DOI: 10.1590/1809-2950/20018327042020

ORIGINAL RESEARCH

Are SPADI score, age, level of education, and gender predictive of self-efficacy in patients with shoulder pain?

O escore SPADI, idade, nível de escolaridade e gênero são preditivos de autoeficácia em pacientes com dor no ombro?

La puntuación SPADI, la edad, el nivel educativo y el género son predictores de autoeficacia en pacientes con dolor de hombro

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ABSTRACT | Factors such as schooling level, age and gender are associated with a more intense pain and a higher level of dysfunction in the shoulder and self-efficacy can modify the effect that pain and dysfunction have on patients' clinical outcomes. Our study investigated if the score on the Shoulder Pain and Disability Index (SPADI), age, schooling level and gender are predictive of self-efficacy in patients with shoulder pain. It also verified if there are differences in levels of pain and disability between age groups and genders. Sociodemographic data and scores from the SPADI and the Chronic Pain Self-Efficacy Scale (CPSS) from a database of patients treated at a public physical therapy clinic specialized in shoulder were analyzed. In total, 123 patients with a mean age of 54 (±11.54), SPADI of 67.56 (±22.54) and CPSS of 182.22 (±61.76) were analyzed. Multiple linear regression analysis showed SPADI as the only predictive factor of self-efficacy (β=–1.39 [95%CI=–1.84 to –0.93], p<0.001), explaining 23% of its variance (r^2=0.23). ANOVA showed that the SPADI score was significantly different between genders (mean difference=22.27; p<0.001), but was similar between age groups (mean difference=7.04, p=0.16). We concluded that patients that complained of shoulder pain in a public shoulder physical therapy clinic were middle-aged women, who attended only up to middle school, had significant pain and disability, and high self-efficacy. The SPADI score can partially predict self-efficacy.

Keywords | Self Efficacy; Chronic Pain; Shoulder.

RESUMO | Fatores intrínsecos, como nível de escolaridade, idade e gênero, se relacionam com dor e disfunção, assim como a autoeficácia pode modificar o efeito que a dor e disfunção têm sobre resultados clínicos dos pacientes. Este estudo transversal investigou se o escore no Shoulder Pain and Disability Index (SPADI), idade, nível de escolaridade e gênero são preditivos de autoeficácia em pacientes com dor no ombro e se há diferença nos níveis de dor e incapacidade entre grupos de idade e gênero. Foram analisados dados sociodemográficos e pontuações do SPADI e do Chronic Pain Self- Efficacy Scale (CPSS) de um banco de dados de pacientes atendidos em um ambulatório de fisioterapia público especializado em ombro, um total de 123 pacientes com média de idade de 54 (±11,54), SPADI de 67,56 (±22,54) e CPSS de 182,22 (±61,76). A análise de regressão linear múltipla mostrou o SPADI como único fator preditivo de autoeficácia (β=-1,39 [IC95%=-1,84 a -0,93], p<0,001), explicando 23% de sua variância (r^2=0,23). A análise de variância (ANOVA) mostrou que a pontuação do SPADI foi significantemente diferente entre gêneros (diferença média=22,27; p<0,001), mas similar entre grupos de idade (diferença média=7,04; p=0,16). Concluiu-se que os pacientes que se queixaram de dor no ombro em um ambulatório de fisioterapia público especializado em ombro foram a maioria mulheres de meia-idade, que

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Financing source: Coordenação de Aperfeiçoamento de Pessoa de Nível Superior (CAPES), Financing code 001 – Conflict of interests: nothing to declare – Presentation: July 17th, 2020 – Accepted for publication: Mar. 2nd, 2021 – Approved by the Ethics Committee under opinion No.: 80091817.9.0000.5414.

cursaram apenas o ensino fundamental, apresentaram dor e incapacidade importantes e uma alta autoeficácia. Sendo que a pontuação no questionário SPADI foi capaz de prever parcialmente a autoeficácia.
Descritores | Autoeficácia; Dor Crônica; Ombro.

