REVIEW ARTICLE

# The Impact of Occupational Therapy on the Self-Management of Rheumatoid Arthritis: A Mixed Methods Systematic Review

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**Objective.** To determine the impact of occupational therapy (OT) on the self-management of function, pain, fatigue, and lived experience for people living with rheumatoid arthritis (RA).

**Methods.** Five databases and gray literature were searched up to June 30, 2022. Three reviewers screened titles and abstracts, with two independently extracting and assessing full texts using the Cochrane risk of bias (quantitative) and Critical Appraisal Skills Programme (qualitative) tools to assess study quality. Studies were categorized into four intervention types. Grading of Recommendations, Assessment, Development and Evaluations (GRADE) (quantitative) and GRADE- Confidence in Evidence from Reviews of Qualitative research (qualitative) were used to assess the quality of evidence for each intervention type.

**Results.** Of 39 eligible papers, 29 were quantitative (n = 2,029), 4 qualitative (n = 50), and 6 mixed methods (n = 896). Good evidence supports patient education and behavior change programs for improving pain and function, particularly group sessions of joint protection education, but these do not translate to long-term improvements for RA (>24 months). Comprehensive OT had mixed evidence (limited to home OT and an arthritis gloves program), whereas limited evidence was available for qualitative insights, splints and assistive devices, and self-management for fatigue.

**Conclusion.** Although patient education is promising for self-managing RA, no strong evidence was found to support OT programs for self-managing fatigue or patient experience and long-term effectiveness. More research is required on lived experience, and the long-term efficacy of self-management approaches incorporating OT, particularly timing programs to meet the individual's conditional needs (i.e., early or established RA) to build on the few studies to date.

## INTRODUCTION

Rheumatoid arthritis (RA) is a systemic, autoimmune inflammatory disease impacting around 18 million people worldwide,[1,2] which can cause joint pain, fatigue, and muscle weakness.[3] In the long term, uncontrolled disease activity (ie, inflammation) leads to deterioration of joint cartilage and bone tissue,[4] and consequently, disability. Treatment involves medication to control inflammation[5] and multidisciplinary team care to improve disease, mental health, and physical outcomes. Occupational therapists are well placed to support RA self-management beyond outpatient care and into daily life. They can equip individuals to adopt strategies to manage the symptoms, the physical and psychological consequences, and the lifestyle transitions associated with RA.[6,7] Although access is limited,[8] the holistic approach of occupational therapy (OT) supports multidisciplinary teams to facilitate client involvement for long-term self-management beyond hospital care. Examples include,

**SIGNIFICANCE AND INNOVATIONS**

- This is the first mixed methods systematic review of the role of occupational therapy (OT) in the self-management of rheumatoid arthritis (RA).
- Educational programs incorporating behavioral strategies, offered by OT, appear to be the most effective strategy to improve pain and function for people living with RA for up to 24 months.
- As yet, limited evidence exists supporting self-management programs incorporating OT to reduce fatigue in people living with RA.
- Future research should aim to capture qualitative evidence from people with RA to better understand why self-management programs are effective or not.

supporting patients with RA in managing medications, regular physical activity, pacing and energy conservation/management, and accessing medical care during flare-ups.[9,10]

RA symptoms fluctuate, and over time, the disease can limit an individual's participation in work, caring, household duties, and social activities.[11,12] OT is an effective, non-pharmacological treatment for RA[10,13] that supports individuals in self-managing their everyday lives.[14] Occupational therapists provide strategies to enhance performance in daily activities, support choices in meaningful occupations, and engage in practical tasks while managing pain and fatigue.[10] The effectiveness of OT for RA was last reviewed systematically in 2017,[13] with studies included up to 2014. Based on trials, the evidence suggests that OT-related interventions can improve function through joint protection training,[10,15] physical activity, and educational-behavioral programs, including self-management and assistive devices.[13,15] No synthesis of both quantitative and qualitative findings related to the self-management of RA incorporating OT exists. What remains unclear is the effectiveness of OT in supporting long-term, patient-led self-management of RA on measurable outcomes (e.g., function) and the lived experience of individuals with RA.

Recent narrative reviews of the experiences of living with RA highlight the importance of self-management in equipping people to "renegotiate the self" to manage the emotional and cognitive impacts after disease onset.[16,17] Based on these reviews, OT is most likely to be effective in supporting the self-management of RA by targeting self-esteem, self-efficacy, and self-perception of the illness. Self-efficacy is a major contributor to self-management, given that it reflects an individual's belief in their ability to manage the disease and it's symptoms.[14] These findings are particularly relevant given recent evidence that the COVID-19 pandemic has significantly impacted people's ability to self-manage effectively, because of heightened anxieties and increased uncertainty.[18,19]

This is the first mixed methods review of the role of OT in the self-management of RA. It assesses both the effectiveness of self-management interventions involving OT, and provides insights into individuals' experiences of participating in OT for the self-management of RA. It aims to assess the impact of OT on the self-management of RA by reviewing quantitative, and qualitative evidence, addressing both patient perspectives and quantifiable outcomes.

## MATERIALS AND METHODS

The review protocol was registered on PROSPERO (CRD42022302205) and published in June 2022.[20] Findings are reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[21] This article reports a mixed methods systematic review, whereby no human participants participated in the research. Ethical approval was not required.

**Information sources and searches.** Searches were conducted via five electronic databases (MEDLINE, CINAHL, AMED, PsycINFO, and Web of Science [Core Collection]) from their earliest date to April 1, 2022, with a refresher search on June 30, 2022. Gray literature searches were across patient-specific bibliographic databases (OTseeker, OTSearch, OTDBase); the Lippincott, Williams and Wilkins (LWW) Health Library: Occupational Therapy Collection; the Rehabilitation Field and Musculoskeletal Group databases (Cochrane Collaboration); and academic theses, trials databases, and conference abstracts (published and unpublished), and the Cochrane Library, NICE Evidence search, UpToDate (Wolters Kluwer), and the Royal College of Occupational Therapist's Library.

The search strategy was co-produced with patients with RA and professionals (Table 1).[22] The initial search terms were drafted by the principal investigator (JG) and then peer-reviewed by the co-authors (JL, CB, JA, and VF) for the project grant bid (January-February 2021). These terms were then used as the basis of the review's search strategy. Thereafter, our newly qualified OT researcher (LR) was guided by our librarian co-author (VF) to test the search terms, and subsequently refine the search strategy based on scoping searches (May-July 2021). Co-author, JL, provided expertise on search terms common to qualitative and mixed methods research. Finally, a 90-minute online workshop was held with patients with RA (n = 5) and facilitated by two reviewers (JG and LR) to refine the search strategy, taking into account patient perspectives (September 2021). The draft search terms, structured using the SPI-DER framework (Sample Phenomenon of Interest/Intervention, study Design, Evaluation/outcome, Research type), were shared with our patient partners who provided feedback to ensure that terms resonated with their lived experiences. Partners contributed 12 additional terms; these were finally checked by two rheumatology

**Table 1.** Search strategy for the mixed methods review

| | Medline | | APA PsycInfo | | CINAHL | | Web of Science | | AMED | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Term set 1 | Term set 3 | Term set 1 | Term set 3 | Term set 1 | Term set 3 | Term set 1 | Term set 3 | Term set 1 | Term set 3 |
| | Exp Rheumatoid Arthritis/ Rheumatoid Nodule/ rheumat* N1 (arthrit* OR nodul*) "inflammatory arthrit*" | Occupational Therapy/ OR Occupational Therapists/ OR Occupational Therapy Department, Hospital/ "occupation* therap*" OR OT | Rheumatoid Arthritis/ rheumat* N1 (arthrit* OR nodul*) "inflammatory arthrit*" | Occupational Therapy/ OR Occupational Therapists/ "occupation* therap*" OR OT | Arthritis, Rheumatoid/ Rheumatoid Nodule/ rheumat* N1 (arthrit* OR nodul*) "inflammatory arthrit*" | Home Occupational Therapy/ OR Occupational Therapists/ OR Occupational Therapy/ OR Occupational Therapy Practice, Evidence-Based/ OR Occupational Therapy Practice/ OR Occupational Therapy Practice, Research-Based/ OR Occupational Therapy Service/ OR Research, Occupational Therapy/ "occupation* therap*" OR OT | Rheumat* NEAR/1 (arthrit* OR nodul*) "inflammatory arthrit*" | "occupation* therap*) OR OT | "rheumat* arthrit*" OR "rheumat* nodul*" OR "inflammation arthrit*" | "occupation* therap*" OR OT |

\*AMED, Allied and Complementary Medicine Database; APA, American Psychological Association; CINAHL, Cumulative Index to Nursing and Allied Health Literature.

occupational therapists within the lead reviewer's (JG) professional network.

**Study selection.** The inclusion criteria were based on the SPIDER framework: Sample (adults diagnosed with RA), Phenomenon of Interest/Intervention (OT for self-management [including culturally adapted programs]), study Design (primary, qualitative and quantitative research), Evaluation/outcome, Research type (qualitative, quantitative or mixed methods) (see Supplementary Table 1). Only English language papers were included. Based on pilot searches, and to limit the likelihood of excluding relevant studies, outcomes informed the screening process but were not included in the final search strategy.[20]

Selection involved firstly conducting a pilot screening and then full screening (including title and abstract, and then full text). To begin, one reviewer ran the search strategy and removed duplicates (LR) using EndnoteWeb, then papers were exported to a shared Microsoft OneDrive account, and finally uploaded to Rayyan for screening and data extraction. Next, in piloting three reviewers (LR, VF, and JG) used Rayyan software[23] to independently screen 20 randomly selected papers. Titles and abstracts of the pilot papers were screened using a predefined tool based on the eligibility criteria and published elsewhere.[20] Finally, all three reviewers met to agree on individual papers and refine the eligibility criteria.

In full screening, three reviewers (JG, LR and VF) used the eligibility criteria (Supplementary Table 1) to screen titles and abstracts, and lastly, two reviewers (JG and LR) screened the full-text papers to identify papers for data extraction. Disagreements were resolved in discussion with a clinically experienced reviewer (AH or CB). The reference lists of full-text papers and previous reviews were checked for additional papers.[11,24–28] Gray literature screening followed the same process and was conducted via the OneDrive account.

**Outcomes.** Based on previous reviews,[10,13] the primary quantitative outcomes were function (including strength and mobility), pain, and fatigue. The primary qualitative evaluation was lived experience and related concepts, including self-care, self-efficacy, occupational balance, and self-management (including problem-solving and goal setting). Patients with RA reviewed and refined the initial outcomes identified by the reviewers[22]; these were later finalized by the research team. Some outcomes were assessed both quantitatively and qualitatively (e.g., self-efficacy and pain).

**Data extraction and quality assessment.** Two reviewers (JG and LR) independently extracted, synthesized, and assessed the data quality from included papers using a standardized Microsoft Excel form.[20] Data were extracted on general information (including date and methodology), study eligibility, characteristics of included studies, risk of bias assessment, data

and analysis, and other information (including conclusions and recommendations). When further information was required, the lead reviewer (JG) contacted the paper's author(s).

The Cochrane risk of bias tool[29] was used to assess the quality of quantitative papers (seven assessment domains), and the Critical Appraisal Skills Program (CASP) tool[30] for qualitative papers (10 assessment domains). For mixed methods papers, quantitative data were assessed with risk of bias and qualitative data with CASP. The overall quality of quantitative papers was determined using the criteria "low risk," when three or fewer domains were deemed an unclear risk and no domains were high risk; "moderate risk," when three or more domains were unclear risk and one domain was deemed high risk; and "high risk," when two or more domains were rated as high risk.[31] The overall quality of qualitative papers was scored out of 10, with scores greater than 9 deemed high quality; between 7 and 9 deemed moderate quality; and scores less than 7 deemed low quality.[16]

Selected papers were categorized into the following four intervention types: 1) patient education; 2) behavior change; 3) comprehensive, community (home) OT (quantitative and qualitative); and 4) other interventions (including exercise and workplace) (10). Confidence in the findings for each intervention type was rated using the Grading of Recommendations, Assessment, Development and Evaluations' (GRADE) approach for quantitative, and the GRADE Confidence in Evidence from Reviews of Qualitative research approach for mixed methods and qualitative.[32] Papers were rated as high, moderate, low, or very low-quality evidence.

