Rheumatol Int (2016) 36:1493–1506
DOI 10.1007/s00296-016-3549-5

Rheumatology INTERNATIONAL

HEALTH SERVICES RESEARCH

Benefit of health education by a training nurse in patients with axial and/or peripheral psoriatic arthritis: A systematic literature review

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Received: 29 March 2016 / Accepted: 3 August 2016 / Published online: 20 August 2016

Abstract The aim of this study was to systematically review the literature available about the benefit of health education by a training nurse in patients with axial and/or peripheral psoriatic arthritis in the framework of the drawing up of the axial spondyloarthritis and psoriatic arthritis guidelines of the "Spanish Society of Rheumatology". Electronic databases (Cochrane Central Register of Controlled Trials, EMBASE, Medline/PubMed, CINAHL) were systematically searched from inception to 2014 using medical subject headings and keywords. Only articles in English, Spanish and French were included. The patients studied had to be diagnosed of psoriatic arthritis (all ages, both sexes) with axial involvement and/or peripheral arthritis who had received health education by a specialized nurse. We included in the search randomized clinical trials, cohort observational studies, descriptive studies and case series and qualitative research studies. Measured outcomes were those related to the education provided in a nursing consultation such as increased adherence to biological therapy, conducting exercises, smoking cessation and patient satisfaction. Eight studies were included, five randomized clinical trials with moderate level of quality and three intervention studies with no control group with low level of quality. Meta-analyses were not undertaken due to clinical heterogeneity. According to our results, it can be concluded that although there is little evidence on the role of a trained nurse in patients with psoriatic arthritis, this role can be beneficial to the patients because it can increase the rate of adherence to treatment prescribed by a rheumatologist, promotes patient self-management of their disease and increases patient satisfaction.

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Introduction

Psoriatic arthritis (PsA) is an immune-mediated inflammatory disease that can affect any joint in the body as well as skin and related structures such as tendons and ligaments. PsA was often viewed by clinicians as milder and less destructive than rheumatoid arthritis (RA). However, although peripheral joint involvement in PsA may not be as extensive as that associated with RA, the additional challenge of skin psoriasis, spondylitis and enthesitis (inflammation at sites where tendons and ligaments attach to bone) can lead to a reduction in physical function and quality of life comparable to the burden of rheumatoid arthritis [1].

PsA affects women and men equally, with an incidence of approximately 6 per 100,000 per year and a prevalence of about 1–2 per 1000 in the general population. Estimates of the prevalence of psoriatic arthritis among patients with psoriasis have ranged from 4 to 30 % [2–7]. These estimates have some limitations, as indicated by a 2008 systematic review of reports from 1987 to 2006 that found marked variability of the reported incidence and prevalence estimates in the general population and suggested that different definitions, as well as geography, may contribute to the variability [8].

The goals of treatment for patients with PsA are similar to those for any rheumatic disease. These include reducing pain, stiffness and swelling, inhibiting disease progression, optimizing function, reducing psychological effects of the disease and helping the patient to maintain a reasonable quality of life. Although patients with PsA are managed predominantly by the rheumatology team, it is essential that a close partnership is maintained with the dermatology team in cases in which psoriasis is a significant component of the patient's symptoms.

Effective patient education for those diagnosed with PsA is essential. Patient satisfaction is assumed to be an important indicator of quality of care. Satisfaction with care is found to improve adherence to treatment, functional status, overall well-being and future health-related behaviours in various chronic diseases.

Patient education is often offered to patients in groups or individually. Group education facilitates patients' learning from each other, while individual education is easier to tailor to patients' individual needs. In the field of rheumatology, individual patient education is often delivered by nurses and covers a great variety of aspects related to living with arthritis, for example medical treatment, motivation to carry out exercise programmes, joint protection, energy conserving and nonmedical pain management. Individual consultations with an expert nurse have shown to have a positive influence on patients' ability to control and cope with arthritis.

The aim of this study was, therefore, to systematically review the literature available about the benefit of health education by the nurse in patients with axial and/or peripheral PsA. This information was afterwards examined and used by the experts of the Spanish Society of Rheumatology guide of spondyloarthritis to generate clinical practice recommendations for rheumatologists.

Methods

As a part of the Spanish Society of Rheumatology consensus of spondyloarthritis, a systematic literature review was performed to address the experts' question on whether the benefit of health education by the nurse is beneficial in patients with axial and/or peripheral PsA.

A protocol of the review was established and obtained further advice from the complete team of the consensus

Search strategy

The studies were identified by sensitive search strategies in the main bibliographic databases (Table 1). For this purpose, an expert librarian collaborated and checked the search strategies.

The following bibliographic databases were screened: Medline and EMBASE, and the Cochrane Central Register of Controlled Trials (CENTRAL) up to and CINAHL from the beginning until 2014. There were language limitations and were only included articles in English, Spanish and French.

All the retrieved references were managed in Endnote X.2. In the end, a hand search was completed by reviewing the references of the included studies, and all the publications or other information provided by the experts related to the systematic review were also examined.

Selection criteria

The studies retrieved by the above strategies were included if they met the following pre-established criteria. The patients studied had to be diagnosed of psoriatic arthritis (all ages, both sexes) with axial involvement and/or peripheral arthritis who had received health education about their disease by a specialized nurse. We included in the search for systematic reviews, randomized clinical trials (RCT), cohort studies observational studies, descriptive studies and case series and qualitative research studies.

Studies that do not conform to answer the question are excluded. Abstracts, posters, narrative reviews, letters, editorials and any unpublished study were also excluded.

Screening of studies, data collection and analysis

One reviewer GC screened the titles and abstracts of the retrieved articles for selection criteria independently. This process was done in 20-min sessions. The reviewer collected the data from the studies included by using *ad hoc* standard forms.

Reviewer entered the data from the forms into spreadsheets. If, while doing this, the reviewer found any question about an article, she could deliberate with a second researcher. Articles that did not fulfil all the inclusion criteria or that had insufficient data were excluded.

