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**RUNNING HEAD: SELF-EFFICACY IN RHEUMATOID ARTHRITIS**

**THE ROLE OF SELF-EFFICACY IN PAIN INTENSITY, FUNCTION, PSYCHOLOGICAL FACTORS, HEALTH BEHAVIOURS, AND QUALITY OF LIFE IN PEOPLE WITH RHEUMATOID ARTHRITIS: A SYSTEMATIC REVIEW**

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### **DECLARATION OF INTEREST**

Javier Martinez-Calderon, PhD student at University of Malaga, is supported by the University of Malaga through a pre-doctoral grant. All authors state that the founders had no role in the study and they have no conflicts of interest to declare. All authors have made a substantial scientific contribution to the study and they are thoroughly familiar with the primary data. All authors have read the complete manuscript and take responsibility for the content and completeness of the manuscript and understand that if the paper, or part of the paper, is found to be faulty or fraudulent, all authors share responsibility.

## **Abstract**

**Objective.** The aim of this study was to systematically review and critically appraise the role of self-efficacy in pain intensity, function, psychological factors, health behaviours, and quality of life in people with rheumatoid arthritis, based on the analyses of longitudinal studies.

**Methods.** An electronic search of PubMed, AMED, CINAHL, PsycINFO, and PubPsych was carried out from inception to July 2017. Study selection was based on longitudinal studies which have explored the role of self-efficacy in rheumatoid arthritis. The Newcastle Ottawa Scale adapted version was used to evaluate the risk of bias, whereas the Grading of Recommendations Assessment, Development and Evaluation evaluated the quality of the evidence per outcome.

**Results.** A total of eleven articles met the inclusion criteria. Our results suggest an association between higher self-efficacy and greater goal achievement, positive affect, acceptance of illness, problem-solving coping, physical function, physical activity participation, and quality of life. Inversely, there was also an association between higher self-efficacy and lower pain intensity, depressive symptoms, and anxiety.

**Conclusions.** The findings of this systematic review suggest that self-efficacy might have a positive effect on the prognosis of this condition, although further longitudinal studies are needed.

PROSPERO: **CRD42016046432**.

**Key Words:** chronic pain; rheumatoid arthritis; prognosis; self-efficacy; systematic review.

## **INTRODUCTION**

Rheumatoid arthritis (RA) is the most common inflammatory joint disease (Turesson and Matteson, 2004). Its global prevalence ranges from 0.2% to 1.2% (Alamanos, Voulgari, and Drosos, 2006; Neovius, Simard, and Askling, 2011), being three times more frequent in women than in men (Symmons et al., 2002) . It is a highly prevalent, disabling, and costly condition (March and Lapsley, 2001), with a substantial costs to individuals and their families, as well as to the society (West and Wållberg-Jonsson 2009). Rheumatoid arthritis is characterized by pain, stiffness, muscle weakness, fatigue, and swelling of the joints (Adams, et al., 2004; Horsten et al., 2010; Matcham, Ali, Hotopf, and Chalder, 2015). In the long term, it causes irreversible joint destruction, deformities, physical and work disability (Kvien, 2004; West and Wållberg-Jonsson 2009), and eventually, premature mortality (Gabriel, 2008). As a result, RA leads to an inability to carry out work, social, recreational, and household tasks (van Middendorp et al., 2005). It affects the physical, social, and psychological well-being of people with RA, which impacts negatively in their quality of life (West and Wållberg-Jonsson 2009).

