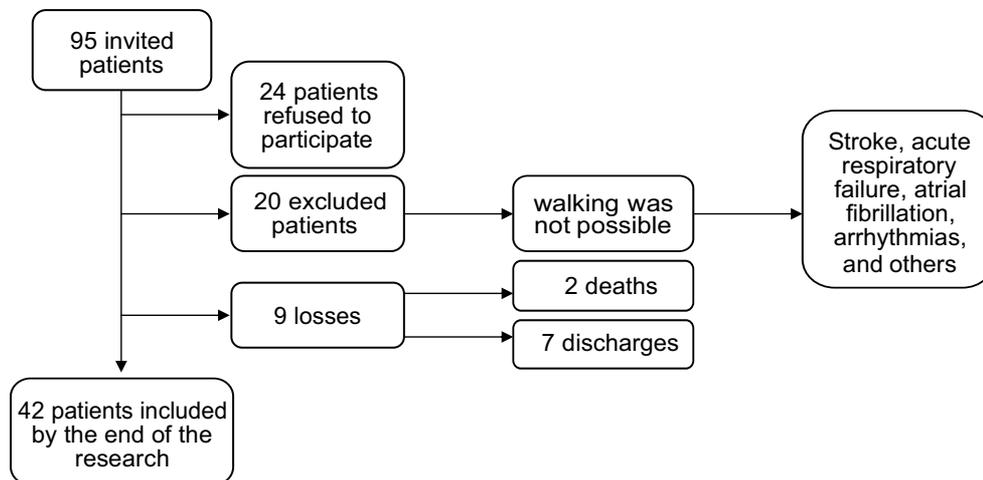
Pain, fear, and a sense of insecurity were the most described barriers by the individuals. We found no statistical significance when comparing the median number of steps between the groups (Figure 2).

Discussion

Some Brazilian authors explain that walking during the postoperative period improves self-confidence. Also, a fast return to daily activities improves the quality of life and reduces the deleterious effects of immobility.[1,6] The results of this study indicate that there are walking barriers in this population, such as pain, fear, insecurity, unwillingness and demotivation, team recommendation, lack of companionship, and limitations to walking only with the physiotherapist. Furthermore, fear was more often reported by those who had a more extended ICU stay period.

This sample consisted of individuals without physical limitations or restrictions who could walk independently. The individuals knew the importance of walking and staying active; however, even those who recovered well without significant locomotor limitations or hemodynamic instabilities described walking barriers and did not increase in-hospital physical activity. There was no statistical difference regarding barriers between men and women, revascularization or valve surgery, or free physical walking activity frequency.

These results follow previous publications that described the presence of walking barriers in the postoperative period.[4-9] In a particular study,[6] walking barriers were also described as follows: fear, pain, lack of professional help and companionship, and lack of encouragement from a companion and discouragement. These descriptions corroborate the findings of this study. Additionally, qualitative research described the following barriers: weakness, fatigue, pain, shortness of breath, dizziness, nausea, and stiffness. These aspects were not found in this study, possibly because patients with physical or clinical limitations to walking were not included.[6,7]

Some authors explain that this population generally presents symptoms of anxiety, depression, and fear.[5] A systematic review reported that several studies point out that the population describes fear in its entirety.[10] Anxiety was described as a factor that leads the individual to think and assume the role of a sick person, to lose control over themselves, to fear that they will become dependent on someone, and to fear the unknown, which is also the leading cause

Table 1. Population characteristics regarding walking barriers after cardiac surgery, Salvador, Bahia, 2019.

Demographic characteristics	N (%)
Age	
Young	2 (4.8)
Adults	17 (40.5)
Old	23 (54.8)
Gender	
Male	34 (81)
Marital Status	
Married/in a stable union	9 (21.4)
Single	33 (78.6)
Education	
Elementary	14 (33.3)
High School	20 (47.6)
College	8 (19)
Clinical characteristics	
BMI	
Adequate weight	14 (33.3)
Overweight	19 (45.2)
Obesity	8 (19)
Comorbidities n (%)	
Arterial Hypertension	20 (47.6)
Diabetes	13 (30.9)
Other comorbidities	5 (11.9)
Surgical and post-surgical characteristics	
Surgical type n (%)	
MR	22 (52.4)
VS	15 (35.7)
MR + VS	5 (11.9)
ICU time	
< 48 hours	17 (40.5)
> 48 hours	25 (59.5)
Number of steps [median (Q25 - Q75)]*	[1,237 (426 - 2,622)]

MR– myocardial revascularization; VS– valve surgery; *Median 5 days.

Table 2. Description of walking barriers after cardiac surgery, Salvador, Bahia, 2019.