**Data synthesis and analysis.** Characterization and quality assessment of selected papers were based on those deemed most effective in promoting physical and psychosocial health in people with RA. Information from papers are presented in separate quantitative and qualitative tables[32] containing descriptive statistics and quotations, respectively, to summarize papers. Given the limited qualitative papers eligible for review, thematic analysis was unnecessary; instead, the reviewers used the themes identified by the paper authors.

## RESULTS

**Study selection and characteristics.** Initially, 2,389 articles were identified, including 23 gray literature articles. Following title and abstract screening, 160 articles were accepted for full-text screening. Finally, 34 articles and 5 gray literature articles met the eligibility criteria (29 quantitative, including 15 randomized controlled trials [RCTs], 6 controlled clinical trials (CCTs), 4 qualitative, and 6 mixed methods) (Figure 1).

Characteristics of the 39 included articles (n = 2,018 adults with RA) are summarized in Tables 2 (intervention type and OT role) and 3 (participants, methods, and results). Three papers reported from an education behavioral RCT,[33–35] two

papers from a workplace RCT,[11,28] two papers from an arthritis gloves trial,[36,37] and one study and report from a group cognitive behavioral therapy (CBT) RCT.[38,39] Only four studies reported on participant ethnicity.[35,38,40,41]

**Patient education.** Studies with interventions emphasizing patient education were reported in 16 papers (n = 1,021): 1 high,[42] 1 moderate quality[43] (qualitative), and 6 moderate and 8 high risk of bias (quantitative, including an MA thesis[43]). In Hammond's[44] cohort study, behavior change was assessed using the Joint Protection Behavior Assessment[44] following two educational sessions on joint protection and awareness of activities of daily living (ADLs) (85 minutes) and energy conservation/management and exercise (120 minutes). Greater attention to joint protection was reported after intervention, yet this did not translate into behavior change. The follow-up RCT focusing on behavior change found that four group education sessions (2 hours weekly on joint protection behaviors), led to improved pain, fewer GP visits, and flare-ups post-12 months.[33] Although adherence to joint protection and reduced joint stiffness were reported after 48 months,[34] functional ability and pain returned to baseline levels. Both studies[33,44] focused on early RA (mean duration = 1.6 years) and did not blind outcome assessors.

Masiero and colleagues'[45] RCT involved occupational therapists in developing and delivering a multidisciplinary intervention focusing on joint protection for moderate-to-severe RA (mean duration = 15.4 years). Like Hammond and Freeman,[33] four 2-hour group education sessions involving spouses and partners were run every 3 weeks, covering joint protection in ADLs, environmental adaptations, and exercises. Pain, function, and disability significantly improved after intervention for the education group, but not usual care.

One RCT used a Pictorial Representation of Illness and Self Measure (PRISM) tool (based on social learning and self-management) to complement traditional education and to enhance short-term improvements in joint protection behavior (6 months) and adherence (12 months).[46] Four 45-minute sessions involving partners and spouses, plus a 2-month follow-up, led to participants viewing joint protection as a coping method for daily tasks via pain and function management.[42] Other benefits included personal control, self-acceptance, and improved psychological well-being: "…more positive towards life"; "less stress because of easier task performance."[42]

Barriers to joint protection education related to a negative self-image, perceived disability, and complicating task performance (Table 3). Adherence to self-management was also reported up to 24 months for early RA following four 1-hour individual treatments and a 2-hour group workshop.[35] Function, pain, or self-efficacy remained unchanged. Elsewhere, adding hand exercises to an 8-week RCT of joint protection education led to increased strength, but not disability, pain, or ADLs.[47] Two pilot RCTs promoting energy conservation[48,49] found that
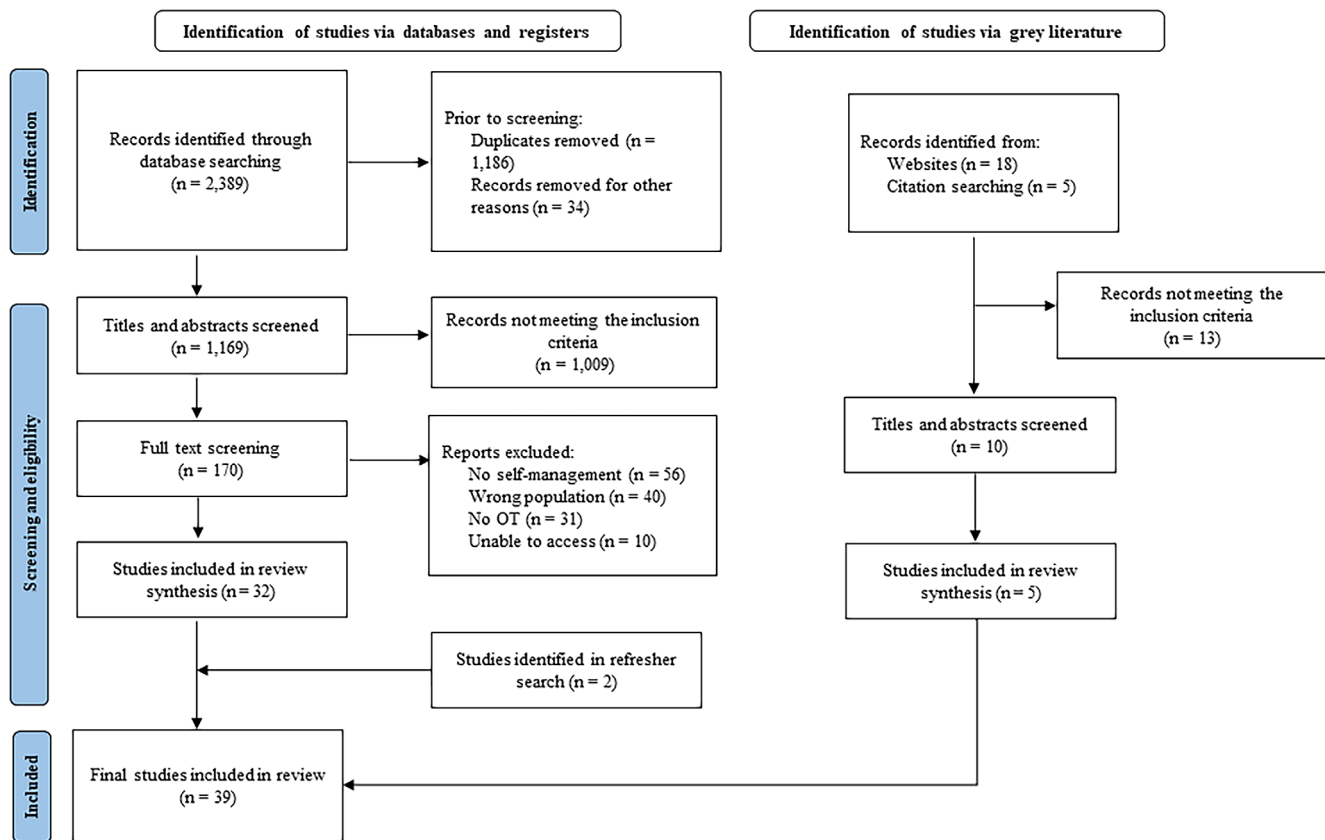
**Figure 1.** PRISMA flow chart of literature identification, screening, eligibility, and inclusion of studies. OT, occupational therapy; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

six weekly educational sessions (each 90 minutes, using the PRECEDE model[50]) did not significantly affect pain, fatigue, function, or behavior at 9 months, nor did standard OT.

One 2-hour self-help group involving relaxation, exercise, and joint protection led to 84% changing their ADL performance and 85% of participants improving their understanding of RA.[43] In a 6-month CCT,[51] elective group workshops and individual education were associated with improved problem-solving, but not knowledge or fatigue. Another high-risk CCT involving a half-day OT education session over 3 months led to increased strength and function at 3 months.[26] One self-instructional OT program (four 20–25-minute sessions) increased knowledge, but not task performance/function; mobility exercises, joint protection, and nursing had no added benefit.[27] Finally, a high-risk cohort study reported 1-hour of OT increased patient knowledge at 6 months, but pain, function, and fatigue were not assessed (Table 3).[52]

**Behavior change.** Six RCTs and one cohort study reported programs focusing on behavior change. The cohort study[53] observed improved knowledge, but not pain or behavior up to 12 weeks, after four 2-hour weekly group sessions (including personalized strategies and goal setting for joint protection).

Reasons for unchanged behavior related to difficulties changing habits, lack of skill, and joint protection, viewed as inappropriate for established RA (disease duration = 6.4 years). The follow-up RCT[33] did reduce pain and showed trends for improved self-efficacy at 6 months (duration = 1.1 years). One RCT[38] used group CBT (6 weekly 2-hour sessions with an hour consolidation) to increase self-efficacy at 26 weeks and reduce fatigue 2 years postintervention. In a head-to-head comparison, CBT and OT group for 10 weekly sessions (2 hours each) had similar effects on increasing knowledge and promoting active involvement in self-management.[25] Only CBT led to improved pain-coping behavior. A similar program was used for self-management for short-term improvements in illness perception and pain self-efficacy, but not pain.[54] Interestingly, only six studies measured self-efficacy (three behavior change,[33,38,54] three patient education,[35,41,46] with one report,[39] and one guideline[55] reporting on these studies) (Table 3).

**Comprehensive, community-based (home) OT.** *Quantitative studies.* Interventions targeting occupational performance were reported in two RCTs and one CCT. Two additional studies used comprehensive OT, but were not community-based and instead addressed patient education.[35,52] One RCT[24]

**Table 2.** Study characteristics—type of intervention (or phenomenon of interest), study type, and the role of occupational therapy[a]

| Author, year (ref.) | Country | Type of intervention | Research type | Study type | Role of occupational therapist |
|---|---|---|---|---|---|
| Barry et al, 1994 (52) | UK | Patient education | Quantitative | Single group, pretest, posttest (cohort) study | Survey development (on patient knowledge and join protection maneuvers) and deliver treatment. |
| Bowell and Ashmore, 1992 (41) | UK | Patient education | Mixed methods | Single group, posttest (cohort) study | Offer education and advice on joint protection techniques, hand care, and assistive devices. |
| Callinan and Mathiowetz, 1996 (59) | USA | Other interventions | Quantitative | Nonrandomized, single group crossover trial | Fabricate, fit, and instruct on using splints. |
| Carter, 1979 (49)[b] | USA | Patient education | Quantitative (MA thesis) | Single group, pretest, posttest (cohort) study | Delivered program. |
| Dubouloz et al, 2004 (55) | Canada | Comprehensive community-based (home) OT | Qualitative | Qualitative interviews/grounded theory | Delivered home-based rehabilitation. Coordination of research (treatment and interviews). |
| Dubouloz et al, 2008 (57) | Canada | Comprehensive, community-based (home) OT | Qualitative | Qualitative interviews/grounded theory | Delivered home-based rehabilitation. Coordination of research (treatment and interviews). |
| Dubouloz, 2008 (58) | Canada | Comprehensive, community-based (home) OT | Qualitative | Qualitative interviews/grounded theory | Assess and implement modifications for meaningful occupations, involving how to adapt performance for daily living activities. |
| Ellegard et al, 2019 (47) | Denmark | Patient education | Quantitative | RCT | Delivered all four, 1-hour intervention sessions. |
| Feinberg, 1992 (60) | USA | Other inventions | Quantitative | CCT | Assessed patient and fabricated hand splints. Intervention only: initial consultation to develop patient-practitioner relationship and a follow-up phone call (approximately 2 weeks after splinting). |
| Furst et al, 1987 (48) | USA | Patient education (with a focus on energy conservation) | Quantitative | Pilot CCT | Delivered standard care for control group and energy conservation and joint protection education to the intervention group. |
| Gerber et al, 1987 (49) | USA | Patient education (with a focus on energy conservation) | Quantitative | Pilot RCT | Delivered standard care for control group and energy conservation and joint protection education to the intervention group. |
| Hammond, 1994 (43) | UK | Patient education (with a focus on joint protection) | Quantitative | Single group, pretest, posttest (cohort) study | Developed observational assessment to evaluate behavior change. Delivered intervention and performed outcome testing. |
| Hammond and Lincoln, 1999 (44) | UK | Behavior change (with a focus on joint protection) | Quantitative | Single group, pretest, posttest (cohort) study. Repeated measures design with a 6-week control phase preintervention | Developed observational assessment to evaluate behavior change. Delivered intervention and performed outcome testing. |
| Hammond and Freeman, 2001 (33) | UK | Behavior change (with a focus on joint protection) | Quantitative | RCT (1-year follow-up) | Assisted in recruitment. Assisted in the delivery of a standard educational program as part of a multidisciplinary team. Delivered the joint protection intervention program. |
| Hammond and Freeman, 2004 (34) | UK | Behavior change (with a focus on joint protection) | Quantitative | RCT (4-year follow-up) | See above. |
| Hammond, Young, and Kidao, 2004 (35) | UK | Patient education (involving comprehensive OT) | Quantitative | RCT | Developed and delivered intervention. |
| Hammond et al, 2021 (36) | UK | Other interventions | Quantitative | RCT | Developed and delivered intervention. |
| Helewa et al, 1991 (24) | Canada | Comprehensive, community-based (home) OT | Quantitative | RCT | Developed the primary outcome measure (as an MDT) and delivered intervention. |
| Hewlett et al, 2019 (38) | UK | Behavior change | Quantitative | RCT | Codelivered intervention with rheumatology nurses. |

