

**A systematic review of interventions to improve knowledge
and self-management skills concerning contraception,
pregnancy and breastfeeding in people with rheumatoid
arthritis**

Dr Ilana N Ackerman

The University of Melbourne and Melbourne Health, Melbourne, Australia

Dr Gene-Siew Ngian

The University of Melbourne and Melbourne Health, Melbourne, Australia

Associate Professor Sharon Van Doornum

The University of Melbourne and Melbourne Health, Melbourne, Australia

Associate Professor Andrew M Briggs

Arthritis and Osteoporosis Victoria, Melbourne, Australia and Curtin University, Perth, Australia

Corresponding author

Dr Ilana Ackerman

Melbourne EpiCentre

7East, Main Block, Royal Melbourne Hospital, Parkville, Victoria 3050, Australia

Phone: +61 3 9342 2153 Fax: +61 3 9342 8780

Email: i.ackerman@unimelb.edu.au

Abstract

This systematic review aimed to determine the effectiveness of interventions for improving knowledge and/or self-management skills concerning contraception, pregnancy and breastfeeding in people with rheumatoid arthritis (RA). We searched 4 databases (Medline, CINAHL, Cochrane Trials, PsycInfo) using a comprehensive search strategy. Studies were eligible if they were prospective, published in English from 2004-2015, included participants with RA, and tested an intervention designed to improve knowledge and/or self-management skills relating to family planning, pregnancy or breastfeeding. As no studies met the latter criterion, the search strategy was expanded to include all prospective studies evaluating RA educational and/or self-management interventions. Data on study characteristics, participant characteristics and program content were extracted to summarise the evidence base for interventions to support people with RA during their reproductive years. Expanded literature searches identified 2290 papers, of which 68 were eligible. Of these, 9 papers (13%) specifically excluded pregnant women/breastfeeding mothers or recruited only older people. Only 1 study (1%) explicitly evaluated pregnancy-focused education via a motherhood decision aid, while 8 studies (12%) incorporated relevant (albeit minor) components within broader RA educational or self-management interventions. Of these, 3 studies provided methotrexate education in relation to conception/pregnancy/breastfeeding; 3 incorporated discussions on RA and relationships, impact of RA on the family, or sexual advice; 1 provided information regarding contraception and fertility; and 1 issued a warning regarding use of biologic therapy in pregnancy/breastfeeding. In conclusion, information regarding family planning, pregnancy or breastfeeding represents a negligible part of published RA educational interventions, with scope to develop targeted resources.

Word count: 250

Keywords

Patient education; rheumatoid arthritis; family planning, contraception, pregnancy, breastfeeding

Accepted version

Introduction

Rheumatoid arthritis (RA) substantially impacts women of reproductive age [1], and the symptoms and physical limitations associated with the disease, as well as the potential side-effects of disease-modifying medications, represent important considerations in family planning and disease management in early parenting [2-4]. Pregnancy raises a plethora of complex issues for women with RA and their families to consider, particularly around the cessation of medications, the management of disease flares, and the effects of drug exposure on an unborn baby or breastfed child [5]. Disease management approaches will usually need to be modified over the course of pregnancy and breastfeeding and as some disease-modifying anti-rheumatic drugs (DMARDs) are teratogenic (such as methotrexate), education regarding effective contraception and avoidance of unplanned pregnancy is also critical for people with RA during their reproductive years [4,6]. Our recent qualitative research found that the lack of accessible and specific information concerning the safety and toxicity of RA medications was the most important issue reported by women who were pregnant, planning a pregnancy, or who had been pregnant in the last five years [7]. Receiving inconsistent advice from health professionals concerning pharmacological management of their RA was a major source of frustration and confusion for many women, and a desire for enhanced peer support and practical education to support women in caring for their young baby was also emphasised. There is, then, a clear need for appropriate education and support for women with RA (and their families) who are contemplating pregnancy, currently pregnant or breastfeeding to provide a more informed and acceptable patient journey.