Rheumatoid arthritis is a very complex condition. Some mechanisms that contribute to its maintenance and impact remain still unclear. Biological, social, psychological, and physical factors have been found to be associated with the maintenance of symptoms in RA such as pain, disability, or disease activity (Albrecht and Zink, 2017; Sturgeon, Finan, and Zautra, 2016). Among the wide range of biopsychosocial factors that have been found to contribute to the experience and impact of pain and disability in RA, psychological factors have received great empirical attention (Hope et al., 2016; Keefe et al., 2002; Keefe, et al., 2004; Meade, et al., 2017). Inside of psychological factors, patient's sense of self-efficacy (SE) appears to be a helpful factor to confront and

manage RA symptoms (Orengo, et al., 2001; Primdahl, Wagner, and Hørslev-Petersen, 2010; Strahl, Kleinknecht, and Dinnel, 2000). Self-efficacy is conceptualized as the confidence to carry out a specific task with the aim of successfully achieving a desired outcome (Bandura, 1997). Self-efficacy is considered as the central motor to develop human motivation, psychosocial well-being, and personal achievement (Bandura, 1983, 1997). Higher levels of SE are associated with more willingness to take risks, and sense of accomplishment (Picha and Howell, 2017). On the other hand, people with lower SE exhibit fear of risks and uncertainty, low aspirations, and feelings of fear of failure (Picha and Howell, 2017). Higher levels of SE have been associated with lower disease activity, sedentary activity, and perceived pain, higher functional status, and better quality of life in people with RA (Gong and Mao, 2016; Huffman, et al., 2015; Vergara et al., 2017). Self-efficacy is also considered as a mediator in the relationship between perceived control-disability (Schiaffino and Revenson 1992), and pain-performance of life activities in RA (Ahlstrand et al., 2017).

Several reviews have been carried out to explore the role of SE in RA (Elliott, 2008; Larkin and Kennedy, 2014; Marks, 2014; Matcham, Ali, Hotopf, and Chalder 2015; Primdahl, Wagner, and Hørslev-Petersen, 2011; Somers, Wren and Shelby 2012). For example, Primdahl et al. (Primdahl, Wagner, and Hørslev-Petersen, 2011) evaluated the association between SE and health-related outcomes. Their findings showed that higher levels of SE were associated with lower levels of disability, pain, fatigue, and disease duration. Larkin et al. (Larkin and Kennedy, 2014) investigated which factors correlate with physical activity in RA. They concluded that SE was associated with physical activity. Despite the findings of previous reviews above-mentioned, a synthesis of the evidence on SE and RA is needed. First, past reviews have documented only the association between SE and a great number of health outcomes and health behaviours,

using cross-sectional studies in nature. To determine prognosis between these factors, results from longitudinal studies are needed, in order to summarise the evidence. Second, most of previous reviews have been narrative in nature, without an exhaustive methodological search protocol in their design. Third, some systematic reviews have explored the role of SE in RA (Larkin and Kennedy, 2014; Matcham, Ali, Hotopf, and Chalder, 2015), mainly focused on physical aspects. Four, there is a strong recommendation to carry out updates on systematic reviews every few years (Shojania et al., 2007). Thus, obtaining more knowledge and understanding about the role of SE in a great number of outcomes (pain intensity, function, psychological factors, health behaviours, and quality of life) in people with RA, is warranted. This information could facilitate clinical decision-making and, if necessary, timely, and specific consultation with -or referral to- other health care providers. To our knowledge, this is the first longitudinal synthesis of evidence which evaluates the role of SE in pain intensity, function, psychological factors, health behaviours, and quality of life in people with RA. The elaboration of this systematic review may diminish the uncertainty caused by the heterogeneity of particular studies, permitting to draw firm conclusions through an exhaustive synthesis of data (Chan and Arvey, 2012). Hence, the aim of this study was to answer the following PECOS (P-participant; E-exposure; C-comparator; O-outcome; S-study design) question through a systematic review of the literature of longitudinal studies (S): which is the role of SE (E) in pain intensity, function, psychological factors, health behaviours, and quality of life (O) in people with RA (P), compared to people free of RA (C)?

## **MATERIAL AND METHODS**

The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Liberati et al., 2009). The systematic review protocol was registered at the International Prospective Register of Systematic Reviews (PROSPERO: CRD 42016046432).