To grade the quality, we used a modification of the Oxford Centre for Evidence-based Medicine Levels of Evidence in its May 2001 update [13]: (1a) Systematic reviews of RCT with homogeneity; (1b) Individual RCT with narrow confidence intervals; (1c) Trials in which all patients get harm or none does; (2a) Systematic reviews of cohort studies with homogeneity; (2b) Individual cohort study, or low-quality randomized controlled trials; (2c) "Outcomes" Research and Ecological studies; (3a) Systematic reviews of case–control studies with homogeneity; (3b) Individual case–control study; (4) Case series and poor-quality cohort

Table 1 Search strategies in the different bibliographic databases and hits

Cochrane Central: 12 resultados

#1 "Arthritis, Psoriatic" or "psoriatic arthritis" or "psoriatic arthropathy" or "psoriasis arthritis" or "Arthritis Psoriatic" or "Arthritic Psoriasis" or "Psoriatic rheumatism" (Word variations have been searched)

#2 Arthrit* near/4 psoria*

#3 "Enthesitis" or "Dactylitis" or "Uveitis"

#4 ("axial" or "peripheral" or "mixed") near/4 psoria*

#5 #1 or #2 or #3 or #4

#6 "nurs*": ti, ab or "nursing education*" or "nursing staff" or Education, NursingOR "nursing care" or "Nurse-Patient Relations" or "Specialties, Nursing"

#7 MeSH descriptor: [Patient Education as Topic] explode all trees

#8 MeSH descriptor: [Education, Nursing] explode all trees

#9 MeSH descriptor: [Nursing Staff] explode all trees

#10 MeSH descriptor: [Nurse's Role] explode all trees

#11 MeSH descriptor: [Nursing Care] explode all trees

#12 #6 or #7 or #8 or #9 or #10 or #11

#13 #5 and #12

Medline (Pubmed): 49 resultados

("Arthritis, Psoriatic"[Mesh] OR "psoriatic arthritis"[Title/Abstract] OR "psoriatic arthropathy"[Title/Abstract] OR "psoriasis arthritis"[Title/Abstract] OR "Arthritis Psoriatic"[Title/Abstract] OR "Arthritic Psoriasis"[Title/Abstract] OR (Arthritis[Title/Abstract] AND psoriatic[Title/Abstract]) OR "Psoriatic rheumatism"[Title/Abstract] OR (Oligoart* AND "Psoria*") OR "Enthesitis"[Title/Abstract] OR "Dactylitis"[Title/Abstract] OR "Uveitis"[Mesh] OR (("axial"[Title/Abstract] OR "peripheral"[Title/Abstract] OR "mixed disease"[Title/Abstract]) AND Psoria*)) AND ("nurs*"[Title/Abstract] OR "nursing education*"[Title/Abstract] OR "nursing staff"[Title/Abstract] OR Education, Nursing[Mesh] OR "nursing care"[All Fields] OR "Nurse-Patient Relations"[Mesh] OR "Specialties, Nursing"[Mesh] OR "Nursing Care"[Mesh] OR "Nurse's Role"[Mesh] OR "Nursing Staff"[Mesh] OR "Education, Nursing"[Mesh] OR "Patient Education as Topic"[Mesh])

Filters: English; French; Spanish

EMBASE: 72 resultados

'arthritis, psoriatic'/exp OR 'arthritis, psoriatic':ab,ti OR 'psoriatic arthritis'/exp OR 'psoriatic arthritis':ab,ti OR 'psoriatic arthropathy'/exp OR 'psoriatic arthropathy':ab,ti OR 'psoriasis arthritis'/exp OR 'psoriasis arthritis':ab,ti OR 'arthritis psoriatic'/exp OR 'arthritis psoriatic':ab,ti OR 'arthritic psoriasis':ab,ti OR (arthr*:ab,ti AND psoria*:ab,ti) OR 'psoriatic rheumatism':ab,ti OR (oligoart*:ab,ti AND psoria*:ab,ti) OR 'enthesitis':ab,ti OR 'dactylitis':ab,ti OR 'uveitis':ab,ti OR ('axial':ab,ti OR 'peripheral':ab,ti OR 'mixed disease':ab,ti AND psoria*:ab,ti) AND ('education, nursing'/exp OR 'education, nursing':ab,ti OR 'nursing care'/exp OR 'nursing care':ab,ti OR nurs*:ab,ti OR 'nursing staff'/exp OR 'nursing staff':ab,ti OR 'patient education as topic':ab,ti OR 'nursing education'/exp OR 'nursing education':ab,ti OR 'nurse-patient relations'/exp OR 'nurse-patient relations':ab,ti OR 'specialties nursing'/exp OR 'specialties nursing':ab,ti OR 'nurse attitude'/exp OR 'nurse attitude':ab,ti) AND [embase]/lim NOT [medline]/lim NOT ('animal'/exp NOT ('animal'/exp AND 'human'/exp)) AND ([english]/lim OR [french]/lim OR [spanish]/lim)

Cinahl: 109 resultados

S9 S7 AND S8

S8 (nurs* AND education) OR TI "nurs*" OR TI "nursing education*" OR TI "nursing staff" OR TI "nursing care" OR AB "nurs*" OR AB "nursing education*" OR AB "nursing staff" OR AB "nursing care" OR (MH "Education, Nursing + ") OR (MM "Nurse-Patient Relations") OR (MM "Specialties, Nursing") OR (MH "Nursing Care") OR (MH "Nursing Role") OR ((MH "Nursing Home Personnel") OR (MH "Nursing Staff, Hospital")) OR (MM "Education, Nursing") OR (MH "Patient Education")

S7 (S1 OR S2 OR S3 OR S4 OR S5 OR S6)

S6 ("axial" OR "peripheral" OR "mixed disease") AND Psoria*

S5 (MH "Uveitis")

S4 TI Enthesitis OR AB Enthesitis OR TI Dactylitis OR AB Dactylitis OR TI Uveitis OR AB Uveitis

S3 TI "Psoriatic rheumatis*" OR AB "Psoriatic rheumatis*"

