The Influence of Pain Self-efficacy on Physiotherapy Outcomes for Patients with Shoulder Pain: A Systematic Review

Aws Obaid^{1*}, Ahmad Alhamed¹ and Alaa Khushhal²

¹Rehabilitation Department, King Abdulaziz Medical City, Jeddah, Saudi Arabia

²Physiotherapy Department, Faculty of Applied Medical Sciences, Umm Al-Qura University, Makkah, Saudi Arabia

***Corresponding Author:** Aws Obaid, Rehabilitation Department, King Abdulaziz Medical City, Jeddah, Saudi Arabia.

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Abstract

Background: Shoulder pain is a very complex and common condition among population, and the mechanisms involved in its perpetuation remain unclear. Pain self-efficacy appear to play a role in the outcomes of treatment in people with shoulder pain. The purpose of this systematic review is to investigate the impact of pain self-efficacy on physiotherapy outcomes (pain intensity and disability) in patients with shoulder pain.

Objectives: To identify the impact of pain self-efficacy on physiotherapy outcomes in patients with shoulder pain.

Methods: A systematic search performed on the following databases PubMed, the Physiotherapy Evidence Database (PEDro), Scopus (Elsevier), Science of Direct, (CINAHL) and Psychology database (ProQuest). Longitudinal studies with quantitative designs analyzing the role of psychological factors and pain self-efficacy on treatment outcomes included. The quality assessment of the included studies evaluated using National Heart, Lung, and Blood Institute's Quality Assessment Tool for Observation Cohort and Cross-Sectional Studies.

Results: Two studies were selected for this systematic review. From 1030 patients 71 putative prognostic factors were collected, main findings were higher patient expectation of recovery as a result of physiotherapy ($\beta = -12.43$, 95% CI -8.20 to -16.67), higher pain self-efficacy ($\beta = -0.36$, 95% CI -0.50 to -0.22), lower pain severity at rest ($\beta = -1.89$, 95% CI -1.26 to -2.51). The results of secondary analysis showed that patient expectancy is related to the patient recovery as the patients who expected to recover with the physiotherapy had better results than those who did not expect to recover with the physiotherapy.

Conclusion: The available evidence suggests that there is a relationship between high levels of pain self-efficacy, and low levels of pain intensity and disability in patients with shoulder pain.

Keywords: Patient Expectations; Psychological Factors; Pain Self-efficacy; Shoulder Pain

Introduction

Shoulder pain is a common occurrence among working people, as well as in the general population [1,2]. Such pain may originate from several structures and conditions which include: Frozen shoulder, Rotator cuff related shoulder pain, instability of the glenohumeral joint, synovitis, and osteoarthritis (OA) of the acromio-

clavicular or glenohumeral joints [3]. Primary healthcare regards shoulder pain to be the third most frequently occurring musculoskeletal disorder. Furthermore, physicians and physiotherapists consider that only low back and neck pain occur more often than shoulder pain [4]. Such pain is a significant cause of functional disability [1-5] and morbidity [6].

Moreover, the predominance and socioeconomic effect of shoulder pain is certainly high, at incidence rates of up to 2.5%, whereas the prevalence increases up to 66.7% for lifetime prevalence in the general population [7,8]. Several suggestions have been made regarding how psychosocial factors are associated with pain-related disability, pain intensity and physical impairment. Current evidence has demonstrated the possible connection between psychological factors such as self-efficacy and the prognosis of shoulder pain [9].

Self-efficacy can be defined as a large and broad notion indicating someone's belief that he or she is able to undertake a particular task in order to attain a desired result [10,11]. The term has also been defined as a protective psychological resource in patients suffering from chronic pain, and a resilience aspect linked with enhanced functional results in adults who encounter chronic pain [12]. Furthermore, numerous studies have considered self-efficacy to be a major contributor to functional results. Examples of this are high self-efficacy, which is linked with improved functional results, as well as variability in self-efficacy that mediates the connection between disability and pain intensity [13].