### Data sources and search strategy

Two independent investigators (JMC and ALS) searched the following electronic databases from inception to January 2017 using optimized search strategies: PubMed, AMED, CINAHL, PsycINFO, and PubPsych. An update of the search strategy was carried out on July 2017 due to the possibility of new potential studies were published. A manual search of relevant eligible studies was also carried out through cross-references identified in the reference lists within both original and review articles, selecting studies missed by the electronic search. A sensitive search strategy using relevant search terms that were developed from Medical Subject Headings (MeSH), and keywords generated from the subject headings, were used: "self-efficacy" [MeSH Terms], "rheumatoid arthritis" [MeSH Terms], "beliefs". The search strategy was as follows: ("self-efficacy"[MeSH Terms] OR ("self"[All Fields] AND "efficacy"[All Fields]) OR "self-efficacy"[All Fields]) AND ("arthritis, rheumatoid"[MeSH Terms] OR ("arthritis"[All Fields] AND "rheumatoid"[All Fields]) OR "rheumatoid arthritis"[All Fields] OR ("rheumatoid"[All Fields] AND "arthritis"[All Fields])) AND ("beliefs"[All Fields]). The grey literature was explored to detect any relevant unpublished work. The following grey literature databases were searched: ACR annual scientific meetings, the EULAR annual congress, the Australian Rheumatology Association, the Rheumatology Health Professionals Association, and the British



Society of Rheumatology scientific meetings. To gather any other non-published data, original authors were contacted directly. References were exported, and duplicates were removed using citation management software (Mendeley desktop v1.17.4).

### Eligibility criteria

The PECOS framework, as aforementioned, was followed to determine which studies were included in the present systematic review. Each study had to meet the following inclusion criteria: (i) longitudinal studies examining the role of SE in pain intensity, function, psychological factors, health behaviours, and quality of life in people with RA; (ii) studies whose participants were adults diagnosed with RA; (iii) studies written in English; (iv) no restriction was applied on participants' gender, follow-up duration, and ethnicity; (v) studies recruiting participants from any setting (general population, primary, secondary, and/or tertiary care). The exclusion criteria were, as follows: (i) all studies not including a longitudinal design (e.g. cross-sectional); (ii) studies aiming at modifying levels of SE through any therapy; (iii) studies investigating psychometric properties of SE measures.

### Study selection

All studies identified by the search strategy were screened using the eligibility criteria specified previously. The first stage of assessment involved the screening of title and abstract by two reviewers (JMC and ALS). Two reviewers (JMC and ALS) undertook the second stage, screening the full-text. In cases of disagreement, a decision was made by consensus or, if necessary, a third reviewer (MM) was consulted. A short checklist was adapted to the present review, and was used to guide the selection of relevant studies (see **appendix A**) (Adom, Puoane, De Villiers, and Kengne, 2017).

### Data extraction

Two independent reviewers (JMC and ALS) extracted the following information from each study: study details (first author and year of publication), characteristics of participants (mean age and disease duration), SE measures, outcome measures, duration of follow-up, and study design. If there was any discrepancy between reviewers, a third reviewer was consulted (MM). When the original article did not contain the information needed, the original authors were contacted to provide further information.

### Methodological quality assessment

Two reviewers (JMC and ALS) independently assessed the risk of bias of included studies using an adapted version of the Newcastle-Ottawa Scale (NOS) (Bawor et al., 2014). This adapted version includes seven questions among four domains of risk of bias assessment: methods for selecting study participants (selection bias), methods to control for confounding (performance bias), statistical methods (detection bias), and methods of exposure and outcome assessment (information bias). Seven items compose the four domains. Each item is scored from zero (high risk) to three (low risk) points. Therefore, the maximum score for each study could be of twenty-one points. To assess the overall quality and the strength of the evidence per outcome the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach was used (Atkins, et al., 2004). In brief, the GRADE classification was downgraded from high quality by one level for each of the following factors identified: (i) risk of bias, (ii) inconsistency of results (iii) indirectness, (iv) imprecision, and (v) other considerations (e.g. reporting bias). Two researchers (JMC and ALS) judged whether these factors were present for each outcome. The GRADE approach was applied when each outcome was reported, at least, by three studies.

