Reumatol Clin. 19 (2023) 579–592

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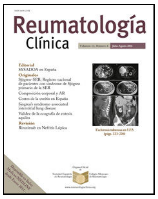

Review article

Emerging trends in nurse-led programs of care for management of patients with established rheumatoid arthritis: Systematic literature review

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ARTICLE INFO

Article history:
Received 6 July 2022
Accepted 2 June 2023
Available online 3 November 2023

Keywords:
Nurse-led care
Nurse–patient relationship
Rheumatology
Systematic review
Rheumatology disease management

ABSTRACT

Introduction: In patients with rheumatoid arthritis (RA), nurses are considered as essential, not only to ensure pharmacological safety, but also in the promotion in self-care and decision-making, favouring the empowerment of patients. This systematic review aimed to summarize the available literature on the health education by the nurse in patients with RA.
Material and methods: Following Cochrane Collaboration procedures, the PRISMA statement and PRISMA checklist, relevant quantitative studies published were retrieved from the CINAHL, Scopus, PubMed and Medic databases and then systematically reviewed. The search ended in August 2021. Nineteen studies were retained for inclusion and evaluated with the Scottish Intercollegiate Guidelines Network for Systematic Reviews.
Results: We found statistically significant improvement in self-care (five studies), disease activity (three studies), quality of life (two studies), satisfaction (five studies) and adherence (one study) with the nursing-led management of patients with established rheumatoid arthritis.
Discussion: Although there is solid evidence of improvement in satisfaction and self-care, there seems to be a trend also to improve other outcomes, such as DAS28, from the EULAR recommendations, the expansion of the therapeutic arsenal for rheumatoid arthritis and shared decision-making. In addition, recently and due to the implementation of new technologies, the role of the nurse has been evaluated through virtual consultations. The results of recent studies have shown that this an effective and well-accepted novel approach for the management of patients with stable rheumatoid arthritis.
Conclusion: Our study suggests that nurse-led health education, in addition of improvement in satisfaction and self-care, improve activity disease scores in RA patients.

Tendencias emergentes en los programas de atención dirigidos por enfermeras para el manejo de pacientes con artritis reumatoide establecida: Revisión sistemática de la literatura

Palabras clave:
Cuidados dirigidos por enfermeras
Relación enfermera paciente
Reumatología
Revisión sistemática
Manejo de enfermedades reumatológicas

RESUMEN

Introducción: En los pacientes con artritis reumatoide, las enfermeras se consideran esenciales, no solo para garantizar la seguridad farmacológica, sino también en la prestación de promoción en el autocuidado y la toma de decisiones, favoreciendo el empoderamiento de los pacientes. Esta revisión sistemática tuvo como objetivo resumir la literatura disponible sobre la educación sanitaria por parte de la enfermera en pacientes con artritis reumatoide.

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https://doi.org/10.1016/j.reuma.2023.06.008

Material y métodos: Siguiendo los procedimientos de la Colaboración Cochrane, la declaración PRISMA y la lista de comprobación PRISMA, se recuperaron los estudios cuantitativos relevantes publicados en las bases de datos CINAHL, Scopus, PubMed y Medic y, a continuación, se revisaron sistemáticamente. La búsqueda finalizó en agosto de 2021. Diecinueve estudios fueron retenidos para su inclusión y evaluados con la *Scottish Intercollegiate Guidelines Network for Systematic Reviews*.

Resultados: Se encontró una mejoría estadísticamente significativa en el autocuidado (cinco estudios), la actividad de la enfermedad (tres estudios), la calidad de vida (dos estudios), la satisfacción (cinco estudios) y la adherencia (un estudio) con el manejo dirigido por enfermería de pacientes con artritis reumatoide establecida.

Discusión: Aunque siempre ha habido evidencias de mejora en la satisfacción y el autocuidado, parece haber una tendencia a mejorar también otros resultados, como el de *Disease Activity Score in 28 Joints* (DAS28), a partir de las recomendaciones de la *European League Against Rheumatism* (EULAR), la ampliación del arsenal terapéutico para la artritis reumatoide y la toma de decisiones compartida. Además, recientemente y debido a la implantación de las nuevas tecnologías, se ha evaluado el papel de la enfermera a través de las consultas virtuales. Los resultados de estudios recientes han demostrado que se trata de un nuevo enfoque eficaz y bien aceptado para el tratamiento de los pacientes con artritis reumatoide estable.

Conclusión: Nuestro estudio sugiere que, aunque siempre ha habido pruebas de mejora de la satisfacción y el autocuidado, demostramos que parece haber una tendencia a mejorar también otros resultados, como la actividad de la enfermedad.

Introduction

Rheumatoid arthritis is estimated to affect 0.24% of the global population and is more frequent in women.[1–3] Although rheumatoid arthritis has no cure, modern therapeutic approaches allow achievement of good disease control, increasing life expectancy which means that more people will develop rheumatoid arthritis in the future and thus need treatment and follow-up. Thus, different alternatives to conventional outpatient physician-led follow-up have been investigated.[4–6]

In patients with long-term conditions, such as rheumatoid arthritis, nurses are considered as essential, not only to ensure pharmacological safety, but also in the delivery of promotion in self-care and decision-making, favouring the empowerment of patients.[7–9]

In this way, evidence of the involvement of nurses in care and control of rheumatoid arthritis patients has increased in recent years. In order to define recommendations for the nurses' role, the European League Against Rheumatism (EULAR) published in 2012 European recommendations for the potential role of nurses in the management of patients with rheumatoid arthritis.[10]

As a consequence, there has been increased attention to the influence of nurse-led case management among rheumatoid arthritis patients. There are several primary studies that compare the impact of nurse-led interventions to support patient self-management with the more usual care-in-the-community programs for chronic patients.[11–14]

In 2011, the first systematic review was published. The objective was to determine the effectiveness of nurse-led case management in rheumatoid arthritis patients. Results of disease activity, functional status, stiffness and coping with arthritis were inconclusive. However, they found significant effects of nurse-led case management in quality of life, patient knowledge, and fatigue.[15]

Since publication of the EULAR recommendations, several studies on rheumatology nursing have been published, which contribute to increased insight and better evidence. Outcomes from rheumatology nursing interventions in rheumatoid arthritis have been described in multiple health domains, such as disease status, symptoms, physical and mental functioning, and patient safety. Furthermore, rheumatology nursing affects the quality of care in several dimensions. For all this, the recommendations have been recently updated.[16]

As we have seen so far, the literature makes it clear that nurses are increasingly involved in the follow-up of patients with rheumatoid arthritis and this follow-up is recognised by recent European guidelines. Previous studies have shown that nursing education increases patients' self-care, knowledge and satisfaction. However, we do not know whether these recommendations are achieving an impact in other outcomes.[17,18] Therefore, the aim of this study was, therefore, to systematically review the literature available about the health education by the nurse in patients with rheumatoid arthritis, in order to clarify the areas on which they should focus nurse-led care.

Methods

A systematic literature search was performed in the following electronic databases: Medline, Embase and the Cochrane Central Register of Controlled Trials. There was no time limit back in time. The search ended in August 2021. We only included in articles in English and Spanish.