RESUMEN | Los factores intrínsecos, como el nivel educativo, la edad y el género, están relacionados con dolor y disfunción, así como la autoeficacia puede modificar el efecto que el dolor y la disfunción tienen en los resultados clínicos de los pacientes. Este estudio transversal tuvo como objetivo evaluar si la puntuación del Índice de discapacidad y dolor de hombro (SPADI), la edad, el nivel educativo y el género son predictores de la autoeficacia en pacientes con dolor de hombro y si existe una diferencia en los niveles de dolor y discapacidad entre grupos de edad y género. Se analizaron los datos sociodemográficos y las puntuaciones de SPADI y la Chronic Pain Self- Efficacy Scale (CPSS) de una base de datos de pacientes que recibieron atención en una clínica pública de fisioterapia especializada en hombro; un total de 123 pacientes con promedio de edad de 54 (±11,54), SPADI de 67,56 (±22,54) y CPSS de 182,22 (±61,76). El análisis de regresión lineal múltiple reveló el SPADI como el único predictor de autoeficacia (β=-1,39 [IC95%=-1,84 a -0,93], p<0,001), lo que explica el 23% de su varianza (r^2=0,23). El análisis de varianza (Anova) demostró que la puntuación SPADI fue significativamente distinta entre los géneros (diferencia media=22,27; p<0,001), pero similar entre los grupos de edad (diferencia media=7,04; p=0,16). Se concluyó que los pacientes que se quejaban de dolor de hombro en una clínica pública de fisioterapia, especializada en hombro, eran en su mayoría mujeres de mediana edad, que tenían cursada la escuela primaria, presentaban dolor y discapacidad significativos y alta autoeficacia. La puntuación en el cuestionario SPADI fue capaz de predecir parcialmente la autoeficacia.
Palabras clave | Autoeficacia; Dolor Crónico; Hombro.

INTRODUCTION

Chronic shoulder pain is among the highly prevalent musculoskeletal complaints and it appears frequently in the Physical Therapy clinical practice[1]. Symptoms related to this joint affect 7 to 34% of adults at some point in life, especially the age group of 42 to 55 years[2], women[2] and with an average level of education[3]. This high prevalence generates a large number of patients with functional limitations, restrictions on social participation, sleep disturbances, emotional distress[4] and costs to the public service[5].

Different risk factors are associated with the development of shoulder pain[5]. The literature shows correlations between shoulder pain and intrinsic (age, gender, education and weight)[2,6], work-related (exposure to repetitive movements, vigorous efforts, weight bearing and use of force)[7], and psychosocial factors (high mental demand, low social support, stress and depression)[8].

Pain-related beliefs have a great influence on the musculoskeletal pain development, transition and perpetuation[9] and on shoulder pain chronicity[10]. Perceived self-efficacy has been gaining prominence in the literature and represents the individual conviction that an individual can execute, with some control, the behaviors necessary to achieve a certain result[11]. High levels of health-related self-efficacy determine how much people strive to develop or change behaviors that directly affect their lives[12], whereas low levels of self-efficacy, in the initial assessment of patients with shoulder pain, reduce the positive predictive effect on physical therapy treatment of less severe pain and inability of the shoulder, that is, the patient's response to treatment will be lower than expected[8]. Moreover, patients with chronic pain and low self-efficacy demand more healthcare services[13].

Perceptions of self-efficacy can be modified with specific interventions and contribute to the improvement of dysfunction and depressive symptoms, and to adherence to treatment and pain tolerance14. The level of self-efficacy of patients with chronic musculoskeletal pain at the time of discharge from physical therapy is also related to a greater clinical perception of improvement, less pain intensity and fewer physical therapy sessions[15]. Therefore, clinician must include the level of self-efficacy regarding chronic pain in the initial assessment of the patient, and strategies to increase self-efficacy should be considered an intervention target[8], which generally includes a therapist-patient relationship that aims at changing perceptions and patient's beliefs by education, promoting self-management of pain[16].