### Statistical analysis

For the primary analysis, studies were grouped per outcomes. Due to the heterogeneity was too high in terms of study participants, metric of SE, metric or outcome evaluated, and statistical methods used, a meta-analysis could not be carried out. Consequently, a descriptive quantitative analysis (the most relevant summary measure with a precision estimate) for each study was provided. For those studies that reported results with several degrees of adjustment for confounders in different models, we extracted the estimate from the model which showed the best adjustment. GRADEpro software (Schünemann and Brozek 2015), and Review Manager (RevMan) version 5.3 (Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014) software were used in the review to process data.

## **RESULTS**

### Study characteristics

A total of 847 citations were identified through electronic databases, with 57 additional studies identified through reference screening. After removing duplicates, authors screened 539 titles and abstracts, and reviewed 121 full-text articles for eligibility. The number of studies retrieved from each database and the number of studies excluded in each screening phase are shown in **Figure 1**. The full references of excluded studies in the last screening (n=110) are reported in **Appendix B**. The conflicts of interests of included studies are shown in **Appendix C**.

Of these, 11 longitudinal studies (3,684 participants) met the inclusion criteria (Barlow, Cullen, and Rowe, 2002; Brekke, Hjortdahl, and Kvien, 2001; Brekke, Hjortdahl, and Kvien, 2003; Holm, Rogers, and Kwoh, 1998; Iversen et al., 2016; Knittle et al., 2011; Lee et al., 2011; Mielenz et al., 2013; Odegård et al., 2005; Parker et al., 1993; Schiaffino, Revenson, and Gibofsky, 1991). Follow-up ranged from three months to

seven years. The following outcomes measures divided in five domains (pain intensity, function, psychological factors, health behaviours, and quality of life) were included in the present review: (1) pain intensity, (2) function (work disability, and physical function), (3) psychological factors (depressive symptoms, anxiety, acceptance of illness, positive and negative affect, and problem-solving coping), (4) health behaviours (physical activity participation, goal achievement, and pain behaviour) and (5) quality of life. The characteristics of the included studies are reported in **Table 1**.

#### Methodological quality (risk of bias)

The degree to which studies met the risk of bias criteria varied considerably. The risk of bias assessment of all included studies is presented in **Table 2**.

The strength of evidence for each outcome was determined through the GRADE system (see **Table 3**). A descriptive of the statistical results about the role of self-efficacy in pain intensity (see **appendix D**), function (see **appendix E**), health behaviours (see **appendix F**), quality of life (see **appendix G**), and psychological factors (see **appendix H**) is reported.

#### The role of self-efficacy in pain intensity in people with rheumatoid arthritis

The role of SE in pain intensity was reported in five studies (Barlow, Cullen, and Rowe, 2002; Brekke, Hjortdahl, and Kvien, 2001; Brekke, Hjortdahl, and Kvien, 2003; Knittle et al., 2011; Lee et al., 2011). Four studies showed that higher levels of SE were significantly associated with lower levels of pain intensity (Barlow, Cullen, and Rowe, 2002; Brekke, Hjortdahl, and Kvien, 2003; Knittle et al., 2011; Lee et al., 2011).

#### The role of self-efficacy on function in people with rheumatoid arthritis

The role of SE on function was explored in four studies (Barlow, Cullen, and Rowe, 2002; Holm et al., 1998; Odegård et al., 2005; Schiaffino, Revenson, and Gibofsky, 1991). Three studies showed that higher SE was significantly associated with better physical function (Barlow, Cullen, Rowe, 2002; Holm, Rogers, and Kwoh, 1998; Schiaffino, Revenson, and Gibofsky, 1991). There was no significant statistical relationship between SE and work disability in people with RA (Odegård et al., 2005).

