BMJ Open

Online physical activity resources for individuals with rheumatoid arthritis: an environmental scan and quality appraisal

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To cite: Ester M, Zafar S, Dhiman K, *et al*. Online physical activity resources for individuals with rheumatoid arthritis: an environmental scan and quality appraisal. *BMJ Open* 2025;**15**:e094220. doi:10.1136/bmjopen-2024-094220

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2024-094220).

Received 25 September 2024
Accepted 07 February 2025

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ABSTRACT

Objectives To review publicly available physical activity (PA) resources for individuals with rheumatoid arthritis (RA). Aims were to find online print and audiovisual resources, review their characteristics and critically examine their quality from medical, exercise and behavioural science perspectives.

Design An environmental scan was completed using the Google search engine, following a pragmatic approach to reviewing patient-facing self-care resources.

Data sources We used combinations of common search terms for RA and PA. The first five pages of results were reviewed for patient-facing resources.

Eligibility criteria Resources were included if they were (1) included RA-specific content, (2) provided specific PA recommendations, (3) written in English and (4) freely available.

Data extraction and synthesis Two independent experts completed a medical review of resources to ensure appropriateness for RA. Data were then extracted by two reviewers using a standardised template to record resource characteristics. Two research team members and two patient partners independently evaluated resources for readability, understandability and actionability. Finally, the quality of exercise recommendations and behaviour change technique use was evaluated by an expert reviewer.

Results The search yielded 23 RA-specific PA resources, 17 of which passed the medical review. All 10 print resources and 7 audiovisual resources were created in English-speaking countries. The mean reading grade was 9.0±1.5. Print resources had mean understandability of 80.0±9.8% and actionability of 60.0±27.7%. Audiovisual materials had mean understandability of 86.0±9.2% and actionability of 86.9±22.9%. The quality of exercise recommendations was low. Only one resource provided comprehensive cardiovascular exercise advice, and two resources provided comprehensive strength exercise advice. 3–14 behaviour change technique groups were featured in each resource. The most common groups were 'shaping knowledge' and 'natural consequences'.

Conclusions The quality of RA-specific PA resources is variable. Some high-quality resources exist that provide actionable PA behaviour change advice. Healthcare teams may refer patients to these resources. However, more work is needed to improve the overall quality of resources. Codevelopment with patients, providers and exercise behaviour change experts is recommended, ensuring resources are actionable, contain clear exercise recommendations and promote behaviour change.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study provides a comprehensive overview and critical appraisal of publicly available physical activity resources for individuals with rheumatoid arthritis (RA).
⇒ A critical appraisal was completed by a rheumatologist, patient partners with lived experiences of RA, researchers, and an exercise and behaviour change expert.
⇒ All resources were evaluated using standard measures for readability, understandability, actionability, exercise recommendations and behaviour change techniques.
⇒ Due to the inherent subjectivity of the tool used to assess understandability and actionability, triplicate ratings were completed for each resource to minimise subjective biases.
⇒ Patient partners were individuals with high health literacy and personal engagement with their health, which may impact certain scores and their generalisability to the broader RA population.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease affecting around 1% of Canadians.[1] Chronic inflammation of the joints and throughout the body leads to systemic problems, compromised function and reduced quality of life.[2] Despite significant improvements in RA treatment due to the emergence of new classes of disease-modifying antirheumatic drugs (DMARDs), individuals living with RA continue to face daily challenges.[3–5] These challenges include unpredictable disease flare-ups, changes in

disease activity, debilitating chronic fatigue and pain, and significant psychological distress.[5]

Effective disease self-management (or self-care, as preferred by patients) between regularly scheduled follow-up appointments is critical to quality RA care. Indeed, major international rheumatology associations such as the European League Against Rheumatology recommend the implementation of self-management strategies for RA care.[6] Recommended strategies include patient education, goal setting and problem solving, lifestyle advice, and connecting patients to resources.[6]

Physical activity is strongly recommended as part of effective RA self-management.[6–8] Regular physical activity can positively impact many disease-related and general health outcomes among RA populations.[2 7–12] For example, physical activity can significantly reduce fatigue, pain and inflammation while improving functional ability and body composition.[9–11] It is positively associated with better strength and cardiorespiratory fitness and enhanced quality of life, while reducing the risk of cardiovascular disease and all-cause mortality.[2 9 12] The health benefits of regular physical activity can also reduce individual- and system-level healthcare costs.[13] Unfortunately, individuals with RA report lower than average physical activity levels, and physical activity support in routine RA clinical care remains limited.[9 14]

Greater efforts are needed to help individuals with RA become and stay physically active as part of their day-to-day disease self-management. Individuals with RA lack disease-specific physical activity resources, express doubts about the safety and effectiveness of physical activity, and rarely receive physical activity advice from their care team.[15] Publicly available, RA-specific physical activity resources may be helpful for addressing these problems. However, the quality of online health information is highly variable, and individuals with chronic conditions struggle to find suitable, credible high-quality resources.[16 17] They may also find it difficult to discern what recommendations are appropriate given their current concerns.

