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ORIGINAL ARTICLE

Who Makes It to the Base? Selection Procedure for a Physical Activity Trial Targeting People With Rheumatoid Arthritis

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Objective. **To compare those who were finally included in a large well-defined sample of individuals with rheumatoid arthritis (RA) at target for a physical activity (PA) trial with those who were not.**

Methods. **In total, 3,152 individuals answered questionnaires on sociodemographic, disease-related, and psychosocial factors and PA levels. The differences between individuals making it to the baseline assessments and those who did not were analyzed in 3 steps.**

Results. **In a first step, 1,932 individuals were eligible for the trial if they were interested in participating, not physically active enough, and fluent in Swedish and if they were not participating in any other study. The participants were mainly younger women, had higher education and income, were more likely to live with children, and had better support for exercise and had higher outcome expectations of PA than the 1,208 ineligible individuals. In a second step, the 286 individuals accepting participation had higher income and education, more support for exercise, less fear-avoidance beliefs, and higher outcome expectations of PA than the 1,646 individuals declining participation. In a third step, the 244 individuals assessed at baseline reported less fatigue than the 42 withdrawing before assessment.**

Conclusion. **To our knowledge, this is the first study describing the entire selection procedure, from a target sample for a PA trial to the sample assessed at baseline, in individuals with RA. Factors other than those related to the disease seemed to mainly determine participation and largely resembled determinants in the general population. Sociodemographic and psychosocial factors should be recognized as important for PA in people with RA.**

INTRODUCTION

Hospital-based exercise safely improves functioning in rheumatoid arthritis (RA) (1,2) and may also be protective against cardiovascular disease (3), for which the incidence has not been reduced following the introduction of biologic agents (4). A combination of daily moderate-intensity physical activity (PA) and twice-weekly strength training is recommended to maintain health in the general population (5) as well as in subpopulations of people with chronic conditions such as arthritis (6). The concept of PA signifies any muscular activities resulting in energy expenditure, such as leisure, transportation, work, and exercise, whereas exercise is defined as planned, structured, and repetitive activity for the purpose of maintaining or improving physical fitness (7). It has been indicated that people with RA accumulate too little PA (8,9), but methodologic challenges and lack of commonly accepted definitions limit the possibility for conclusions (8) and may also represent threats to the internal validity of PA studies. This may be one reason for hospital-based exercise trials being more frequent in studies on RA in the literature than those focusing on daily PA.

Regarding the external validity of PA trials, the participants are most likely a highly selected and motivated group, as indicated by the high numbers of completers

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Significance & Innovations

- Only a small minority of individuals with rheumatoid arthritis are reached for physical activity trials.
- Factors other than those related to the disease seem to mainly determine physical activity participation and largely resemble determinants in the general population.
- Caregivers need to identify and address sociodemographic and psychosocial factors when promoting physical activity.

(10,11). This hampers the generalizability of the study results, and little is known about the impact of different factors during the process. Older age, male sex, longer disease duration, worse pain and stiffness, lower outcome expectations, and lower self-efficacy characterized nonparticipants in a Dutch high-intensity exercise program (12), whereas transportation problems, time constraints, feeling too good or too bad, and a wish not to be confronted with illness were reasons given for nonparticipation. In contrast, the potential participants' willingness to participate in a hypothetical exercise program was not related to disease duration or disease activity, but to male sex, old age, and low education level (13), which resembled the results of the above Dutch study (12). However, although differences related to disease characteristics, sociodemographics, and specific study inclusion criteria have been described in a few studies, additional factors most likely influencing PA trial participation need to be identified, and differences between trial participants and the entire target population need to be described. A better understanding of what characterizes participants who are eligible for PA trials but who never begin them can help tailor programs to their needs. The aim of the present study, which included a large, well-defined sample of individuals with RA at target for a PA trial, was to compare those finally included in the trial with those who were not, in regard to sociodemographic, disease-related, and psychosocial factors and current PA.