#### The role of self-efficacy in health behaviours in people with rheumatoid arthritis

The role of SE in health behaviours was evaluated in four studies (Iversen et al., 2016; Knittle et al., 2011; Mielenz et al., 2013; Parker et al., 1993). Two studies showed that higher SE was significantly associated with higher physical activity participation (Knittle et al., 2011; Mielenz et al., 2013). One study reported that higher SE was significantly associated with higher goal achievement (Knittle et al., 2011). There was no significant statistical relationship between SE and pain behaviours (Parker et al., 1993).

#### The role of self-efficacy in quality of life in people with rheumatoid arthritis

The role of SE in quality of life (measured by AIMS-2 and SF-36) was tested in three studies (Brekke, Hjortdahl, and Kvien, 2001; Brekke, Hjortdahl, and Kvien, 2003; Knittle et al., 2011). Higher SE was significantly associated with better quality of life across studies (Brekke, Hjortdahl, and Kvien, 2001; Brekke, Hjortdahl, and Kvien, 2003; Knittle et al., 2011).

#### The role of self-efficacy in psychological factors in people with rheumatoid arthritis

The role of SE in psychological factors was analysed by two studies (Barlow, Cullen, and Rowe, 2002; Schiaffino, Revenson, and Gibofsky, 1991). One study showed that higher SE was significantly associated with lower depressive symptoms, lower anxiety,

greater positive affect and greater acceptance of illness (Barlow, Cullen, Rowe, 2002). One study showed that higher SE was significantly associated with greater problem-solving coping (Schiaffino, Revenson, and Gibofsky, 1991). There was no significant statistical relationship between SE and negative affect (Barlow, Cullen, Rowe, 2002).

## **DISCUSSION**

### Statement of principal findings

The objective of this review was to explore the role of SE in pain intensity, function, psychological factors, health behaviours, and quality of life, in people with RA, based on the analyses of longitudinal studies. Our results suggest a possible association between higher SE and greater goal achievement, positive affect, acceptance of illness, problem-solving coping, physical function, physical activity participation, and quality of life. Inversely, there was also a possible association between higher SE and lower pain intensity, depressive symptoms, and anxiety. Nevertheless, the findings should be taken with caution due to the very low quality of the evidence.

### Comparison with other studies

To our knowledge, this is the first synthesis of the evidence that longitudinally analyses the role of SE in pain intensity, function, psychological factors, health behaviours, and quality of life specifically in RA. Our findings are in accordance with the social cognitive theory proposed by Bandura (Bandura, 1997). In this model, it is hypothesised that SE often appears in order to deal with an unfavourable issue when an actual or perceived threat comes into play (Bandura, 1997). People with higher SE can carry out many activities despite their pain, because they have the ability to confront and manage that negative pain experience (Bandura, 1983, 1997). In this sense, this model has been supported by previous reviews in RA (Elliott, 2008; Matcham, Ali, Hotopf, and Chalder, 2015). Elliot (2008) examined the reasons and solutions about poor adherence

to medication in adult with RA. A lack of SE was associated with an increase of concerns about medications and a reduction of the adherence to treatment. Matcham et al. (Matcham, Ali, Hotopf, and Chalder, 2015) studied which psychological variables are associated with fatigue in RA, showing an association between SE and fatigue. Moreover, a recent study has proposed a model focused on the importance of SE to achieve the desired outcomes after therapy (Picha and Howell, 2017). Both models (Bandura, 1997; Picha and Howell, 2017), as well as our results and previous reviews RA (Elliott, 2008; Matcham, Ali, Hotopf, and Chalder, 2015), underline that SE is associated, not only with several outcomes (e.g. pain intensity) in people with RA, but also SE might have a positive effect in the prognosis of this condition. However, as above-mentioned, there were methodological limitations, inconsistencies, indirectness of evidence, imprecisions of results, and other issues in the present review, thus, the conclusions should be taken with caution.