Therefore, we completed an environmental scan of publicly available physical activity resources for individuals living with RA. Specific goals were to identify available resources, provide an overview of their characteristics and critically examine their quality. High-quality resources identified herein can serve as a foundation for patients and providers to improve physical activity behaviour change as part of RA self-management. Meanwhile, the shortcomings among existing resources can inform future research and development.

MATERIALS AND METHODS

We completed an environmental scan and critical appraisal of publicly available online resources on physical activity for individuals living with RA.[18] Environmental scans are a form of pragmatic content review that has been used extensively in healthcare to understand the quantity and quality of available health resources such as patient education materials.[18]

Patient and public involvement

Patient partners with lived experiences of RA were involved throughout the study. The study was conducted in direct response to conversations with patient partners and reports in the literature that indicate challenges with accessing high-quality information on physical activity. Their opinions informed the study design, including the search strategy and selection of measures for critical appraisal. Furthermore, three patient partners were involved in assessing understandability and actionability of the included resources. Patient partners were recruited from existing relationships with patients involved in a larger project being conducted by the research team on improving physical activity support for individuals living with RA. Individuals with prior experience reviewing patient-facing RA self-care resources[19] were invited to participate by email. The email included a brief overview of the study objectives and explained the purpose of patient partner involvement with the critical appraisal of resources. All invitations included the option to decline participation. Patient partners will also be involved in sharing lay summaries of our findings with patient organisations.

Search strategy

An online search was carried out using the Google search engine from January to April 2024. The search strategy was developed, tested and refined by three members of the research team (ME, SZ, CB). Searches were repeated using various combinations of search terms related to RA, physical activity, and programme or resource. Search terms were obtained from existing patient materials and relevant scientific literature. Additional searches were completed after adding a term for the major countries contributing to English language patient resources (eg, the USA, the UK, Canada, Australia). The complete list of search terms used for each concept is presented in online supplemental file 1. To reduce bias in search results due to prior search history, all searches were completed using Google Chrome's Incognito mode on a shared lab computer. As research suggests that most online search traffic is on the first two results pages, all links on these pages were reviewed.[20] Authors also screened the results on pages 3–5 to make sure no relevant resources were missed. To be included in the environmental scan, resources had to meet the following inclusion criteria: (1) freely available, (2) written in English, (3) developed specifically for individuals living with RA, and (4) containing at least one recommendation for physical activity. Resources were excluded based on the following criteria: (1) payment required to access, (2) presence of predatory advertising, (3) intended for healthcare professionals or researchers, (4) information not specific to RA, and (5) absence of physical activity recommendations (eg, sign-up page for a physical activity programme). During the medical review

(described below), any resources deemed unsafe or inappropriate by a rheumatologist were also excluded.

Data extraction

A data extraction spreadsheet was used to record resource characteristics including URL, title, organisation, country of origin, date created or last updated, format (print, audiovisual), type (eg, blog post, slideshow, PDF handout, video) and interactivity. A resource was deemed to be interactive if it prompted the user to complete an action or answer a question while viewing the content. If reported, additional data were recorded on the availability of translated versions of the resource, as well as the involvement of healthcare professionals or patient partners in resource development.

Critical appraisal

The included resources underwent a comprehensive critical appraisal for medical appropriateness, readability, understandability, actionability, quality of exercise recommendations and use of behaviour change techniques. While physical activity is any body movement that expends energy, exercise is a subset of structured, planned physical activity that aims to improve physical fitness.[21] The focus of the critical appraisal was specifically on exercise.

Medical review

The medical review was completed by a rheumatologist (CB) on the research team, in collaboration with research colead (ME), an exercise specialist with a PhD in Kinesiology focusing on exercise psychology among individuals with chronic conditions. Each resource was reviewed to ensure that the content was safe and appropriate for patients with RA in the opinion of a rheumatologist. Factors considered included (1) whether information provided in the resource about RA and its management was medically accurate, as well as (2) whether the exercise recommendations would be safe from a medical perspective for patients with RA. Each resource received a yes/no rating along with additional comments for consideration by the research colead (ME). Both team members met to discuss resources and achieve consensus on final decisions to include or exclude the resource. Only resources that had no concerns across both factors were approved as medically suitable for the general population of RA patients, based on clinical experience. Resources with any concerns were deemed unsuitable and excluded from further review.

Readability

The validated and widely used Flesch-Kincaid Reading Grade score was used to assess readability.[22] It has demonstrated both content-related and criterion-related validity across various written materials. Document text was copied into Microsoft Word and the Flesch-Kincaid Reading Grade score was calculated using the automated proofreading tools in Microsoft Word. The formula used is 0.39×mean words per sentence+11.8×mean syllables per word−15.59. Numbers range from 1 to 18, corresponding to the US school grade reading level required to understand the resource. Grades 1–5 are a primary school, grades 6–8 are a middle school, and grades 9–12 correspond to secondary/high school in this system. Scores of 13–15 are considered college reading level and 15–18 are considered postgraduate level.

