Facilitators and barriers for adherence of shoulder pain patients to a home-based exercise program: cross-sectional study

Facilitadores e barreiras para a adesão de pacientes com dor no ombro em um programa de exercícios domiciliares: estudo transversal

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DOI 10.5935/2595-0118.20230009-en

ABSTRACT

BACKGROUND AND OBJECTIVES: Home-based exercises can improve function and quality of life in shoulder pain patients. Knowing the facilitators and barriers is crucial for adherence to shoulder pain treatment. It is believed that individuals who adhere to home exercises have fewer environmental barriers, pain intensity and shoulder disability. The aim of this study is to identify facilitators and barriers for adherence to a home-based exercise program in shoulder pain individuals, and to investigate the influence of environmental barriers, shoulder pain and disability, and kinesiophobia on adherence to a program.

METHODS: This is a cross-sectional study. Shoulder pain individuals performed home-based exercises for eight weeks based on a booklet in addition to supervised physical therapy or as their sole therapy. They reported the perceived facilitators and barriers to home exercises adherence and answered the Craig Hospital Inventory of Environmental Factors (CHIEF), Shoulder Pain and Disability Index (SPADI), and the Tampa Scale for Kinesiophobia (TSK) questionnaires. Logistic regression models analyzed the scores of the CHIEF, SPADI, and TSK as predictors of adherence.

RESULTS: Fifty individuals participated in this study and 88% adhered to the program. The most frequent facilitator and barrier were "having guidance from a professional," and "lack of available time," respectively. Pain and disability were the only predictor of adherence (p=0.044), and an increase of one point in SPADI reduced the likelihood of adherence to home exercises by 14% (Exp(B) =0.86).

CONCLUSION: Individuals reported facilitators and barriers to the exercise program. Environmental barriers assessed using the CHIEF and kinesiophobia were not predictors of adherence.

Keywords: Adherence to treatment, Compliance, Exercises, Shoulder pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Os exercícios domiciliares podem melhorar a função e a qualidade de vida de pacientes com dor no ombro. Conhecer facilitadores e barreiras é fundamental para adesão ao tratamento da dor no ombro. Acredita-se que indivíduos que aderem aos exercícios domiciliares apresentem poucas barreiras ambientais, baixa intensidade de dor e incapacidade do ombro. O objetivo deste estudo foi identificar facilitadores e barreiras para a adesão a um programa de exercícios domiciliares em indivíduos com dor no ombro e investigar a influência de barreiras ambientais, da dor e incapacidade no ombro, e da cinesiofobia na adesão ao programa.

MÉTODOS: Neste estudo transversal, indivíduos com dor no ombro realizaram exercícios domiciliares por oito semanas com base em uma cartilha além da fisioterapia supervisionada ou como sua única terapia. Os indivíduos relataram facilitadores e barreiras percebidos para a adesão aos exercícios em casa e responderam ao *Craig Hospital Inventory of Environmental Factors-Brasil* (CHIEF-Br), *Shoulder Pain and Disability Index-Brasil* (SPADI-Br) e Escala Tampa de Cinesiofobia (TAMPA). Os escores do CHIEF-Br, SPADI-Br e TAMPA foram analisados como preditores de adesão por meio de modelos de regressão logística.

RESULTADOS: Participaram 50 indivíduos e 88% aderiram ao programa. O facilitador e a barreira mais frequentes foram "receber orientação de um profissional" e "falta de tempo disponível", respectivamente. Dor e incapacidade foram os únicos preditores de adesão (p=0,044), e o aumento de um ponto no SPADI-Br reduziu a probabilidade de adesão aos exercícios domiciliares em 14% (Exp(B) = 0,86).

CONCLUSÃO: Os indivíduos relataram facilitadores e barreiras ao programa de exercícios. As barreiras ambientais avaliadas por meio do CHIEF-Br e a cinesiofobia não foram preditores da adesão.

Descritores: Adesão ao tratamento, Cooperação, Dor no ombro, Exercício físico.

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Submitted on January 10, 2023.
Accepted for publication on February 27, 2023.
Conflict of interest: none - Sponsoring sources: none

HIGHLIGHTS

- Biological and social factors are important determinants of adherence to exercises.
- Knowing the facilitators are crucial for adherence to shoulder pain treatment.
- Knowing the barriers are crucial for adherence to shoulder pain treatment.
- The most common facilitator to home-based exercise adherence is professional guidance.
- Who don't adhere to home exercises have higher levels of shoulder pain and disability.