(Continued)

**Table 2.** *(Cont'd)*

| Author, year (ref.) | Country | Type of intervention | Research type | Study type | Role of occupational therapist |
|---|---|---|---|---|---|
| Hewlett et al, 2019 (39)[b] | UK | Behavior change | Mixed methods (technical report) | RCT with nested qualitative evaluation (interviews/focus group) | Codelivered intervention with rheumatology nurses. |
| Kashani, 2016 (63)[b] | Canada | Other interventions (virtual joint protection) | Mixed methods (PhD thesis) | Pilot RCT informed by interviews | Interviewed participants and developed the intervention. |
| Kraimaat et al, 1995 (25) | Netherlands | Behavior change (involving cognitive behavioral therapy) | Quantitative | RCT | Delivered one of two interventions (ie, standard OT, not CBT). |
| Lahiri et al, 2021 (62) | Singapore | Other interventions (multidisciplinary including patient education/behavior change) | Quantitative | CCT | Provide patient education on self-management, cognitive-behavioral approaches, and joint protection strategies to managing daily activities as part of MDT intervention. |
| Macedo et al, 2009 (54) | UK | Comprehensive, community-based (home) OT | Quantitative | RCT | Delivered pre- and postintervention assessments and delivered intervention. |
| Masiero et al, 2007 (45) | Italy | Patient education | Quantitative | RCT | Developed intervention as an MDT. |
| Mathieux et al, 2009 (26) | France | Patient education | Quantitative | CCT | Delivered intervention as an MDT. |
| Mohanty, Padhan, and Singh, 2018 (64) | India | Other interventions (hand exercises) | Quantitative | Two group, pretest, posttest (cohort) study | Delivered pre- and postintervention assessments. |
| Neuberger et al, 1993 (27) | USA | Patient education | Quantitative | RCT (pilot study) | Developed intervention as an MDT. |
| Neuberger et al, 1993 (27) | USA | Patient education | Quantitative | CCT (follow-up) | Developed intervention as an MDT. |
| Niedermann et al, 2010 (40) | Switzerland | Patient education (with a focus on joint protection) | Mixed methods | Survey with follow-up qualitative interviews/ interpretive phenomenological analysis | Developed outcome measure and delivered intervention (joint protection) as usual care. Also, provided their perceptions on barriers and benefits of delivering joint protection. |
| Niedermann et al, 2012 (46) | Switzerland | Patient education (with a focus on joint protection) | Quantitative | RCT | Delivered both treatment programs. |
| Pimm, 2003 (53)[b] | UK | Behavior change | Quantitative (PhD thesis) | RCT | Input into specific group sessions only; sessions led by clinical psychologist and rheumatology nurse specialist. |
| Pot-Vaucel et al, 2016 (51) | France | Patient education | Quantitative | CCT | Involved in intervention delivery (either individual consultation or joint MDT workshop). |
| Prior et al, 2022 (37) | UK | Other interventions | Qualitative | Nested qualitative interviews/ grounded theory within an RCT | Developed and delivered intervention. |
| RCOT, 2022 (61)[b] | UK | Other interventions | Mixed methods (practice guideline) | N/A | OT developed national guidelines. |
| Tonga, Düger, and Karatas, 2016 (55) | Turkey | Comprehensive, community-based (home) OT | Quantitative | CCT | Planned and delivered treatment (intervention and control). |
| Van Vilsteren et al, 2017a (11) | Netherlands | Other interventions (workplace program) | Quantitative | RCT | Delivered the integrated care treatment (within an MDT) and the follow-up workplace intervention (OT only). |
| Van Vilsteren et al, 2017b (28) | Netherlands | Other interventions (workplace program) | Quantitative | RCT (1-year follow-up) | See above. |

[a]CBT, cognitive behavioral therapy; CCT, controlled clinical trial (does not mention randomization process); MDT, multidisciplinary team; N/A, not applicable; OT, occupational therapy; RCOT, Royal College of Occupational Therapists; RCT, randomized controlled trial.
[b]Gray literature.

**Table 3.** Study characteristics for quantitative, qualitative, and mixed methods papers—participants, methods, and results from included articles