Understandability and actionability

Understandability and actionability were assessed using the Patient Education Materials Assessment Tool (PEMAT).[23] This tool has demonstrated strong internal consistency and reliability, can be used by both researchers and patient partners, and can be used for both print (PEMAT-P, 24 items) and audiovisual (PEMAT-A/V, 17 items) resources. The understandability domain includes evaluation of 6 subdomains for content, word choice and style, use of numbers, organisation, layout and design, and use of visual aids. Actionability measures the degree to which a resource provides specific actionable steps for patients using the provided information (eg, feasibility, specificity, relevance). The PEMAT user guide includes specific instructions for the rating of each item as 1 (agree), 0 (disagree), or not applicable.[24] All assessors adhered closely to the PEMAT user guide for rating each resource.[24] Researchers and patient partners were trained using the PEMAT user guide PDF and a virtual 1:1 session with a member of the research team (KD) as needed.[24] Those with no prior PEMAT experience (ME) completed a practice session with an experienced PEMAT rater (KD) to ensure consistency.

To ensure consistency, each resource was reviewed by 3three assessors: two researchers (ME and KD) and one patient partner (either AM, CG, or GL). Discrepancies between researcher ratings were resolved by open discussion to achieve a consensus researcher score. Understandability and actionability scores, as well as overall PEMAT scores, were calculated according to PEMAT scoring guidelines.[23] The percentage of possible points achieved in each domain was calculated, where 100% indicates that the resource received a rating of 1 (agree) on all applicable items in that domain. Mean scores were calculated using equal weighting for the consensus researcher score and the patient partner score. A higher percentage indicates better understandability or actionability.

Exercise recommendation review

The exercise review was completed by a clinical exercise specialist (ME) on the research team. Each resource was reviewed in detail to assess the presence of exercise recommendations, exercise cautions, specific and actionable exercise tips, and tailored exercise advice for RA. This information was recorded using a standard data extraction spreadsheet, with separate sections for cardiovascular, strength, balance and stretching exercise. Exercise types that were not mentioned at all were left blank in the data extraction spreadsheet. Meanwhile, missing information was noted as 'not specified'. Recommendations to