Patient education is considered an integral part of routine care for people with inflammatory arthritis [8] and this can be complemented by self-management training to enhance knowledge and skills and empower people to better manage their health across the disease continuum. Although many diverse models exist, perhaps the most well-known programs internationally are the Stanford Arthritis Self-Management Program and the Chronic Disease Self-Management Program developed by Lorig and colleagues [9]. Self-management interventions commonly cover a range of disease-relevant skills including problem-solving, informed decision-making, and relationships

with health professionals, while aiming to influence health attitudes, beliefs and behaviours [10]. To date, systematic reviews of patient education and self-management interventions in RA (including one Cochrane review) have all been broad in scope and have not focused on the specific needs of women who are pregnant or considering pregnancy [8,10-13], despite emerging evidence that this group of patients have specific educational needs [7,14]. The content and outcomes of educational interventions for this patient group therefore remain unknown. This systematic review aimed to evaluate the effectiveness of interventions designed to improve knowledge and/or self-management skills concerning contraception, pregnancy and breastfeeding in people with RA.

Accepted version

Methods

Study design

A systematic review was undertaken and documented according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist [15].

Search strategy

Four key electronic databases were searched from January 2004 to March 2015 to identify potentially relevant studies (Cochrane Controlled Trials Register, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE and PsycInfo). A standardised search strategy was based on that used for an earlier Cochrane review of patient education for adults with RA [11], with the addition of specific search terms relating to pregnancy, breastfeeding/lactation/nursing, conception, contraception and family planning:

(rheumatoid arthritis OR arthritis) AND (clinical trial OR study OR evaluation OR program OR experiment) AND (health promotion OR patient education OR behavior therapy OR behaviour therapy OR occupational therapy OR self care OR psychological adaptation OR counseling OR counselling) AND (pregnan* OR lactat* OR breast* OR nursing mother OR conception OR contracept* OR family planning)
NOT review

Although search terms were kept consistent, the search format was adapted for each database, as appropriate.

Inclusion criteria

To be eligible for inclusion in the review, studies were required to have: used a prospective design (not limited to randomised controlled trials), been published in English since 2004, included participants with RA, and tested an intervention designed to improve knowledge and/or self-management skills relating to family planning, pregnancy or breastfeeding. Studies published prior

to 2004 were excluded to optimise relevance of the findings given significant changes in the pharmacological management of RA over the past decade [16] and the potential impact of these changes on the content of disease-related education.

Selection of studies and revision of search strategy

All titles and abstracts identified from the database searches were screened independently by 2 reviewers. As no studies were identified that met the intervention criterion, the search strategy was revised and a broader search was conducted across the same 4 electronic databases to identify all prospective studies evaluating educational and/or self-management interventions for people with RA that were published in English from January 2004 to March 2015. The following search strategy was used:

(rheumatoid arthritis OR arthritis) AND (clinical trial OR study OR evaluation OR program OR experiment) AND (health promotion OR patient education OR behavior therapy OR behaviour therapy OR occupational therapy OR self care OR psychological adaptation OR counseling OR counselling) NOT review

Titles and abstracts retrieved from the second literature search were also screened independently by 2 reviewers according to the revised inclusion criteria, and the full texts of eligible papers were obtained. Where eligibility was unclear from title and abstract screening, the full text was obtained. Two reviewers independently reviewed the full text papers to confirm eligibility, with any discordance resolved through discussion (with referral to a third independent reviewer, where required). Where two or more papers derived from the same study clearly met the inclusion criteria (for example, follow-up studies reporting longer-term outcomes or additional interventions) each paper was included in the review but their relationship was noted (Online Resource 1). The reference lists of all included papers were also screened to identify any additional papers that met the inclusion criteria for the review. The ClinicalTrials.gov (<https://clinicaltrials.gov>) and Australian

New Zealand Clinical Trials Registry websites (www.anzctr.org.au) were also searched to identify registered trials of relevance, and related publications (where available) were obtained.

Data extraction

The following data were independently extracted by 2 reviewers from all included studies:

- relevant participant exclusion criteria (pregnancy or breastfeeding status, age restrictions);
- participant characteristics (sample size, proportion of female participants, age of participants, proportion of sample with a diagnosis of RA); and
- whether the intervention(s) included an educational and/or self-management component relating to contraception, conception, pregnancy and/ or breastfeeding.

Any disagreements were resolved through discussion in order to reach consensus, and a third independent reviewer was enlisted where required. Information about the use of outcome measures relevant to conception/pregnancy/breastfeeding knowledge was also extracted from studies where interventions included a pregnancy-related component. Outcomes data were not extracted from included studies because for most studies the effect of individual program components could not be determined (for example, the effect of specific education related to pregnancy). Where information provided in a published paper was unclear, clarification was sought from the corresponding author by email.