PATIENTS AND METHODS

Design. Our prospective and descriptive study reported on the selection procedure for a 2-year PA trial (14). The Swedish Rheumatology Quality (SRQ) registers, covering a majority of the entire RA population in Sweden (15), were used for the purpose of defining a target population for the PA trial and for retrieval of data on age, sex, and date of diagnosis. These data were supplemented with data from a questionnaire administered at the start of the selection procedure as well as questionnaire answers on reasons for nonparticipation obtained in the subsequent 2 steps.

Participants. The SRQ registers were searched for potentially eligible participants from 6 rheumatology clinics chosen to represent university and county hospitals, rural and urban areas, and different parts of Sweden. In all, 3,152 of 5,391 potentially eligible patients with RA according to The American College of Rheumatology criteria (16) who were ages 18–75 years and independent in daily living (Stanford Health Assessment Questionnaire [HAQ] disability index score ≤2) responded to the questionnaire and were identified as the target sample for the trial. Of these patients, 73% were women, the median age was 62 years, and the median disease duration was 9 years (interquartile range 4–16 years). A detailed description of differences between the target sample (n = 3,152) and nonresponders (n = 2,239) is available elsewhere (9).

This study was approved by the Stockholm Regional Ethical Review Board (Protocol number: 2010/1232-31/1).

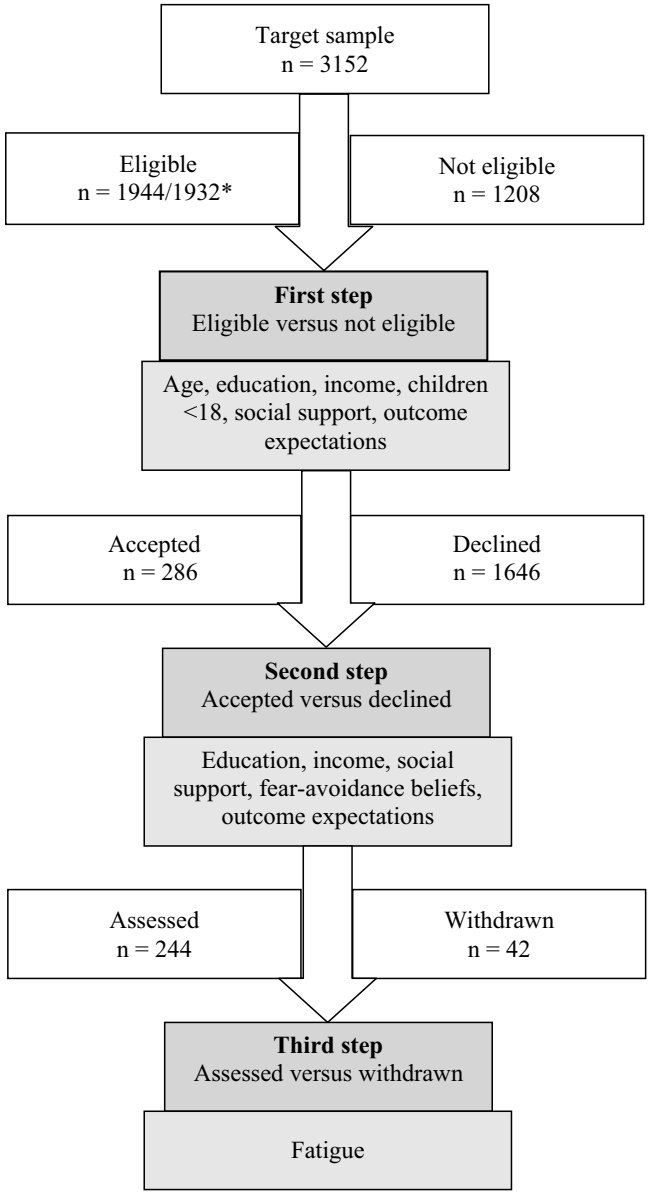

Figure 1. The results of the participant selection procedure for the physical activity trial. * = of the 1,944 individuals, 12 were excluded because of participation in another study.

The subjects consented to participate by filling in and returning the questionnaires.