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

Selection criteria

The studies retrieved by the above strategies were included if they met the following pre-established criteria. The patients studied had to be diagnosed of rheumatoid arthritis (all ages, both sexes), who had received health education about their disease by a specialised nurse. We included in the search for systematic reviews, randomised clinical trials, cohort studies, observational studies, descriptive studies and case series and qualitative research studies. Studies that do not conform to answer the question are excluded. Abstracts, posters, narrative reviews, letters, editorials and any unpublished study were also excluded.

Screening of studies, data collection and analysis

Three reviewers screened the titles and abstracts of the retrieved articles for selection criteria independently. The reviewer collected

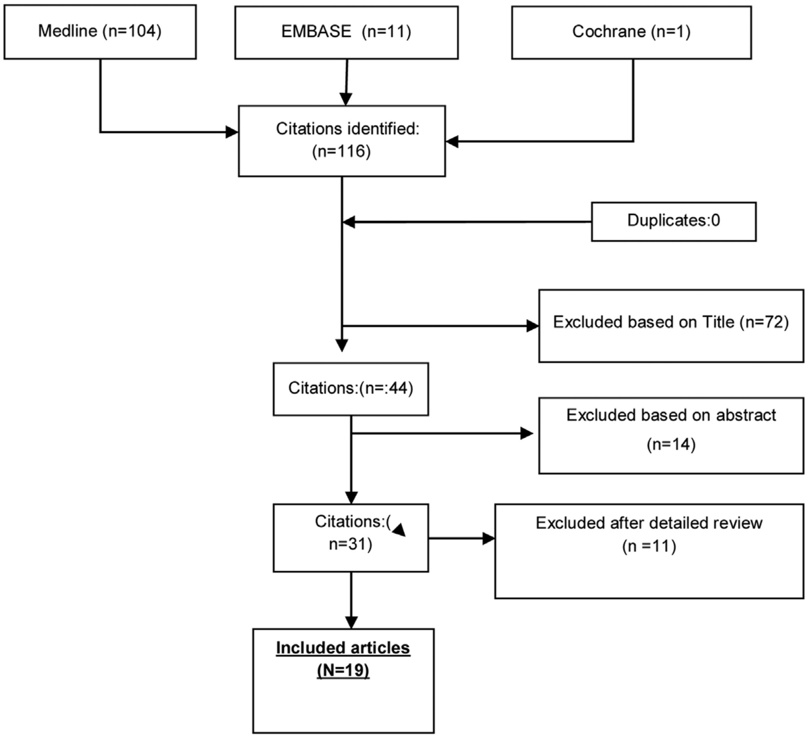

Fig. 1. Articles retrieved by the different search strategies and result of selection and appraisal process.

the data from the studies included by using ad hoc standard forms. The professionals who participated in this review have between 5 and 30 years of experience in the field. Their ages range from 30 to 50 years.

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

To grade the quality, we used SIGN evidence levels (Scottish Intercollegiate Guidelines Network).[19]

Results

We found 30 articles that were studied in detail because by title or abstract were related to the study, or because they had no abstract to review. Finally, 19 studies were included, fifteen of which were randomised controlled trials, three were observational studies, one was a systematic review and one was a case series study. Regarding our predefined outcomes, only three studies evaluated the impact of the intervention on treatment compliance, while the impact on global satisfaction, disease activity and quality of life (understood as functional capacity, level of pain, fatigue and perceived disability) were weighed in the majority of the studies (Fig. 1). Also, although it was not a purpose of our review, up to half of studies described the patient degree of knowledge about its disease and self-care ability, so we decided also to mention it within the results due to its presumably clinical relevance. The characteristics and the results of each one of the studies included in our systematic review are listed below (Table 1).

Self-care

Five studies showed a statistically significant improvement in the intervention group compared to the control group. Giraudet-Le Quintrec et al. showed a statistically significant improvement was observed in the intervention group compared to the control group on self-care (−1.22 ± 5.55 vs −0.22 ± 3.81; $p = 0.03$).[20] Grønning et al. showed a statistically significant improvement was observed in the intervention group compared to the control group on self-care (Arthritis Self-efficacy Other Symptoms Subscale mean change 4.17, 95% CI (0.2, 8.1), $p = 0.04$).[21] Primdahl et al. showed a significant improvement in the intervention group compared to the control group on self-care (Self-efficacy Scale mean change 105.9 in patients on primary care follow-up and 109.3 in the intervention group, $p = 0.0949$).[22,23] Pot-Vaucel et al. showed a statistically significant improvement was observed in the intervention group compared to the control group on self-care (VAS/10 3.83 ± 4.89 in the intervention group and 5.14 ± 2.82 in the control group, $p < 0.05$).[24] Ming-Chi et al. showed a statistically significant improvement was observed in the intervention group compared to the control group on self-care ($p < 0.05$).[17] Other studies did not show significant differences on self-care.[18,15,25]

Disease activity

Three studies showed a statistically significant improvement in the intervention group compared to the control group. Núñez et al. showed a statistically significant improvement was observed in the intervention group compared to the control group on disease activity (number of painful joints $p = 0.04$, number of tender joints $p = 0.003$).[26] Wang et al. showed a significant improvement in the intervention group on disease activity measured by DAS28 ($p < 0.001$).[27] Lu et al. found that the nurse-led case management implementation significantly decreased the levels of DAS28 ($p = 0.01$).[17] Li-Ching showed that the disease activity for 72.0% of patients improved or remained stable over the duration of the study, while 73.1% (136/186) of the patients were in remission at 1-year follow-up.[23,28,29,24,30]

Quality of life

Two studies showed a statistically significant improvement in the intervention group compared to the control group. Núñez

Table 1
Main characteristics of the included studies.