Results

Study selection

Figure 1 provides an overview of the study screening and selection process. In total, 2290 potentially eligible papers were identified from the revised database searches. After excluding 143 duplicate papers and 2073 papers that did not meet the eligibility criteria, 74 full text papers were retrieved to confirm their eligibility. Of these, a further 11 papers were excluded, including 2 papers where it was not clear that people with RA were included in the study sample (1 study included people with any type of arthritis or persistent joint pain but the proportion of participants with RA was not reported; 1 study included people with rheumatic diseases but the proportion of participants with RA was not reported). Screening of reference lists and searches of clinical trial registries identified 5 additional eligible papers, resulting in a total of 68 papers included in the review.

Characteristics of included studies

As shown in Table 1, the majority of included studies were randomised controlled trials ($n=45$, 66%). Non-randomised prospective designs (including single group pretest-posttest designs) were also common ($n=19$, 28%) while only 1 study used a mixed-methods design. Most studies were conducted in Europe ($n=30$, 44%), followed by North America ($n=28$, 41%). The included studies were undertaken in a range of healthcare and community settings including hospitals or clinics, community health or rehabilitation centres and the general community. Table 1 summarises the age, gender and diagnosis characteristics of all participants in the included studies. Forty-five studies (66%) recruited people with RA only (or people with RA and their partners), while the remaining 23 studies included a broader range of diagnoses including RA. A detailed summary of each of the 68 included studies (including information about interventions and controls) is provided in Online Resource 1.

Studies with exclusion criteria related to pregnancy, breastfeeding or age

Of the included papers, 3 specifically excluded pregnant women or breastfeeding mothers [17-19] and one recruited only participants who were rheumatologist-confirmed candidates for methotrexate therapy [20]. As methotrexate is contraindicated during pregnancy and the pre-conception period [21], it is unlikely that women who were pregnant or considering pregnancy were included in this study sample. As shown in Table 2, 5 papers reported studies that recruited only older age groups (people aged 50 years and over [22-24], people aged 55 years and over [25], or people aged 65 years and over [26]), thereby likely excluding women of reproductive age. A further 10 studies did not report detailed eligibility criteria [27-36].

Studies that included relevant intervention components

Of the 68 included papers, only 1 (1%) explicitly evaluated pregnancy-focused education (Table 3). Eight studies (12%) described interventions containing a minor component that could be considered relevant to conception, contraception, pregnancy or breastfeeding, within broader RA educational or self-management interventions. The relevant content of these interventions is described below.

Pregnancy-focused education

Meade et al [37] recently published the results of their RCT describing the development and evaluation of a 'motherhood choices decision aid' for RA. The Australian decision aid tool was designed to assist women with RA in making informed choices about having children, or having more children. Health professionals and women with RA and their partners were involved in the development of this resource which includes information on RA, pregnancy and medications, decision-making activities, and links to available resources [38].

Information regarding medication safety

In their study, Fraenkel et al [39] tested a web-based decision support tool designed to inform people with RA about biologic DMARD therapy. This support tool included a warning regarding the

current lack of information about the effect of biologic medications on an unborn child and advised participants to inform their doctor prior to commencing therapy if they were pregnant, planning a pregnancy, or breastfeeding. Li et al [20] evaluated a web-based methotrexate decision aid for people with RA that incorporated a value clarification module and an information module. The value clarification module asked participants to rate the perceived importance of a set of statements; this information was then provided to the rheumatologist to facilitate discussion regarding methotrexate use. As part of this module, participants were asked to rate the importance of becoming pregnant (or their partner becoming pregnant) over the next 12 months. The accompanying education module covered 6 key topics including planning a family and methotrexate use. Ciciriello et al [40] designed a multimedia patient education program that aimed to improve patient knowledge about methotrexate treatment for RA. This program included content regarding contraindications to taking methotrexate, situations where methotrexate should be ceased, and precautions relating to the use of methotrexate in the context of conception and breastfeeding.