S2 (Oligoart* AND "Psoria*")

S1 (MH "Arthritis, Psoriatic") OR TI "psoriatic arthritis" OR AB "psoriatic arthritis" OR TI "psoriatic arthropathy" OR AB "psoriatic arthropathy" OR TI "psoriasis arthritis" OR AB "psoriasis arthritis" OR TI "Arthritis Psoriatic" OR AB "Arthritis Psoriatic" OR TI "Arthritic Psoriasis" OR AB "Arthritic Psoriasis"

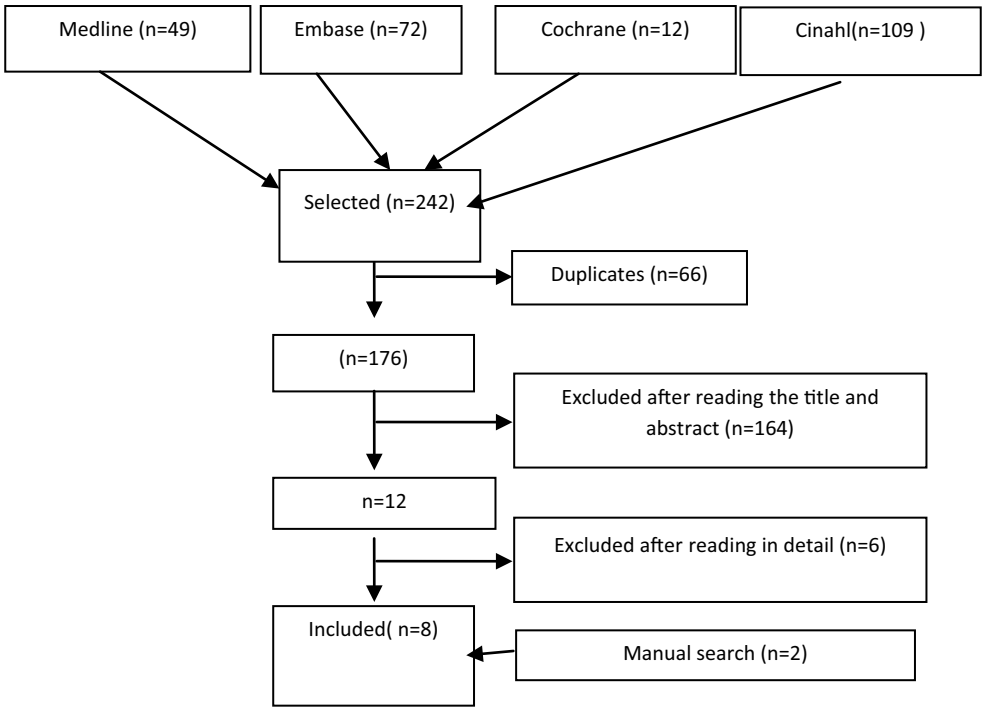

Fig. 1 Articles retrieved by the different search strategies and result of selection and appraisal process

and case–control studies; and (5) Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles".

Measured outcomes were those related to the education provided in a nursing consultation such as increased adherence to biological therapy, conducting exercises, smoking cessation and patient satisfaction with the education.

Evidence tables were produced. Meta-analysis was only planned in case enough homogeneity was present among the included studies.

Results

The result of the search strategies is presented in Table 1 by specific terms and in total in Fig. 1. We found 12 articles that were studied in detail because by title or abstract they seemed to be related to the study, or because they had no abstract to review. Table 2 shows the studies that were excluded after detailed review and the reasons for exclusion. Finally, eight studies were included (Table 3), five RCT (quality level 1b–2b)) and three intervention studies with no control group (quality level 4) and their data retrieved.

The results of each study in detail were as follows:

In the article by Groonning et al. [9], NE:1b, the objective was to investigate the effect of an educational programme for patients with polyarthritis (RA, PsA and unspecified polyarthritis) compared to usual care without educational programme. One hundred and forty-one patients were included and were randomized to the intervention ($n = 71$) or usual care ($n = 70$). The intervention consisted of three group educational sessions followed by one individual educational session. The primary outcomes were a patient's global well-being measured by the *Arizona integrate outcome scale (AIOS)*, and arthritis self-efficacy was measured using *the Arthritis Self-efficacy Other Symptoms Subscale (SE symptoms)*. Secondary outcomes were patient activation, physical and psychological health status using, educational needs and disease activity. Health status was measured using six subscales of the Arthritis Impact Measurement Scales 2 (AIMS 2), and psychological distress was measured by the Hospital Anxiety and Depression Scale (HADS). Physical functioning was measured by Modified Health Assessment Questionnaires (MHAQ), and disease activity was measured by the 28-joint count Disease Activity Score (DAS28-3) formula using the CRP and number of swollen and tender joints.

After four months of education, the intervention group had significantly better global well-being (*mean change score 8.21, 95 % CI (2.3, 14.1), $p = 0.01$*) and self-efficacy (*mean change score 4.17, 95 % CI (0.2, 8.1), $p = 0.04$*) than the control group. There were also trends for improved disease activity (DAS28-3: *mean change score −0.23 (−0.5, 0.0, $p = 0.10$)*, and a statistically significant improvement in patient activation (*mean change score 5.98, 95 % CI*