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INTRODUCTION

Similar to the effects of supervised exercise, home-based exercises can improve overall function and quality of life while relieving pain in shoulder pain patients[1]. As part of a regimen, they are also known to promote the self-management of care; that is, patients are encouraged to take responsibility for their own care over the course of the treatment program[1]. However, patient adherence is important to respond to physical therapy treatment[2], including the home-based exercise programs.

The World Health Organization (WHO) defines adherence as the extent to which a person's behavior corresponds to the recommendations of their health professionals[3]. However, it is an unpredictable variable that is less controllable during health interventions, and particularly regarding physical exercise, the determinants of adherence include environmental and personal factors[2,4-6]. Most studies on physiotherapy or musculoskeletal pain conditions have focused on influences of personal and biological factors such as high pain intensity and pain severity, high disability at baseline, fear avoidance related to movement, difficulty when attempting to routinize exercises, lack of time, motivation, depression, and self-efficacy[2,4,5].

According to the International Classification of Functioning, Disability and Health (ICF), environmental factors include home, workplace, school, social support, government actions, transportation, rules, and cultural ideologies[7]. In particular, support from family/friends and professional guidance/advice have been identified as environmental factors that influence adherence under musculoskeletal pain conditions[5]. There is currently a lack of information on the environmental factors that determine adherence to home-based exercise programs intended for shoulder pain patients, since a review showed difference in predictors of adherence among musculoskeletal conditions[5].

Therefore, this study investigated barriers and facilitators to home-based exercise adherence among shoulder pain individuals, with a more extensive approach to environmental factors, since understanding the influence of these factors and modifying the environment can improve adherence and help to achieve greater benefits from treatment. A more specific objective was to determine how adherence was influenced by environmental barriers. Secondarily, this study identified the relationship of adherence with the environmental barriers and the intensity of shoulder pain and disability, and with kinesiophobia, after the intervention. The following hypothesis was therefore established: individuals with greater adherence to home-based exercises will exhibit fewer environmental barriers, less intensity of shoulder pain and disability, and less kinesiophobia.

METHODS

This research was conducted as a cross-sectional observational study that followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[8] parameters. This study was approved by the Research Ethics Committee and registered under Opinion Number: 89782318.8.0000.5414 (CAAE). All selected individuals consented to participate in the study. Individuals were also guaranteed confidentiality and ensured that all participation was entirely voluntary. They were informed that they could withdraw from this study at any time and did not need to provide a reason to do so.

A total of 50 patients were recruited through electronic guides for referring patients to physiotherapy, using the public health system of the Municipal Health Secretariat of Ribeirão Preto City (*Secretaria Municipal de Saúde da cidade de Ribeirão Preto* - São Paulo, Brazil). The electronic guides were intended for the Coordination of the Physiotherapy Service at Cuiabá City Health Center-School (*Centro de Saúde-Escola de Cuiabá* - CSE-Cuiabá). The recruiting period took place from June 2018 to April 2019. This study included individuals of aged 18 years and above with shoulder pain and who were undergoing physiotherapeutic treatments through their local public health system. Patients with pain that was unrelated to the shoulder complex were excluded, including those with generalized musculoskeletal pain, referred pain in the cervical or thoracic spine, pain due to subluxation or dislocation of the glenohumeral joint, and post-operative patients.

The sample size was determined *a priori* based on the assumption for regression analysis of at least 15 individuals per each of three predictors included in the model[9].

Home-based exercise program

Each participant engaged in a home-based exercise program over an eight-week period. The program was based on a previous study and consisted of three groups of exercises, including self--stretching, joint mobility, and strengthening (four exercises in each group). Individuals were instructed to perform at least one exercise from each group at least three times per week[10]. They also were instructed to perform the exercises free of pain, and perception of mild to moderate pain during exercise should be used as a signal to skip that exercise. The following instructions were also provided: keep the upper limb active according to symptomatic tolerance and use ice to relieve pain. They received the instructions in a booklet and DVD format. The instructions and exercises used were the same as those in the previous study by the authors of the present research, which is more detailed[10].

Interview

After completing the full eight weeks of the home-based exercise program, all individuals were interviewed by a physiotherapist. The evaluator asked the following question to the individuals: "did you perform at least one exercise from each group from your booklet at least three times per week"? Those who verbally answered "yes" were considered adherent to the home-based exercise program.