Perceived self-efficacy is not an outcome measure classically assessed by the clinician that has gained attention in the scenario of chronic shoulder pain treatment; however, little is known about its correlation with the patient's intrinsic aspects and with self-reported pain and disability levels. Thus, our study had as its primary

objective to investigate if the score on the Shoulder Pain and Disability Index (SPADI), age, education level and gender are predictive of self-efficacy in patients with shoulder pain. The secondary objective of our study was to investigate if there is a difference in the levels of pain and disability between age and gender groups. The hypothesis is that some of these factors are associated with self-efficacy and that SPADI score is different for gender and age.

METHODOLOGY

This cross-sectional observational study analyzed a database from a public physical therapy outpatient clinic specialized in shoulder, from July 2017 to June 2019. The study followed the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology[17] and was approved by the local Committee of Ethics. In total, 100% of the records of patients that met the inclusion criteria were collected, with no losses due to the collection of data stored in a database. Out of 167 patients, 123 were older than 18 of age and had a major complaint of shoulder pain related to the subacromial space. Data from 44 patients with trauma-related diagnoses involving the shoulder or upper limb, such as dislocations and fractures, and symptoms of neurological involvement, such as paralysis or paresthesia in the upper limb, were excluded. The self-reported sociodemographic data (age, gender and education) and the scores of two questionnaires adapted and validated for the Brazilian population – the Shoulder Pain and Disability Index (SPADI) and the Chronic Pain Self-Efficacy Scale (CPSS) – were analyzed.

The SPADI is a questionnaire that assesses pain and disability associated with dysfunctions specifically in the shoulder. It consists of 13 items distributed in the domains of function (8) and pain (5), with each item scored on a numerical scale from 0 to 10 points. The total score for each domain is converted into a percentage for values ranging from 0 to 100, with the highest score indicating the worst condition of shoulder dysfunction. The Brazilian version shows excellent reliability (Interclass Correlation Coefficient =0.94) and internal consistency (Cronbach's Alpha α=0.89) of the total score and for each domain[18].

The CPSS is a scale that assesses the perception of self-efficacy and the ability to deal with the consequences of pain in a patient with chronic pain. It consists of 22 items distributed in the domains of pain control (5), functionality (9) and symptom control (8). Each belief is classified on a scale ranging from 10 to 100 and corresponds to the certainty that one has in relation to each item. The score can be total or for each domain. The minimum score is 30 and the maximum 300, with the highest score indicating better self-efficacy. The Brazilian version has excellent internal consistency (α=0.94) of the total score[19]. Patients with musculoskeletal pain that scored 172 or less on this questionnaire were classified as having low self-efficacy and those who scored above 172 as high self-efficacy[15].

Simple descriptive statistical analyzes were performed by extracting the mean, standard deviation, absolute numbers and percentage of sociodemographic data from the score classification in the questionnaires. The two-way analysis of variance (two-way ANOVA with SIDAK adjustment) was performed to verify whether there is a difference in the SPADI questionnaire score between the age factors (young adults were considered to be in the 15 to 59 year old age group and the older adults in the age equal to or above 60 years, according to the National Policy for the Elderly, Law No. 8842, of January 4, 1994)[20] and gender (female and male), and also if there is an interaction effect between them.

Finally, multiple linear regression analysis was performed in the forward method to determine the degree of influence of predictive factors on the levels of perceived self-efficacy. Continuous data from the SPADI total score and age, and categorical data from schooling (illiterate, middle school, high school or higher education) and gender (female and male) were considered as independent variables. Standardized (Beta) and non-standardized (β) coefficients were measured with the intention of finding how strongly each predictor variable influenced the dependent variable (self-efficacy). The Beta coefficient was calculated in units of standard deviation and the β coefficient in its natural units. Before the multiple linear regression analysis, a simple linear regression analysis was performed to identify the variables with significant influence (T-statistic of the β coefficient) on self-efficacy[21]. Only variables with significant influence were included in the multiple linear regression, which covered all the required prerequisites. The analyses were performed using SPSS version 17 for Windows (SPSS Inc. Chicago, IL) and the significance level was 0.05.