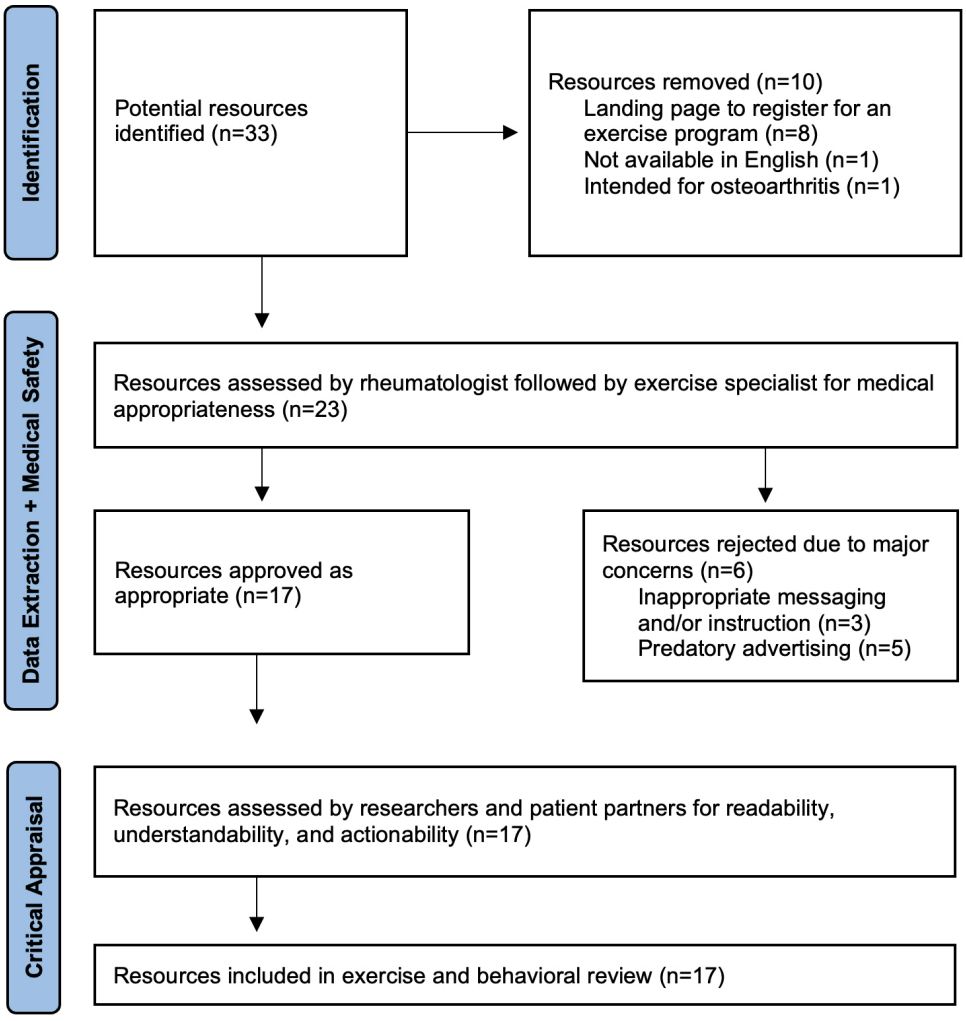

Figure 1 Flow diagram of environmental scan and critical appraisal of physical activity resources for individuals with rheumatoid arthritis.

consult with a healthcare professional or qualified exercise professional were recorded.

Behavior change technique review

The behavioural review was completed by a physical activity behaviour change expert (ME) on the research team. To assess the use of behaviour change techniques for physical activity behaviour, each resource was reviewed using a standard data extraction spreadsheet based on the behaviour change technique taxonomy.[25] This taxonomy is the gold standard for classifying behaviour change techniques in physical activity behaviour change research. The presence of behaviour change techniques was recorded across the 16 groups from the behaviour change technique taxonomy. Groups were either considered present, if one or more techniques from that group were identified, or absent, if none of the techniques were used.

RESULTS

An overview of the environmental scan phases is shown in figure 1. Our initial search yielded 33 potential resources. After screening the resources, 10 of them were excluded as they did not meet our inclusion criteria. Eight of these were landing pages for in-person or online exercise programmes. One was not available in English, and another was not intended for RA. 23 resources were included in the data extraction and critical appraisal phases.

Medical review

After completing the medical review, 17 resources were approved as safe and appropriate for individuals with RA.[26–42] Six resources were excluded due to concerns about appropriateness for individuals with RA (1/23), predatory advertising (2/23) or both (3/23). Notable concerns among the excluded resources were the recommendation of potentially unsuitable weight-bearing exercises (eg, push-ups and other exercises that load the hands and wrists) without sufficient modification for RA patients with joint symptoms, as well as blanket statements to avoid certain exercises (eg, high impact, high intensity), which may still be suitable for individuals with well-controlled RA. In contrast, another resource wrote that

Table 1 Characteristics of the 17 included physical activity resources for individuals with rheumatoid arthritis

Title	Organisation	Country	Date created or updated	Type	Interactive	Language	HCPs involved	Patients involved
Print resources								
Exercise and RA	Arthritis Australia	Australia	June 2024	Brief article	No	English	Unclear	Unclear
At home exercise guide	Arthritis Research Canada	Canada	July 2022	Brief article	No	English	Yes	Yes
30-Day Exercise Challenge for Arthritis	Arthritis Research Canada	Canada	January 2020	PDF workbook	Yes	English	Yes	Unclear
Exercise for RA	Health Link BC	Canada	September 2022	Brief article	No	English	Yes	Unclear
I START Toolkit (quick guide fact sheet)	University of British Columbia	Canada	2023	PDF handout	No	English	Yes	Yes
I START Toolkit (website)	University of British Columbia	Canada	2023	Brief article	No	English	Yes	Yes
Let's Move with Leon activity tracker	Versus Arthritis	UK	2024	PDF workbook	Yes	English	Yes	Unclear
Best Exercises for RA	Arthritis Foundation	USA	Unknown	Slideshow	No	English	Unclear	Unclear
EIM Rx for Health Rheumatoid Arthritis	Exercise is Medicine	USA	2021	PDF handout	No	English, Spanish	Unclear	Unclear
Exercise can ease RA pain	Harvard Health Publishing	USA	May 2023	Blog post	No	English	Yes	Unclear
Audiovisual resources								
How to stay active at home during COVID-19 (Arthritis at Home)	Arthritis Consumer Experts	Canada	April 2020	Video	No	English	Yes	Unclear
Indoor Exercise Snacks (Arthritis At Home Ep.16)	Arthritis Consumer Experts	Canada	May 2020	Video	Yes	English	Yes	Unclear
Strong with Arthritis (Arthritis Research Education Series)	Arthritis Research Canada	Canada	March 2023	Video	No	English	Yes	Yes
Exercise Videos	National Rheumatoid Arthritis Society	UK	October 2017	Video series	No	English	Yes	Yes
Importance of physical activity and exercise (SMILE-RA)	National Rheumatoid Arthritis Society	UK	September 2021	Interactive platform	Yes	English	Yes	Yes
Yoga Exercises (SMILE-RA)	National Rheumatoid Arthritis Society	UK	September 2021	Video	Yes	English	Yes	Yes
Let's Move with Leon	Versus Arthritis	UK	2024	Video series	Yes	English	Yes	Yes

HCP, healthcare provider.