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Lindroth 1997	*Objective*: To evaluate the effect of an educational program in terms of degree of disease knowledge, pain and perceived disability on a group of RA patients *Design*: Randomised controlled trial *Time of follow-up*: 12 months	*Number of patients*: Total 96; intervention group 49; control group 47 *Baseline characteristics*: RA patients, mostly women, mean duration of disease of 13 years, no significate differences between both groups	*Intervention group*: 8 educational sessions in groups of 5–6 patients that lasted 2.5 h and were delivered weekly by a multidisciplinary team *Control group*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 8	After 3 months of follow-up, a significate improvement on self-care, level of pain and perceived disability was observed in the intervention group After the 12 months of total follow-up, the improvement persisted although loosing statistic signification No correlation was observed between the change in knowledge and self-care, and pain and disability	Comparing the progression of both groups in terms of self-care and quality of life, the educational program appears to have a positive impact on the degree of disease knowledge acquired and self-care ability development, and also on level of pain and perceived disability, mostly at short follow-up	1–
Riemsa 1997	*Objective*: To evaluate the effect of an educational program in terms of degree of disease knowledge and self-care ability on a group of RA patients *Design*: Randomised controlled trial *Time of follow-up*: 19 months	*Number of patients*: Total 216; intervention group 169 and group 275; control group 72 *Baseline characteristics*: RA patients that had consulted at least 2 health professionals in the last 6 months, mostly women, mean age 58 years and mean duration of disease of 13 years, no significate differences between both groups	*Intervention group 1*: Educational material under the instructions of a multidisciplinary team, along with an “arthritis passport” identification *Intervention group 2*: Educational material through self-study *Control group*: Traditional follow-up (rheumatology consultant) *Dropouts post-randomisation*: 12	No significant differences were observed on degree of knowledge or self-care, neither between the groups nor within any of the groups The only significate difference observed was that on the intervention groups (1 and 2) the number of visits to primary care decreased with regard to the control groups The “arthritis passport” improved the attention provided by the physiotherapists, but not by the rheumatologists	Comparing the progression of both groups in terms of self-care, the educational program has not a positive impact on the degree of disease knowledge acquired and self-care ability development, so it seems that a group educational intervention might be more useful that individually providing educational material alone Besides that, an “arthritis passport” may be useful to improve the coordination between health professionals	1–
Hill 2001	*Objectives*: To evaluate the effect of an educational program on treatment compliance on a group of RA patients receiving D-penicillamine; secondary objectives related to disease activity were also measured *Design*: Randomised controlled trial *Time of follow-up*: 6 months	Number of patients: Total 100; intervention group 51; control group 49 *Baseline characteristics*: RA patients with active disease, mostly women, mean age of 62 years, mean duration of disease of 12 years, no significate differences between both groups	*Intervention group*: 7 educational individual sessions that lasted 30 min and were delivered monthly by a nurse *Control group*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 37	A significate improvement on treatment adherence was observed in the intervention group, while it gradually decreased in the control group (85% in the intervention group and 55% in the control group, $p = 0.01$) Regarding secondary objectives, no significate improvement was observed on RCP or ESR level, pain or morning stiffness ($p = 0.55$)	Comparing the progression of both groups in terms of treatment compliance, the educational program seems to have a positive impact, but this effect does not appear to provide clinical benefit with regard to traditional medical care On the other hand, more patients in the intervention group suffered any adverse event (12 vs 3) but fewer patients in the intervention group dropped out the study	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Núñez 2006	*Objectives*: To evaluate the effect of an educational program in a group of RA patients in terms of quality of life and disease activity *Design*: Randomised controlled trial *Time of follow-up*: 18 months	*Number of patients*: Total 43; intervention group 22; control group 21 *Baseline characteristics*: RA patients diagnosed in the previous 3 months, mean age 51–55 years, mean disease duration 19–21m, exclusion criteria: additional inflammatory condition, <16 years old at diagnosis, severe psychiatric disease or chronic painful condition	*Intervention group*: 4 individual sessions of 30 min duration every 3 months and 2 group sessions of 10–12 patients and 120 min duration delivered by an educator *Control group*: Traditional follow-up, initially gold in and in case of inefficacy or adverse event occurrence, MTX	*Differences within each group*: - *Intervention group*: A significate improvement observed on HAQ ($p = 0.003$), VAS-pain ($p = 0.031$), number of tender ($p = 0.003$) and swollen joints ($p = 0.001$), ACR20 (59%), patient's ($p = 0.014$) and doctor's global assessment ($p = 0.004$); no significate changes on ESR or CRP - *Control group*: No significate differences were observed during follow-up *Differences between groups*: A significate improvement was observed in the intervention group on HAQ ($p = 0.024$), number of tender ($p = 0.04$) and swollen joints ($p = 0.003$)	After an 18-month follow-up, a significate improvement was observed in the intervention group both on quality of life and on disease activity; within the control group, no significate improvement on any outcome was observed during total follow-up	1+
Giraudet-Le Quintrec 2007	*Objectives*: To evaluate the effect of an educational program in a group of RA patients in terms of quality of life (functional capacity as the primary outcome), self-care, global satisfaction and disease activity *Design*: Randomised controlled trial *Time of follow-up*: 1 year	*Number of patients*: Total 208; intervention group 104; control group 104 *Baseline characteristics*: RA patients, mostly women, mean age 54–55 years, mean disease duration 12–14 years	*Intervention group*: 8 group educational sessions of 6 h duration delivered weekly by a multidisciplinary team, with an additional session of 4 h duration at month 6 *Control group*: Traditional follow-up (rheumatologist consultant) *Post-randomisation dropouts*: 19	- *Primary outcome*: HAQ mean change -0.04 ± 0.46 in the intervention group and -0.06 ± 0.47 in the control group, $p = 0.79$ - *Secondary outcomes*: There were significate differences between groups in global satisfaction (p 0.02), disease knowledge ($p < 0.0001$) and ability to adapt to the disease (p 0.03); no significate differences were observed in DAS28, anxiety, depression, physical activity or treatment adherence	After 1 year of follow-up, no significant differences between groups were observed neither on functional capacity nor in disease activity, despite the significate improvement observed in the intervention group both on global satisfaction and on self-care ability	1+
LTC van Hulst 2010	*Objectives*: To compare the progression in terms of disease activity and prescription stability of a group of RA patients in traditional follow-up to a group also followed in a nurse consultation to DAS28 measurement, and also to explore possible predictor factors of change treatment and non-adherence *Design*: Randomised controlled trial *Time of follow-up*: 18 months	*Number of patients*: Total 248; intervention group 144; control group 104 *Baseline characteristics*: RA patients >18 years old treated with a DMARD, mean age 60 years, mean disease duration 6–9 years, baseline DAS28 = 4	*Intervention group (IG)*: Followed in a nurse consultation for DAS28 assessment, with advice to the rheumatologist to switch treatment prescription if DAS28 > 3.2 *Control group (CG)*: Traditional follow-up (rheumatologist consultant)	- *Change in disease activity*: DAS28 mean change -0.66 in the control group and -0.69 in the intervention group, $p = 0.7$ - *Changes in treatment prescription*: 35% in the intervention group and 33% in the control group, $p = 0.99$ - *Types of treatment change*: Corticosteroid infection (IG 13.5% and CG 15%), switching DMARD (IG 14% and CG 11%), increasing DMARD dose (IG 6% and CG 6%) - *Predictors of treatment change*: Sex (higher in men, OR 1.29, $p = 0.16$), age (higher in elder, OR 0.95/5 years, $p = 0.16$), disease duration (higher in longer disease, OR 0.90/5 years, $p = 0.03$), disease activity (higher when higher DAS28, OR 1.61, $p < 0.0001$), function (higher when higher HAQ, OR 1.35, $p = 0.03$) - *Causes of non-adherence*: Patient's refusal (26%), activity improvement (23%), adverse event (6%), infection (5%)	After 18 months of follow-up, no significant differences were observed regarding disease activity between the intervention group and the traditionally followed group, switching of treatment being uncommon in both of them	1-