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| **Quantitative studies** | | | | | |
| Barry et al, 1994 (52) | 55, 60%, mean 57.4 y; RA diagnosis, attending a rheumatology clinic, not previously received OT. | Single, 1-hour session with individual attention. | Patient knowledge, performance of joint protection for maneuvers. Photographic questionnaire. | Pre, post 1 and 6 months | Patient knowledge increased from 2.83 (pre-OT) to 5.72 (1 month) and 5.48 (6 month) post-OT (out of 12; $P < 0.001$). Patient performance was not influenced by age, sex, or disease duration 1-month post-OT. |
| Callinan and Mathiowetz, 1996 (59) | 39, 92%, mean 51 y (range 19–76 y); RA diagnosis (American Rheumatism Association 1987 criteria), hand pain, and/or morning stiffness. | OT administered 28 days each of soft splint, hard splint, and no splint (in random order). | Function, pain, grip strength, splint use (ie, time worn, duration of morning stiffness, comfort, and preference). AIMS-2, self-reported (diagram-based), handgrip dyno, daily diary. | Post immediately (for each condition) | No improvement in finger and hand function. Pain decreased after soft and hard splints. Fewer joints were painful when using the soft splints when compared with no splint. The hard splint scored highest for appearance and cleanliness, but the splint for pain reduction and compliance (82%). 57% preferred the soft splint, 33% the hard splint, and 10% no splint. |
| Carter, 1979 (42)[b] | 5; 100%, range 59–63 y; RA diagnosis ≤3 y, English speaking, limited prior joint protection education. | Two, 45-minute sessions over 2 to 4 days apart. Presentations on joint protection principles and means of avoiding deforming forces. Group discussion and problem solving. | Knowledge, attitude, and performance. MCQs, statements on feelings of joint protection, rated correct or incorrect patient use of joint protection principle. | Pre, post 1 weeks and 2 months | Knowledge increased by 27% postintervention (with 7% set as requisite threshold for change). Attitude increased by 8% (with 7% set as requisite for change). Performance increased by 19% (with 25% set as requisite for change). |
| Ellegard et al, 2019 (47) | 55, 100%, mean (SD) 63.7 (13) y; aged older than 18 y, RA diagnosis (ACR/EULAR 2010 criteria), stable medication, reduced ability to perform ADLs. | Intervention = 28: Four, 1-hour sessions over 8 weeks, with hand exercises (four times per week [one supervised, three home-based; approximately 35 minutes]). Control = 27: Four 1-hour sessions over 8 weeks. Sessions involved 1) assessment and goal setting, 2) joint protection principles, 3) joint protection and assistive device practice, and 4) social prescribing in the community. | ADL motor ability, ADL process ability, (self-reported) ADL ability, (self-reported) disability, disease activity, grip strength, pain. AMPS (ADL motor ability; ADL process ability), ADL-questionnaire (ADL ability), HAQ-DI (self-reported disability), DAS28 (disease activity), handgrip dyno, VAS (pain). | Pre, post immediately (after 8-week intervention) | No significant differences in outcomes after 8 weeks between the groups. Both groups involved in ADL motor ability (intervention: mean change = 0.24 logits; 95% CI = 0.09–0.39; control: mean change = 0.20 logits; 95% CI = 0.05–0.35). Clinically relevant improvements in ADL motor ability for 46.4% (n =13) of intervention group and in 44.4% (n = 12) the control group. Grip strength increased in the intervention group; marker of inflammation (ESR) increased in the control group. |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Feinberg, 1992 (60) | 46, N/D; mean 48.8 y; RA diagnosis (functional class I or II), outpatients with no prior hand splint referral. | Intervention = 20: Assessed patient, fabricated hand splint, and fostered patient-practitioner relationship (including education principles, expectations, and encouragement). Follow-up phone call at 2 weeks. Control = 20: Assessed patient and fabricated hand splint. | Pain, duration of morning stiffness, compliance. 5-point VAS, 4-point VAS, diary. | Pre, post splinting (28 days) | Patients wore their splints a mean 23.3 days (intervention) and 18.1 days (control), respectively ($P = 0.056$). Nine (45%) in the intervention group, but only four (20%) in the control group used their splints daily ($P = 0.04$). Greater knowledge of splint use related to actual use for both groups ($P = 0.035$). Wrist and hand pain did not change in either group. Experimental group had less morning stiffness ($P = 0.013$). |
| Furst et al, 1987 (48) | 28, 89%, mean 54.1 y; aged older than 18 y, RA diagnosis (American Rheumatism Association criteria) | Intervention = 18: Six, 90 minute weekly educational sessions on energy conservation, body position, rest, activity analysis (1 & 2), and joint protection. Instructor guide and patient workbook to standardize across centers. Control = 10: Standard OT (one to three sessions). | Knowledge, ADL status, pain, fatigue, psychological adjustment to illness, disease activity, energy conservation behavior. Questionnaire, HAQ, VAS, PAIS, RAI, IPA/activity record (for behavior). | Pre, post 3 and 9 months | No difference after 3 and 9 months in either group. Post 3 months, the intervention group showed a tendency for improved energy conservation behaviors for rest during physical activity ($P = 0.07$), balance between rest and physical activity ($P = 0.0$), and time being physically active ($P = 0.1$). |
| Gerber et al, 1987 (49) | 28, 89%, mean 54.1 y; aged older than 18 y, RA diagnosis. | Intervention = 18: Six, 90 minute weekly educational sections on energy conservation, body position, rest, activity analysis (1 & 2), and joint protection. Instructor guide and patient workbook to standardize across centers. Control = 10: Standard OT (one to three sessions). | Psychological adjustment to illness, grip strength, walk speed, tender/swollen joints, ADLs, daily activity. RAI and PAIS, hand dyno, walk time (50 ft), HAQ (including VAS), activities log. | Pre, post 3 months | 50% of intervention group increased physical activity time ($P = 0.1$). A total of 11% of control group increased physical activity time ($P = 0.1$). A total of 22% of control group and 50% of intervention group achieved better balance of rest and physical activity ($P = 0.07$). These were not significant and tendencies only. |
| Hammond, 1994 (43) | 10, 90%, mean 56.2 y; ages older than 18 y, RA diagnosis (ACR class I or II), no other medical conditions affecting hand function. | Intervention = 10: Two educational sessions on 1) the disease, JP principles, and identifying ADL issues (85 minutes) and 2) energy conservation, practicing JP methods, and hand exercises (120 minutes). Sessions formed part of a 6-week arthritis program. | Hand movement patterns (primary), swelling, pain, disability, ROM, functional disability. JPBA, ACR disease classification of progression and functional class, hand joint count (0–120 scale), HAQ, VAS, disease duration. | Pre, post 2 and 6 weeks | Joint protection behavior did not change 2- or 6-weeks postintervention ($P > 0.1$). Participants indicated that they paid increased attention to joint care since education. However, there was no relationship between self-perceived and observed joint protection behavior for these participants who indicated they had changed behavior. |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Hammond and Lincoln, 1999 (44) | 21, 81%, mean (SD) 48.9 (6.4) y; RA diagnosis and currently attending an arthritis education program at the site. | Intervention = 21: Four, 2-hour arthritis education sessions (including 2-hour joint projection education). Control: Control phase included prior to the intervention. | Hand movement patterns (primary), joint protection knowledge, hand pain, hand joint paint, function, attitude, attitude toward joint protection. JPBA, questionnaire, 10-point VAS, HAQ, quantitative interview. | Pre 6 and 1 weeks, post 6 and 12 weeks | No improvement in JPBA scores ($P = 0.65$), hand pain ($P = 0.7$), hand joint pain ($P = 0.6$), and HAQ ($P = 0.5$). Joint protection knowledge improved after the intervention ($P = 0.01$), and most participants believed joint protection to be beneficial. Reasons for not changing behavior: problems recalling information; joint protection being considered inappropriate for early RA; lack of skill; difficulties changing habits. |
| Hammond and Freeman, 2001 (33) | 139, 76.5%, mean (SD) 50.5 (10.6) y; aged 18–65 y, RA diagnosis, experiencing hand pain, no other medical condition affecting hand function. | Intervention = 65: Four, 2-hour weekly group sessions (4–8 participants, including partners) involving demonstration and practice, personalized strategies, and goal setting for joint protection. Control = 62: standard education program involving group sessions (6–12 participants, including partners; 8-hour total). | Hand paint, adherence (primary), disease activity, hand status, function, psychological status. 100 mm VAS, JPBA (primary), EULAR28 joint count, during of morning stiffness, AIMS2, hand dyno, self-efficacy scale, RAI. | Pre, post 6 and 12 months | Intervention group improved in adherence ($P = 0.001$), hand pain ($P = 0.02$), general pain ($P = 0.05$), morning stiffness ($P = 0.01$), self-reported number of flare-ups ($P = 0.004$), visit to the doctor for arthritis ($P < 0.01$), and activities of daily living ($P = 0.04$). Trend toward improved swollen joint counts was shown ($P = 0.07$) and improvements in self-efficacy and perceived control. |
| Hammond and Freeman, 2004 (34) | See above. | See above. | See above. See above. | Pre, post 48 mo | The intervention group had significantly increased adherence ($P = 0.001$). Functional ability worsened in both groups but significantly more for the control group. The intervention group had significantly less early morning joint stiffness ($P = 0.01$); however, improvements in pain during activity had returned to preintervention level. Participants in the control group who increased joint protection behavior were more likely to have lower baseline physical function ($P = 0.002$). |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Hammond, Young, and Kidao, 2004 (35) | 326, 72%, mean (SD) 55.5 (13.7) y; aged older than 18 y, RA diagnosis | Intervention = 162: Four 1-hour individual treatments, plus one 2-hour group arthritis education program. Individual treatment plan included information about RA management, ADL training, joint protection and energy conservation, posture and positioning, coping strategies, and home exercises. Control = 164: usual care. | Function, disease activity, hand status, psychosocial status, adherence. HAQ, AIMS2, 100 mm VAS, handgrip dyno, ASES. | Pre, post 6, 12, and 24 months | The intervention group received a mean (SD) 7.6 (3.0) hours of OT. The intervention group significantly increased in self-management post 12 months (hand exercises, $P < 0.001$; joint protection, $P < 0.01$; rest $P = 0.05$). There were no significant differences in any outcome measures or between groups for function (AIMS2, $P = 0.96$), pain ($P = 0.74$), or self-efficacy ($P = 0.39$). |
| Hammond et al, 2021 (36) | 206, 80%, median 59 y; aged over 18 y, RA, or undifferentiated inflammatory arthritis diagnosis. | Intervention = 103: Fitted three-quarter length finger Isotoner glover. Control = 103: Fitted loose-fitting three-quarter length finger Jobskin classic edema gloves. Both groups: instructed to wear most of the day and not, but not for 24 hours | Hand pain (primary), nondominant hand pain, hand stiffness, duration of morning hand stiffness, function disability, health status, perceptions on treatment. 10-point NRS, Michigan Hand Outcomes questionnaire HAQ, EQ-5D-3L, treatment log. | Pre, post 12 weeks | 84 (intervention) and 79 (control) participants completed the 12-week follow-up. Both groups had less hand pain at 12-weeks post intervention (intervention 1.0 and control 1.2; both lower NPRS score) (adjusted mean difference = 10.10 [95% CI: −0.47 to 0.67; $P = 0.72$]). No clinically important improvement in either group for hand pain, stiffness, function. 51% of intervention and 36% of control group had adverse events, with 6% and 7% discontinuing glove wear, respectively. Arthritis gloves provision = £129, with not additional benefit. |
| Helewa et al, 1991 (24) | 105, 87%, mean (SD) 54 (12.2) y; aged 18–70 y, RA diagnosis (American Rheumatism Association criteria), limitation in physical function, no other disability affecting function, stable clinical status. | Intervention = 53: 6 weeks individual, home OT within 10 days of referral. Treatment included hand and foot management, vocational assessment, work adaptation, stress management and psychological counseling. Control = 52: no treatment. | Functional ability, morning stiffness, pain, depression, inflammation. Questionnaire, HAQ, AIMS, VAS, Beck depression scale, erythrocyte sedimentation rate. | Pre, post 6 and 12 weeks | The intervention group had greater function than the control group post 6 weeks (mean difference = 8.1 [95% CI 1.7–15.8]; $P = 0.012$). The intervention group were stable between post 6 and 12 weeks (all outcomes). No significant difference in pain, function, and depression between groups post 12 weeks. |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Hewlett et al, 2019 (38) | 33, 79%, mean 62.8 y (range 54.3–69 y); aged ≥18 y, RA diagnosis and recurrent fatigue (BRAF-NRS score of ≥6 [out of 10]) | Intervention = 175: six, weekly 2-hour sessions (weeks 1–6) and one 1-hour consolidation session (week 14). Treatment involved group CBT using reflective questioning and support for fatigue validation, pacing, goal setting, and problem-solving. Participants self-monitor activity, rest, and fatigue to support goal setting. Control = 158: usual care involving short discussion with nurse. | Fatigue (primary; impact, severity, coping), fatigue impact, pain, disability, sleep, disease activity, mood, quality of life, value leisure activities, self-efficacy. BRAF-NRS, BRAF-MDQ, VAS, MHAQ, Pittsburgh Sleep Quality Index, DAS28, self-reported HADS, AIMS, VLA (discretionary activity subscale), RASE, AHI. | Pre, post immediately, 6, 26, 52, 78 and 104 weeks (with fatigue at 10 and 18 weeks) | BRAF-NRS impact at 26 weeks decreased for both intervention ($P < 0.001$) and control groups ($P < 0.004$), with greater reduction in the intervention group up to 2 years ($P = 0.01$). The intervention group had greater improvements in fatigue impact ($P = 0.03$), living with fatigue ($P = 0.02$), and emotional fatigue ($P = 0.01$) at 26 weeks. Fatigue differences were sustained over 2 years. The intervention group had greater self-efficacy at 26 weeks ($P = 0.02$) and coping over 2 years ($P = 0.02$). Fatigue severity and clinical outcomes were similar between groups. |
| Kashani, 2016[b] (63) | 50, 76%, Range 24–72 y; RA diagnosis not previously received self-management involving joint protection, internet, and computer access. | Intervention = 25: Negotiate interactive displays and receive joint protection information for at least 1 hour over 30-day period. | Outcomes: Joint protection knowledge. Outcome measures: AIMS2SF and PSEQ. | 30 days post-study entry | 15 out of 25 reported using program (60%), 15 felt capable of learning with the program, 5 had difficulty accessing program. Intervention group score doubled that of control group (52.8%) for joint protection knowledge. Intervention group scored favorably on some. |
| Kraimaat et al, 1995 (25) | 77, 68%, mean 57 (12.7) y; Minimum age of 20 y, a duration of illness >1 y, and RA class I, II, III. | Intervention 1 = 24: Ten, weekly 2-hour sessions of cognitive behavioral therapy to groups of 6–10. Sessions 1–4 involved information on RA management. Subsequent sessions included: teaching progressive relaxation, rational thinking, goal setting, and using coping strategies (for pain, mobility, and self-care). Intervention 2 = 28: Ten, weekly 2-hour sessions of standard OT to groups of 6–10. Sessions 1–4 involved | Outcomes: Pain, functional ability, depression and anxiety, knowledge, disease activity. Outcome measures: IRLG (measure for pain, functional ability, depression, and anxiety), questionnaire, joint score, 30 m walk time, blood samples, PCI. | Pre, post immediately and 6 months | CBT led to minor changes in pain coping behavior ($P < 0.01$; effect size, 0.5). CBT and OT groups increased knowledge of RA after intervention (CBT, $P < 0.01$) (OT, $P < 0.01$). Duration of RA explained 12% of variance in self-care ($P < 0.001$), 6% variance in pain ($P < 0.05$), 9% variance in anxiety ($P < 0.01$) and 12% variance in depression ($P < 0.001$). |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | information on RA management. Subsequent sessions included: energy conservation, joint protection, and use of assistive devices. Control = 19: Waiting list/ usual care. | | | |
| Lahiri et al, 2021 (62) | 140, 86%, mean 56.6 y (range 46.7–62.4 y); aged ≥21 y; RA diagnosis, attending outpatient rheumatology clinics. | Intervention = 70: Single, MDT 2-hour clinic visit. Led by a rheumatologist, with 20 minutes each spent with a nurse (education and counseling), medical social worker (psychological and emotional support and financial needs), physiotherapist (exercise), hand OT (self-management, cognitive-behavioral approaches, and joint protection), and podiatrist (foot care). Control = 70: Usual care, involving three visits to their rheumatologist. | Outcomes: HR-QOL (primary), pain, disease activity, physical function, coping, self-efficacy, symptom state, medication adherence, disease-specific knowledge, and patient experience. Outcome measures: EQ-5D-3L (primary), VAS, DAS28, MHAQ, RASE, PASS, MARS, 12-item questionnaire (disease-specific knowledge), survey (patient experience). | Pre, post 6 months | 40.6% of the intervention group and 34.3% of the control group improved in HR-QOL ($P = 0.46$; minimal clinically important difference of 0.1). In the intervention group, patients with high disease activity were more likely to achieve an improvement in HR-QOL. Intervention group had a within-group improvement in pain ($P = 0.02$), RASE ($P < 0.001$), and coping ($P < 0.001$) but not in the control group. No group × time interaction stated. Intervention group had a small, significant improvement for HR-QOL ($P = 0.04$), disease activity ($P = 0.03$), and coping ($P = 0.02$) when compared with the control group. |
| Macedo et al, 2009 (54) | 32, 93%, mean 50.6 (9.85) y; RA diagnosis, employed, English speaking, medium-high work disability risk (by RA work instability scale) | Intervention = 16: Six to eight sessions (30 to 120 minutes) of comprehensive OT and usual rheumatology care for 6 months. OT-involved assessments of medical history and work, functional, and psychosocial capabilities. Sessions involved: education, self-advocacy, workplace rights and responsibilities, reasonable adjustments, pacing, stress management, sleep, exercise, and MDT support (as required). Control = 16: Usual care. | Outcomes: Function, work productivity, coping, disease activity, pain, morning stiffness, fatigue. Outcome measures: COPM (primary), HAQ disability index, RA-WIS, number of illness days, Modified Health Economics Questionnaire, AIMS2, AHI, EQ-5D, VAS, DAS28. | Pre, post 6 months | The intervention (OT) group had greater improvements than the control group in:<br>• All functional assessments (COPM performance, $P < 0.001$, COPM satisfaction, $P < 0.001$, HAQ)<br>• Disability index, $P = 0.02$)<br>• Majority of work outcomes (RA work instability index, $P = 0.04$, VAS work satisfaction, $P < 0.001$, VAS work performance, $P = 0.01$).<br>• Coping outcomes (AHI, $P = 0.02$, AIMS2 pain, $P = 0.03$, VAS pain, $P = 0.007$, EQ-5D, $P = 0.02$, DAS28, $P = 0.03$) |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Masiero et al, 2007 (45) | 91, 81%, mean 53.7 (11.6) y, aged 18–65 y, stable medication 6 months prior, not severely disabled. | Intervention = 46: Four, 3-hour group meetings every 3 weeks. Sessions included four to six patients, plus one or more family member. Group meetings included: pathophysiology and development of RA, joint protection in activities of daily living, advice on environmental adaptations, and home exercise prescription. Control = 39: Usual care. | Outcomes: Sociodemographics, knowledge of disease, quality of the health care service, pain, function, disability and health status, frequency of home exercises, usefulness of education program for daily living. Outcome measures: Clinical consultation, RAI, Health Service Interview questionnaire, VAS, HAQ, AIMS2 (Italian version), personal diary, questionnaire. | Pre, post 8 months | The intervention group had greater improvements in disability and health status ($P = 0.0001$) (HAQ), physical symptoms ($P = 0.049$), social interaction ($P = 0.045$) (both AIMS2), and pain ($P = 0.001$) than the control group. The intervention group significantly improved disability and health status (HAQ) ($P = 0.01$), but the control group significantly worsened ($P = 0.09$). The intervention group significantly improved symptoms ($P = 0.02$), function ($P = 0.05$), and social interaction ($P = 0.04$) (HAQ), but not in work ($P = 0.31$) and psychological dimensions ($P = 0.19$). During the trial, 24 intervention participants exercised on average twice a week, whereas only 12 control group exercised regularly. Hand exercises were performed most frequently. 75% of the intervention group found the program very useful (n = 27), 16.6% found it moderately useful (n = 6), and 8.4% found it not useful (n = 3) for daily activities. |
| Mathieux et al, 2009 (26) | 60, 72%, mean 47.5 (13.1) y; RA diagnosis (ACR criteria), early disease duration (<2 y). | Intervention = 30: One half-day session, including joint protection practices (including fabrication) and twice daily hand and wrist exercises. Booklet provided; intervention over 3 months. Control = 30: Usual care, and then the intervention from months 3 to 6, in an open label extension phase. | Outcomes: Grip strength, function, satisfaction, compliance. Outcome measures: Hand dyno, HAQ, questionnaire (verbal scale). | Pre, post 3 months | Both groups showed similar improvements in strength and function after they received the intervention. In the intervention second group, 85% used their hand splints compared with 57% in the intervention first group (0–3 months) ($P < 001$). In the intervention first group, 90% were practicing self-rehabilitation exercises |