Table 2 Excluded studies

Study	Reasons for exclusion editorial
Aldeen [23]	Narrative review
Aldridge [24]	Narrative review
Altobelli [25]	Not conform to answer the question
Arthur [26]	Not conform to answer the question
Aschenbrenner [27]	Narrative review
Beker [28]	Does not meet inclusion criteria
Borras Blanco [29]	Not conform to answer the question
Borras Blanco [30]	Not conform to answer the question
Clelland [31]	Does not meet inclusion criteria
Cox [32]	Narrative review
Deamude [33]	Does not meet inclusion criteria
Dobnik [34]	Does not meet inclusion criteria
Dominguez [35]	Does not meet inclusion criteria
El Miedany [36]	Does not meet inclusion criteria
García-Diaz [16]	Does not meet inclusion criteria
Goh [37]	Not conform to answer the question
Green L [38]	Narrative review
Hammond [39]	Not conform to answer the question
Heap [40]	Does not meet inclusion criteria
Holdswotrh [41]	Narrative review
Hull [42]	Does not meet inclusion criteria
Lesko [43]	Narrative review
Leung [44]	Not conform to answer the question
Lloyd [45]	Does not meet inclusion criteria
Mc Bain [46]	Does not meet inclusion criteria
Moretti [47]	Does not meet inclusion criteria
Neal-Boylan [48]	Narrative review
Nemeth [49]	Narrative review
Nuttall [50]	Narrative review
Pringle [51]	Narrative review
Ricardson [52]	Not available
Saiz [53]	Does not meet inclusion criteria
Sanchez–Eslava [54]	Letter
Travers [55]	Does not meet inclusion criteria
Wajed [56]	Does not meet inclusion criteria
Waldron [57]	Narrative review
Watkins [58]	Narrative review
Yosipovitch [59]	Narrative review
Young [60]	Narrative review

(1.8, 10.2), p = 0.01) and pain (*mean change VAS score −9.41, 95 % CI (−16.6, −2.2), p = 0.01*) in the intervention group.

These authors analysed the same study at 12-month follow-up ([10], NE: 1b) and observed that the intervention group had a statistically significant higher global well-being than the controls after 12 months (mean change score 8.2, 95 % CI 1.6–14.8, p value = 0.015), but not in the Arthritis Self-Efficacy Other Symptoms Subscale. Within each group, analyses showed a statistically significant improvement in DAS28-3 (mean change −0.3, 95 % CI −0.5 to −0.1, p value = 0.001), in the intervention group from baseline to 12 months, but not in the controls. The controls had a statistically significant deterioration in the Arthritis Self-Efficacy Other Symptoms Subscale (mean change −5.0, 95 % CI −8.6 to −1.3, p value = 0.008), AIMS-2 (mean change 0.3, 95 % CI 0.1–0.5, p value = 0.008) and HADS (mean change 1.4, 95 % CI 0.3–2.5, p value = 0.013).

In another study ([11], NE: 4), the impact on waiting times and patient satisfaction of nurse-led rheumatology telephone clinics was analysed.

Patients awaiting outpatient review were contacted by the rheumatology clerk and offered a nurse-led rheumatology telephone appointment. For a month, 71 patients received an appointment for phone consultation. The consultation followed the same parameters as a regular consultation, and patients were asked about medications that they are taking regularly, analytical control or any impact on the disease, especially in patients with inflammatory arthritis. All of them were offered regular consultation with your doctor. Of the 71 patients, three of them did not answer, so the final number of patients included was 68.

A questionnaire was mailed to the 68 patients reviewed during the first month of the telephone clinics to assess satisfaction. Status forms were also completed to record further action. Of the 68 patients surveyed, 73 % completed and returned the questionnaire.

Overall 72 % were happy with the telephone consultation and would be happy to use the service again. Waiting times were reduced by 2 months as a total of 169 patients were reviewed during the April to August period.

In a randomized trial ([12], NE: 2b), the authors analysed the feasibility of giving patients who were about to start on a DMARD, information about the drug in groups and compared this with information given individually. Adults with a clinical diagnosis of rheumatoid arthritis or psoriatic arthritis who were referred to the nursing team for counselling about starting on methotrexate, sulfasalazine or leflunomide were included. Patients who had previously taken a DMARD were not excluded, and those consenting were randomized to receive drug information individually or in groups (of three to six patients). All patients received written materials about the relevant drug and discussed the risks and benefits of drug use verbally. Patients allocated to group counselling received this intervention in a teaching room, with a slide presentation.

The primary outcome was adherence with medication use, ascertained by pill counts, self-report diaries and prescription dispensation. Secondary outcomes included satisfaction with information about medicines (SIMS) by

Table 3 Main characteristics of the included study

Study	Population	Intervention	Results	Quality*
Gronning [10] RCT, 4 m follow-up	*n*: 141 (I: 71; C: 70) Patients with arthritis (RA, PsA or nonspecific polyarthritis) aged 18−80 years who have not participated in the 12 months prior to an educational programme of arthritis	*Intervention group* 3 sessions of group education and individual education session Each group comprising 8–10 patients with different pathologies and 2 nurses who acted as moderator *Control group* Traditional assistance without educational programme *Dropouts post-randomization* 3 (I: 1; C: 2)	Differences between groups *The intervention group had* Better global well-being (*mean change score 8.21, 95 % CI (2.3, 14.1), p = 0.01*) Higher SE other symptoms (*mean change score 4.17, 95 % CI (0.2, 8.1), p = 0.04*) Higher activation: (*mean change score 5.98, 95 % CI (1.8, 10.2), p = 0.01*) Less pain: (*mean change VAS score −9.41, 95 % CI (−16.6, −2.2), p = 0.01*) Lower DAS28-3 scores: (*mean change score −0.23 (−0.5,0.0, p = 0.10*) Changes within groups *Intervention group:* Better global well-being (AIOS): (*mean change score*: 6.15 (−10.7, 1.6), $p = 0.01$) Better DAS28-3 scores: (*mean change score*): −0.33 (0.1,0.5)) $p = 0.00$ Less pain: (VAS): (*mean change store*: −7.04 (1.2, 12.9), $p = 0.02$) *Control group:* Higher SE other symptoms (mean change score: −5.49 (2.0, 9.0), $p = 0.00$) Deterioration in the scores of social SIMS and total HADS score Both groups had significantly increased use of hospital health resources	Oxford: 1b
Gronning [9] RCT, 12 m follow-up	*n*: 141(I: 71; C: 70) Patients with arthritis (RA, PsA or nonspecific polyarthritis) aged 18−80 years who have not participated in the 12 months prior to an educational programme of arthritis 31 %: men; 69 %: women. 62 %: RA, 25 %: PsA y 19 % UA Mean disease duration: 12 years 81 %: 1–2 DMARD, 26 % NAIDS y 37 % corticosteroids	*Intervention group* 3 sessions of group education and individual education session Each group comprising 8–10 patients with different pathologies and two nurses who acted as moderator *Control group* Traditional assistance without educational programme *Dropouts post-randomization* 9 (I: 3; C: 6)	*Differences between groups at the end of follow-up* The intervention group had: Better global well-being (AIOS) (*mean change score 8.21, 95 % CI (1.6, 14.8), p = 0.01*) There was no statistically significant difference in arthritis SE other symptoms the other primary outcome (mean change score 2.6, 95 % CI −1.8 to 7.1, *p*-value = 0.245) Higher activation*: (mean change score 3.9, 95 % CI (−0.3, 8.0), p = 0.069*) AIMS2 social (*mean change score*: −0.3 (−0.7, 0.0), $p = 0.062$) *Changes within groups:* *Intervention group* Improvement in DAS-28 (*mean change score −0.3 (−0.5, −0.1), p = 0.001)* Increased number of hospital-based health services (*mean change 0.9, (0.4, 1.4), p = 0.001*) *Control group:* Worsening SE symptoms (*mean change −5 (−8.6, −1.3), p = 0.008)* Worsening aims social score (*mean change: 0.3 (0.1, 0.5), p = 0.008*) Worsening HADS (*mean change: 1.4 (0.3, 2.5), p = 0.013*)	Oxford: 1b