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Grønning 2012	*Objectives*: To compare the progression in terms of quality of life, self-care, disease activity and global satisfaction of a group of patients with polyarthritis (RA, PsA and unspecified polyarthritis) in traditional follow-up to a group additionally included on an educational program delivered by a nurse *Design*: Randomised controlled trial *Time of follow-up*: 4 months	*Number of patients*: Total 141; intervention group 71; control group 70 *Baseline characteristics*: Patients with arthritis (RA, PsA or nonspecific polyarthritis) aged 18–80 years who have not participated in the previous 12 months on an educational program	*Intervention group*: 3 sessions both individual and in groups of 8–10 patients delivered by two nurses *Control group*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 3 (IG 1; CG 2)	*Differences between groups*: The intervention group had: - *Better global well-being*: AIOS mean change 8.21 (2.3, 14.1), $p = 0.01$ - *Better self-care*: SE symptoms mean change 4.17 (0.2, 8.1), $p = 0.04$; PAM13 mean change 5.98 (1.8, 10.2), $p = 0.01$ - *Less pain*: VAS mean change −9.41 (−16.6, −2.2), $p = 0.01$ *Differences within groups*: In the intervention group: - *Better global well-being*: AIOS mean change 6.15 (−10.7, 1.6), $p = 0.01$ - *Better self-care*: PAM 13 mean change 3.07 (−6.2, 0.0), $p = 0.05$ - *Lower disease activity*: DAS28 mean change −0.33 (0.1, 0.5) $p = 0.00$ - *Less pain*: VAS mean change −7.04 (1.2, 12.9), $p = 0.02$ In the control group: - *Better self-care*: SE symptoms mean change −5.49 (2.0, 9.0), $p = 0.00$ - Worsening on functional capacity by social AIMS2 (0.32 (0.0, 0.6), $p = 0.05$) and on mental health by HADS (1.41 (−2.6, 0.2) $p = 0.02$) Both groups had also significantly increased use of hospital health resources; in the remaining variables, no significate differences were observed	Comparing the progression of both groups after 4 months of follow-up, the educational program appears to have a positive impact on global satisfaction, self-care and level of pain, with no significant differences on disease activity, although a trend towards signification favouring the intervention was observed	1+
Primdahl 2012	*Objectives*: To compare the progression in terms of quality of life, self-care and disease activity of a group of RA patients followed in a nurse consultation to that of a group followed by a rheumatologist and a group followed in primary care *Design*: Randomised controlled trial *Time of follow-up*: 12 months	*Number of patients*: Total 287; Group 1 (nurse-led follow-up) 94; Group 2 (primary care) 96; Group 3 (rheumatologist) 97 *Baseline characteristics*: RA patients >18 years, at least 18-month disease duration, DAS28CRP <3.2, without systemic manifestations nor biologic treatment	*Intervention group 1 (G1)*: Followed by a specialised nurse consultation every 3 months *Control group 2 (G2)*: Primary care following a protocol designed by a rheumatologist and with telephone contact with a nurse on demand *Intervention group 3 (G3)*: Followed by a rheumatologist *Post-randomisation dropouts*: 16 (5 CG2, 8 CG1, 3 IG)	Differences between groups at month 12 (a: comparing G2 and G3; b: comparing G3 and G1): - *Disease activity*: (a) DAS28CRP 2.7 G3 and 2.5 G2 ($p = 0.152$); (b) DAS28CRP 2.7 G3 and G1 ($p = 0.235$) - *Quality of life*: (a) HAQ: 0.25 G3 and 0.25 G2 ($p = 0.891$), fatigue: 27.5 G3 and 20.0 G2 ($p = 0.184$), pain: 17.5 G3 and 12.0 G2 ($p = 0.198$); (b) HAQ: 0.25 G3 and 0.13 G1 ($p = 0.145$), fatigue: 27.5 G3 and 23.5 G1 ($p = 0.235$), pain: 17.5 G3 and 13.0 G1 ($p = 0.269$) - *Self-care ability*: (a) RASE: 105.9 G3 and 106.5 G2 ($p = 0.897$), ASES-global: 214.3 G3 and 221.9 G2 ($p = 0.450$), ASES-pain: 60.6 G3 and 63.8 G2 ($p = 0.403$), ASES-function: 88.9 G3 and 87.8 G2 ($p = 0.639$), ASES-other symptoms: 75.0 G3 and 78.3 G2 ($p = 0.466$) (b) RASE: 105.9 G3 and 109.3 G1 ($p = 0.094$), ASES-global: 214.3 G3 and 236.1 G1 ($p = 0.009$), ASES-pain: 60.6 G3 and 66.5 G1 ($p = 0.098$), ASES-function: 88.9 G3 and 94.7 G1 ($p = 0.010$), ASES-other symptoms: 75.0 G3 and 83.3 G1 ($p = 0.023$)	After 12 months of follow-up, a significate improvement was observed in the intervention group on self-care ability, especially regarding pain management, while no significant differences between groups were observed neither on disease activity nor on quality of life	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Koksvik 2013	*Objectives*: To compare the progression in terms of global satisfaction, quality of life and disease activity of a group of patients with inflammatory arthritis in traditional follow-up to patients also followed in a nurse consultation *Design*: Randomised controlled trial *Time of follow-up*: 21 months	*Number of patients*: Total 68; intervention group 35; control group 38 *Baseline characteristics*: RA patients 53%, APs 9%, AS 15%, AIJ 7%, nonspecific arthritis 16% >18 years, mean disease duration 8 years, 53% women, with initiation of therapy the previous 3 months (MTX 54%, ANTITNF 12%, MTX + ANTITNF 25%, HCQ 2%, LFN 3%, SSZ 4%)	*Intervention group*: Follow-up on a specialised nurse consultation tailored to the individual patient's needs *Control group*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 3 (IG 1; CG 2)	Leeds satisfaction questionnaire: - *Overall satisfaction*: 9m: −0.36 (−0.72, −0.00), $p = 0.05$; 21m: −0.57 (−0.86, −0.27), $p < 0.001$ - *Information*: 9m: −0.06 (−0.83, −0.37), $p < 0.001$; 21m: −0.60 (0.82, 0.38); $p < 0.001$ - *Empathy*: 9m: −0.79 (−1.03, 0.55), $p < 0.001$; 21m: −0.72 (−0.95, −0.499), $p < 0.001$ - *Technical competence*: 9m: −0.67 (−0.93, −0.40), $p < 0.001$; 21m: −0.38 (−0.57, −0.19), $p < 0.001$ - *Attitude*: 9m: −0.91 (−1.23, −0.59), $p < 0.001$; 21m: −0.79 (−1.03, −0.54), $p < 0.001$ - *Access and continuity*: 9m: −0.89 (−1.19, −0.60), $p < 0.001$; 21m: −1.08 (−1.36, −0.82), $p < 0.001$ - *Global*: 9m: −0.74 (−0.96, −0.52), $p < 0.001$; 21m: −0.69 (−0.87, −0.50); $p < 0.001$ No significate differences in DAS28, fatigue, pain, SF36 or patient global assessment	Comparing the progression of both groups after 21 months of follow-up, a significate improvement was observed in the intervention group on global satisfaction but no significant differences were observed between groups on disease activity or on quality of life	1+
Grønning 2014	*Objectives*: To compare the progression in terms of quality of life, self-care, disease activity and global satisfaction of a group of patients with polyarthritis (RA, PsA and unspecified polyarthritis) in traditional follow-up to a group additionally included on an educational program delivered by a nurse *Design*: Randomised controlled trial *Time of follow-up*: 12 months	*Number of patients*: Total 141; intervention group 71; control group 60 *Baseline characteristics*: Patients with arthritis (RA 62%, PsA 25%, nonspecific polyarthritis 19%), aged 18–80 years, no included in the previous 12 months on an educational program; 69% women, mean disease duration 12 years, 81% with DMARD, 26% NAIDS and 37% corticosteroids	*Intervention group*: 3 sessions both individual and in groups of 8–10 patients delivered by two nurses *Control group*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 9 (IG 3; CG 6)	*Differences between groups*: The intervention group had: - *Better global well-being*: AIOS mean change 8.21 (1.6, 14.8), $p = 0.01$ - Regarding self-care, there was no statistically significant difference on SE symptoms (mean change 2.6 (−1.8, 7.1), $p = 0.245$) but it was observed on PAM13 (mean change 3.9 (−0.3, 8.0), $p = 0.069$) - Better functional capacity by AIMS2 social (mean change −0.3 (−0.7, 0.0), $p = 0.062$) *Differences within groups*: In the intervention group: - *Lower disease activity*: DAS-28 mean change −0.3 (−0.5, −0.1), $p = 0.001$ - Increased use of hospital health services (mean change 0.9 (0.4, 1.4), $p = 0.001$) In the control group: - *Worsening on self-care*: SE symptoms mean change −5 (−8.6, −1.3), $p = 0.008$ - Worsening on functional capacity by AIMS2 social (mean change 0.3 (0.1, 0.5), $p = 0.008$) and on mental health by HADS (mean change: 1.4 (0.3, 2.5), $p = 0.013$) In the remaining variables, no significate differences were observed	Comparing the progression of both groups after 12 months of follow-up, the educational program still appears to have a positive impact on global satisfaction, self-care and pain but not on disease activity, in line with the previous study; nevertheless, within each group, analyses did show a significant improvement in DAS28 in the intervention group but not in the control group	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Vermaak 2015	*Objective*: To evaluate the effect of an educational program in terms of self-care and quality of life on a group of RA patients *Design*: Descriptive observational study *Time of follow-up*: 12 months	*Number of patients*: 113 *Baseline characteristics*: RA patients, women 85%, mean age 54 years, treated with corticosteroids 43%, synthetic DMARD 76% or biologic DMARD 13%	*Intervention group*: 6 educational sessions in groups of 8–15 patients of 2.5 h duration delivered weekly by 2 health professionals *Post-randomisation dropouts*: 17	*Pain*: No significate improvement during follow-up *Fatigue*: Significate improvement after 1 week but lost thereafter *Depression*: Significate improvement that lasts until the end of the study *Anxiety*: No significate improvement during follow-up *Distress*: Significate improvement that lasts until the end of the study *Self-efficacy*: No differences during follow-up *SF-36*: Mental health improves immediately and lasts until the end of the study; physical function, role emotional and vitality improve from 6 month onwards	The study reflects that the educational program led to a significate improvement in self-care ability and certain aspects of quality of life (depression, distress, mental health) which was maintained to 12 months follow-up, but without differences on other aspects (level of pain, fatigue or anxiety) which may reflect that some changes may only develop in the long term	2−