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**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | compared with 40% in the intervention second group (*P* < 0.001). |
| Mohanty, Padhan, and Singh, 2018 (64) | 40, 82.5%, mean 46 (6) y; aged 20–74 y, RA diagnosis (2010 ACR/EULAR functional class II and III), stable medications. | Intervention = 20: Proprioceptive exercise retraining three times a week for 8 weeks. Seated exercises included hand gripping, weighted finger pulleys, lifting dumbbells with hand, wrist roller activity, and stretch and hold of bilateral counterpart fingers. Each exercise was held for 3–5 seconds for 10 repetitions (10 second rest). Control = 20: Home exercises, three times a week for 8 weeks. Seated exercises included wrist and finger movements, thumb movement (resistance), volar and dorsal flexion of wrist, forearm pronation and supination, and tendon gliding exercises. Each exercise was held for 3–5 seconds for 10 repetitions (10 seconds rest). | Outcomes: Health (ie, hand) status, hand function. Outcome measures: Brief MHAQ, Jebsen hand function test. | Pre, post immediately (after 8-week intervention) | Both intervention and control groups showed a significant improvement in health status and hand function at 8 weeks (no *P* values). Improvement was significantly greater for the intervention group than the control group (no *P* values). |
| Neuberger et al, 1993 (pilot study) (27) | 45 (n = 31 complete), All female, mean 48.3 y; aged 18–76 y, English speaking, mentally competent, and female. | Intervention = 15: Self-instructional OT program. Four 20–25-minute sessions involved pathophysiology of RA; medication therapy; rest, pacing and joint protection; and exercise and posture. Control = 16: No self-instructional OT. | Outcomes: Function, task performance, knowledge. Outcome measures: Observation, questionnaire (40 multiple choice questions). | Pre, post 3 to 16 weeks | The intervention group performed significantly higher than the control group (*P* = 0.005) in knowledge after the self-instructional OT. There was no significant difference in task performance (ie, function) between groups after the self-instructional OT (*P* = 0.08). |
| Neuberger et al, 1993 (follow-up) (27) | 98 (n = 53 complete), 66%, mean 52.6 (14.3) y (range 25–81 y); aged 18–76 y, English speaking, mentally competent, and either male or female. | Intervention 1 = 13: Self-instructional OT program (see above). Intervention 2 = 14: Self-instructional OT program, plus ROM and joint protection practices. Intervention 3 = 15: Self- | Outcomes: Function/task performance, knowledge, pain, depression. Outcome measures: Observation, questionnaire (40 multiple choice questions), VAS, CES-D. | Pre, post 3 to 16 weeks | All intervention groups scored higher than the control group on the knowledge test (*P* < 0.01), performance of JP practices (*P* = 0.01), ROM exercises (*P* = 0.01), and adherence to home joint |

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**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | instructional OT program, plus ROM and joint protection practices, and nurse-patient contracts for behavior change. Four, 30–45-minute sessions for each intervention. Control 1 = 11; No self-instruction, no intervention. | | | protection practices (*P* < 0.01) after self-instructional OT. There was no difference between intervention groups for any outcome, including an increase in adherence to home ROM exercises (*P* = 0.83). |
| Niedermann et al, 2012 (46) | 54, 85%, mean 57.8 (14.1) y: RA diagnosis (ACR class II, III, or IV), hand pain justifying OT, German speaking. | Intervention = 26: "PRISM" joint protection, involving a pictorial tool, visualizing the relationship between an illness and other aspects of a patient's life (eg, work, hobbies, and friends/family), plus conventional joint protection (see below). Control = 27: Conventional joint protection, involving information on RA, and joint protection and assistive device practices. Four, 45-minute session; four over a 3-week period, and one refresher session 2 months later. | Outcomes: Joint protection behavior (primary), hand function, pain, self-efficacy, QOL, drug treatment and disease activity, and PRISM data (ie, perceived burden of illness; resource use) (secondary). Outcome measures: D-JPBA-S (German version), handgrip dyno, 10-point VAS, EUROHIS-QUOL8, HADS (German version), DAS28, PRISM task observation. | Pre, post 6 and 12 months | Post 6 month: Greater improvement in joint protection behavior in the PRISM-JP group than the conventional group (effect size 0.32, *P* = 0.02). 14 patients (53%) increased joint protection behavior scores by more than 30% (ie, smallest detectable change) in the PRISM group, whereas 5 patients (19%) in the conventional group increased by more than 30% (*P* = 0.008). Joint protection self-efficacy significantly increased in both groups. Post 12 month: Greater joint protection adherence in the PRISM group compared with the conventional group (effect size 0.28, *P* = 0.04). More PRISM group participants increased joint protection behavior by more than 30% from baseline (53%), compared with conventional (19%) (*P* = 0.008). The conventional group had significantly better QOL at 12 months compared with the PRISM group (*P* = 0.04). Within-group, the PRISM group improved joint protection self-efficacy (*P* = 0.02) and grip strength (*P* = 0.04); the conventional group improved in depression, QOL and disease activity. |

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**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Pimm, 2003[b] [(53)](#) | 136, 77%, mean 52.9 y; RA diagnosis (≥1 year), aged 16–70 y, English speaking. | Intervention = 58: Six, weekly 2-hour meetings, involving sharing information and coping strategies. Topics included medication advice, joint protection, use of aids, nutrition, and stress and pain management. | Outcomes: Pain, physical disability, emotional state (primary), social and occupational function, QOL, disease activity, health care utilization, illness representations, self-efficacy, coping procedures (secondary). Outcome measures: VAS, graphic rating scale, NPRS, Stanford Health Assessment, AIMS 2, customized questionnaire (function), HADS, POMS, PANAS. | Pre, post immediately, 2 and 12 to 13 weeks, and 9 months | No difference in pain between groups after intervention ($P = 0.051$). Immediately after, the intervention group had a greater improvement in illness perception (identity and consequence scales), and pain self-efficacy, use of coping strategies, and exercise adherence than the control. Improvements in illness perception (identity), pain self-efficacy, and use of coping strategies were maintained at 3 months post, and illness perception (identity) at 9 months post. Pain and depression improvements were not maintained at 9 months for the intervention group. |
| Pot-Vaucel et al, 2016 [(51)](#) | 62, N/D, mean 60.2 (10.4) y; RA diagnosis (ACR 2009 classification), aged greater than 18 y, stable RA 6 months prior. | Intervention = 28: 6-month patient education, involving 1) 1-hour interview with a nurse (identification of key priorities for disease management), 2) three 90-minute group workshops and/or individual consultations, and 3) a final 1-hour interview with a nurse. Patients had choice between individual consultation (eg, social worker, OT, psychologist) and/or joint workshops (three out of six topics). Control = 26: Waiting list/usual care. | Outcomes: Knowledge (success in solving three predefined ADL problems), skills acquisition, medication use, engagement in health care, disease development, disease activity and health status (secondary). Outcome measures: Questionnaire, including VAS, HAQ, and Beck depression scale. | Pre, post immediately (after 6-month intervention) | The most positively evaluated choices in the intervention were OT and physiotherapy (84%), with least interest in social rights (1 person in 5) and self-image (1 person in 4). Knowledge, assessed by problem solving, was achieved by 76.9% of the intervention group and 42.4% of control group ($P < 0.0001$). Knowledge of treatments and managing side-effects did not change during the intervention, nor did fatigue, stiffness, or number of consultations. Following intervention, participants reported they required less corticotherapy, more OT, more demand for social aid, more physical activity, greater understanding of RA of RA, and how to cope with RA. |