'exercise is uncomfortable for 85% of people with RA'. The statement was not supported by scientific evidence and may discourage physical activity engagement despite its many benefits. Some resources were deemed inappropriate due to predatory advertisements (eg, weight loss medications) and stock images (eg, able-bodied, younger white women) that are not representative of the RA population. The critical appraisal was completed only for the 17 resources that passed the medical review.

Resource characteristics

Of these 17 resources, 14 were created or updated between 2020 and 2024 (table 1). All resources originated from English-speaking countries, including the USA (n=3), Canada (n=8), the UK (n=5) and Australia (n=1). 10 resources were print materials of various formats (blog post, brief article, slideshow, PDF), whereas the remainder were audiovisual resources (eg, videos, multimedia materials). Only six resources included an interactive component. The involvement of healthcare professionals and patient partners was documented in 14 and 8 resources, respectively. A single resource was available in Spanish and English. All others were only available in English. Table 1 presents the characteristics for each resource.

Readability

The readability, understandability and actionability scores of the included physical activity resources are summarised in table 2. The mean reading grade level of the 10 print resources was grade 9.0±1.5. Only one resource was written at or below a sixth-grade level.[34] A second resource fell within the seventh-grade range.[32] All other print resources required a reading level of grade 9 or higher.

Understandability and actionability

After being assessed by both researchers and patient partners, the mean understandability ratings were

Table 2 Readability, understandability and actionability of the included physical activity resources

Print resources			FK reading grade	PEMAT	PEMAT
Article	**Organisation**	**Country**	**Readability**	**Understandability**	**Actionability**
Exercise and RA	Arthritis Australia	Australia	10	80.1%	57.5%
At home exercise guide	Arthritis Research Canada	Canada	8.6	92.3%	50.0%
30-Day Exercise Challenge for Arthritis	Arthritis Research Canada	Canada	8.9	84.0%	91.7%
Exercise for RA	Health Link BC	Canada	9.8	71.5%	30.0%
I START Toolkit: Quick guide fact sheet	University of British Columbia	Canada	8.9	82.6%	70.0%
I START Toolkit: Website	University of British Columbia	Canada	9.9	62.5%	73.3%
Let's Move with Leon activity tracker	Versus Arthritis	UK	7.0	91.2%	100.0%
Best Exercises for RA	Arthritis Foundation	USA	9.2	76.0%	28.3%
EIM Rx for Health Rheumatoid Arthritis	Exercise is Medicine	USA	6.4	89.4%	80.0%
Exercise can ease RA pain	Harvard Health Publishing	USA	11.5	70.8%	20.0%
	Mean (SD)		9.0 (1.5)	80.0 (9.8)%	60.0 (27.7)%
Audiovisual esources			**FK reading grade**	**PEMAT**	**PEMAT**
Article	**Organisation**	**Country**	**Readability**	**Understandability**	**Actionability**
How to stay active and exercise at home during COVID-19 (Arthritis At Home)	Arthritis Consumer Experts	Canada	N/A	84.3%	87.5%
Indoor Exercise Snacks Higher Intensity (Arthritis At Home)	Arthritis Consumer Experts	Canada	N/A	79.4%	100.0%
Strong with Arthritis Webinar (Arthritis Research Education Series)	University of British Columbia	Canada	N/A	71.5%	37.5%
Exercise Videos	National Rheumatoid Arthritis Society	UK	N/A	90.9%	83.3%
Importance of physical activity and exercise (SMILE-RA)	National Rheumatoid Arthritis Society	UK	N/A	91.3%	100.0%
Yoga Exercises (SMILE-RA)	National Rheumatoid Arthritis Society	UK	N/A	84.7%	100.0%
Let's Move with Leon	Versus Arthritis	UK	N/A	100.0%	100.0%
	Mean (SD)			**86.0 (9.2)%**	**86.9 (22.9)%**

FK, Flesch-Kincaid; PEMAT, Patient Education Materials Assessment Tool.

80.0±9.8% for print materials and 86.0±9.2% for audiovisual materials (table 2). Actionability ratings were lower for print materials (60.0±27.7%) than for audiovisual materials (86.9±22.9%). Whereas all resources scored above 60% for understandability, 50.0% (5/10) of the included print resources and 14.3% (1/7) of the audiovisual resources had actionability ratings below 60%. The highest scoring print resources were the 'Let's move with Leon' PDF activity tracker workbook from Versus Arthritis, the 'Rx for Health Rheumatoid Arthritis' PDF information sheet from Exercise is Medicine and the '30-day Exercise Challenge for Arthritis' from Arthritis Research Canada.[28 32 34] All three scored above 80% for understandability and actionability. Meanwhile, the highest scoring audiovisual resources were the 'Let's move with Leon' video series from Versus Arthritis and the 'Importance of physical activity and exercise' interactive module on the National Rheumatoid Arthritis Society's 'SMILE-RA' online learning platform.[40 42] These two scored above 90% for understandability and actionability. Individual ratings for each resource are displayed in table 2.