Measurements. A comprehensive questionnaire, including a number of separate questionnaires validated for either the general population or for people with musculoskeletal diseases or developed for the present study, was used to collect data on sociodemographic, disease-related, and psychosocial characteristics and data on PA. Detailed descriptions of the questionnaire content have been reported elsewhere (14).

The sociodemographic data included sex, age, education level, income, members of household, and Swedish language comprehension. The disease-related data were disease duration and comorbidity. Furthermore, pain (17), fatigue (18,19), and general health perception (20) were rated on visual analog scales, and activity limitations were assessed with the Stanford HAQ (21).

Psychosocial factors were assessed with the Exercise Self-Efficacy Scale (22,23), the modified Fear-Avoidance Beliefs Questionnaire (24), the Scales to Measure Social Support for Exercise Behaviors (25), and 2 study-specific questions on outcome expectations of PA influencing long-term health and current RA symptoms.

Self-reported current PA was assessed with the International Physical Activity Questionnaire, which assesses overall PA during the past week (26), whereas maintained PA was assessed with the Exercise Stage Assessment Instrument (ESAI). The original 1-item ESAI was modified for the present study to include 2 items: 1 item on PA of moderate intensity 30 minutes at least 5 times per week and 1 item on muscular strength training twice weekly (27).

Data on reasons for nonparticipation were collected with a study-specific questionnaire and by telephone interviews. Seven predetermined reasons ("training center too distant"; "no time due to family, work, or other reasons"; "too expensive"; "feeling well and not in need of exercise"; "bothered by injury/comorbidity"; "RA too active/disabling"; and "no energy to participate") were supplemented with 1 open-ended question for additional reasons, and multiple reasons for declining participation could be given.

Procedures. The differences between individuals making it to the baseline assessments of the PA trial and those who did not were analyzed in 3 steps. In the first step, eligible individuals who fulfilled the following additional inclusion criteria were compared with individuals who were not eligible: 1) interest to participate in a PA trial; 2) maintained (>6 months) a health-enhancing PA level below that identified by the American College of Sports Medicine (physically active on at least a moderate-intensity level for a minimum of 30 minutes at least 5 times per week, combined with twice-weekly muscle strength training) (5,9), as determined in the present study by the ESAI; and 3) good Swedish language skills.

In the second step, eligible individuals were mailed a letter of invitation, including information on the aim of the study and the requirements for participation in the 2-year PA trial, which included twice-weekly aerobic exercise and strength training at a public gym, moderately intense PA the remaining days of the week, and group meetings every other week to support behavior change. The individuals were also informed about the time, place, and cost (approximately €400 the first year) and about the physical performance tests and questionnaires scheduled at baseline and after 1 and 2 years. Those who agreed to participate in the PA trial were compared with those who declined participation. In the third step, the individuals assessed at baseline were compared with those who accepted participation but withdrew before the baseline assessments.

Statistical analysis. Descriptive statistics are shown as the number and proportion (%) or as the median and interquartile range. Differences between the groups were analyzed with Student's unpaired *t*-test, the Mann-Whitney U test, or the chi-square test, when appropriate. Because of multiple comparisons, only *P* values less than 0.01 were accepted as statistically significant. All analyses were performed using Statistica, version 10.0.

RESULTS

An overview of the differences between individuals making it to the baseline assessments and those who did not is shown in Figure 1.

First step: eligible versus not eligible. In total, 1,944 individuals (62%), more women than men ($P < 0.001$), were identified as eligible for the PA trial and 1,208 individuals (38%) were not eligible (Table 1). Furthermore, the eligible individuals were younger ($P < 0.001$), reported higher education ($P < 0.001$), reported higher income ($P < 0.001$), were more likely to be living with children ($P = 0.003$), reported more social support for exercise ($P < 0.001$), and reported higher outcome expectations of PA ($P < 0.001$). The eligible individuals also reported less current and maintained PA ($P < 0.001$), which was expected to be the case because the latter was an exclusion criterion. Among the ineligible individuals, 428 (35%) of 1,208 reported current PA and 325 (27%) reported maintained PA.