The selected individuals also answered verbally the following question through interview: "which factors did you consider to be facilitators and barriers to home-based exercise adherence"? In addition, both the Numeric Pain Rating Scale (NRPS) and Shoulder Pain and Disability Index-Brazil (SPADI-BR)[11], were used to evaluate shoulder pain and disability during the same interview. The Craig Hospital Inventory of Environmental Factors-Brasil (CHIEF-BR) was used to evaluate the influence of environmental factors, followed by the Tampa Scale for Kinesiophobia (TSK)[12], in order to evaluate the fear of movement-related pain.

Outcomes

The NRPS was used to evaluate pain intensity in the shoulder, along a scale ranging from 0 (no pain) to 10 (worst pain imaginable)[13].

SPADI-BR questionnaire consists of 13 items across the two subscales of pain (five items) and disability (eight items), with higher total scores (0-100) indicating increased intensity[11]. SPADI-BR was previously tested for reliability, validity, and responsiveness[14].

CHIEF-BR questionnaire was used to assess environmental factors. It consists of 25 items across the five domains of Policies, Physical and Structural, Work and School, Attitudes and Support, and Services and Assistance, thereby assessing the frequency and magnitude of perceived physical, attitudinal, and policy barriers that prevent disability patients from doing things they desire or need[15]. Scores for each item are calculated to create a frequency-magnitude product score (range of 0-8) based on the frequency with which a respondent encounters a given barrier (0 = never, 4 = daily) and the magnitude of the problem it typically creates (1 = a small problem, 2 = a large problem)[15]. Total scores indicate the overall impacts of the barrier (range of 0-200), with higher scores indicating greater impacts[15].

TSK consists of 17 items designed to address fear related to movement, pain, and symptom intensity[12]. Each item is rated on a 4-point Likert scale ranging from "strongly disagree" to "strongly agree". Total scores may range from 17-68, with higher scores indicating increased kinesiophobia. In this regard, previous research has suggested a cut-off value of 39 for the condition[12]. TSK has been deemed reliable and valid for measuring the fear of movement-related pain[16].

Statistical analysis

Descriptive analyses were presented as means and standard deviations (age, pain intensity, SPADI-BR, CHIEF-BR, and TSK) and absolute/relative frequencies (gender and factors that were considered facilitators and barriers for adherence).

A logistic regression (backward logistic regression method) was conducted with "adherence to exercise" (yes or no) set as the dependent variable, while total scores from the SPADI-BR, CHIEF-BR, and TSK were set as the independent variables. Significant associations with "adherence to exercise" were determined based on significance levels < 0.05. Residuals were checked for cases of influence via Cook's Distance, leverage value, normalized residual, and DFBeta for constant and the model's predictor. All statistical analyses were conducted using the IBM SPSS Statistics software (SPSS Inc., Chicago, IL, USA).

RESULTS

The majority of individuals (88%, n=44) adhered to the home-based exercise program. Most were women, with a mean age of 58 (12.8) years. After home-based exercise program, their average outcome values were 20.3 (19.4) points for CHIEF-BR, 23.1 (28.9) points for SPADI-BR, and 40.6 (10.4) points for TSK. Table 1 provides an overview of the participant characteristics. Based on the earlier mentioned cut-off value of 39 points for TSK, 54% (27) of individuals had kinesiophobia.

Compared to the barriers, individuals reported a greater diversity of facilitators regarding their personal and environmental factors. For the personal factors, the most frequent facilitators were "supervision of a care provider," "perception of clinical improvement," and "expectations of improvement," while the most frequent barriers were "lack of time," "despondency," "laziness," and "pain." Barriers and facilitators reported by the patients were described in table 2.

For the CHIEF-BR questionnaire, the highest scoring environmental barriers were governmental policies (1.66), structural and physical aspects of the house (1.34), the natural environment (1.20), the surroundings (2.50), lack of computer technology (1.12), attitudes of individuals at home (1.38), availability of transportation (1.30), and health and medical services (1.26). Table 3 provides an overview of the CHIEF-BR scores.