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**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| Tonga, Düger, and Karatas, 2016 (55) | 40, 95%, aged 39–60 y; RA diagnosis (ACR criteria stage 2 or 3), aged 18–65 y, stable medications 6 months prior. | Intervention = 20: Ten, daily 45-minute physiotherapy sessions, plus four or more 60–90-minute client-centered OT sessions. Control = 20: Ten, daily 45-minute physiotherapy sessions. For both groups, physiotherapy involved pain management, exercises (stretching and strengthening), educational therapy (ie, joint protection techniques, energy conservation, assistive device use). | Outcomes: Pain, function, disability and health status, occupational performance, and occupational satisfaction (relating to self-care), QOL. Outcome measures: Short-form MPI, Turkish version HAQ, AIMS2, COPM (semistructured interview), questionnaire. | Pre, post immediately (after 1 month intervention) | The intervention group had a significant decrease in pain scores (>0.002), whereas the control group only improved in sensory pain ($P = 0.001$). The intervention group and control group both improved in global disability and health status scores ($P = 0.0001$ to $P = 0.02$), and only the intervention group in QOL ($P = 0.001$). The intervention group significantly improved activity limitation and participation restriction when compared to the control group after the trial ($P = 0.001$). The intervention group had significant increases in occupational performance and occupational satisfaction, whereas the control group only increased occupational performance ($P = 0.001$). |
| Van Vilsteren et al, 2017a (11) | 150, 84%, mean 49.7 (8.6) y; RA diagnosis, employed (>8 hour per week), minor difficulties in functioning at work. | Intervention = 75: 12 week "Care for Work" program involving integrated care and a participatory workplace intervention, based on participatory ergonomics. Intervention weeks involved 1 - initial consultation and treatment plan, 2 - workplace intervention (OT, involving care manager, patient, and employer), 6 - second consultation/evaluation, and 12 - third consultation/ evaluation. Control = 75: Usual care. | Outcomes: Supervisor support, work instability, work productivity. Outcome measures: Job Centre questionnaire, RA-WIS, Work Limitations questionnaire. | Pre, post 6 months | Supervisor support had a statistically significant effect in favor of the intervention group (95% CI 0.007–0.38). There was no difference in work instability (difference: −0.50 [95% CI 1.71–0.71]) or work productivity (difference: 0.1 [95% CI 0.7–0.9]) between intervention and control groups. |
| Van Vilsteren et al, 2017b (28) | See above. | See above. | Outcomes: Work productivity (primary), QOL, pain and fatigue, work instability. Outcome measures: Work | Pre, post 6 and 12 months | 143 participants completed follow-up questionnaire at post 12 months. There were no intervention effects on |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | work productivity loss, work instability, pain, fatigue, and QOL |
| **Qualitative and mixed methods studies** | | | | | |
| Bowell and Ashmore, 1992 (41): Mixed methods | n = 450 patients and 350 partners/carers (enrolled), n = 100 patients and 100 partners/carers (for data collection); Inclusion criteria: RA diagnosis and clinic referral. | Intervention: Single, 2-hour group session led by a physiotherapist and OT. | Outcomes/evaluations: Feedback on the program (including usefulness, requirement for additional information or training, and timings). Outcome measures: RASH evaluation form. | Pre, post immediately and 6 months | All participants and partners found the program helpful and informative, with 2-hour suitable duration. 50% wanted more sessions. Further information was requested on living with RA (65%) and relaxation (63%) and coping techniques (52%). 84% changed the way they performed daily activities, and "many" purchased equipment. 85% of partners reported that their attitude changed toward RA, in that they had greater insight and understanding. |
| Dubouloz et al, 2004 (56): Qualitative | 5, All female, aged 38–67 y; RA diagnosis within last year, beginning community-based OT. | Intervention: Individual home-based OT (up to 8 months) focusing on information provision, reflection, and adaptation of the daily environment and activities. | Evaluations: Two to seven, 1-hour interviews during home-based OT. Transformation of personal beliefs, values, feelings, and knowledge (meaning perspectives) underlying occupational change. | During | Themes (postintervention):<br>• Illness: Some maintained the same personal values as before their illness, while recognizing that they had to find different ways of functioning for independence and activity. Others found functional reorganization difficult to accept and perceived illness as a lesser part of oneself. *"Look, it's just another part of life like getting a pimple, bad haircut, that's it. It, it's certainly not...beating me up. It's just, it's [a] part of me."* Some assessed the illness less negatively, as an inconvenient and manageable condition.<br>• Independence: Individuals continued to strongly value the meaning and function of independence. |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
| --- | --- | --- | --- | --- | --- |
| | | | | | *"I thought seriously about meals on wheels for a while but then the ugly horns come up, 'Uh... dependency.'"*<br><br>However, others redefined the definition of independence via self-reflection.<br><br>*"...instead of being an independently fit person, I'm an independently disabled person... chronically ill person who occasionally needs help, you know."*<br><br>Participants seemed able to redefine what independence was for them.<br><br>• Activity: The function, meaning, and assessment of activity remained similar for individuals but become *"within my means."* Alternate ways to be and remain active developed.<br><br>*"It's all the same. Being active, being able to work. Being able to volunteer. Being able to use my brain and whatever. I mean, that's all still there...I just have to learn different roads to get to the same way..."*<br><br>• Altruism: Became less of a priority in becoming secondary to the individual's own needs.<br><br>*"...I don't need to feel obligated to do anything that somebody else wants to do. It's OK to say no[...] and I think that is positive in a way because you're responding to, like I'm responding to my own needs, not to the needs of everyone around me."*<br><br>• Self-care: A new meaning emerged acknowledging a |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | balance between the giving and receiving help. "So it's a balance there, what they [other people] give to me. [A friend told me] 'Think of all you do for other people'...in another way maybe they [other people] are helping somebody and they don't realize it...I guess everyone has their own perception, my own is that it [getting help] shouldn't be a loss of independence." Instead of being socially dependent, intervention helped transform participants from "dependent" to "interdependent" (ie, independent with help). • Self-respect: Some individuals altered their views on their problems and judgment of others, which empowered them to respond to personal needs. Participants began to better pace themselves in daily tasks. For example, only tackling what they could achieve, doing tasks slower, and sleeping when tired. "Pacing myself...I think it's more pleasurable now....I tend to take more pleasure in what I do.... instead of thinking about it, I'm actually feeling it. ...I'll sleep if I want. I get up when I want. And in the end, I accomplish as much in a day on a Saturday as if I woke up 3 hours earlier." |
| Dubouloz et al, 2008 ([57]): Qualitative | 10, 80%, aged 39 to 66 y; aged 21–70 y, RA diagnosis, receiving community-based OT. | Intervention: Individual, weekly home-based OT (between 6 and 12 weeks) focusing on information provision, reflection, and adaptation of | Evaluations: Two, 1-hour interviews during home-based OT. Transformation of personal beliefs, values, feelings, and knowledge (meaning | During | Themes (postintervention): 80% reported a conflict between their perspectives and OT interventional strategies. These included energy conservation (ie, pacing and |

(Continued)

**Table 3.** (*Cont'd*)

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | the daily environment and activities. | perspectives) underlying occupational change. | | resting), using help from others, and/or assistive devices. Pacing and resting conflicted with some of the participants' beliefs. "...to finish what I start was important." "...resting made me feel guilty." Seeking or receiving help from others conflicted with some participants' values of independence. "...not counting on somebody else to go to places." Receiving help led to feelings of: "...being useless; incapacitated." Recommendations by OTs and the use of assistive devices led to conflicted with belief systems for some: "A wheelchair was not plausible at 35 years old, with a young child." Pacing and rest strategies were initially challenged, and for some a cause of guilt. "I couldn't imagine resting before, I felt guilty. Now... rest allows me to feel myself, to be a joyful wife and a nice person." For some with long-term RA, they developed rule for managing occupations. "I do things in moderation; I stop for pain even if the activity is not finished." This also involved redefining the concept of rest. Initially, rest meant strictly "going to bed at night," later becoming part of "sedentary activity." This allowed rest to become meaningful and part of daily routine. |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | Seeking help was initially a major barrier, later becoming *"a joy that people give to me."* Priorities seemed to change from completing activities alone over prolonged time, to saving time and seeking help, *"freedom to do, to freedom to be."* An evolution to a positive perspective occurred before devices were incorporated into daily life. Initially, splint wearing was seen as a *"step down,"* later becoming associated with *"a way to increase what I am able to do."* This view of gaining control over symptoms contrasted with the previous perceived view of capitulation. |
| Dubouloz, 2008 (58): Qualitative | 16, 81%, mean 50 y; Having received or receiving OT and other rehabilitation. | Intervention: Individual home-based OT focusing on adaptation of the daily environment and activities. | Evaluations: Two to seven, 1-hour interviews during home-based OT. Experiences of adapting to living with RA | During | Themes (postintervention): • Independence: Individuals had to create self-care strategies to establish a new occupational balance. Self-reflecting on their new situation enabled individuals to recognize self-continuity and self-acceptability in illness. *"Rarely will I ask for assistance. It's just my nature. So that's going to be one of the hardest lessons I'll ever have to learn if I have to become dependent..."* The definition of independence broadened to accepting external help. • Activity: The definition of the value of activity adapted from how busy the individual was to engaging in moderated activity that recognized the individual's health needs. |

*(Continued)*

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | *"I do things in moderation; I stop for pain even if the activity is not finished."* Participants divided large tasks into smaller and more manageable tasks, performed over longer duration. When strategies of pacing, instrumental help, and social support were integrated into daily occupations, participants found that they could remain productive, as well as active and independent. • Altruism: A commitment to helping others become less of a priority; instead, OT intervention helped to shift focus to valuing and satisfying individual needs. *"…my character make-up is providing help as opposed to asking for help."* |
| Hewlett et al, 2019[b] [(39)](#): Mixed methods | 333, 79%, mean 62.8 y (range 54.3–69 y); aged ≥18 y, RA diagnosis and recurrent fatigue (BRAF-NRS score of ≥6 [out of 10]). | Intervention = 175: Six weekly 2-hour sessions (week 1–6) and one 1-hour consolidation session (week 14). Treatment involved group CBT using reflective questioning and support for fatigue validation, pacing, goal setting, and problem solving. Participants self-monitor activity, rest, and fatigue to support goal setting. Control = 158: Usual care involving short discussion with nurse. | Outcomes: Fatigue (primary; impact, severity, coping), fatigue impact, pain, disability, sleep, disease activity, mood, quality of life, valued leisure activities, self-efficacy. Outcome measures: BRAF-NRS, BRAF-MDQ, VAS, MHAQ, Pittsburgh Sleep Quality Index, DAS28, self-reported HADS, AIMS, VLA (discretionary activity subscale), RASE, AHI. Economic outcomes: Cost-effectiveness was calculated by the QALYs with the EQ-5D-5L. Evaluations: Individual face-to-face interviews with tutors (n = 14), plus one focus group (n = 8) to discuss clinical implementation. | Pre, post immediately, 6, 26, 52, 78, and 104 weeks (with fatigue at 10 and 18 weeks) | See (36) for quantitative results. Satisfaction with the intervention was high, with 89% of participants rating the booklet (*P* < 0.0001), compared with 54% in the control group. 96% recommended the intervention and 68% the intervention booklet to others (*P* < 0.001). Qualitative results: Becoming confident required time and effort. *"…the RAFT programme was a daunting but exciting undertaking."* Training together and expert demonstrations were helpful. *"…skills practice and demonstrations were essential."* Clinical supervision helped and tutors develop dynamics of pair work. |

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | *"…developing an individual approach to a standardised intervention…"* Tutors described working with patients as a whole person in clinic; their new "ask don't tell" skills helped them listen, draw things out, and confidently discuss fatigue using the intervention resources. *"…enhanced clinical practice beyond the RAFT programme."* |
| Niedermann et al, 2010 (40): Mixed methods | 10, 80%, mean 58.4 (12.8) y; RA diagnosis (ACR class II, III or IV), German speaking, had previously used and continued to use hand joint protection methods. | Study aim: To evaluate the retrospective views (patients and OTs) of the benefits and barriers to the intervention.[b] Intervention: Joint protection education, provided individually up to 3 to 4 hours over several sessions. Standard education included oral and written information on RA and joint protection principles, demonstration and practice of hand joint protection methods, and demonstration of assistive devices. | Outcomes (questionnaire): Psychological wellbeing, physical wellbeing, potential benefit, self-acceptance, altruism (benefits); negative impact on self-image, negative attitude on others, taking time from other things, difficulties/effort (barriers). Outcomes (demographics): Disease activity, drug therapy, functional disability. Evaluations (interviews): Outcomes above were used to direct interviews. Outcome measures: Questionnaire, interviews, DAS28, HAQ (German version). | [a]Post intervention (retrospective) | Only three of the barriers were relevant for the majority of people with RA; and these related to using assistive devices. Perceived benefits of joint protection: Physical wellbeing. Joint protection use was consistently related to improving pain and function. These benefits were also considered lead to improved psychological wellbeing. Joint protection was seen as a helpful ergonomic technique to help cope with specific tasks. Potential benefits: The belief of preventing damage and saving later health costs varied in strength from hope to conviction among patients with RA. The belief in potential long-term benefits may be an important motivation. Personal control: Joint protection use was consistently related to making an active contribution to physical and psychological wellbeing. Two participants emphasized the importance of staying physically independent as a benefit of joint protection use. Psychological wellbeing: Seven |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | participants attributed improved psychological wellbeing to the use of joint protection, associating it with *"…feeling better and more positive towards life"* (two patients), *"less stress because of easier task performance"* (two patients) and *"making an active contribution"* (one patient). Self-acceptance, self-image and altruism: The commitment to performing joint protection was associated with disease acceptance. One person associated a positive self-image with a positive perception of their body and personal control and linked it to disease acceptance. Being a role-model when performing joint protection (on approval by others) was rated as relevant by all participants. Perceived barriers to joint protection: The themes *"attracting attention/feeling embarrassed"* and *"assistive devices/feeling disabled"* emerged from the key themes *"negative impact on self-image"* and *"negative attitudes of others."* The themes *"complicate task performance"* and *"difficult learning"* emerged as key themes from *"difficulties/effort."* Negative impact on self-image/ negative attitudes of others: No participant reported negative experiences with others because of using joint protection, but some did fear that using joint protection may attract attention and lead to |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | embarrassment. The main issue related to the use of assistive devices giving the image of being disabled. Difficulties/effort: Joint protection was suggested to make task performance slower, or more complicated, earlier in the condition, but it became a habitual behavior over time. Once joint protection was learned, it became easy. The interview item "*there is too much to learn to perform joint protection correctly*" seemed particularly relevant when starting to use joint protection. |
| Prior et al, 2022 (37): Qualitative | 19, 63%, Range 30–79 y; aged more than 18 y, RA or undifferentiated inflammatory arthritis diagnosis. | Intervention = 10: Fitted three-quarter length finger Isotoner gloves. Control 9: Fitted loose-fitting three-quarter length finger Jobskin classic edema gloves. Both groups: instructed to wear most of the day and night, but not for 24 hr. | Evaluations: One-to-one, semistructured interviews (in-person or telephone). Experiences of wearing arthritis gloves for up to 12 weeks | Post 12-week intervention | Themes (postintervention): Mechanisms determining glove use. Many participants used gloves indoors to keep hands warm at rest and for light activities. Participants valued the gloves thermal qualities: "*As soon as your joints get a bit warmer, the pain actually eases.*" Glove use in daily, sedentary activities was also common, such as watching television, reading, or doing light housework. These did not require getting the hands wet or tight gripping. "*It helped a great deal with support, when I was doing housework...carrying shopping bags. It helped then.*" Participants who used gloves at night during sleep, to help with night pain and/or morning stiffness found their warming and comforting effect helpful. |