Second step: accepted versus declined. Twelve individuals were excluded from the group of 1,944 eligible individuals because of participation in another study, and they were not invited to the PA trial. Of the 1,932 individuals asked, 1,646 (85%) declined participation, either actively (n = 965) or by not answering the invitation (n = 681), and 286 (15%) accepted to participate. The individuals who agreed to participate reported higher education ($P = 0.004$), higher income ($P < 0.001$), more social support for exercise ($P = 0.004$), less fear-avoidance beliefs ($P = 0.008$), and higher outcome expectations of PA on health and symptoms ($P < 0.001$ and $P = 0.006$, respectively) compared with those declining (Table 2). Of those accepting to participate, 66 (23%) of 286 reported current PA compared with 488 (30%) of 1,646 who declined (not statistically significant).

Table 1. Descriptive data of the entire target sample (n = 3,152) for the physical activity trial and subsamples of eligible (n = 1,944) and not eligible (n = 1,208) individuals for the trial (step 1)*

	Target sample		Eligible		Not eligible		
	No. (%)	Median (IQR)	No. (%)	Median (IQR)	No. (%)	Median (IQR)	*P*†
Sex							< 0.001‡
Men	843 (27)		457 (24)		386 (32)		
Women	2,309 (73)		1,487 (76)		822 (68)		
Age, years (all)	3,152	62 (54–68)	1,944 (62)	62 (52–67)	1,208 (38)	64 (55–69)	< 0.001‡
Education							< 0.001‡
Basic	926 (29)		452 (23)		474 (39)		
College	789 (25)		506 (26)		283 (23)		
University	1,025 (33)		724 (37)		301 (25)		
Other	378 (12)		244 (13)		134 (11)		
Missing	34 (1)		18 (1)		16 (2)		
Income							< 0.001‡
Below average	1,631 (52)		905 (47)		726 (60)		
Above average	1,431 (45)		1,000 (51)		431 (36)		
Missing	90 (3)		39 (2)		51 (4)		
Other adults in household							0.217
Yes	2,342 (84)		1,463 (75)		879 (73)		
No	767 (24)		460 (24)		307 (25)		
Missing	43 (2)		21 (1)		22 (2)		
Children ages <18 years							0.003‡
Yes	505 (16)		342 (17)		163 (13)		
No	2,626 (83)		1,591 (82)		1,035 (86)		
Missing	21 (1)		11 (1)		10 (1)		
Language comprehension							0.011
Native Swedish speaker	2,787 (88)		1,746 (90)		1,041 (86)		
Non-native Swedish speaker	323 (10)		179 (9)		144 (12)		
Missing	42 (2)		19 (1)		23 (2)		
Disease duration, years	3,044 (97)	9 (4–16)	1,872 (96)	9 (4–16)	1,172 (97)	9 (5–16)	0.702
Pain (VAS; range 0–100)	3,131 (99)	27 (14–53)	1,934 (99)	27 (11–52)	1,197 (99)	26 (11–54)	0.992
Fatigue (VAS; range 0–100)	3,129 (97)	37 (16–62)	1,932 (99)	39 (17–62)	1,197 (99)	35 (15–60)	0.017
General health (VAS; range 0–100)	3,059 (98)	29 (14–53)	1,890 (97)	29 (14–52)	1,169 (97)	29 (14–54)	0.707
Activity limitation (HAQ; range 0–3)	3,114 (98)	0.5 (0.125–1.0)	1,922 (99)	0.50 (1.125–1.0)	1,192 (99)	0.50 (0.123–1.12)	0.386
Self-efficacy for exercise (ESES; range 6–60)	2,694 (85)	30 (21–40)	1,733 (89)	30 (22–40)	961 (80)	30 (19–42)	0.191
Social support for exercise, family (SSEB; range 0–65)	2,505 (79)	27 (17–36)	1,604 (83)	28 (20–37)	901 (75)	24 (9–35)	< 0.001‡
Social support for exercise, friends (SSEB; range 0–65)	2,196 (70)	23 (12–31)	1,435 (74)	24 (16–32)	761 (63)	21 (4–30)	< 0.001‡
Fear-avoidance beliefs (mFABQ; range 0–24)	2,938 (93)	7 (3–12)	1,849	7 (3–11)	1,089 (90)	7 (3–12)	0.523
Outcome expectations							
Health (NRS; range 1–10)	3,077 (97)	10 (8–10)	1,937 (99)	10 (9–10)	1,140 (94)	10 (6–10)	< 0.001‡
Symptoms (NRS; range 1–10)	3,073 (97)	8 (5–10)	1,934 (99)	8 (6–10)	1,139 (94)	7 (4–10)	< 0.001‡
Current physical activity (IPAQ)							
Yes	984 (31)		556 (28)		428 (35)		< 0.001‡
No	2,157 (68)		1,378 (71)		779 (65)		
Missing	11 (1)		10 (1)		1		
Maintained physical activity (ESAI)							
Yes	2,645 (84)		0		325 (27)		< 0.001‡
No	325 (10)		1,848 (95)		797 (66)		
Missing	182 (6)		96 (5)		86 (7)		