Exercise review

The quality of exercise recommendations provided was highly variable across the resources, as shown in table 3. Specific exercise recommendations in at least one domain (eg, cardiovascular, strength, balance, flexibility) were included in 14/17 (82.4%) resources. Most resources recommended professional help from a doctor (11/14, 78.6%) and exercise professional (14/14, 100%) for starting or resuming exercise after being diagnosed with RA. Of the 14 resources with exercise recommendations, 13 (92.9%) provided cardiovascular exercise recommendations, 13 (92.9%) provided strength exercise recommendations, 6 (42.9%) provided flexibility exercise recommendations and 5 (35.7%) provided balance exercise recommendations.

Cardiovascular exercise was defined in lay terms in 5/14 (38.5%) of resources that recommended it. A complete (ie, specific details for all four variables: frequency, intensity, time and type) prescription for cardiovascular exercise was included in only 1/13 (7.7%) of these resources. The remaining resources provided either a partial (ie, specific details missing for one or more variables)

Table 3 Summary of exercise recommendations provided by the included physical activity resources

	Professional help		Cardiovascular exercise recommendation				Strength exercise recommendation				Balance	Flexibility
Title	**Doctor**	**Exercise professional**	**Definition provided**	**FITT Rx**	**Progre-ssion**	**Tailored to RA**	**Definition provided**	**FITT Rx**	**Progression**	**Tailored to RA**		
Exercise and RA	X	X		Partial	X	X	X	None				
30-Day Exercise Challenge for Arthritis		X		Partial	X			Complete	X	X		
At home exercise guide	X	X	X	Partial		X	X	None		X	X	
Exercise for RA	X	X		None			X	None				X
I START Toolkit (quick guide fact sheet)	X	X		None			X	None		X		
I START Toolkit (website)		X		None				None				
Strong with Arthritis (Arthritis Research Webinar)	X	X					X	Partial	X	X		
Exercise Videos	X	X		None		X	X	Partial		X		
Importance of physical activity and exercise (SMILE-RA)	X	X		Partial	X	X						
Let's Move with Leon (Activity Tracker)	X	X	X	Partial	X	X		Partial	X	X	X	X
Let's Move with Leon (Videos)	X	X	X	Partial	X	X		Partial	X	X	X	X
Best Exercises for RA	X	X		None				None				X
Rx for Health Rheumatoid Arthritis	X	X	X	Complete	X	X	X	Complete		X	X	X
Exercise can ease RA pain		X	X	None		X	X	None			X	X

FITT, frequency, intensity, time, type.

prescription (6/13, 46.2%) or none (6/13, 46.2%). Details for how to progress exercise gradually (6/13, 46.2%) and RA-specific exercise tailoring (ie, exercise adaptations and/or cautions for common RA symptoms) (8/13, 61.5%) were present in more than half of these resources. Four (30.8%) resources did not provide any RA-specific tailoring for cardiovascular exercise.

Common RA-specific advice included exercising more when RA symptoms are lowest, resting if symptoms are too high, choosing lower impact exercise types (eg, swimming) to reduce stress on joints, focusing on less-affected areas of the body when flaring, using appropriate footwear to minimise pain, ensuring a gradual warm-up and cool-down, and starting slow before progressing exercise frequency, intensity or time. Resources cautioned individuals with RA to avoid exercise during flare-ups, reduce intensity or time if exercise leads to unexpected pain, avoid vigorous or high-impact exercises at affected joints and return slowly to cardiovascular exercise after flares or other medical events.

Strength exercise was defined in lay terms in 8/13 (61.5%) of resources that recommended it. These resources provided either a complete (2/13, 15.4%) or partial (4/13, 30.8%) strength exercise prescription. Seven (53.8%) resources did not provide any prescription. Information was provided on gradual exercise progression (4/13, 30.8%) and RA-specific exercise tailoring (8/13, 61.5%) for strength exercise. Four (30.8%) resources did not provide any RA-specific tailoring for strength exercise.

RA-specific strength training recommendations included planning strength training when symptoms are lowest, using water-based exercises to reduce strain on joints, strengthening muscles around affected joints, using resistance bands and wrapping them around wrists if grip strength is limited, using padded gloves and shoes for extra comfort, reducing weights and duration when symptoms are worse. Resources cautioned against intense strength exercise during flares and suggested using braces and professional supervision to minimise injury risk. Further details on the cardiovascular and strength exercise prescriptions and RA-specific advice provided by each resource can be found in online supplemental file 2.