Table 3 continued

Study	Population	Intervention	Results	Quality*
Homer [12] RCT, 12 m follow-up	*n*: 62 (Individual education: 32; Group education: 30) RA patients or PsA >18 years that were going to start DMARD, had not had surgery 6 months previous, were not pregnant or breastfeeding. Patients who were already taking DMARD were not excluded Mean age: 54; 60 %: women; 31 %: men 85 %: AR, 15 % PsA Mean disease duration: 7, 8 years *Ttos instaurados* Mtx: 47 %; LFN: 27 %; SSZ: 26 %	*Intervention group* Group information about the use of medication *Control group* Individual information about the use of medication No dropouts post-randomization	Medication adherence, monitoring and overall satisfaction with information Pill count: Control: 69 %; intervention: 90 %. $p = 0.06$ Attendance monitoring visits: Control: 75 %; Intervention: 83 %. $p = 0.54$ Attendance at follow-up visits: Control: 81 %; Intervention: 97 %. $p = 0.1$ *SIMS* score* (total score (range 0–17): Control: 16; Intervention: 15. $p = 0.53$ Continue taking medication 4 m: Control: 63 %; Intervention: 73 %. $p = 0.42$ 12 m: Control: 38 %; Intervention: 47 %. $p = 0.61$ *SIMS** (satisfaction with information about drugs)	Oxford: 2b
Koksvik [13] RCT, 21 m follow-up	*n*: 68 (Intervention: 35; Control: 38) Patients with arthritis (RA, PsA or nonspecific polyarthritis, AS or ARJ) >18 years who start on a DMARD and give their informed consent to begin treatment with theses drugs 12.9 %: men; 68 %: women 53 %: AR 9 %: PsA; 7 %: JIA; 15 %: AS; 16 %: UA Mean disease duration: 8 años *Established treatments* Mtx: 54 %; Anti-TNF: 12 %; Mtx + anti-TNF: 25 %; HCQ: 2 %; LFN: 3 % SSZ: 4 %	*Intervention group* Follow-up by a clinical nurse specialist (CNS), In each follow visit, they evaluated disease activity (joint examination, laboratory tests and patient's global assessment (PGA)), comorbidity, medication use, functional and psychosocial status. Moreover, provided education and counselling addressing self-management strategies that were tailored to the individual patient's needs *Control group* Traditional assistance without educational programme After randomization, patients were given appointments with their respective practitioners for the 3-, 9- and 21 month follow-up visits Dropouts post-randomization: 3 (I: 1; C: 2)	*Leeds satisfaction questionnaire* General satisfaction: 9 m: −0.36 (−0.72, −0.00); $p = 0.05$; 21 m: −0.57 (−0.86,−0.27); $p < 0.001$ Provision of information: 9 m: −0.06 (−0.83,−0.37); $p < 0.001$; 21 m:−0.60 (0.82, 0.38); $p < 0.001$ Empathy: 9 m:−0.79 (−1.03,0.55);$p < 0.001$; 21 m:−0.72 (−0.95, −0.499; $p < 0.001$ Technical competence: 9 m: −0.67 (−0.93, −0.40); $p < 0.001$; 21 m:−0.38 (−0.57, −0.19); $p < 0.001$ Attitude to the patient: 9 m: −0.91 (−1.23, −0.59); $p < 0.001$; 21 m: −0.79 (−1.03, −0.54); $p < 0.001$ Access and continuity with care: 9 m: −0.89 (−1.19, −0.60); $p < 0.001$; 21 m: −1.08 (−1.36, −0.82); $p < 0.001$ Overall score: 9 m: −0.74 (−0.96,−0.52); $p < 0.001$; 21 m: −0.69 (−0.87, −0.50); $p < 0.001$ Disease Activity Score 28-joint count (DAS-28) was improved from baseline to 9 months in both groups, and improvement was maintained at 21 months, but without any group difference. No statistically significant between-group differences were found in any of the other secondary outcomes	Oxford: 1b