#### Strengths and weaknesses of the study

The strengths of this review included the use of a pre-specified protocol registered on PROSPERO, the PRISMA checklist, the adapted NOS scale, and the GRADE approach. The limitations associated with this study must be acknowledged when interpreting the results. First, despite the use of a long variety of MeSH terms, grey literature, and a manual search, it could be possible that not all studies were identified. Second, outcome measures were very diverse, and authors often used a simple question to evaluate these outcomes rather than using a validated tool (e.g. patient reported outcome).

#### Clinical implications of study findings

Self-efficacy is known to be a facilitator in the adherence to rehabilitation programmes in different chronic pain conditions (Thompson, Broadbent, Bertino, & Staiger, 2015). Furthermore, SE is also considered as a modifiable factor that may facilitate earlier

achievement of pain relief and functional recovery (Picha and Howell, 2017). Physiotherapy plays an important role in the management of people with RA (Park and Chang, 2016; Riemsma, Taal, Kirwan, & Rasker, 2004). Recent guidelines have been developed in order to facilitate physiotherapists when it is necessary to apply physiotherapy treatment in this condition (Peter et al., 2016). Specifically, exercise therapy has shown good results over pain, disability, cardiovascular risk, and disease activity in people with RA (Baillet, et al., 2012; Cairns and McVeigh, 2009; Cooney et al., 2011), and SE plays a pivotal role in the adherence to exercise therapy in patients with disability (Mcauley and Szabo, 2011; Picha and Howell, 2017). Based on that, physiotherapists should pay attention to identify the presence of SE prior to the prescription of any intervention, e.g., exercise therapy, since its presence may require a different and more specific approach than standard rehabilitation programmes. Rheumatoid arthritis is complex, and an exhaustive screening to prevent and reduce morbidity is warranted (Widdifield et al., 2017). There are some tools that have shown good properties in assessing SE levels in arthritis populations (e.g., the Arthritis Self-Efficacy Scale: ASES), although the optimal frequency of screening is not known. Physiotherapists need to be aware of such tools and their utility when designing treatment approaches for patients with RA. Further, taking the time to prepare and explain the screening and assessment process to the patient could give him or her a greater sense of control in his/her disease management.

#### Future Research

There is a clear gap in the literature about the role of self-efficacy in pain intensity, function, psychological factors, health behaviours, and quality of life in people with RA. It is based mainly on two aspects: the unclear sustainability and effectiveness in the long-term of many self-management programs in the management of chronic disease



(including RA) (Nicholas and Blyth, 2016; Riemsma, Kirwan, Taal, & Rasker, 2003), and the absence of longitudinal studies that can solve the flaws found in the present review. Hence, there are some recommendations to guide future research: (i) further experimental studies evaluating the effectiveness in the long-term of therapeutic strategies such as pain self-management (Damush et al., 2016), cognitive-behavioural therapy (Nash et al., 2013), or mindfulness (Turner et al., 2016)), that appear to enhance SE levels, are needed; (ii) further studies analysing prospectively the role of SE in people with RA, are required.

## **CONCLUSIONS**

This systematic review provides information about the role of SE in pain intensity, function, psychological factors, health behaviours, and quality of life in people with RA based on the analysis of longitudinal studies. The available evidence suggests a possible association between higher SE and greater goal achievement, positive affect, acceptance of illness, problem-solving coping, physical function, physical activity participation, and quality of life. Inversely, there was also a possible association between higher SE and lower pain intensity, depressive symptoms, and anxiety. Nevertheless, the quality of the evidence was very low, and further research is needed.

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## **Figure legends**

**Figure 1.** Preferred Reporting Items for Systematic reviews and Meta-Analyses flow diagram of the conducted search.

**Table 1.** Characteristics of included studies

**Table 2.** Assessment of risk of bias of included studies through the adapted NOS scale.

**Table 3.** Summary of findings and Quality of evidence assessment.