Information about fertility and contraception

Although Homer et al [19] excluded women who were pregnant or breastfeeding from their study of DMARD education, the authors reported that they sought permission from participants for group discussions about fertility and contraception. Participants in this study were also offered the option of discussing these issues privately after the education session, or via a nurse helpline. In their study, Mohammad et al [33] administered a methotrexate patient information booklet. While the content of the information booklet was not specified, the authors indicated that contraception use and the side effect profile of methotrexate were outlined in the booklet.

Information about relationships and sexual advice

In a study of occupational therapy for people with early RA, Hammond et al [41] offered optional intervention program components that included sexual advice, and discussion about the effect of RA on relationships. In a later unrelated study, Hammond and colleagues [42] evaluated a modular behavioural arthritis education program that included a facilitated discussion about the

impact of arthritis on the family. Finally, the study by Ellard et al [34] evaluated the effect of targeted education for people with RA and their partners, provided in the form of day-long workshops. One of the workshops involved small-group discussions on relationships, led by a specialist registrar and a psychologist.

Studies that utilised relevant outcome measures

Of the 9 studies that incorporated a pregnancy-related intervention component, 5 utilised a relevant outcome measure to assess patient knowledge or satisfaction. Ciciriello and colleagues [40] developed the Methotrexate in Rheumatoid Arthritis Knowledge test (MiRAK) and used this to evaluate changes in knowledge after viewing of their methotrexate multimedia patient education program. This instrument contains 4 items that assess patient understanding of whether it is safe to take methotrexate during pregnancy and breastfeeding, whether it is safe to become pregnant 3 weeks after methotrexate therapy has been ceased, and contraceptive use for men and women taking methotrexate. The MiRAK instrument was also used to evaluate patient knowledge in the methotrexate decision aid study by Li et al [20]. Homer et al [19] used the Satisfaction with Information about Medicines Scale (SIMS) [43] in their study. The SIMS contains items relating to whether adequate information was given about unwanted effects of medication, the risks of side effects, and the impact of medications on an individual's sex life. Meade et al [37] described the development of a new Pregnancy in Rheumatoid Arthritis Questionnaire (PiRAQ) designed to assess knowledge outcomes in their RCT. The PiRAQ contains 39 items that cover knowledge around RA and its impacts, the effects of RA medicines during conception, pregnancy and breastfeeding, and post-natal aspects. The study by Mohammad et al [33] used a questionnaire that assessed awareness of the reason for taking folic acid and awareness of contraception use following administration of their methotrexate information booklet.

Discussion

This is the first systematic review of interventions designed to improve knowledge and/or self-management skills concerning contraception, pregnancy and breastfeeding in people with RA. We only identified one study [37] that specifically evaluated pregnancy-focused education or self-management support for people with RA, revealing a critical gap in the published literature. Additionally, most studies (88%) evaluating broader RA education or self-management programs did not include any interventional component relating specifically to family planning, pregnancy or breastfeeding. There is, therefore, considerable scope to develop targeted resources or programs to effectively support women with RA and their families in negotiating the potentially complex journey to parenthood.

Our review also identified that most of the research evaluating education or self-management interventions for people with RA has involved older individuals, with average ages for the included studies ranging up to 79 years (Online Resource 1). Although women constituted the majority of participants in all of these studies, it is clear that these study samples are not representative of younger women with RA who are likely to be making decisions about contraception and pregnancy. Importantly, several studies excluded people aged 50 years or less, while others explicitly excluded women who were pregnant or breastfeeding. Consequently, the outcomes of these broader RA programs are unlikely to be generalisable to women who are currently pregnant or planning pregnancy. Notably, our earlier qualitative research highlighted that the specific information needs of younger women (such as managing a pregnancy with RA) were not being appropriately addressed [7] and this is supported by the results of this systematic review. This finding is of particular relevance given key recommendations from a recent European League Against Rheumatism (EULAR) taskforce report that patient education for people with inflammatory arthritis should be needs-based and tailored to individual life circumstances [8], and our previous research demonstrating the strong preference of younger women with RA not to be grouped with older individuals with regard to disease-related educational resources [7].