Logistic regression showed acceptable associations between adherence to the home-based exercise program and total scores for CHIEF-BR (p = 0.062), SPADI-BR (p = 0.006), and TSK (p = 0.007). Logistic regression revealed a significant model [X^2(1)

Table 1. Characteristics of the individuals (n=50)

Variables	Adhered (n=44)	Not adhered (n=6)
Age (years), mean (SD)	57.1 (13.0)	66.6 (7.8)
Gender, n (%)		
Female	33 (75%)	6 (100%)
Male	11 (25%)	0 (0%)
Patients with kinesiophobia, n (%)	25 (56.8%)	6 (100%)
Pain intensity (NPRS 0-10), mean (SD)	1.6 (2.7)	7.6 (1.5)
CHIEF-BR (0 – 200), mean (SD)	18.2 (18.9)	36.0 (18.5)
SPADI-BR Pain (0 – 100), mean (SD)	21.9 (30.7)	78.6 (22.2)
SPADI-BR Disability (0 – 100), mean (SD)	13.4 (20.8)	64.7 (25.2)
SPADI-BR Total (0 – 100), mean (SD)	16.6 (23.7)	70.1 (22.6)
TSK (17 – 68), mean (SD)	38.9 (9.5)	53.5 (9.2)

SD = standard deviation; NPRS = Numeric Pain Rating Scale; CHIEF-BR = Craig Hospital Inventory of Environmental Factors-Brasil; SPADI-BR = Shoulder Pain and Disability Index-Brasil; TSK = Tampa Scale for Kinesiophobia.

Table 2. Facilitators and barriers for adherence to home-based exercises as reported by individuals (n=50)

Factors	Facilitators	Number of answers (n=58)	Barriers	Number of answers (n=56)
Personal	Supervision of a care provider	13	Lack of time	18
	Perception of clinical improvement	8	Despondency	6
	Expectations of improvement	7	Laziness	6
	Time availability	5	Pain	5
	Short time to perform the exercises	1	Not having exercise habits	2
	Establish fixed time	1	Forgot the exercise	1
	Managing time	1		
Environmental	Booklet with illustrations and descriptions	6	None	10
	None	4	Lack of a care provider	6
	Knowledge of exercises	3	Not having someone to exercise together	1
	Support from family members	3	Lack of support material	1
	No need to leave home	2		
	Having company at home	2		
	Having support material	1		
	YouTube™ videos	1		

SD = standard deviation.

Table 3. Mean score (standard deviation) and median (interquartil range) of Craig Hospital Inventory of Environmental Factors questions (n=50).

Questions	Mean (SD)	Median (Interquartil Range)
Policies domain		
22. Community services	0.46 (1.43)	0 (0-0)
23. Policies of businesses	0.30 (0.87)	0 (0-0)
24. Employment/education policies	0.64 (1.55)	0 (0-0.25)
25. Governmental policies	1.66 (2.37)	0 (0-2.50)
Physical and structural domain		
2. Design of home	1.34 (2.51)	0 (0-2.25)
3. Design of work/school	0.88 (2.27)	0 (0-0)
4. Design of community	0.88 (2.12)	0 (0-0)
5. Natural environment	1.20 (2.15)	0 (0-1)
6. Surroundings	2.50 (3.29)	0.5 (0-6)
11. Technology	1.12 (2.46)	0 (0-1)
Work and school domain		
13. Help at work/school	0.28 (0.91)	0 (0-0)
16. Attitudes at work/school	0.38 (1.21)	0 (0-0)
19. Support at work	0.14 (0.57)	0 (0-0)
Attitudes and support domain		
15. Attitudes at home	1.38 (2.54)	0 (0-1.25)
17. Attitudes in the community	0.06 (0.24)	0 (0-0)
18. Support at home	0.56 (1.76)	0 (0-0)
20. Support in the community	0.02 (0.14)	0 (0-0)
21. Discrimination	0.64 (1.77)	0 (0-0)
Services and assistance domain		
1. Transportation	1.30 (2.67)	0 (0-1)
7. Information	0.80 (2.00)	0 (0-1)
8. Education/training	0.20 (0.88)	0 (0-0)
9. Medical care	1.26 (2.24)	0 (0-)
10. Personal equipment	0.68 (2.06)	0 (0-0)
12. Help at home	0.70 (1.48)	0 (0-1)
14. Help in the community	0.08 (0.44)	0 (0-0)

SD = standard deviation; n = number of individuals.