Ndosi 2016	*Objective*: To evaluate the effect of a specific educational based on individual needs on the level of disease knowledge, pain and perceived disability on a group of RA patients *Design*: Randomised controlled trial *Time of follow-up*: 32 weeks	*Number of patients*: Total 132; intervention group 70; control group 62 *Baseline characteristics*: RA patients >18 years old, mean age 54–56 years, mean disease duration 5–7 years	*Intervention group*: Educational needs assessment tool (ENAT) delivered by a nurse *Control group*: Standard educational program *Post-randomisation dropouts*: 30	- *Primary outcome*: A significate difference was observed at week 32 on satisfaction and self-care ($p = 0.008$ and $p = 0.003$) - *Secondary objectives*: Only a significate difference on pain was observed	After an 8-month follow-up, it seems that improvement on self-care ability achieved by the educational program leads to an improvement on quality of life, pain and perceived disability	1−
Pot-Vaucel 2016	*Objectives*: To compare in terms of global satisfaction, self-care, disease activity and treatment compliance the progression of a group of RA patients in traditional medical follow-up to a group also followed in a nurse consultation, with a primary outcome defined by the question “Have you reached a solution for your 3 main problems?” *Design*: Randomised controlled trial *Time of follow-up*: 6 months	*Number of patients*: Total 54; intervention group 28; control group 26 *Baseline characteristics*: RA patients >18 years old, mean age 60 years and mean disease duration 11 years	*Intervention group (IG)*: Follow-up on a specialised nurse consultation *Control group (CG)*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: Unspecified	- *Mean score/100 ± ds (primary outcome)*: 76.9 ± 13.2 IG and 42.2 ± 21.2 CG ($p < 0.0001$) - *Level of education*: Therapy knowledge VAS/10 8.80 ± 4.13 IG and 7.39 ± 2.26 CG (p = ns), outbreak management VAS/10 3.83 ± 4.89 IG and 5.14 ± 2.82 CG ($p < 0.05$) - *Disease activity*: RAPID/10 3.41 ± 2.02 IG and 4.11 ± 2.23 CG (p = ns), morning stiffness (min) 22.13 ± 25.82 IG and 37.14 ± 57.51 CG (p = ns), fatigue VAS/10 4.44 ± 2.49 IG and 4.45 ± 2.49 CG (p = ns), depression (Beck/39) 13.68 ± 9.77 IG and 10.44 ± 5.50 CG (p = ns), corticosteroid use (mg/d) 2.45 ± 2.92 IG and 5.28 ± 5.17 CG ($p = 0.04$) - *Treatment adherence*: 0.92 ± 0.91 IG and 1.00 ± 1.07 CG (p = ns) - *Satisfaction with the system (only measured in IG)*: 9.25 ± 0.75	A significate improvement was observed in the intervention group on global satisfaction and on level of knowledge acquired to manage an outbreak with no significant differences on disease activity or on treatment compliance, so it seems that a nurse-led care drives an improvement on self-care ability and global satisfaction of the patient but not on specific disease activity parameters	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Garner 2017	*Objectives*: Assess the effect of NLC on the quality of care in patients with RA using a comprehensive framework for quality of care *Design*: Systematic review: 17 publications (10 RCT, 4 qualitative studies, and 3 economic evaluations) with high and moderate quality *Time of follow-up*: From 1950 to January 2015	*Number of patients*: 976 RA patients RA patients >18 years old and assessed 1 or more dimensions of quality (effectiveness, acceptability, efficiency, accessibility, appropriateness, and safety)	Intervention In every model, nurses provided patient education, and in all models except one nurse took on the responsibility for toxicity monitoring The nurse was often responsible for clinical assessment and making referrals Two models specified that the nurse was to suggest or make medication change	Results Effectiveness: *DAS-28*: -3 studies: NLC is superior to RLC (1 no compare with traditional care) -2 studies: No inferior NLC vs RLC *HAQ*: -2 studies: No difference between NLC and RLC. -2 studies: Higher HAQ scores in patients receiving NLC compared with RLC, but they were not clinically significant. *Pain*: 3 studies found NLC superior to RLC ($p < 0.05$) and 1 study found no statistically significant difference between NLC and RLC at 12 months or 24 months *Fatigue*: -2 studies found NLC significantly superior to RLC -1 study found no statistically significant difference between NLC and RLC at 12 months or 24 months *Morning stiffness*: -2 studies NLC was inferior compared with RLC. -1 study had shown no statistically significant difference between NLC and RLC *Self-efficacy*: -1 study found NLC superior to RLC at 12 months, but this was not statistically significant at 24 months, -1 study found that NLC patients were empowered to solve their own problems *Acceptability* Satisfaction: 5 studies found greater satisfaction with NLC. 1 study not found differences and 1 found less satisfied with NLC *Efficiency*: Referrals or conferrals to rheumatologist: -2 studies: 19–25% of referral for changes in therapy and for steroid injections. -1 study: RR = 1.45 (95% CI 1.0–2.1; $p = 0.04$) -1 study: RR = 3.22 (95% CI 2.1–5.0; $p < 0.001$) Appointment length: The median consultation time in the NLC group was 20–30 min and in the RLC was 15–30 min *Safety* -2 studies found no statistically significant difference between NLC and RLC in patient adherence -5 studies reported on healthcare contacts and found no statistically significant differences in the number of hospitalizations -3 studies documented no difference between NLC and RLC. *Appropriateness* *Relationship with care provider*: -2 studies: Patients receiving NLC said they gained attention, empathy, and holistic person-centered care -2 studies: Patients identified the nurse's positive attitude towards the patient, and the patient/nurse relationship, as the most important aspects of nursing care -1 study: Nurses provided psychosocial support more frequently than did RLC (RR 3.3, 95% CI 2.6–4.3; $p < 0.0001$) *Provision of information*: -1 study found patients receiving NLC more knowledgeable than those attending RLC (67.3% and 52.3%, respectively, $p < 0.0001$). -1 study noted that nurses documented educating patients more frequently than rheumatologists (RR 1.7, 95% CI 1.4–2.1; $p < 0.0001$). -2 studies patients said that NLC clinics improved their knowledge and skills through education *Accessibility* -3 studies: Patients reported that nurses provided regular, accessible care that ensured continuity and allocated sufficient time to address patients' thoughts, feelings, and social situations	NLC for patients with RA is promising and is effective, acceptable, and safe compared with other models. Evidence is insufficient to draw conclusions about the model's efficiency, accessibility, and appropriateness	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Wang 2018	*Objectives*: To compare the progression in terms of global satisfaction, self-care, disease activity and treatment compliance of a group of RA patients in traditional follow-up (rheumatology consultant) to a group also followed in a nurse consultation *Design*: Randomised controlled trial *Time of follow-up*: 12 months	*Number of patients*: Total 220; intervention group 110; control group 110 *Baseline characteristics*: RA patients >18 years old, mean disease duration of 9 years, treated with a DMARD (synthetic or biologic)	*Intervention group (IG)*: Follow-up on a specialised nurse consultation *Control group (CG)*: Traditional follow-up (rheumatology consultant) *Post-randomisation dropouts*: 0	*Leeds satisfaction questionnaire*: - Overall satisfaction: 6m: 3.98 (0.75) IG and 3.28 (0.45) CG $p < 0.001$; 9m: 4.63 (0.61) IG and 4.02 (0.31) CG $p < 0.001$; 12m: 4.82 (0.92) IG and 4.12 (0.22) CG $p < 0.001$ - *Information*: 6m: 3.99 (0.72) IG and 3.18 (0.15) CG $p < 0.001$; 9m: 4.59 (0.21) IG and 4.01 (0.12) CG $p < 0.001$; 12m: 4.82 (0.92) IG and 4.12 (0.22) CG $p < 0.001$ - *Empathy*: 6m: 3.98 (0.75) IG and 3.99 (0.72) CG $p < 0.001$; 9m: 4.75 (0.61) IG and 4.94 (0.92) CG $p < 0.001$; 12m: 4.89 (0.92) IG and 3.98 (0.75) CG $p < 0.001$ - *Technical competence*: 6m: 3.92 (0.75) IG and 4.82 (0.82) CG $p < 0.001$; 9m: 4.91 (0.61) IG and 3.92 (0.55) CG $p < 0.001$; 12m: 4.94 (0.92) IG and 3.73 (0.31) CG $p < 0.001$ - *Attitude*: 6m: 3.98 (0.35) IG and 4.58 (0.35) CG $p < 0.001$; 9m: 4.75 (0.31) IG and 4.89 (0.72) CG $p < 0.001$; 12m: 4.89 (0.52) IG and 4.59 (0.21) CG $p < 0.001$ - *Access and continuity*: 6m: 3.99 (0.72) IG and 4.59 (0.21) CG $p < 0.001$; 9m: 4.75 (0.61) IG and 3.63 (0.61) CG $p < 0.001$; 12m: 3.98 (0.35) IG and 4.82 (0.92) CG $p < 0.001$ - *Global*: 6m: 4.82 (0.92) IG and 3.67 (0.75) CG $p < 0.001$; 9m: 3.98 (0.75) IG and 3.98 (0.35) CG $p < 0.001$; 12m: 4.75 (0.61) IG and 4.75 (0.31) CG $p < 0.001$ *Secondary objectives*: DAS28: 6m: 2.21 (0.87) IG and 2.11 (1.32) CG $p < 0.001$; 9m: 1.13 (1.26) IG and 1.83 (1.22) CG $p < 0.001$; 12m: 1.02 (0.61) IG and 0.98 (1.06) CG $p < 0.001$ - *Pain (VAS)*: 6m: 35.08 IG and 32.12 CG $p < 0.001$; 9m: 30.03 IG and 27.06 CG $p < 0.001$; 12m: 29.21 IG and 26.03 CG $p < 0.001$ - *Fatigue (VAS)*: 6m: 45.48 IG and 41.12 CG $p < 0.001$; 9m: 40.23 IG and 43.06 GC $p < 0.001$; 12m: 49.41 IG and 44.03 CG $p < 0.001$ - *Morning stiffness*: 6m: 55.23 IG and 51.23 CG $p < 0.001$; 9m: 50.21 IG and 53.46 CG $p < 0.001$; 12m: 59.42 IG and 54.53 CG $p < 0.001$	After 1 year a significate improvement was observed in the intervention group on every outcome, so the educational program appears to have a positive impact compared to the traditional follow-up alone	1+
Bergsten 2019	*Objectives*: To evaluate the effect of a nurse-led clinic with frequent visits, treat-to-target and person-centered care of patients with established RA and moderate-to-high disease activity compared with patients receiving regular care *Design*: Randomised controlled trial *Time of follow-up*: 26 weeks	*Number of patients*: Total 70; intervention group 36; control group 34 *Baseline characteristics*: RA patients >18 years old of over 2 years' duration, moderate to high disease activity (DAS28 >3.8, two or more swollen joints) and with stable medical treatment for >8 weeks	*Intervention group (IG)*: Nurse-led clinic *Control group (CG)*: Regular care group *Post-randomisation dropouts*: IG: 0, CG: 4	- *DAS28*: 3.17 (1.21) IG and 3.87 (1.32) $p = 0.43$ - *European League Against Rheumatology*: IG: 76% achieved moderate or good response (95% CI 58, 89) CG: 49% achieved moderate or good response (95% CI 32, 65)	After 26 weeks, disease activity tended to improve more with the nurse-led intervention compared with regular care, although the difference was not significant, probably partly due to the lack of statistical power	1+