RESULTS

Data from 123 patients seen at a public shoulder physiotherapy outpatient clinic were analyzed. The mean age was 54 years old (standard deviation = 11.54 years old), with a predominance of females and who attended only elementary school. In addition, most patients had a total CPSS score greater than 172 points (59.35%) (Table 1).

Table 1. Patients' sociodemographic data and questionnaire score (n=123)

Variable	Values
Age, N (%)	
60 years or older (older adults)	40 (32.52)
20 to 59 years (adults)	83 (67.48)
Gender, N (%)	
Female	91 (73.98)
Male	32 (26.02)
Schooling, N (%)	
Illiterate	02 (01.63)
Middle school	67 (54.47)
High school	44 (35.77)
Higher education	10 (08.13)
Shoulder Pain and Disability Index (SPADI), mean (SD), [min; max]	
Pain domain	66.14 (22.76). [10.0; 100.0]
Disability domain	54.71 (22.25). [2.5; 95.0]
Total score	67.56 (22.54). [94.0; 28.0]
Chronic Pain Self-Efficacy Scale (CPSS), N (%)	
Individuals with score equal to or lower than 172†	50 (40.65)
Individuals with score equal to or greater than 173	73 (59.35)
Chronic Pain Self-Efficacy Scale (CPSS), mean (SD), [min; max]	
Pain control domain	58.46 (23.35). [12.0; 100.0]
Function domain	68.56 (20.17). [10.0; 100.0]
Symptom control domain	62.24 (25.36). [11.25; 100.0]
Total score	182.22 (61.76). [45.25; 300.0]

SD: standard deviation; min / max: range of minimum and maximum values; † 172 points or less is indicative of low self-efficacy in individuals with chronic musculoskeletal conditions.

The SPADI score was significantly different between genders [F (1.119)=19.88; mean difference=22.27 (95%CI=12.38; 32.16), p<0.001], but similar between the age groups [F (1.119)=1.99; mean difference=7.04 (95%CI=–2.85; 16.93), p=0.16] and there was no interaction effect [F (1.119)=1.58; p=0.21] (Table 2).

Table 2. Analysis of variance of SPADI for gender and age (n=123)

	Female Mean (SD)	Male Mean (SD)	Mean Difference (95%CI)	P-value
Adults	63.86 (21.01)	47.88 (16.75)	15.99 (6.67; 25.31)	0.001†
Older adults	63.10 (19.67)	34.55 (22.68)	28.55 (11.10; 45.99)	0.002†
Female intergroup comparison				
Adults (n=57) – Older adults (n=34)			0.77 (–7.77; 9.30)	0.859
Male intergroup comparison				
Adults (n=26) – Older adults (n=6)			13.32 (–4.52; 31.16)	0.142

†Difference between genders (p<0.05); n=sample size.

The average score on the CPSS scale was 182.22 (±61.76), and stratifying by age and gender, we obtained an average score of 176.97 (±63.46) for adult men (n=26); 202.02 (±43.49) for older men (n=6); 182.45 (±66.43) for adult women (n=57); and 173.74 (±67.39) for older women (n=34).

Simple linear regression demonstrated a significant influence of the SPADI score (β=–1.39; p<0.001), gender (β=27.08; p=0.03) and education (β=14.31; p=0.09) in self-efficacy, with no influence of age (β=–0.06; p=0.90). Multiple linear regression showed that the SPADI score was the only independent variable capable of predicting self-efficacy (β=–1.39 [95%CI=–1.84 to –0.93], p<0.001) and explained 23% of its variance (r2=0.23). The analysis resulted in a statistically significant model [F (1.121)=36.21; p<0.001], with Beta=–0.48, in which self-efficacy=263.773–1.39× (SPADI score)].