The recent study by Meade et al [37] involved women with RA who were contemplating having children (or more children). This research found that participants who were given a motherhood decision aid resource had a greater increase in knowledge around RA and pregnancy-related topics and a greater reduction in decisional conflict, compared to a no intervention control group. However, follow-up of participants beyond the immediate post-intervention period was not undertaken and both the relatively high dropout rate (23%) and absence of an intention-to-treat analysis should be considered when interpreting the study results. Despite some limitations in the quality of evidence provided by this study, it suggests that a decision aid could present a valuable resource for women with RA and their families, consistent with Cochrane review evidence demonstrating that decision aids can reduce decisional conflict in people facing health treatment or screening decisions [44]. An evaluation of the motherhood decision aid's effectiveness in clinical practice is now warranted.

Where relevant intervention components were identified in the other included studies, many of these were limited to medication safety (particularly around methotrexate use) rather than adopting a broader self-management paradigm to address disease-related problem solving skills, resource utilisation and patient-health professional relationships [10] in relation to reproductive and post-natal issues. While medication safety has been identified by women with RA as a key educational priority for them [7], this narrow focus does not address other important aspects of effective chronic disease management. Research from our group and others has shown that women with RA can struggle profoundly during the post-natal period [14,45] and that they seek practical strategies and emotional support to enable them to cope with caring for a young baby [7]. Although some interventions included discussions regarding the impact of arthritis on the family and relationships, it is clear that information and support spanning the entire pre-pregnancy/pregnancy/post-natal continuum is needed. This could be provided via multidisciplinary approaches incorporating primary care, rheumatology and obstetrics input. Peer support from women with RA who have already experienced pregnancy could also form an important part of a targeted educational program. Future research evaluating new interventions should consider carefully how best to assess study outcomes, given the scarcity of tools for assessing skills and knowledge regarding

the management of RA in the context of family planning and pregnancy. Aside from medication-focused tools (such as the MiRAK), the Educational Needs Assessment Tool (ENAT) could be used to assess potential educational needs including how arthritis might affect one's children, the ways arthritis is affecting an individual, and the side-effects of medications [46]. The new PiRAQ tool could be valuable for evaluating pregnancy-related knowledge outcomes, although further psychometric evaluation is likely needed [37].

The findings of our systematic review have several implications for practice. A recent paper reporting the proceedings of a multi-disciplinary American College of Rheumatology Reproductive Health Summit highlighted the importance of pregnancy planning and pre- and post-natal counselling for women with autoimmune and systemic inflammatory conditions [47]. However, given the paucity of educational interventions with demonstrated effectiveness, the onus is on treating clinicians (for example, primary care physicians, rheumatologists, obstetricians and/or pharmacists) to provide relevant information to women who are pregnant or planning a pregnancy. While provision of information remains a key component of clinical care (including team-based care) [48] and several online medication resources are available [47], these may not be sufficient for reinforcing key messages. For example, a recent clinical audit of sexually active women with rheumatologic conditions including RA found that only 57% of women on known teratogenic DMARDs were using effective contraception despite receiving specialist rheumatology care at a large teaching hospital [49]. A hospital-based study in Turkey also highlighted suboptimal contraceptive use among female patients with RA [50]. Appropriate education and support should also be made available outside the clinical setting as information seeking may not coincide with the timing of clinical consultations. Additionally, decisions regarding pregnancy in the context of RA can require considerable contemplation over time, and women may want to involve their partners and others who may not be able to attend clinic appointments. Educational programs and resources that can be accessed outside the clinical setting (such as the motherhood choices decision tool [38]) would also be of considerable value to clinicians as there is often inadequate time to cover all the educational aspects of RA medications within consultations. There is also a need to develop educational resources that are accessible to women with RA who live in rural and

remote areas, and those who may be unable to travel (for example due to illness, functional limitations or advanced pregnancy). As suggested by Kavanaugh and colleagues [47], there is also potential for consumer organisations to partner and co-develop 'risk communication tools' regarding pregnancy and chronic conditions.

We acknowledge several limitations to our research. We searched the published, peer-reviewed literature and it is possible that reports of other interventions may exist in the grey literature, or that other effective, unpublished programs may be available in clinical or community settings. We also acknowledge that our determination of relevant intervention components was based on information provided in the published papers. Several of the included studies stated that they provided education regarding medication use or side effects as part of their intervention program and this may have feasibly included information relating to pregnancy or breastfeeding, although it was not explicitly mentioned. Finally, we did not grade levels of evidence or apply a risk of bias filter to the included studies since outcomes data were not extracted.