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Farley 2019	*Objectives*: Implement a nurse telephone education program for patients with recently diagnosed RA *Design*: Case series *Time of follow-up*: 1 year	*Number of patients*: 26 patients *Baseline characteristics*: RA patients >18 years old within the previous 12 months or if the rheumatologist requested that the patient be included	A rheumatology clinic nurse telephoned patients to offer disease education	*RAPID3*: 8.5 baseline and 6.5 follow-up visit *Adherence to follow-up visit*: 73% of patients *Qualitative analysis*: Patients were satisfied with nurses' callings	This pilot project successfully implemented an educational program that included a nurse-facilitated, RA-specific telephone call and toolkit	3
Gossec 2019	*Objectives*: Assess effects of a nurse visit for comorbidity counselling *Design*: Open randomised controlled trial (extension of the COMEDRA trial) *Time of follow-up*: 3 years	*Number of patients*: Total 776 *Baseline characteristics*: RA patients >18 years old	*Post-randomisation dropouts*	- *Mean comorbidity screening score*: Baseline: 36.6 (±19.9) and in 3 years: 24.3 (±17.8), $p < 0.0001$ - *CV risk screening*: BP measurement: Baseline: 64, 3 years: 96, $p < 0.0001$ - *Fasting blood glucose measurement*: Baseline: 53, 3 years: 64, $p < 0.0001$ - *Lipid measurement*: Baseline: 49.8, 3 years:65, $p < 0.0001$ - *Creatinine measurement*: Baseline: 77.8, 3 years: 94.5, $p < 0.0001$ - *Vaccination status*: Influenza: Baseline: 44.1, 3 years: 54.7, $p < 0.0001$ - *Pneumococcus*: Baseline: 59.9, 3 years:65.3 $p < 0.01$ - *Bone densitometry*: Baseline: 74.4, 3 years: 88, $p < 0.0001$	Comorbidity screening was suboptimal but improved notably over 3 years, after a nurse-led program aiming at checking systematically for comorbidity screening and giving patient advice. this long-term efficacy pleads in favour of nurse-led interventions to better address comorbidities in RA	2−
Ming-Chi Lu 2020	*Objectives*: Clarify the impact of NLCM on RA patients by using a generalised estimating equations (GEEs) model *Design*: Quasi-experimental research design using convenience sampling and non-random group assignment *Time of follow-up*: January of 2017–June of 2018	*Number of patients*: A total of 96 patients with RA met the criteria for inclusion in the study (50 were assigned to the experiment group and 46 to the control group) *Baseline characteristics*: Age from 22 to 70 years (mean: 53.8 [SD = 10.5]). Women (82.3%), married (84.4%) and cohabitating with other people (92.7%), with a high level of education (56.3%) The mean levels of BMI, DAS28, serum CRP and pain were 23.7, 4.5, 1.5 and 5.7, respectively	*Intervention group (IG)*: Received six sessions of NLCM over six months *Control group (CG)*: Received only standard care during the same time period. *Post-randomisation dropouts*: None	- Self-efficacy: Regarding ASES score, a maturation effect was found at T2 that was significantly greater than that initially measured in the control group ($p < .01$). The initial ASES score was significantly lower in the experiment group compared with the control group ($p < .01$). After controlling for age, disease duration, pain level and maturation effect, the increased level of ASES in the experiment group was greater than that in control group at both T1 and T2, with the Beta values of 394.03 and 440.69 ($p < .01$). - *Disease activity*: Regarding DAS28, multivariate analyses by GEEs revealed that maturation effect occurred but the two groups had equivalent levels of DAS28 at baseline. NLCM significantly lowered DAS28 in RA patients at T1. The positive effect was further maintained for six months (at T2) following the completion of the NLCM - *Depression*: Statistically significant difference was demonstrated for baseline depression scores between the two study groups. The depression score at T2 was also statistically different from those at T0, implying a maturation effect may occur. After adjusting for maturation effect, age, disease duration and pain level by GEEs approach, the reduction slope of the TDQ score was significantly larger for the experiment group compared with the control group, irrespective of T1 and T2	This study demonstrated that NLCM could effectively improve RA patients' disease activity and self-care efficacy. Additionally, NLCM was shown to have a positive effect on the reduction of depressive levels for these patients. The positive effects persisted for six months following completion of the NLCM program. Data from the repeated measurement of these outcomes allow healthcare providers to more confidently consider the practicability of NLCM for patients with RA. The concepts of NLCM may be applicable to participants with other chronic diseases in further assisting their progressive adaptation to the disease and lead to improved clinical outcomes	2−