DISCUSSION

Our study characterized the disability and self-efficacy of patients seen at a public shoulder physical therapy outpatient clinic and identified the population that complains of shoulder pain, which is composed of women, in the age group of 50, who attended only teaching fundamental, have significant pain and disability and high self-efficacy. The analysis of the difference in the SPADI questionnaire score between the age and gender factors showed that women, regardless of age, show greater self-report of pain and disability than men. The regression analysis resulted in a statistically significant model, in which only the score of the SPADI questionnaire explained the variance of self-efficacy. Age, gender and education were not able to predict self-efficacy.

SPADI could predict self-efficacy by 23%, that is, a quarter of its variance, and the worsening of pain and disability by 1 point in SPADI implies a reduction in self-efficacy by 1.39 points in CPSS. This observation is relevant to the clinician, since it indicates that patients with low self-efficacy may manifest a worse perception of their clinical condition, which corroborates with Souza et al. (2020)[15], who observed a moderate association between a greater perception of self-efficacy and a better perception of improvement in clinical status at the time of discharge from physical therapy, for patients with chronic musculoskeletal pain. The patient's expectations regarding improvement with physical therapy and high self-efficacy regarding pain[14] had also been indicated as factors that positively influence the score of the SPADI questionnaire[8]. Moreover, a systematic review showed strong evidence of an association of self-efficacy with home physical therapy adherence, which may imply a clinical improvement in pain and function at the end of treatment.

Studies have shown that the combination of self-efficacy with the level of pain and disability can lead to different therapy outcomes. High levels of pain and dysfunction related to high self-efficacy reduce the probability of persisting symptoms in the shoulder[17]. However, the likelihood of persistent shoulder pain increases in individuals with low SPADI scores and with less self-efficacy upon admission to physical therapy. Subjects with a low level of pain intensity and self-efficacy scores have similar or worse results than those with a high level of shoulder dysfunction and high self-efficacy[8,22]. Thus, actions that positively interfere with self-efficacy must be inserted in rehabilitation to ensure adherence to the proposed exercise program and guarantee the results that would be expected for the patient in the absence of compromised levels of self-efficacy.

Age, gender, and education were not able to predict self-efficacy, which ratifies the study by Souza et al.[15] in which they did not find a relationship between self-efficacy and age or duration of symptoms in patients with chronic musculoskeletal pain. Future studies need to investigate other predictors of self-efficacy to help promote this behavior during the treatment of individuals with shoulder pain. The literature shows an association between self-efficacy and emotions, in which high levels of "optimism" and "hope" are related to less pain and musculoskeletal dysfunction[23]. Therefore, we recommend that physiotherapists conduct evaluations in order to identify these psychological components; however, with a closer look from the responsible professional, as well as multiprofessional approaches.

The perception of self-efficacy can be modified, since it involves cognitive and culturally acquired components[19]. To this end, models of cognitive interventions are proposed with the objective of intervening in the patient's beliefs and perceptions by education[16] and of promoting self-management of pain by an action plan with progress feedback, problem solving strategies, and social persuasion, among others. Virtually, patient education involves clear explanation of the condition, resolution of issues, shared therapeutic decision, feedback on performance during therapy, health-related promotion and prevention counseling and proof of the professional's ability[16,24]. Therefore, health professionals must be encouraged to identify patients with reduced levels of self-efficacy and trained to properly perform this type of intervention[25].

This study has as its positive points the use of questionnaires validated for the Brazilian population, with excellent internal consistency, characterizing a sample of patients who attended a public physical therapy outpatient clinic specialized in shoulder. The limitations are the use of a secondary database, the evaluation performed by different physiotherapists and the sample from a single service, which makes it difficult to generalize the data. In this study, there were no measures for emotions and cognition factors (kinesiophobia and catastrophizing), as well as no information such as body mass index, work situation and self-reported perception of health status that can be investigated as predictors of self-efficacy in future studies. Furthermore, our study is restricted to explaining associations rather than cause-effect relationships, so future research may include the use of self-efficacy as an additional intervention related to pain and disability outcomes.

CONCLUSION

We conclude that self-efficacy was predicted by the SPADI score and was not related to intrinsic age and gender factors.

ACKNOWLEDGMENTS

We would like to thank the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brazil (CAPES) for the financial assistance that made this work possible.

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