The role of pain self-efficacy on pain intensity and disability in patients with shoulder pain has been examined in previous studies, the findings of these studies had shown a possible association between high levels of self-efficacy and better outcomes in level of disability [14,15]. According to Chester, *et al.* (2018) a high level of pain self-efficacy and expectation to better recovery were associated with good improvement in intensity of pain in patients with shoulder pain. Also, Engebretsen, *et al.* (2010) suggest that high levels of pain self-efficacy significantly associated with low level of disability in patient treating from shoulder pain. Therefore, the aim of this systematic review is to identify the impact of pain self-efficacy on physiotherapy outcomes on patients who experience shoulder pain.

Methods

Study design

A systematic review.

Protocol and registration

This systematic review was written according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [16].

Eligibility criteria

The following criteria in the selection of included studies have been applied: longitudinal studies (prospective and retrospective); that examined the effect of pain self-efficacy on physiotherapy outcomes in patients with shoulder pain. Furthermore, studies that whose participants complain of non-traumatic shoulder pain like frozen shoulder, rotator cuff related shoulder pain. Addition, the search was limited to studies published since 2010 until January 2021 studies that written in the English language only. Moreover, this study excluded studies that did not include the following: longitudinal design; studies exploring pain self-efficacy on post-operative cases (e.g. rotator cuff repair, bankert repair, shoulder arthroplasty); studies evaluating self-efficacy on people having shoulder pain due to a stroke; rheumatoid arthritis or any non-mechanical shoulder pain as well as studies that written in a language other than English.

Search strategy

The literature search was undertaken by two independent reviewers, namely (Aws Obaid and Ahmad Al-Hamed). In order to identify relevant studies, the following databases were used: PubMed, the Physiotherapy Evidence Database (PEDro), Scopus (Elsevier), Science of Direct, (CINAHL) and Psychology database (ProQuest). The titles and abstracts were examined separately by the two reviewers in accordance with the inclusion and exclusion criteria. In case of any doubt, the full text of an article was read in order to determine its relevance. Addition to that, reference lists of all selected articles were screened for additional relevant literature. Subsequently, in the case of any disagreement between the two reviewers (Aws Obaid and Ahmad Al-Hamed), a third reviewer (Alaa Khushhal) was consulted.

Date extraction

Two independent reviewers (Aws Obaid and Ahmad Al-Hamed) extracted the following relevant data from each study: study details (first author, year of publication); study design, sample size; characteristics of participants; metric of self-efficacy measures, metric of outcome measures; and main findings. At each stage, if the two reviewers do not agree on the eligibility of the studies, a third reviewer was asked to mediate the final decision (Alaa Khushhal).

Quality assessment

The two reviewers (Aws Obaid and Ahmad Al-Hamed) independently assessed the risk of bias of included studies by using the National Heart, Lung, and Blood Institute's Quality Assessment Tool for Observation Cohort and Cross-Sectional Studies [17]. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was followed to report this systematic review.

Data analysis

A descriptive, narrative synthesis of the main findings and quality of the included studies were presented in this systematic review. This systematic review did not include a forest plot because the included studies were only two studies and one of them was the secondary analysis for the first study, so it was not resendable to do a forest plot for one study only.

Results

Through databases, a total of 1477 studies were found. Following the elimination of duplicated and abstract articles, the authors screened 1150 titles. This left 46 articles in which the entire text was to be reviewed, but of these, just two satisfied this review's pre-determined inclusion criteria, and were consequently included in the analysis (Figure 1). An outline of the research is shown in (Table 1).

Chester, *et al.* [14] conducted a multicentral study in 2018 in which they gathered 71 putative prognostic factors from 1030 patients aged 18 or over. The objective of the study was to recognize which baseline patient clinical attributes were related to an improved result six weeks or six months subsequent to the commencement of the physiotherapy course for shoulder pain. This resulted in the Shoulder Pain and Disability Index (SPADI) as well as the Quick Disability of the Arm, Shoulder and Hand Questionnaire.