(Continued)

**Table 3.** *(Cont'd)*

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | *"I mostly wear it at night because… my mornings are worse. So, if I wear it at night this helps me in the morning. You know, my wrist, it won't get stuck."* |
| | | | | | Ambivalence about glove use: Participants were mostly ambivalent about the benefit of wearing gloves for hand pain and function: |
| | | | | | *"I suppose a normal pair of gloves would do the same sort of thing?"* |
| | | | | | Some could not tell if hand pain or function had improved, or not. Others found gloves a hindrance rather than a help, because of having to take them on and off for daily activities requiring wet hands or a firm grip. |
| | | | | | *"I can't say that I found them particularly helpful, as I say, apart from the comfort factor of having the warmth on my hands…but I think that's probably the only benefit, I think."* |
| | | | | | Some participants found the appearance of the gloves acceptable and unobtrusive and liked that they could cover their hands. |
| | | | | | *"I think they are really nice, and they are like, I can hide my hands with them, that's what I like."* |
| RCOT, 2022[b] [(61)]: Mixed methods | N/A | Practice guideline | Aim: to optimize occupational performance by improving pain, swelling, deformity, self-efficacy, dexterity, sensory symptoms, grip strength, ROM, QOL, self-management strategies | N/A | It is recommended that to optimize adherence to wearing a prescribed orthosis, the OT should discuss with the person:<br>• The potential benefits and limitations |

(Continued)

**Table 3.** (Cont'd)

| Author, year (ref.) | Participants: n, % female, age; inclusion criteria | Intervention and control | Outcomes and outcome measures | Time points | Results |
|---|---|---|---|---|---|
| | | | | | • Practicalities of use and comfort<br>• Provide the opportunity to try on orthoses prior to issue, and routinely follow-up review of the intervention. |

[a]95% CI, 95% confidence interval; ACR, American College of Rheumatology; ADL, activities of daily living; AHI, Arthritis Helplessness Index; AIMS, Arthritis Impact Measurement Scale; AIMS2, Arthritis Impact Measurement Scale 2; AIMS2SF, AIMS Short Form (version 2); AMPS, Assessment of Motor and Process Skills; ASES, Arthritis Self-Efficacy Scale; BRAF-MDQ, Bristol RA Fatigue Multidimensional Questionnaire; BRAF-NRS, Bristol RA Fatigue Numerical Rating Scale; CBT, cognitive behavioral therapy; CES-D, Center for Epidemiologic Studies Depression Scale; COPM, Canadian Occupational Performance Measure; DAS28, Disease Activity Score; D-JPBA-S, Joint Protection Behavioural Assessment (German version); EQ-5D-5L, EuroQol-5 Dimensions, 5-level version; EQ-5D-3L, EuroQol-5 Dimensions, 3-level version; ESR, erythrocyte sedimentation rate; EULAR-28, European League Against Rheumatism version - DAS28; EUROHIS-QUOL8, World Health Organisation Quality of Life Instrument-Abbreviated Version (8-item) Questionnaire; HADS, Hospital Anxiety and Depression Scale; HAQ, Stanford Health Assessment questionnaire; HAQ-DI, HAQ disability index; HR-QOL, health-related quality of life; IPA, Index of Physical Activity; IRLG, Impact of Rheumatic Diseases on Health and Lifestyle; JPBA, Joint Protection Behaviour Assessment; MARS, Medication Adherence Report Scale; MCQ, multiple choice question; MDT, multidisciplinary team; MHAQ, Modified Health Assessment Questionnaire; MPI, McGill Pain Index; N/A, not applicable; N/D, not disclosed; NPRS, Numeric Pain Rating Scale; NRS, numerical rating scale; OT, occupational therapy; PAIS, Psychosocial Adjustment to Illness Scale; PANAS, Positive and Negative Affect Scale; PASS, Patient Acceptable Symptom State; PCI, Pain Coping Inventory; POMS, Profile of Mood States; PRISM, Pictorial Representation of Illness and Self Measure; PSEQ, Pain Self-Efficacy Questionnaire; QALY, quality-adjusted life-year; QOL, quality of life; RA, rheumatoid arthritis; RAI, Ritchie Articular Index; Rand-36, Rand Corporation survey; RASE, RA Self-efficacy scale; RASH, Rheumatoid Arthritis Self-Help; RA-WIS, RA Work Instability Scale; RCOT, Royal College of Occupational Therapists; ROM, range of movement; VAS, visual analog scale; VLA, Valued Life Activities; WIS, Work Instability Scale.
[b]Gray literature.

**Table 4.** Quality assessment—risk of bias for quantitative studies[a]

| Author, year (ref.) | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of participants and personnel (performance and bias) | Blinding of outcome assessment (detection bias) | Incomplete outcome data (attrition bias short-term 0–6 weeks) | Incomplete outcome data (attrition bias long-term >6 weeks) | Selective outcome reporting? (report bias) | Overall risk of bias |
|---|---|---|---|---|---|---|---|---|
| Barry et al, 1994 (52) | N/A | N/A | N/A | N/A | + | + | + | M[b] |
| Callinan and Mathiowetz, 1996 (59) | ? | − | − | − | + | N/A | − | H |
| Carter, 1979[c] (42) | − | − | − | − | + | + | + | H |
| Ellegard et al, 2019 (47) | + | + | − | + | + | N/A | + | M |
| Feinberg, 1992 (60) | + | − | − | − | + | N/A | + | H |
| Furst et al, 1987 (48) | + | + | − | ? | N/A | + | − | H |
| Gerber et al, 1987 (49) | + | + | − | ? | N/A | + | − | H |
| Hammond, 1994 (43) | N/A | − | − | − | + | N/A | + | H |
| Hammond and Lincoln, 1999 (44) | N/A | N/A | − | ? | ? | ? | + | M |
| Hammond and Freeman, 2001 (33) | + | + | + | − | N/A | + | + | M |
| Hammond and Freeman, 2004 (34) | + | + | + | − | N/A | + | + | M |
| Hammond, Young, and Kidao, 2004 (35) | + | + | − | + | N/A | + | + | M |
| Hammond et al, 2021 (36) | + | + | − | ? | N/A | + | + | M |
| Helewa et al, 1991 (24) | + | + | − | + | + | + | + | M |
| Hewlett et al, 2019 (38) | + | + | − | ? | + | + | + | M |
| Hewlett et al, 2019[c] (39) | + | + | − | ? | + | + | + | M |
| Kashani, 2016[c] (63) | + | + | − | ? | − | + | + | H |
| Kraimaat et al, 1995 (25) | ? | ? | − | ? | N/A | + | + | M |
| Lahiri et al, 2021 (62) | + | + | − | + | N/A | + | + | M |
| Macedo et al, 2009 (54) | + | + | − | − | N/A | + | + | H |
| Masiero et al, 2007 (45) | + | + | − | + | N/A | + | + | M |
| Mathieux et al, 2009 (26) | ? | ? | − | ? | N/A | + | − | H |
| Mohanty, Padhan, and Singh, 2018 (64) Neuberger et al, 1993 (pilot study) (27) | − | − | − | − | − | N/A | − | H |
| Neuberger et al, 1993 (follow-up) (27) | ? | ? | − | ? | − | N/A | + | H |
| Niedermann et al, 2012 (46) | + | ? | − | ? | − | N/A | + | H |
| Pimm, 2003[c] (53) | + | ? | − | + | + | + | + | M |
| Pot-Vaucel et al, 2016 (51) | + | + | ? | − | + | N/A | + | M |
| Tonga, Düger, and Karatas, 2016 (55) | ? | ? | − | − | + | N/A | + | H |
| Van Vlisteren et al, 2017a (11) | + | + | − | − | N/A | + | + | H |
| Van Vlisteren et al, 2017b (28) | + | − | − | − | N/A | + | + | H |

[a]Individual item scores were ranked as +, low risk; −, high risk; ?, unclear; or n/a, not applicable (eg, studies without randomization). Overall risk of bias for individual studies was ranked as low, moderate, or high bias according to Rizzo et al (31).
[b]Study had no control group.
[c]Gray literature.

reported that home-based OT (6 weeks, individual treatment) improved function 12 weeks postintervention for established RA. Assessor blinding was used, but not participant blinding (Table 4). The other 6-month RCT[40] did not blind participants or assessors. This involved 6 to 8 sessions (30–120 minutes; at home, clinics, and/or workplace), which improved function, coping, and work performance more than usual care. The CCT[56] incorporated four OT sessions (each 60–90 minutes) into a 10-day physiotherapy program, reporting improvements in pain, disability, and occupational performance 1-month postintervention. However, there was no control, nor participant and assessor blinding.

*Qualitative studies.* Two interview studies involving personalized home OT (weekly for 6–12 weeks) were reported across three papers exploring the changing beliefs, values, and knowledge in participants with early RA (n = 21; aged 38–67 years; diagnosis ≤2 years).[40,56,57] Two papers were of moderate quality[57,58] and one of low quality[59] (Table 5).

Six core themes were identified relating to 1) illness, as a driver for personal change, 2) independence, 3) activity and 4) altruism, as values/traits the participants possessed before diagnosis (that were subsequently influenced by RA and home OT), 5) self-care, and 6) self-respect, as emerging from engaging in home OT (Table 3).[57,59] Patients with RA redefined their views of independence; however, functioning in activities remained similar, albeit "within their means": "Being active, being able to work… Being able to use my brain…that's all still there…I just have to learn different roads to get to the same way…"[57]

Following home OT, self-care changed from a fear of losing independence to being more accepting of help while continuing to help others (Table 3).[57] Device and splint provision were initially observed as "a step down," whereas postintervention, these aids became "a way to increase what I am able to do."[58] Pacing in daily tasks also became beneficial: "Pacing myself? … take more pleasure in what I do…instead of thinking about it, I'm actually feeling it."[57]

Around 80% reported OT recommendations conflicted with personal values, particularly energy conservation advice, self-pacing, and help-seeking strategies[58]: "…to finish what I start was important … resting made me feel guilty."[57] Patients with established RA developed rules for moderating daily activities based on pain and tiredness.