In conclusion, the current evidence base of effective, published interventions to inform and support women with RA and their families during their reproductive years is extremely limited and the quality of evidence for specific interventions is modest. There is significant scope to develop and evaluate new programs designed to improve knowledge and self-management skills in this area. Future models of education and support should encompass more than just the medication safety aspect of RA education and span the entire pre-pregnancy/pregnancy/post-natal continuum in order to be of most value to women with RA and their families.

Word count

3718 words

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Figure 1. Overview of literature screening processes and eligible studies

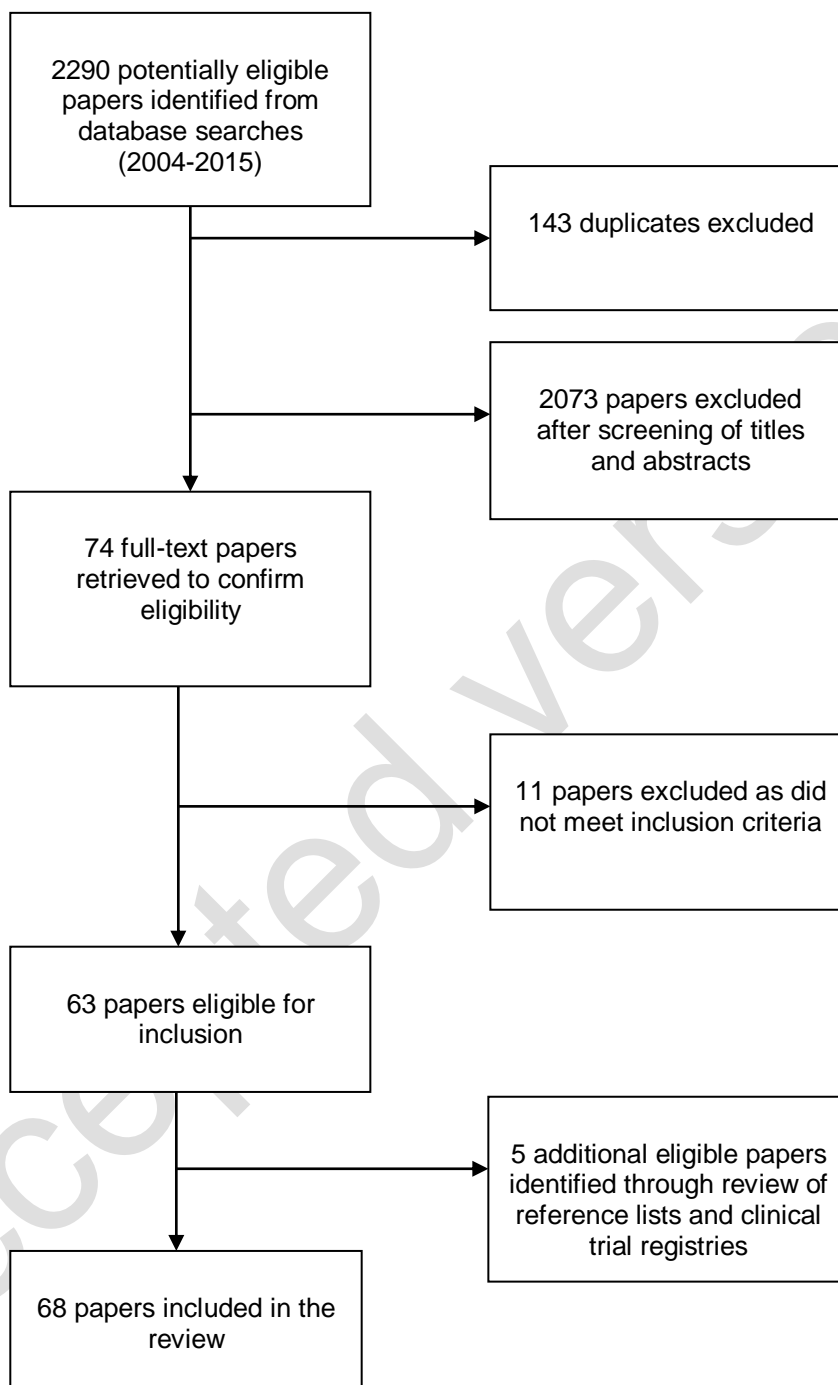


Table 1. Characteristics of included studies

Characteristic	Studies (n=68)
Study design, <i>n</i> (%)	
RCT* or cluster RCT	45 (66)
Non-randomised prospective study†	19 (28)
Pilot RCT	3 (4)
Mixed-methods study	1 (1)
Study region, <i>n</i> (%)	
Europe	30 (44)
North America	28 (41)
Australia and Asia	7 (10)
Africa and Middle East	2 (3)
South America	1 (1)
Study setting, <i>n</i> (%)	
Hospital or rheumatology clinic / centre / practice	40 (59)
General community	14 (21)
Community health or rehabilitation centre	7 (10)
Other	6 (9)
Primary care	1 (1)
Range of sample sizes#	17-921
Range of mean/median ages#	31-79
Range of % of participants with rheumatoid arthritis#	12-100
Range of % of female participants#	60-100

RCT: Randomised controlled trial

* 1 paper reported the results of 2 separate RCTs

† Includes cohort, quasi-experimental and pretest-posttest repeated measures designs

Data refer to the overall sample for each study (all study participants)

Table 2. Studies with exclusion criteria related to pregnancy, breastfeeding or age

First author	Year	Study population	Relevant exclusion criteria	Intervention(s)
Davis [26]	2008	People with arthritis including RA	People <65 years	4-month Goal Attainment Pain Management Program
Giraudet-Le Quintrec* [17]	2007	People with RA	Pregnancy	8-week intensive education program
Homer [19]	2009	People with RA or PsA	Pregnant women Nursing mothers	Provision of individual or group information about DMARDs
Laforest† [23]	2008	People with OA or RA	People <50 years	6-week self-management program
Laforest† [24]	2012	People with OA or RA	People <50 years	Provision of social reinforcement after a 6-week self-management program
Li [20]	2014	People with RA	Only included people who were rheumatologist-confirmed candidates for methotrexate	Web-based patient methotrexate decision aid