Table 1 (*Continued*)

Ref.	Study	Population	Intervention	Results	Conclusions	NE(Sign)
Li-Ching Chew 2018	*Objectives*: To study clinical and patient reported outcomes for the Virtual Monitoring Clinic (VMC), a remote nurse-led telemonitoring service for monitoring RA patients treated with disease-modifying antirheumatic drugs (DMARDs). *Design*: Prospective study, consenting patients with RA attending the Autoimmunity and Rheumatology Center (a rheumatology specialist outpatient center) *Time of follow-up*: 2012–2014	*Number of patients*: Of the 251 patients enrolled, 186 completed 1-year of follow-up *Baseline characteristics*: Female 82.3%, mean age 58 years	*Intervention group (IG)*: All patients accepted into the VMC program would only be required to come to the hospital on alternate visits to see the rheumatologist	- *Disease activity:* DAS28 scores for 186 patients showed an increase in the mean DAS28 score from 2.56 to 2.78 ($p < 0.05$) at 1-year follow-up. However, despite the increase in the mean DAS28 score, the disease activity for 72.0% (134/186) of patients improved or remained stable over the duration of the study, while 73.1% (136/186) of the patients were in remission or LDA at 1-year follow-up. RAPID3 scores from a total of 186 patients were analysed. Similar to the trend reported using DAS28, the mean RAPID3 score increased from 5.28 to 6.03 ($p < 0.05$) at 1-year follow-up. The disease severity for 63.4% (118/186) of patients remained stable or improved over the duration of the study, while 53.2% (99/186) of patients were in near remission or low level of severity at 1-year follow-up - *Satisfaction*: The mean patient satisfaction score for overall care provided by the rheumatology outpatient center following the introduction of VMC increased from 7.70 to 8.16 on an 11-point Likert scale ($p < 0.05$; Table 1). A total of 68.2% of patients indicated that having the VMC appointment alternating with the rheumatologist was “a little” or “a lot” better than the existing conventional service where patients had all their follow-up visits with the rheumatologist. The reasons cited for choosing VMC were convenience (in terms of reduction in time spent on travelling to and from the hospital), and cost savings (lower consultation and transportation costs). There was no increase in the number of visits to the hospital as a result of the VMC; in fact, most of the patients halved the number of visits to the hospital as they only needed to come for alternate visits with the rheumatologists. Among the 16 patients (8.6%) who found the VMC less useful (i.e. slightly worse or a lot worse), the lack of sense of security due to the absence of face-to-face consultation was frequently cited. Given a choice, the majority of the RA patients (61.5%) opted to remain with the VMC service for their subsequent follow-up visits	The VMC is an effective and well-accepted novel approach for the management of patients with stable RA	1+