Table 4. Logistic regression analysis (n = 49)

Steps and variable		B	Wald	p-value	Exp(B)	CI 95% Exp(B)
Step 1	CHIEF-BR	-0.086	0.636	0.425	0.918	(0.743; 1.133)
	SPADI-BR	-0.285	2.239	0.135	0.752	(0.518; 1.092)
	TSK	0.182	1.259	0.262	1.199	(0.873; 1.646)
Step 2	SPADI-BR	-0.204	3.224	0.073	0.815	(0.652; 1.019)
	TSK	0.088	0.647	0.421	1.092	(0.881; 1.352)
Step 3	SPADI-BR	-0.147	4.052	0.044	0.863	(0.748; 0.996)

CHIEF-BR = Craig Hospital Inventory of Environmental Factors; SPADI-BR = Shoulder Pain and Disability Index; TSK = Tampa Scale for Kinesiophobia; Wald = Wald test for logistic regression; CI = confidence interval.

= 21.677; p = 0.001; $R^2_{Nagelkerke}$= 0.74] and correctly classified 93.9% of individuals regarding their adherence to the home-based program. Based on SPADI-BR, "shoulder pain and disability" was the only factor associated to adherence (p = 0.044), with a 1-point increase in total scores indicating a ~14% increase in the chance of exercise adherence. Table 4 shows the results of the logistic regression.

DISCUSSION

In this study, individuals reported several facilitators to home-based exercise adherence, including professional guidance and advice, perceived clinical improvement, and the desire to improve. The most common barriers were the lack of time/motivation to exercise, intensity of pain, and difficulties related to the environment, including attitudes at home, government policies, the house structure, aspects of the environment and surroundings, and some services and forms of assistance. Patients with higher adherence to exercises benefited more from undertaking the exercises, compared to those that did not adhere (thus had higher remaining pain and disability levels). The environmental barriers assessed via the CHIEF-BR or kinesiophobia were not associated with adherence level.

These results support the findings of previous studies. For example, one study reported qualitative variables among 12 individuals with rotator cuff tendinopathy, finding that perceived clinical improvement was a facilitator for adherence, while pain intensity and the lack of motivation/equipment acted as barriers[6]. Furthermore, a systematic review of the predictors for adherence to home-based physical therapies targeted at various musculoskeletal structures showed strong positive associations for guidance/advice from a physiotherapist, support from friends and family, and self-motivation[5]. The same study also produced moderate evidence of a negative association between adherence and the lack of time for exercise, as well as limited evidence of an association with the expectations of therapy outcomes[5].

Based on SPADI-BR scores, this research found that lower shoulder pain and disability predict greater adherence to home-based exercise. It is necessary to take into account that the low SPADI-BR values refer to the time of discharge from the patient's treatment. A previous study similarly showed that lower levels of both cervical disability and cervical pain as respectively assessed by the Neck Disability Index and NRPS were associated with greater adherence to home-based exercise among women with chronic neck and shoulder pain who performed stretching and strengthening exercises for their upper and cervical limbs[17].

On the other hand, a previous systematic review found no relationships between adherence to home-based exercise and poor scores for the functional tests of walking speed, timed up and go, and sit to stand movement among elderly women[18]. There is limited evidence of an association between perceived severity and adherence to home-based exercise, with the authors stating that the lack of a stronger association may result from the absence of a more objective consideration of severity in terms of counting symptom occurrences[5]. In general, this study reinforces the evidence showing a positive association between adherence and pain/disability severity in patients with musculoskeletal dysfunction of the shoulder[5].

Most of this study's individuals (88%) adhered to their home-based exercise programs, which differs from other studies showing much lower rates; that is, about 50% for supervised treatment and even lower for home-based exercise[19]. In this regard, it is likely that a patient-centered exercise prescription model (i.e., including the patient in the exercise selection process) increases exercise engagement while empowering patients to behave more autonomously[20].

In short, individuals are more likely to adhere to home-based physical therapies and exercises when they have received clarifications over any doubts, are provided answers to their questions, and undergo at least one session of supervised exercise[19-21]. These strategies were considered when developing the program implemented in this study.

The most frequent environmental barriers identified by the CHIEF-BR questionnaire were government policies, the physical home structure, aspects of the environment and surroundings, lack of computer technology, attitudes at home, the availability of transport, health services, and medical care. All these barriers are part of government policies, among them, there are policies aimed at quality of life and physical activity, where it is up to the governmental sphere to facilitate and develop actions for the practice and awareness regarding physical exercise. These actions, if well developed, could facilitate adherence to home exercises.