**Other interventions.** Four studies involving 267 participants found that splint provision and assistive devices[36,37,60,61] had little impact on function, pain, and occupational performance. Other salient splint and device studies targeting RA were identified in screening. However, only the four above involved both OT and self-management, and were delivered to patients with RA or undifferentiated inflammatory arthritis. The arthritis gloves trial[36,37] fitted intervention group participants with three-quarter length Isotoner gloves (exerting 23–32 mmHg pressure), and the control

**Table 5.** Quality assessment—CASP for qualitative studies[a]

| Author, year (ref.) | 1. Was there a clear statement of the aims of the research? | 2. Is a qualitative methodology appropriate? | 3. Was the research design appropriate to address the aims of the research? | 4. Was the recruitment strategy appropriate to the aims of the research? | 5. Were the data collected in a way that addressed the research issue? | 6. Has the relationship between researcher and participants been adequately considered? | 7. Have ethical issues been taken into consideration? | 8. Were the data analysis sufficiently rigorous? | 9. Is there a clear statement of findings? | 10. How valuable is the research? | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bowell and Ashmore, 1992 (41) | 1 | 0.5 | 0 | 1 | 0.5 | 1 | 1 | 0.5 | 1 | 1 | 7.5 |
| Dubouloz et al, 2004 (56) | 1 | 1 | 0.5 | 1 | 1 | 0.5 | 0 | 1 | 1 | 1 | 8 |
| Dubouloz et al, 2008 (57) | 0 | 1 | 0.5 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 7.5 |
| Dubouloz, 2008 (58) | 0 | 1 | 0.5 | 0.5 | 1 | 0 | 0 | 0.5 | 0 | 1 | 4.5 |
| Hewlett et al, 2019[b] (39) | 0 | 1 | 1 | 1 | 0.5 | 0 | 0.5 | 1 | 1 | 1 | 8 |
| Niedermann et al, 2010 (40) | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | 1 | 1 | 1 | 9.5 |
| Prior et al, 2022 (37) | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 9 |
| RCOT, 2022[b] (61) | 1 | 0.5 | 1 | N/A | 1 | N/A | 0.5 | 0.5 | 1 | 1 | 6.5 |

[a]Each qualitative study is scored out of 10, with scores >9 deemed high quality; scores between 7 and 9 deemed moderate quality; and scores <7 deemed low quality according to Donnelly et al (16). Individual item scores were assigned as 1, clear and/or detailed discussion; 0.5, unclear or little discussion; or 0, not discussed or inadequate quality. CASP, Critical Appraisal Skills Program; N/A not applicable; RCOT, Royal College of Occupational Therapists.
[b]Gray literature.

group receiving Jobskin edema gloves (exerting 15–25 mmHg pressure); both groups were provided with a hand self-management booklet including joint protection and hand exercises. Isotoner compression gloves were no more effective than the loose-fitting placebo gloves, nor cost-effective.[36] Nested interviews revealed participants liked both the compression and placebo gloves' thermal qualities and comfort in light activities but were ambivalent about use.[37]

One practice guideline (updated for[36,37]) advocated wrist orthoses to reduce pain, based on review evidence alone.[55] Quantitative studies focusing on methods of splint provision[60,61] were limited to pre- and postimmediate time points, lacked allocation concealment, and lacked participant, personnel, and assessor blinding. Callinan and Mathiowetz[60] used a single-group crossover study with random allocation to a soft, hard, or no splint for 28 days without a "washout" period. Occupational therapists fitted and instructed participants on splint use for the dominant hand, which did not affect function, but soft splints did result in fewer painful joints. Soft splints were preferred (by 57%) based on pain reduction and compliance when compared with hard (33%) and no splint (10%). Although there was no structured self-management program, each participant was briefed to be aware of the comfort and preference for the material quality of each splint type. Feinberg[61] involved OT further by delivering an initial consultation and a follow-up phone call to foster the patient-practitioner relationship and increase adherence. Splints were worn between rheumatology appointments (28–55 days). After which, adherence for daily use was 45% (OT consultation) and 20% (usual care); pain was unaffected, but the intervention group had marginally less morning stiffness.

A multidisciplinary intervention[41] used a 2-hour clinic comprising five 20-minute appointments (nurse, social worker, physiotherapist, podiatrist, and hand OT [provided self-management, cognitive-behavioral approaches, and joint protection]) to marginally improve health-related quality of life, disease activity, and coping, over usual care. Newly diagnosed or severe patients with RA had a greater likelihood of improving health-related quality of care following multidisciplinary care. A 30-day virtual program focusing on joint protection techniques and coproduced with patients with RA[62] did not benefit function but improved joint protection knowledge (by 52%) compared with the control. Adherence was poor (60%) with the program deemed "acceptable" by participants. Mohanty et al[63] found that an 8-week proprioceptive hand exercise program had a greater effect on health status and function when compared with home hand exercises (both three times weekly). No details were reported on randomization or blinding, and data were selectively reported. One 12-week "Care for Work" program[11,28] involved integrated care and a participatory workplace intervention (including consultations, individualized plans, and evaluations) and had little impact on work instability or productivity for up to 12 months. However, the authors concluded that participants were potentially recruited too early, given the

low RA work instability scores reported, which may have limited the intervention's effectiveness. Other workplace and employment studies were identified in screening; these were not exclusively involving RA participants (or group data identifiable for RA among other rheumatologic conditions), including a component of self-management, and/or including OT as an intervention.

## DISCUSSION

This review synthesized 39 papers to assess the effectiveness of self-management interventions involving OT and understand the lived experiences of participants in self-management for RA. This involved searching databases from their inception to 2022 to capture quantitative and qualitative evidence, as therapeutic services have developed over time. Of the 39 included papers, interventions were characterized as patient education, behavior change, comprehensive community-based OT (i.e., targeted at improving occupational performance), and other interventions (including workplace and exercise programs). Good evidence was found for patient education and behavior change programs on pain and function, particularly group sessions involving joint protection education. However, few qualitative insights exist into patients' lived experiences.

At first glance, the included papers in Table 2 omit key articles within the search period, including the "Strengthening and stretching for rheumatoid arthritis of the hand" (SARAH)[64] and "Job retention vocational rehabilitation for employed people with inflammatory arthritis" (WORK-IA)[65] trials. Studies evaluating OT interventions, without explicitly stating how they involved OT in self-management support for people with RA were excluded, which is consistent with the review's purpose.

We initially intended to adopt Thomas and Harden's[66] thematic synthesis in generating codes and themes from primary qualitative studies to help explain quantitative findings across the different intervention types. However, given that our qualitative evidence was limited to comprehensive, community-based OT and other interventions (i.e., an arthritis gloves trial), we opted to focus our synthesis solely on these intervention types to avoid decontextualizing findings beyond their settings.[66] The improvements in function[24,40] and coping[40] shown following comprehensive, community OT, could be partly explained in the short-term at least (up to 6 months) by the greater independence and self-care[57,59] arising from personalized and occupational support. The qualitative findings suggest a shift in perspectives for independence in that the individual may be more capable of adapting and coping, particularly in maintaining work performance/remaining in work.[40] As a meaningful occupation, this could, in turn, bring a sense of empowerment and help preserve independence as the disease progresses.

Previous reviews on the effectiveness of OT for RA identified interventions across therapeutic exercise,[13,67] comprehensive OT, motor skills training,[10] splint provision,[10,13,67] and

educational-behavioral approaches (typically patient education, self-management, CBT, assistive devices, and joint protection[10,13,67]). These interventions differ from this review's focus, which examined self-management interventions, incorporating OT as either a stand-alone intervention or component of multidisciplinary care. Our main finding concurs with previous reviews, in that good evidence supports patient education and behavior change for improving pain and function (particularly via joint protection education for enhancing self-management). We advance previous work by 1) reviewing evidence beyond Level 1 studies in peer-reviewed publications, 2) including quantitative and qualitative evidence, and 3) focusing solely on RA (excluding mixed diagnoses [e.g., osteoarthritis/lupus] but including undifferentiated inflammatory arthritis), and OT interventions for supporting patient self-management. Studies varied across intervention types in sample size, sessions (number and duration), outcome measures, and follow-up periods (0–48 months) (Table 3), making comparisons difficult. Papers were consistent, however, in rarely reporting participants' economic, educational, and ethnicity demographics.

Our review suggests that OT interventions (including patient education and behavior change) may not impact pain, function, and fatigue outcomes for those with early RA (<2 years) based on limited longitudinal, long-term evidence, and condition-specific management strategies.[34,35] This may partly be attributable to pathologic and psychological changes, as the individual must adapt as functional symptoms manifest. Medications are used in early RA to suppress inflammation and, in turn, avoid or delay the progression of joint damage and control pain.[5] Although OT can support the management of acute functional limitations in early RA through behavior change,[33] it cannot limit physical joint deterioration. As RA progresses, the need for patients to develop strategies for managing daily occupations grows,[57,59] increasing the potential for OT to support patient self-management lifestyle adaptations. In turn, this can increase function[24,40] and reduce pain.[45] This is where qualitative studies could be focused—to provide better understanding as to how behavioral changes following OT intervention can lead to functional and "physical" improvements. It is, therefore, surprising that only six studies measured self-efficacy (all relating to patient education and/or behavior change interventions), and none studied readiness to change. Although readiness for change is more likely in those with established RA, early OT involvement may lead to greater long-term engagement for self-management.[68]

Although the results indicated that patient education and behavior change interventions support RA self-management outcomes, only five trials assessed outcomes greater than or equal to 12 months.[28,33–35,38,46] Scant evidence exists to support that behavior change following OT intervention can lead to improved long-term physical outcomes. Increased knowledge and adherence after OT intervention does not correspond to behavior change. Hammond and Freeman[34] observed that self-perceived

change did not translate to changed behavior 3 years postintervention; although, those with lower functional ability were more susceptible to change. Perhaps, as shown by our qualitative evidence, this could partly be explained by a greater relative functional improvement, not "within their [functional] means," but beyond. Increasing patient knowledge in early diagnosis, although promoting active involvement in self-management, may be important for mental health and coping, particularly for flare-ups and physical deterioration over the long term. It should be noted, however, that the lack of evidence for changed behavior may reflect the challenges associated with the implementation of complex behavioral trials, and not necessarily because of a lack of OT impact.

Evidence of self-management interventions on patient experience and health inequalities is lacking. However, group sessions were impactful in providing patients and partners with greater insights into their situations and sharing self-help strategies. Qualitative insights from individual, home-based OT show that beliefs, values, and knowledge change in early diagnosis,[57–59] making group-based sessions appealing for promoting acceptance with peer support and in developing strategies for long-term self-management. Only one study, using group cognitive-behavioral approaches to complement usual care, was associated with reduced fatigue for up to 2 years.[38] Tutors highlighted that the course's success was contingent upon buy-in from managers and colleagues, models of training and support, and observing patient progression.[39] Rheumatology care has been significantly disrupted by COVID-19[18,69] but has seen telehealth adopted widely, potentially offering greater access to group interventions. Telehealth also offers promise, in terms of overcoming the lack of access to OT in rheumatology practice, which is currently a worldwide problem.[69,70]

This is the first mixed methods review of the evidence on the impact of OT in the self-management of RA providing a holistic overview of outcomes and patient experience. There were limitations in our review. Firstly, it was beyond the scope of this review to identify the most effective components of OT intervention for RA self-management. Intervention components (e.g., practitioner roles or educational-behavioral strategies) and characteristics (eg, home/clinic or individual/group) most related to effectiveness are crucial in translating research evidence into clinical programs. Secondly, qualitative evidence was derived from only four eligible studies of low-to-moderate quality, and therefore inconclusive.

Our review has generated three key recommendations. Firstly, to improve the OT evidence base and inform decision-making on implementing self-management involving OT, consensus in the research community is needed on core outcome measures and participant demographic characteristics. Secondly, opportunities should be sought to implement digital technologies to support "early OT" in RA diagnosis and management. This can help patients understand their condition holistically. Peer support can be used to facilitate this by promoting

active involvement in self-management. Finally, to develop the OT evidence base for RA self-management, research should reflect real-life, multidisciplinary care. Research should assess the long-term effectiveness of OT intervention for improving RA self-management and it's impact on health outcomes and patient experience. As advocated in the 2022 ACR Guideline for Exercise, Rehabilitation, Diet, and Additional Integrative Interventions for Rheumatoid Arthritis,[69] we must work to raise awareness of OT to support the long-term care of RA. OT has clear beneficial impacts on RA self-management, yet we must continue to generate robust evidence to educate the medical community and inform people living with RA.

This review has highlighted what is known from the published literature on the impact of OT to support self-management of RA in terms of function, fatigue, pain, and lived experience. Patient education offers improvements in pain and function (≤24 months) in adults with RA. However, there is insufficient evidence to demonstrate that improvements persist for the long term. No strong evidence was found to support OT programs for improving fatigue management or patient experience. Qualitative insights were limited to home OT (focusing on illness and independence) and arthritis gloves for hand pain and function.

## ACKNOWLEDGMENTS

## AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be published. Dr Gavin has full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
**Study conception and design.** Gavin, Fenerty, Leese, Adams, Hammond, Davidson, Backman.
**Acquisition of data.** Gavin, Rossiter, Fenerty, Leese.
**Analysis and interpretation of data.** Gavin, Rossiter, Fenerty, Leese, Adams, Hammond, Backman.

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