et al. showed a significant improvement in the intervention group on quality of life (HAQ, $p = 0.024$).[26] Other studies did not show significant differences on quality of life.[20,29,24,21] Lopatina et al. studied disability Index scores and they observed positive results in patients with nurse-led case management ($p = 0.01$).[31,32]

Satisfaction

Five studies disclosed a statistically significant improvement in the intervention group compared to the control group. Giraudet-Le Quintrec et al. (10.07 ± 11.70 vs 5.72 ± 13.77; $p = 0.02$) showed a significant improvement in the intervention group on satisfaction.[20] Grønning et al. showed a significant improvement in the intervention group on satisfaction (global well-being by the Arizona Integrate Outcome Scale mean change 8.21, 95% CI (2.3, 14.1), $p = 0.01$).[3] These authors analysed the same study at 12-month follow-up, Grønning et al. observed that the intervention group still had a statistically significant higher global satisfaction than the control group after 12 months (global well-being by the Arizona Integrate Outcome Scale mean change 8.21, 95% CI (1.6, 14.8), $p = 0.015$).[33] Koksvik et al. observed a significant improvement in the intervention group compared to the control group on global satisfaction Leeds Satisfaction Questionnaire – general satisfaction -0.57 (-0.86,-0.27), $p < 0.001$; LSQ-global score -0.69 (-0.87,-0.50), $p < 0.001$.[29] Pot-Vaucel et al. showed a significant improvement was observed in the intervention group on global satisfaction compared to the control group (mean score/100 76.9 ± 13.2 in the intervention group and 42.2 ± 21.2 in the control group, $p < 0.0001$).[24] Wang et al. observed a significant improvement in the intervention group on every outcome: on global satisfaction Leeds Satisfaction Questionnaire – general satisfaction, $p < 0.0011$.[27] Recent studies have shown that if a relationship of trust and security is established with the nurse, the patient communicates in a better way in order to resolve their doubts and thus better self-manage their illness.[34] Li-Ching demonstrated that 68.2% of patients indicated that having the virtual nursing consult appointment alternating with the rheumatologist was “a little” or “a lot” better than the existing conventional service where patients had all their follow-up visits with the rheumatologist. Even so, among the 8.6% of patients who found the virtual nursing consult less useful, the lack of sense of security due to the absence of face-to-face consultation was frequently cited.[30]

Adherence

One study showed a statistically significant improvement in the intervention group compared to the control group. Hill et al. showed a significant improvement on treatment adherence in the intervention group while it gradually decreased in the control group (85% in the intervention group and 55% in the control group, $p = 0.01$).[35] Pot-Vaucel et al. did not show significant differences on adherence.[24]

Discussion

In the present study we have analysed the benefit of a nurse-led program of care for management of patients with established rheumatoid arthritis, showing trend changes in results, as a result of the EULAR recommendations for the training of nurses and their role in nurse-led care. However, we decided not to carry out a meta-analysis due to the heterogeneity of studies, in terms of diverse patient groups in a range of clinical settings.

In the recent years, evidence of the involvement of nurses in care and control of rheumatoid arthritis patients has increased. Our findings replicate, support and extend three previous systematic reviews, which evaluated different aspects of care by rheumatology nurses, but providing results that suggest that a change is taking place, and some of the patient reported outcomes, including some objective measures, have begun to show improvements with the nursing educational intervention.

Given that all studies that assessed global satisfaction found a higher level after nursing led-care management, and since seven of nine studies that assessed self-care found a better ability in the intervention group, it appears reasonable to think that providing specific education to the patient by a specialised nurse leads to a higher degree of knowledge of its disease along with a better perception of quality of health care system.

However, the studies that evaluated the impact of the intervention on quality of life offered divergent results. This seems to reflect how difficult it is to measure this aspect due to its subjectivity, and the multidimensionality with which it is measured (functional capacity, perceived disability, pain, fatigue). However, the results of the studies that evaluated disease activity, whose measurement is indeed possible with objective parameters, show a temporal trend, with the most recent studies showing improvements after the nursing intervention. Therefore, further studies are necessary to draw more precise conclusions about this new change in patient outcomes.

Nurses have been working in the field of rheumatology for many years and therefore can provide experience and knowledge to be involved in the management of patients with rheumatoid arthritis. From the point of diagnosis, patients are expected to acquire a lot of knowledge about to treatments and management strategies to regain control of their lives. Patients who are being managed on DMARD therapy will not only have to come to terms with complex long-term medication regimens, but also regular monitoring to ensure side effects are minimised and comorbidities are identified early.

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

To empower nursing today, we have recent recommendations based on robust evidence that support the figure of rheumatology nursing in the team, as well as that these nurses provide evidence-based care taking into account the perspective of the patient.[10,16] In this sense, and seeing the results of our study, we can say that patients should have access to a nurse who meets their educational needs to improve their self-management of the disease as well as greater satisfaction with the care received. To improve the intrinsic conditions of the patient, taking into account the new trends shown by this work, nurses must participate in the comprehensive management of the patient’s disease in order to reduce symptoms and improve the patient’s PROs. To do this, nurses must have access to continuing education in rheumatology to increase their knowledge and skills and thus be more prepared to take on extended roles.

Although there has always been evidence of improvement in satisfaction and self-care, there seems to be a tendency to also improve other outcomes, such as DAS28, from the EULAR recommendations, the expansion of the therapeutic arsenal for rheumatoid arthritis and shared decision-making.[17,18] In addition, recently and due to the implementation of new technologies, the role of the nurse has been evaluated through virtual consultations. The results of a recent study have shown that this an effective and well-accepted novel approach for the management of patients with stable rheumatoid arthritis.[30]

To conclude, the main lines to follow are, on the one hand, to continue promoting the empowerment of patients (so that they become more involved and become co-responsible for their disease and its treatment); and on the other hand, working for homogeneity of nursing care in rheumatology, with more educational curriculum, and higher qualification and specialisation.

Conflict of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.reuma.2023.06.008.

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