Mayoux-Benhamou* [18]	2008	People with RA	Pregnancy	8-week intensive education program
Nour† [22]	2006	People with OA or RA	People <50 years	6-week self-management program
Pariser [25]	2005	People with OA or RA	People <55 years	6-week telephone-based arthritis self-management program

DMARDs: Disease-modifying anti-rheumatic drugs; OA: Osteoarthritis; PsA: Psoriatic arthritis

*Related studies (Mayoux-Benhamou et al 2008 reports a post-hoc analysis)

†Related studies (Laforest et al 2012 evaluates an additional intervention in the same cohort)

Table 3. Studies including relevant intervention components and outcome measures

First author	Year	Study design	Relevant intervention component	Relevant outcome measure
Ciciriello [40]	2014	Non-randomised prospective study	Multimedia patient education program contained information about methotrexate use, conception and breastfeeding	MiRAK [†]
Ellard [34]	2009	Non-randomised prospective study	Education day for people with RA and their partners included a workshop on relationships	No
Fraenkel [39]	2012	Non-randomised prospective study	Interactive online educational module contained a warning regarding biologics, pregnancy, pregnancy planning and breastfeeding	No
Hammond* [41]	2004	RCT	Optional program components (to meet individual needs) included discussing the effect of RA on relationships, and sexual advice	No
Hammond* [42]	2008	RCT	Education modules included discussion of impact of arthritis on the family	No
Homer [19]	2009	Pilot RCT	Discussion about contraception and fertility	SIMS
Li [20]	2014	Mixed-methods study	Decision aid information module addressed planning a family and methotrexate	MiRAK
			Decision aid value clarification module incorporated rating the importance of becoming pregnant / starting a family	
Meade [37]	2015	RCT	Forty-five page motherhood decision aid tool for women with RA contemplating pregnancy	PiRAQ
Mohammad [33]	2009	Non-randomised prospective study	Methotrexate patient information booklet outlining contraception use and side effect profile	Awareness of contraception use Folic acid use and awareness of reason for taking folic acid

MiRAK: Methotrexate in Rheumatoid Arthritis Knowledge test; PiRAQ: Pregnancy in Rheumatoid Arthritis Questionnaire; SIMS: Satisfaction with Information about Medicines Scale; RCT: Randomised controlled trial; RA: rheumatoid arthritis

[†]Copy of MiRAK instrument obtained from the authors

*Unrelated studies

Conflict of interest statement

The authors declare they have no conflicts of interest with respect to this work.

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