Table 3 continued

Study	Population	Intervention	Results	Quality*
Rudd [17] RCT, 12 m follow-up	*n*: 127 (Intervention: 64; Control: 63) Patients with arthritis (RA Aps or nonspecific polyarthritis,) >18 years Randomization was stratified by education level 79 %: women; 92 %: caucasian race; The mean age was 58.5 ± 13.8 years and mean disease duration was 16.6 ± 14.3 years. Average of 13.0 ± 2.1 years of education 43 % was working full- or part time 30 % had an annual family income below <30.000$ 18 % scored at high school reading level	*Plain English Material group* Received usual rheumatology care supplemented by a notebook containing all information materials in a clear, simple, conversational style for oral and written interactions *The standard care group* Received standard rheumatology care from their rheumatologist and a notebook containing arthritis foundation (AF) pamphlets about their type of arthritis and about their arthritis medicines, examples of medicine calendars and a map of the hospital The individualized care group received usual rheumatology care supplemented by the plain language materials as well as two appointments with an educator that reviewed all of the materials in the notebook, highlighting information directly pertinent to the participant with specific attention to medicines that the participant was currently taking *No dropouts post-randomization*	Follow-up scores at 6 months (Control vs Individualized Care & Plain English) SF36 (mental subscale): Control: −4.32; Intervention: 4.56. $p = 0.04$ Satisfaction: Control: 0.83; Intervention: 1.29. $p = 0.71$ HAQ: Control 3.30; Intervention: −0.30. $p = 0.45$ Self-efficacy: Control: −3.18; Intervention: 1.53. $p = 0.05$ Medication adherence: Control: 0.25; Intervention: −4.76. $p = 0.33$ Follow-up scores at 12 months (Control vs Individualized Care & Plain English): SF36 (mental subscale): Control: −0.78; Intervention: 4.79. $p = 0.11$ Satisfaction Control: −0.78; Intervention: 1.38. $p = 0.21$ HAQ: Control 1.33; Intervention: −0.79. $p = 0.64$ Self-efficacy: Control: −2.04; Intervention: 3.57. $p = 0.04$ medication Adherence: Control: −3.12; Intervention: −12.21. $p = 0.10$	Oxford: 1b
Hennell [11] intervention studies with no control group, 12 m follow-up	*n*: 71. 68 analysed 3 were not in or did not answer the telephone RA: 48 %; Polyarthritis: 5 %; PsA: 6 %; Osteoporosis: 5 %; Gout: 6 %; MCTD: 5 %; PMR: 6 %; OA: 6 %; FM. 5 %; SLE: 3 %; As: 2 %; Others: 3 %	Nurse-led telephone appointment in patients with rheumatic disease on the waiting list for treatment In the telephone survey, nurse assesses clinical and educated on medication management and appreciated the need for consultation with rheumatologist	Of the 68 patients surveyed, 73 % completed and returned the questionnaire Overall 72 % were happy with the telephone consultation and would be happy to use the service again Waiting times were reduced by 2 months	Oxford: 4

Table 3 continued

Study	Population	Intervention	Results	Quality*
Naranjo A [14] intervention studies with no control group, 12 m follow-up	*n*: 185. 33 do not want to participate. 152 participate in the study Exposed cohort: 98: women; 54: men Mean age: 50 years 55 RA, 45 spondyloarthritis (16 AS, 8 PsA and 20 with other diseases), 40 with collagen vascular diseases and vasculitis (13 SLE, 7 scleroderma, 2 Sjögren, 18 other diseases), and 12 other inflammatory diseases (6 palindromic rheumatism, 3 with undifferentiated arthritis and 2 with juvenile arthritis) Uneposed cohort 16 men, 17 women Mean age: 52 years RA 14; Spa 10; collagenopathies: 5 others: 4	Educational intervention by the rheumatologist and the rheumatology nurse on rheumatic patients who smoked Dropouts: 33	The smoking cessation rate: 11.8 % at 3 months, 14.4 % at 6 months and 15.7 % at 12 months The OR of smoking cessation at 12 months was 3.8 (95 % CI 1.8–8.1) compared to the previous smoking cessation rate Reduction in smoking at 12 m: Reduction ≥30 %: 36 %; reduction ≥50 %: 19 % The linear regression analysis showed that a score of less dependence ($p = 0.03$) and previous attempts to quit smoking ($p = 0.04$) were significantly associated with definitive smoking cessation at 12 months	Oxford: 4
García-Díaz S [15] intervention studies with no control group, 6 m follow-up	*n*: 29 69 %: women; 31 %: men Mean age: 52.5 years ± 10.9 RA: 48 %; AS: 21 %; PsA: 28 % undifferentiated spondyloarthropathy.: 3 % Mean disease duration: 17 years Exposed time to etarnecept: 3 years	Evaluate the level of fear of post-injection pain prior to the administration, the difficulty in handling the device, and the level of satisfaction of patients using a pre-filled syringe versus an etanercept pen, as well as the usefulness of the training given by nursing staff prior to starting with the pen, and the preferences of patients after using both devices using questionnaires at 2, 4 years and 6 months No dropouts	Satisfaction syringe vs pen ($p = 0.774$) *Syringe*: Normal: 34.5 %; Satisfied: 37.9 %; very satisfied: 13.87 % *Pen:* Normal: 40.7 %; Satisfied: 37 %; Very satisfied: 22.2 % Utility of training given by nursing staff *Basal:* Normal: 0 %; Useful: 17.2 %.; Very useful: 82.8 % *2* months: Normal: 6.9 %; Useful: 13.8 %.; Very useful: 79.3 % 4 months: Normal: 6.9 %; Useful: 41.4 %; Very useful: 51.7 % 6 months: Normal: 6.9 %; Useful: 24.1 %; Very useful: 69 % (p (2 m vs 4 m) = 0.392; p (4 m vs 6 m) = 0.644) Device preference 2 months: Pen: 62.1 %; Syringe: 13.8 %; Both: 24.1 % 4 months: Pen: 58.6 %; Syringe: 20.7 %; Both: 20.7 % 6 months: Pen: 55.2 %; Syringe: 20.7 %; Both: 24.1 % (p (2 m vs 4 m) = 0.968; p (4 *m* vs 6 m) = 0.846)	Oxford: 4

VAS visual analogue scale, *OIOS* Arizona integrative outcomes scale, *AIMS* 2 impact measurement scales 2, *HADS* Hospital Anxiety and Depression Scale, *MHAQ* Modified Health Assessment Questionnaires, *DAS*-28 28-joint count Disease Activity Score, *SE* Arthritis Self-Efficacy Subscale, *SIMS* satisfaction with information about medicines questionnaire, *RA* rheumatoid arthritis, *PsA* psoriatic arthritis, *Mtx* methotrexate, *Lfn* leflunomide, *HCQ* hydroxychloroquine, *SSZ* sulfasalazine, *MCTD* mixed connective tissue disease, *Spa* spondyloarthropathy, *PMR* polymyalgia rheumatica, *JIA* juvenile idiopathic arthritis, *AS* ankylosing spondylitis, *RCT* randomized controlled trial

* Quality was assessed according to the modification of the Oxford Centre for Evidence-based Medicine Levels of Evidence (March 2009 Update)

questionnaire; time taken to provide information; adherence to scheduled hospital appointments and blood monitoring schedules; and DMARD continuation rates at 4 and 12 months.