The principal outcome was that patients have a greater expectation of recovery after physiotherapy ($\beta = -12.43$, 95% CI -8.20 to -16.67), higher pain self-efficacy ($\beta = -0.36$, 95% CI -0.50 to -0.22), lower pain severity when at rest ($\beta = -1.89$, 95% CI -1.26 to -2.51) and for patients not retired, being in employment or education were associated with a better outcome at discharge as well. The results of this multicentral study suggest that, in referring shoulder-pain patients to physiotherapists, they should consider biomedical and psychological information regarding the patient. Moreover,

patients with a low level of self-efficacy ought to be referred to psychological experts at an early stage for psychological interventions. Furthermore, this study proposed that the principal aim of treatment for patients with shoulder pain when at rest or pain

post-surgery is to relieve and manage pain.

Another technique of giving prognostic guidance is the Classification and Regression Tree (CART) analysis. This type of analysis regards the prognostic factors' predictive value sequentially, meaning a hierarchy of significance. This assists clinicians in prioritizing their first prognostic evaluation of the most influential facets. In their analyses, the authors utilized regression trees' algorithms which are a subclass of CART for continuous outcome variables (Chester, *et al.* 2019) [18]. This method is more adaptable for detecting complicated variable relationships than is conventional linear modelling. This is because it is not dependent on any functional connection between the result of a predictor variable. Moreover, CART exhibits less sensitivity to outline data and is particularly appropriate to large number of predictor variables. Consequently, it presents an acceptable alternative for constructing prediction paradigms with unspecified variables and where the current parametric statistical techniques are unsuitable for constructing such paradigms.

The CART analysis for the Quick DASH ($n = 810$) and the SPADI involved every participant who completed total outcome data at six months. The following three variables were recognized as significant predictors of these six-month results: (1) disability levels or baseline pain, (2) pain self-efficacy, and (3) patient expectation of 'change as a result of physiotherapy treatment'. Before the participant attended the initial physiotherapy session, these three variables were collected. Pain self-efficacy can be defined as the degree or resilience of how patients believe that they are able to complete tasks, thereby attaining the desire outcome although they experience shoulder pain [19]. Furthermore, the pain self-efficacy questionnaire (PSEQ) was applied in order to measure pain self-efficacy [20]. It is composed of 10 items which are rated from zero to six, where zero indicates a minimum level of pain self-efficacy, while six denotes the maximum.

With regard to the subgroup classed as experiencing a low degree of concomitant pain self-efficacy, baseline pain and disability, there was a greater possibility of continuous pain. However, when

the SPADI pain subscale was applied, it was significant that patients who had low self-efficacy and low baseline pain experienced a similar or worse outcome in comparison with those with a high baseline pain and high pain self-efficacy.

It was revealed by the CRAT analysis that patient expectancy is associated with recovery. This is because those who anticipated recovery through physiotherapy obtained a better outcome than those who did not (Chester, *et al.* 2019). Furthermore, the results indicated a connection involving every outcome between the high and low levels of the follow-up as well as that of baseline. Furthermore, it is advocated that patients with low self-efficacy ought to be given priority treatment. Moreover, patient expectations and pain self-efficacy ought to be part of the initial evaluation for patients with shoulder pain.

The quality of the included studies was assessed using the National Heart, Lung, and Blood Institute's Quality Assessment Tool for Observation Cohort and Cross-Sectional Studies, both included studies were rated a high quality. (Table 2) shows the quality assessment of included studies in details.

Figure 1: Flowchart for the search strategy.

Study	Design	Participants	Collected Data	Outcome measures	Follow up	Main findings
Chester, <i>et al.</i> 2018 [14]	Multicenter longitudinal cohort study	Participants with baseline data available for the study (n = 1030)	Data for 71 putative prognostic factors, determined and defined a priori, were collected from each participant.	Shoulder Pain and Disability Index (SPADI), and Quick Disability of the Arm, Shoulder and Hand (QuickDASH).	Participants were sent a postal follow-up questionnaire, 6 weeks and 6 months after starting their course of physiotherapy.	Higher level of patient expectation of recovery as a result of physiotherapy, and higher pain self-efficacy, were associated with a better outcome.
Chester, <i>et al.</i> 2019 [21]	Secondary analysis for available data of multicenter longitudinal cohort study	(n = 810) participants providing complete outcome data at 6 months were included in the analysis.	Data for potential prognostic factors were collected prior to and during the participant's first physiotherapy appointment using bespoke questionnaires and clinical record forms.	Shoulder Pain and Disability Index (SPADI), and Quick Disability of the Arm, Shoulder and Hand (QuickDASH).	Outcome measures were collected at baseline and via postal questionnaire at 6-month follow-up.	This multicenter study provides evidence that for a given baseline measure of shoulder pain and disability, pain self-efficacy and patient expectation of change as a result of physiotherapy, are the most influential predictors of patient-rated outcome at 6-month follow-up. people with shoulder pain higher pain self-efficacy reduced the likelihood of continued high levels of pain and disability at 6-month follow-up, for those with high baseline pain or disability

Table 1: Summary and main finding of the included studies.