Barriers	N (%)
Insecurity	15 (35.7)
Fear	12 (28.6)
Pain	10 (23.8)
The presence of a physiotherapist is required	8 (19)
Demotivation /Unwillingness	8 (19)
The patient prefers to watch TV and access the internet	7 (16.7)
Team recommendation for bed rest	2 (4.8)
Lack of companionship	2 (4.8)
None	14 (33.3)

Table 3. Association of anthropometric, sociodemographic, and clinical characteristics with the most described walking barriers by individuals after cardiac surgery, Salvador, Bahia, 2019.

Characteristics	Pain (N%)	p-value	Fear (N%)	p-value	Insecurity (N%)	p-value
Gender						
Male	8 (23.5)	0.626*	8 (23.5)	0.146*	12 (35.3)	0.605*
Female	2 (25.5)		4 (50.0)		3 (37.5)	
Age						
Young and adults	6 (31.0)	1.573**	4 (21.1)	1.879**	6 (31.6)	0.589**
Old	4 (17.4)		8 (34.8)		9 (39.1)	
Surgical type						
Revascularization	4 (18.2)		5 (22.7)		8 (36.4)	
Valve	4 (26.7)	1.174**	5 (33.3)	0.855**	5 (33.3)	0.081**
Revasc. / Valve	2 (40.0)		2 (40.0)		2 (40.0)	
ICU length of stay						
< 48 hours	6 (35.3)		2 (11.8)		5 (29.4)	
> 48 hours	4 (16.0)	0.142*	10 (40.0)	**0.048***	10 (40.0)	0.494*

*Fisher's test,** Chi-square test, Revasc. – revascularization, ICU– Intensive Care Unit.

Figure 2. Graphical comparison between the number of steps and the groups. Walking barriers in individuals after cardiac surgery, Salvador-Bahia, 2019.
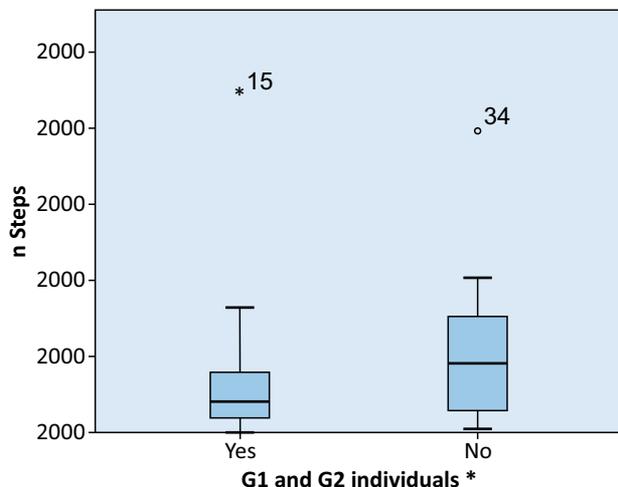
*G1: Individuals who reported pain, fear, and insecurity; and G2: Individuals who did not report pain, fear, and insecurity. P-value 0.06 - Mann-Whitney test.

of insecurity.[4] This study population reported that fear and anxiety were potential walking barriers.

Expanding the consideration related to fear and walking, we can note that the length of stay in the ICU environment is inversely proportional to the level of the individual's activity. Thus, walking and functional independence after ICU discharge is directly influenced by the length of stay in this environment,[6] reinforcing the feeling of fear and insecurity in individuals. These findings are consistent with this study in which there was a significant difference between the length of ICU stay and the description of fear by the study population.

Pain is described as the leading cause of functional and organic repercussions that can impair the treatment, contributing to decreased active movement and deep breathing, sleep dysfunction, causing physical exhaustion, besides being one of the leading causes of treatment demotivation.[6,8,11] A systematic review states that pain perceptions vary according to the subject gender, and it is slightly interlinked with the predisposition to express it, requiring the externalization of the painful sensation to understand it.[6,10] Like the other barriers, the description of pain in this study was mentioned by the individuals according to their experience during the period studied, and it is the third most frequent.

Concerning the number of steps, the group that did not report barriers of pain, fear, and insecurity had a higher number of steps and distance walked, although without statistical significance, suggesting a better functional prognosis. This hypothesis is supported by a systematic review that proved that the greater the distance walked during rehabilitation, the greater the indication of an excellent response to treatment, with a consequent gain in functional capacity.[12]

As a study limitation, the questionnaire on walking barriers used in the investigation has yet to be validated, which hinders comparison with other studies. Since this study is part of a broader research, which included applying other questionnaires and evaluations at the same time of hospitalization, many refusals to participate in this study were received during this period.

Describing and knowing the walking barriers in patients undergoing cardiac surgery should be considered during physiotherapy treatment concomitant to the increase of functional training to improve the functional status of patients and reduce possible postoperative complications. The observed barriers should not be exclusively directed at hospital psychology and should be identified and valued by all health professionals.[6,7] The physiotherapist must also focus on physical rehabilitation and remember that the movement relies on integrated systems to guide individuals concerning the importance of walking.

Conclusion

Individuals undergoing heart surgery have distinct mobility in the postoperative period, and personal factors linked to personal perceptions can be walking barriers in the hospital environment.

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