Of 127 eligible patients referred for counselling about DMARDs, 62 consented to take part (32 were randomized to receive drug information individually and 30 to receive it in groups). Patients allocated to the two different interventions were comparable for age and diagnoses at baseline, but more patients allocated individual counselling had not taken a DMARD previously: 56 % (18/32) versus 20 % (6/30).

More patients counselled in groups were adherent (27/30; 90 %) compared with patients counselled individually (22/32; 69 %; $p = 0.06$) by pill counts. However, on self-report diaries, similar proportions were adherent.

More patients allocated to individual counselling missed at least one blood monitoring visit (25 vs 17 %; $p = 0.54$) and at least one scheduled clinic visit (19 vs 3 %; $p = 0.10$). SIMS scores indicated high levels of patient satisfaction and were similar for both groups. The time taken to run group and individual counselling sessions was similar (median of 35 min vs 33 min, respectively). Nursing time per individual patient in those allocated group counselling was 11.6 min. Drug continuation rates were higher for those counselled in groups compared with those counselled individually: at 4 months, 73 versus 63 %, $p = 0.42$; at 12 months, 47 vs 38 %, $p = 0.61$.

In another study ([13], NE: 1b), the effect of individual nursing consultations in patients treated with disease-modifying antirheumatic drugs (DMARDs) in a rheumatology outpatient setting was examined.

Patients with inflammatory arthritis (RA, PsA, JIA or unspecified polyarthritis) who had started with a DMARD regimen 3 months before were randomized to two different follow-up consultation systems: follow-up either by a clinical nurse specialist (CNS) or by a medical doctor (MD) in rheumatology 3, 9 and 21 months after randomisation.

The primary outcome was patient satisfaction measured by Leeds Satisfaction Questionnaire (LSQ). Secondary outcomes included coping, disease activity measured by DAS28, pain, fatigue, patient's global assessment of disease activity and health-related quality of life using SF-36 questionnaire. Effects at 9 and 21 months were estimated by least square means calculated from the final mixed model.

Of 68 randomized patients (35 were allocated to nurse education and 33 to MD), 65 completed assessments at 21 months. Statistically significant improvements in favour of the CNS group were found in all LSQ subscales (all p values <0.001) and in overall satisfaction at 9 months (adjusted mean between-group difference 0.74, 95 % CI −0.96 to −0.52) and at 21 months (−0.69, 96 % CI −0.87 to −0.50). Disease Activity Score 28-joint count (DAS-28) was improved from baseline to 9 months in both groups, and improvement was maintained at 21 months, but without any group difference. No statistically significant between-group differences were found in any of the other secondary outcomes.

In the work by ([14], NE: 4), an intervention programme in smoker patients was evaluated. Consecutive active smoker patients with RA, spondyloarthritis or connective tissue diseases were selected. The intervention consisted in a baseline visit which included verbal and written advice by the rheumatologist, emphasizing the practical benefits of smoking cessation. Patients completed a questionnaire that included smoking dependence tests and previous attempts to quit. Three months later, a follow-up visit was made by the nurse for reinforcement and the receiving of pharmacological treatment to help patients quit smoking.

The primary outcome measured was total abstinence in the last 7 days of a phone interview at 3, 6 and 12 months. The secondary outcome was a reduction in cigarette consumption by at least 50 %.

A total of 945 patients were screened. About 185 (19.5 %) were current smokers, and 152 were included for intervention. The smoking cessation rate was 11.8, 14.4 and 15.7 % at 3, 6 and 12 months (OR compared with previous cessation rate 3.8 (95 % CI 1.8–8.1)). Twenty-nine patients (19 %) reduced C50 % of the cigarette consumption at 12 months. The linear regression analysis showed that a score of less dependence ($p = 0.03$) and previous attempts to quit smoking ($p = 0.04$) were significantly associated with definitive smoking cessation at 12 months. One out of six patients quits smoking with the aid of an educational programme which included verbal and written advice by the rheumatologist and the nurse.

In a prospective study with 6 months of follow-up, Garcia-diaz et al. ([15, 16], NE: 4) analysed the level of fear of post-injection pain prior to the administration, the difficulty in handling the device and the level of satisfaction of patients using a pre-filled syringe versus an etanercept pen, as well as the usefulness of the training given by nursing staff prior to starting with the pen, and the preferences of patients after using both devices. The data were collected using questionnaires.

A total of 29 patients were included, of whom 69 % were female, with a mean age 52.5 ± 10.9 years. Of these, 48 % had rheumatoid arthritis, 28 % psoriatic arthritis, 21 % ankylosing spondylitis and 3 % undifferentiated spondyloarthropathy. There were no statistically significant differences with either the fear or pain or handling of the device between the syringe and the pen ($p = 0.469$; $p = 0.812$; $p = 0.169$, respectively). At 6 months, 59 % of patients referred to being satisfied or very satisfied with the pen. Almost all (93 %) found useful or very useful the

training given by nursing staff prior to using the pen, and 55 % preferred the pen over the pre-filled syringe.

In another study ([17], NE: 1b), the efficacy of educational interventions to reduce literacy barriers and enhance health outcomes among patients with inflammatory arthritis was tested. The intervention consisted of plain language information materials and/or two individualized sessions with an arthritis educator. Randomization was stratified by education level. Principal outcomes included adherence to treatments, self-efficacy, satisfaction with care and appointment keeping. Secondary outcomes included health status and mental health. Data were collected at baseline, 6 and 12 months post.