One study reported the most common problems in shoulder pain patients using the ICF, thus finding that support from immediate family/friends was the most frequently mentioned facilitator, while social security services/policies were the most frequent barriers[22].

Also using the ICF, a systematic review of the measures of shoulder pain and functioning identified that environmental factors were rarely included in the study instruments, thereby limiting the knowledge about the magnitude of their influences[23]. Studies on musculoskeletal conditions have also less frequently addressed environmental factors. Notably, however, a systematic review[5], found that the environmental factor of social support was related to attitudes at home and showed strong evidence of an association with adherence to home-based exercises in the context of physical therapy.

The environmental barriers assessed by the CHIEF-BR received low scores and did not appear to influence home-based exercise adherence in this study. One study[21] used CHIEF-BR in a sample of community-dwelling seniors, thus finding a relationship between the perception of environmental barriers and disability. However, this relationship occurred in individuals with post-stroke disability, spinal cord injuries, and traumatic brain injuries, with the physical and structural subscale receiving the highest scores[21].

The CHIEF-BR questionnaire was developed to be used among individuals with neurological disabilities, which may explain the low scores received for environmental factors. More specifically, patients with musculoskeletal conditions of the shoulder may have lower perceptions of environmental barriers. It is important to mention that CHIEF-BR is not specifically looking at barriers to home-based exercise program and no previous studies have used the CHIEF-BR to assess individuals with musculoskeletal conditions.

Another factor that did not influence exercise adherence was the presence of kinesiophobia, which is known to interfere with the quality of life, function and intensity of pain, and home-based exercise performance[17,23-25]. A previous study found a negative association between fear avoidance beliefs assessed using the TSK and adherence to treatment. Whereby, higher degrees of adherence to treatment recommendations were predictive of greater pre-treatment and post-treatment changes in fear avoidance beliefs[25]. However, another study used the Fear-Avoidance Beliefs Questionnaire and found no significant association between fear-avoidance beliefs and treatment adherence[27]. These results corroborate this study, which used the TSK questionnaire. It is likely that the results of this study was influenced via the emphasis placed on the role of exercise in pain relief in the context of neuroscience education, as individuals frequently mentioned that professional guidance facilitated their adherence[4].

Home-based exercises are important elements in rehabilitation programs aimed at chronic conditions but are also associated with a variety of adherence difficulties, which compromise the success of the therapies. In regard to home exercise recommendations, this study showed that greater adherence can be achieved when health professionals allow patients to engage in the decision-making process for program development. This includes pain and neuroscience education while ensuring that patients understand their prescriptions. To maximize exposure to the factors that promote adherence, therapists should also be aware of whether their patients are self-motivated, have family support, and/or can find the time to exercise. It is also important to consider postponing home prescriptions for patients with more intense shoulder pain; that is, until they feel more comfortable with the exercises.

This study had some limitations. One noteworthy aspect is that, since adherence is a self-reported daily measure, individuals may have felt uncomfortable reporting cases in which they did not perform the exercises, thereby creating a social desirability response bias. This study interviews was performed face to face after eight weeks, so recall bias must be considered[5]. Future studies should thus evaluate lengthier programs to better understand the relationship between the progression of the musculoskeletal condition and voluntary exercise engagement. Furthermore, this study did not investigate individual self-efficacy, which is a psychosocial aspect that is known to influence adherence to home exercise[5,27]. Self-efficacy also refers to the tendency of individuals to preserve a behavior in the absence of external stimuli[28]. Most likely, a person with high self-efficacy would address fewer environmental and external barriers. In this study, one of the most reported barriers was the lack of family support, considered an external motivation. If self-efficacy had been assessed, it would be possible to gain a better understanding of the association between self-efficacy and adherence in the studied population.

CONCLUSION

This study found that the main facilitators to home-based exercise adherence were professional guidance and self-motivation, while the most frequent barriers were the lack of time and environmental factors, including the lack of family support. Further, lower perceptions of shoulder pain and dysfunction were associated with greater adherence to home exercise. This result was not observed for environmental barriers or kinesiophobia in this patient-centered research.

ACKNOWLEDGEMENTS

The authors would like to thank all the study participants for their time and compromise.

AUTHORS' CONTRIBUTIONS

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