Questions	Chester, <i>et al.</i> 2018	Chester, <i>et al.</i> 2019
Was the research question or objective in this paper clearly stated?	Yes	Yes
Was the study population clearly specified and defined?	Yes	Yes
Was the participation rate of eligible persons at least 50%?	Yes	Yes
Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	Yes	Yes
Was a sample size justification, power description, or variance and effect estimates provided?	Yes	No
For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?	Yes	Yes
Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	Yes	Yes
For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	Yes	Yes
Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes
Was the exposure(s) assessed more than once over time?	Yes	Yes
Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes
Were the outcome assessors blinded to the exposure status of participants?	Yes	Yes
Was loss to follow-up after baseline 20% or less?	Yes	Yes
Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	Yes	Yes

Table 2: Quality assessment for the included studies.

Discussion

We believe that this is the first systematic review that aims to investigate the effect of pain self-efficacy on the results of physiotherapy on people who experience shoulder pain according to the analysis of longitudinal studies. An association between high pain self-efficacy levels and patient expectation of recovery with low disability and pain intensity levels is implied by our results which underline the fact that musculoskeletal pain is a multidimensional issue. Moreover, it is apparent that the merging of psychological

and physical factors are of greater significance than are single predictors [22,23].

Numerous systematic reviews have been conducted in order to investigate the function of pain self-efficacy of those experiencing continuous pain [24,25]. However, no specific systematic review has examined this factor in patients who have shoulder pain. The data revealed just one systematic review that examined the function of various psychological factors in the continuation of symptoms (disability and pain intensity) in those suffering from persis-

tent shoulder pain. In these patients, a link was found between high degrees of the following: anxiety, depressive symptoms, emotional distress, FA beliefs, preoperative concerns, pain self-efficacy, somatisation or pain catastrophising, and high disability and pain intensity levels [26], which is in a line with our results.

Consequently, it is apparent that the results of this study and of previous ones support the possible role of pain self-efficacy on the outcome of physiotherapy treatment on patients suffering shoulder pain. This is a significant predictor, and the outcome of this review advocates that pain self-efficacy is formally evaluated in patients who experiences shoulder pain. We believe that this systematic review is the first of its kind to explore the connection between pain self-efficacy particularly, and the outcome regarding patients with shoulder pain. Since a minimal amount of research has been conducted in this domain, it can be regarded as being new. Consequently, it is necessary to conduct further research in this field in order to investigate the impact of pain self-efficacy on physiotherapy outcomes in those experiencing shoulder pain. It is also important to accept the evidence of applying pain self-efficacy in people who have shoulder pain, as well as to include it in the evaluation and treatment of these patients.

This study has a number of limitations, the first of which is that the authors did not apply the grey literature search. The second limitation is that the review contained only two articles, one of which is a secondary one for the other. Lastly, these studies were observational (cohort studies without a non-exposed cohort) and the evidence was sparse. Consequently, the effect of pain self-efficacy on physiotherapy means that the results in this population could not be established, and hence, firm conclusions could not be drawn.

There appears to be a distinct gap in the literature which needs to be filled. Therefore, we advocate more study with the objective of analysing the functions of pain self-efficacy on physiotherapy outcomes in patients experiencing shoulder pain.

Conclusion

This systematic review provides information on the effect of pain self-efficacy on the outcome of physiotherapy treatment on shoulder-pain patients. Furthermore, the evidence implies a link between high self-efficacy levels and low disability and pain inten-

sity levels. However, the scarcity of evidence means definite conclusions cannot be reached; therefore, more research is required.

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