* IQR = interquartile range; VAS = visual analog scale; HAQ = Stanford Health Assessment Questionnaire; ESES = Exercise Self-Efficacy Scale; SSEB = Scales to Measure Social Support for Exercise Behaviors; mFABQ = modified Fear-Avoidance Beliefs Questionnaire; NRS = numerical rating scale; IPAQ = International Physical Activity Questionnaire; ESAI = Exercise Stage Assessment Instrument.
† *P* for comparison between eligible and not eligible participants.
‡ $P < 0.01$.

Table 2. Descriptive data of the samples that accepted (n = 286) and declined (n = 1,646) participation in the physical activity trial (step 2)*

	Accepted		Declined		
	No. (%)	Median (IQR)	No. (%)	Median (IQR)	*P*†
Sex					
Men	54 (19)		402 (24)		0.042
Women	232 (81)		1,244 (76)		
Age, years	286	60 (54–66)	1,646	62 (52–67)	0.321
Education					
Basic	48 (17)		402 (24)		0.004‡
College	66 (23)		436 (26)		
University	143 (50)		577 (33)		
Other	29 (10)		213 (13)		
Missing	0		18 (1)		
Income					
Below average	95 (33)		804 (49)		< 0.001‡
Above average	186 (65)		808 (49)		
Missing	5 (2)		34 (2)		
Other adults in household					0.569
Yes	212 (74)		1,240 (75)		
No	72 (25)		387 (24)		
Missing	2 (1)		19 (1)		
Children ages <18 years					0.438
Yes	46 (26)		294 (18)		
No	240 (84)		1,341 (81)		
Missing	0		11 (1)		
Language comprehension					0.455
Native Swedish speaker	262 (92)		1,474 (90)		
Non-native Swedish speaker	23 (8)		154 (9)		
Missing	1		18 (1)		
Disease duration, years	276 (97)	10 (5–17)	1,646	8 (4–16)	0.112
Comorbidity					
Yes	168 (59)		913 (55)		0.294
No	116 (41)		723 (44)		
Missing	2		10 (1)		
Pain (VAS; range 0–100)	284 (99)	25 (8–48)	1,639 (99)	27 (11–53)	0.045
Fatigue (VAS; range 0–100)	284 (99)	35 (14–58)	1,636 (99)	39 (17–63)	0.083
General health (VAS; range 0–100)	276 (97)	26 (12–49)	1,603 (97)	30 (14–54)	0.088
Activity limitation (HAQ; range 0–3)	283 (99)	0.5 (0–1.0)	1,628 (38)	0.5 (0.125–1.0)	0.062
Self-efficacy for exercise (ESES; range 6–60)	270 (94)	32 (24–40)	1,451 (88)	30 (22–39)	0.132
Social support for exercise, family (SSEB; range 0–65)	242 (77)	29 (21–36)	1,352 (82)	28 (20–37)	0.391
Social support for exercise, friends (SSEB; range 0–65)	234 (82)	25 (20–33)	1,194 (73)	24 (15–32)	0.215
Fear-avoidance beliefs (mFABQ; range 0–24)	276 (97)	6 (3–10)	1,561 (95)	7 (4–11)	0.008‡
Outcome expectations					
Health (NRS; range 1–10)	286	10 (10–10)	1,639 (99)	10 (8–10)	< 0.001‡
Symptoms (NRS; range 1–10)	286	9 (7–10)	1,636 (99)	8 (6–10)	0.006‡
Current physical activity (IPAQ)					0.024
Yes	66 (71)		488 (30)		
No	218 (23)		1,151 (70)		
Missing	2 (1)		7		
Maintained physical activity (ESAI)					
Yes	0		0		
No	277 (97)		1,559 (95)		
Missing	9 (3)		87 (5)		