Behavior change technique review

Online supplemental file 3 presents the groups of behaviour change techniques used in each resource. Out of 16 possible groups, the mean number of behaviour change groups used was 9.0±4.4for PDF resources, 5.7±2.1for websites and 6.3±4.5for audiovisual resources. Five (29.4%) resources used eight or more (ie, over 50%) of the behaviour change groups. The resources with the highest number of behaviour change groups used were the 'Let's move with Leon' PDF workbook and video series from Versus Arthritis (14 behaviour change groups used in both resources) and the 'Importance of physical activity and exercise' module within the National Rheumatoid Arthritis Society's SMILE-RA interactive learning platform (11 behaviour change groups used).[32 40] All 16 behaviour change groups were used in at least one resource. The least common behaviour change groups used were 'identity' (Group 13), 'scheduled consequences' (Group 14) and 'covert learning' (Group 16), each appearing in only two resources. In contrast, 'shaping knowledge' (Group 4) and 'natural consequences' (Group 5) were the most common, appearing in 17/17 (100%) and 13/17 (76.5%) resources, respectively.

DISCUSSION

Principal findings

Physical activity is internationally recommended as a key component of RA care, contributing to improved overall health and quality of life.[2 7–14] Patient-facing online resources may help individuals with RA become and stay physically active. Through our environmental scan of online RA-specific physical activity resources, we identified 23 resources, 6 of which were excluded due to predatory advertising or medical concerns.[26–42] A comprehensive critical appraisal of the 17 remaining resources, 10 print and 7 audiovisual, highlighted high overall understandability. Several resources stood out for having high actionability that was supported by detailed exercise recommendations and strong use of behaviour change techniques. Audiovisual resources had higher average actionability than print resources. However, many resources left room for improvement with regard to readability and actionability. These concerns were often compounded by incomplete exercise recommendations and behaviour change support, reducing the potential impact of these resources on physical activity behaviour change.

Study meaning in relation to related research

Medical appropriateness concerns for individuals with RA continue to be a weakness among online patient resources. Alongside the present study, where 26% of the resources were excluded due to concerns, a recent environmental scan of flare self-management resources excluded 32% of resources for inappropriate advertisements or medical concerns.[19] Weight loss medications and programmes were commonly advertised and often included stigmatising language, which could be harmful to patients. In prior work, patients expressed concerns about the poor quality of patient materials, causing them to distrust online information.[17] Physical activity resources should always be reviewed by rheumatologists, exercise professionals and patients to ensure safety prior to publication. Furthermore, caution must be taken to ensure that advertisements, if present, are appropriate for the target population. This can be challenging for YouTube and other social media platforms where additional recommendations and advertisements are automated. Some resources were flagged during expert review for their negative tone and advanced exercise examples. To ensure that future resources empower, rather than discourage,

physical activity behaviour change, emphasis on positive messaging and gradual progression is preferable.

Certain resources stood out during the critical appraisal. These resources had high understandability and actionability scores, as well as detailed exercise and behaviour change content.[28 32 39 40 42] Four of these resources were developed by organisations in the UK (Versus Arthritis,[32 42] National Rheumatoid Arthritis Society[39 40]) and one was created in Canada (Arthritis Research Canada[28]). Notable differences between these and other resources were the presence of interactive components (eg, follow-along exercises, goal-setting prompts, self-monitoring tools) and the involvement of healthcare teams, exercise professionals and patients in resource development. In line with evidence-based best practices for creating patient materials, these findings further emphasise the importance of codevelopment with relevant partners.[43 44] For physical activity resources, this may include members of the target population (eg, individuals with RA), healthcare providers, exercise professionals and behaviour change experts.

Whereas understandability was generally acceptable across the physical activity resources, more work is needed to improve their readability and actionability. The average reading level in both the present work and prior studies is often above eighth grade, with little or no patient materials meeting the recommended level of grade 6 or lower.[45 46] Adding to this challenge is the limited translation of patient materials, despite the high prevalence of non-native English speakers in Canada and other English-speaking countries.[47] Rapid improvements in automated translation through Google Translate and other artificial intelligence-based tools may help address this gap. A common shortcoming among patient materials, noted above and across the literature, is a lack of actionability.[19] Specific actionable steps are key to eliciting physical activity behaviour change among RA populations.[48–50] Close collaboration with patient partners is required to ensure that written and audiovisual content is actionable. The PEMAT emphasises the importance of including clear actions, manageable steps, tools to support action and visual aids to enhance actionability.[23] We noted that audiovisual content across the reviewed resources featured either stock images of healthy, younger adults or white women with RA without apparent physical limitations. More representative content is warranted to encourage physical activity behaviour change across the range of ages, ethnicities and physical abilities of RA patients.