Of the 127 patients, half had education beyond high school and three-quarters had disease duration >5 years. There were no differences in the primary outcome measures between the groups. In mixed models controlling for baseline score and demographic factors, the intervention group showed improvement in mental health score at 6 and 12 months (3.0 and 3.7 points, respectively), while the control group showed diminished scores (−4.5 and −2.6 points, respectively) ($p = 0.03$ and 0.01).

Table 3 shows the main characteristics of the included studies.

Discussion

In the present study, we have analysed the benefit of health education by the nurse in patients with axial and/or peripheral psoriatic arthritis. For the purpose of the present systematic literature review, we decided to include descriptive studies and case series and qualitative research studies. We considered this as the most appropriate way to answer to the research question.

We finally included a total of eight studies: five RCT and three intervention studies with no control group. The quality of most of them was low-moderate. Education made by the nurse was different in the studies included.

PsA is likewise an inflammatory joint disease that, aside from its association with psoriasis, manifests clinically in several ways, including arthritis, enthesitis, dactylitis, axial disease and skin/nail involvement. It is a chronic disabling disease with impact on body functions, but also on daily activities and participation in society including productivity and employment. It is for this reason that effective patient education for those diagnosed with psoriatic arthritis is essential.

Health professionals should provide integrated and multidisciplinary care, in which the nurse has a fundamental role in developing an educational programme for patients and their families, including all those structured activities to increase patient knowledge on related topics to the disease, or being able to take care of patient education both individually and in groups.

The most important points included inpatient education programmes carried out by nurses are: information and training to patients on diagnostic processes, their disease, treatments, exercises, pain management and joint protection.

Evidence suggests that patients who are given the tools to develop in-depth knowledge of their disease and its management from the outset are better able to cope with the physical and psychological challenges of their disease [18]. Patients with psoriatic arthritis need to be managed effectively over many years [19]. From the point of diagnosis, patients are expected to acquire a vast amount of knowledge relating to treatments and management strategies to regain control of their lives. Patients who are being managed on DMARD therapy will not only have to come to terms with complex long-term medication regimens, but also regular monitoring to ensure side effects are minimized and comorbidities are identified early.

Lubrano et al. [19] developed a validated questionnaire specific to psoriatic arthritis to assess patients' knowledge of their disease. The study showed that patients lacked understanding of the disease itself, and also frequently appeared to be misinformed about the causes and prognosis of their condition and drug efficacy. Other studies have explored the effect of patient education on different long-term conditions [20, 21]. It is vital that patients receive adequate support to enable them to understand their disease and contribute to decision making with the aim of improving adherence to treatment regimens and enhancing quality of life [22].

There are few studies that evaluate the work of clinical nurse specialized in the management and monitoring of patients with psoriatic arthritis, although they are professionals that play an important role in the therapeutic approach of patients who visit their clinic. In fact, all published studies are made with a mix of patients of different pathologies that are included within the label of arthritis, inflammatory arthritis and rheumatic diseases.

Nurses can work directly with the patient and his disease and can link up between the patient and rheumatologist, other medical professionals, patients' associations and agencies.

The range of tasks that a training nurse can be performed in the patient's care is very wide, highlighting among others the following: monitoring of patients through a systematic clinical evaluation that includes measurement and metrological parameters/or questionnaires; participation in the enforcement, self-administration, correct dosage and side effects of treatment; administration and monitoring of biological drugs intravenously to be performed according to the protocols and/or current consensus.

The work of a specifically trained nurse benefits the patient, solving problems of different nature related to their illness, and benefits the own rheumatologist, helping to significantly reduce their work load. It also helps in obtaining benefits for the health system itself, and its intervention is feasible to obtain a significant reduction in costs.

There is little evidence about health education benefits provided by nursing in patients with psoriatic arthritis or EspAax. In fact, almost all published studies are conducted with a mixture of patients of various pathologies which are encompassed within the label polyarthritis, inflammatory arthritis or rheumatic diseases.

A statistically significant increase in the patient's knowledge of the disease process, treatment strategies (e.g. drug treatment), physiotherapy and self-management strategies (e.g. joint protection techniques) was found in patients with RA who were educated during monitoring or who received a specific educational programme from nurses [61–63]. Moreover, statistically significant greater levels of knowledge were found in patients monitored and educated by a nurse compared to patients monitored by doctors. The majority of the studies showed statistically significant increased satisfaction with information, empathy, technical quality and attitude of the professional, as well as access to care in patients with RA when monitored by a nurse compared to monitoring by doctors or other health professionals [64, 65].

Patients with RA also perceived statistically significant less pain 9 and fatigue when monitored by nurses, compared to doctors.

One study found a statistically significant reduction in anxiety and depression in patients with RA after monitoring by a nurse [61].

A systematic review-identified behavioural group intervention for people with RA results in significantly better short-term (6 months) outcomes for functional disability, affect and patient global assessment, with a trend to improved pain, in comparison with information-focused group programmes, which primarily improve understanding [66]. Longer-term (i.e. 12 months) benefits of behavioural interventions vary depending on programme structure, content and delivery, but in many benefits were not sustained.

The recently published The European League Against Rheumatism (EULAR) recommendations for the role of the nurse in the management of IA emphasize that the competencies and skills of the nurse should be optimized to further improve patient care [67].

According to our results, we can conclude that although there is little evidence on the role that could make a trained nurse in patients with PsA, clinicians could benefit from support conducted by them in the management of these patients in tasks such as metrology clinic, participation in enforcement, self-administration, the correct dosage and side effects of treatments, and link the patient and other professionals or entities. It would therefore be advisable to conduct further studies to draw more accurate and reliable conclusions in this context.

Acknowledgments We thank Sivia Sánchez Ramón, PhD, for her contribution to this manuscript as medical writer.

Funding Spanish Society of Rheumatology.

Compliance with ethical standards

Conflict of interest All authors declare they havenot conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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