Comprehensive exercise recommendations are essential to physical activity promotion as part of RA management. First, individuals with RA need specific information on the frequency, intensity, time and type (or FITT) of physical activity to address lack of knowledge, a common physical activity barrier in this population.[48–50] The reviewed RA-specific physical activity resources rarely provided complete FITT recommendations or covered all four key domains of physical fitness: cardiovascular, strength, balance and flexibility. Future resources should aim to address this shortcoming. Second, individuals with RA may be unsure how to continue being physically active after an RA diagnosis, with fears about exacerbating RA symptoms.[15] While many resources provided some RA-specific suggestions for tailoring and progressing exercise, physical activity promotion efforts in this population could benefit from standardised physical activity guidelines. Relevant tailoring factors may include RA history and medications, joint damage and active inflammation, joint replacement precautions, and other health concerns impacting physical activity tolerance. Such guidelines are common for chronic conditions such as cancer and cardiovascular disease.[51 52] Due to the breadth of important information related to the four physical fitness domains and RA-specific tailoring, resource developers may purposefully select content that aligns with specific aims for a patient resource.

However, physical activity information alone does not necessarily lead to behaviour change. Only some of the included patient resources placed a strong emphasis on behaviour change. These resources leveraged evidence-based behaviour change techniques such as goal setting and self-monitoring, which have been shown to support physical activity behaviour change.[53] Many of the resources, however, focused on educating individuals with RA about the importance of physical activity but did not provide sufficient tools for helping them become and stay active. A lack of actionable behaviour change advice is likely to limit the potential positive impact of these resources in RA care. Consultation with a behaviour change specialist is recommended for future physical activity resources. Importantly, online resources alone may not be sufficient to promote lasting physical activity behaviour change among many individuals with RA. Work is needed to integrate further physical activity behaviour change support into RA care pathways.

Clinical implications

For rheumatology care providers, our findings have important clinical implications. The list of RA-specific physical activity resources reviewed can serve as a useful starting point for supporting patients to set, meet and adjust their physical activity goals. Providers are encouraged to keep a list of available resources to refer patients to, including information on the characteristics of the resources as well as the quality of content within them. Notably, the resources varied widely with respect to their purpose, content, format, complexity and actionability. For example, resources covered one or more of the following domains: education on why to exercise, demonstration of how to exercise, guidance on talking about exercise with a care provider, tips for adopting and maintaining exercise habits, and more. This variety should be seen as a strength. Different content and delivery modes may work better for different patients. Optimal physical activity behaviour change support should begin with a patient-led discussion around needs, preferences,

available time and resources, motivation, and other relevant factors.[54] The provider can then use this information to provide tailored recommendations to available resources or additional support as part of a 'personalized medicine' approach to physical activity. In addition to patient-provider discussions and recommendation of high-quality physical activity resources, rheumatology care teams may want to leverage mobile health technologies or tailored group-based programmes (online or in-person, where available). These approaches have shown promise for helping individuals with RA increase their physical activity.[55 56]

Study strengths and limitations

The strengths of our work include the involvement of patient partners to assess understandability and actionability, the use of a search strategy that mimicked a real-world scenario of patients searching for resources, and the in-depth critical appraisal from patient, medical, exercise and behavioural science perspectives. While this pragmatic single search engine strategy may have led to some resources being missed, resources not identified in the first five pages of Google search results are unlikely to be found by patients themselves.[20] A limitation to the use of the PEMAT is its inherent subjectivity. To counteract this, we completed triplicate ratings for all resources. The lack of a validated measure for assessing exercise and behaviour change components of patient materials is) also a limitation. In addition, the exercise and behavioural appraisal was completed by a single author, which may have led to some coding biases despite significant expertise in the topic areas. Work is needed to develop such measures that can guide development and evaluation. Finally, our patient partner team featured individuals with high health literacy and personal engagement in their health. This may have impacted the resultant PEMAT scores, limiting generalisability to all RA populations.

CONCLUSION

Our environmental scan identified a need for more high-quality physical activity resources for RA populations, which should be developed with patient partners and content experts. More work is needed to create resources that provide complete FITT recommendations for exercise and go beyond providing knowledge to truly empowering behaviour change. To address health inequities, efforts must be made to create accessible resources for underserved populations. The use of more diverse audiovisual content and translation into other languages represent two steps in the right direction. A bigger library of excellent physical activity resources will better support the different needs, capabilities and considerations of individuals with RA. Further research is also needed to develop and implement more intensive physical activity interventions for patients where resources alone are insufficient to promote behaviour change.

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Acknowledgements We would like to thank our patient partners Gisele, Annette and Christine for their time in helping us review the understandability and actionability of the included resources. We would also like to thank the organisations that created the included resources for devoting their time and resources to supporting physical activity among individuals with rheumatoid arthritis.

Contributors ME: conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, visualisation, writing—original draft, writing—reviewing and editing, guarantor. SZ: data curation, formal analysis, methodology, writing—reviewing and editing. KD: data curation, formal analysis, investigation, project administration, resources, writing—reviewing and editing. AMH: conceptualisation, methodology, resources, writing—reviewing and editing. CG: data curation, formal analysis, investigation, writing—reviewing and editing. AM: data curation, formal analysis, investigation, writing—reviewing and editing. CB: conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, resources, supervision, writing—original draft, writing—reviewing and editing.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The data are available from the corresponding author upon reasonable request.

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