* IQR = interquartile range; VAS = visual analog scale; HAQ = Stanford Health Assessment Questionnaire; ESES = Exercise Self-Efficacy Scale; SSEB = Scales to Measure Social Support for Exercise Behaviors; mFABQ = modified Fear-Avoidance Beliefs Questionnaire; NRS = numerical rating scale; IPAQ = International Physical Activity Questionnaire; ESAI = Exercise Stage Assessment Instrument.
† *P* for comparison between eligible and not eligible participants.
‡ $P < 0.01$.

Table 3. Descriptive data of samples that were assessed at baseline (n = 244) and withdrew (n = 42) from assessments of the physical activity trial (step 3)*

	Assessed		Withdrew		
	No. (%)	Median (IQR)	No. (%)	Median (IQR)	*P*†
Sex					
Men	46 (19)		8 (19)		0.976
Women	198 (81)		34 (81)		
Age, years	244	60 (54–66)	42	62 (56–67)	0.520
Education					
Basic	44 (18)		4 (10)		0.409
College	53 (22)		13 (30)		
University	122 (50)		21 (50)		
Other	25 (10)		4 (10)		
Missing	0		0		
Income					
Below average	75 (31)		20 (48)		0.019
Above average	166 (68)		20 (48)		
Missing	3 (1)		2 (4)		
Other adults in household					0.095
Yes	185 (76)		15 (36)		
No	57 (23)		27 (64)		
Missing	2 (1)		0		
Children ages <18 years					
Yes	40 (16)		6 (14)		0.731
No	204 (84)		36 (86)		
Missing	0		0		
Language comprehension					0.027
Native Swedish speaker	227 (93)		35 (83)		
Non-native Swedish speaker	16 (7)		7 (17)		
Missing	1		0		
Disease duration, years	237 (97)	10 (4–16)	39 (93)	9 (7–17)	0.556
Comorbidity					
Yes	141 (58)		27 (64)		0.465
No	101 (41)		15 (36)		
Missing	2 (1)		0		
Pain (VAS; range 0–100)	242 (99)	23 (7–47)	42	40 (17–55)	0.033
Fatigue (VAS; range 0–100)	242 (99)	33 (13–55)	42	51 (26–68)	0.009‡
General health (VAS; range 0–100)	237 (97)	24 (12–48)	39 (93)	32 (12–52)	0.544
Activity limitation (HAQ; range 0–3)	242 (99)	0.438 (0–0.875)	41 (98)	0.5 (0.125–1.0)	0.235
Self-efficacy for exercise (ESES; range 6–60)	232 (95)	31 (23–40)	38 (90)	35 (26–45)	0.183
Social support for exercise, family (SSEB; range 0–65)	213 (87)	28 (21–36)	29 (69)	32 (44–38)	0.169
Social support for exercise, friends (SSEB; range 0–65)	206 (84)	24 (18–33)	28 (67)	28 (23–34)	0.072
Fear-avoidance beliefs (mFABQ; range 0–24)	234 (96)	6 (3–10)	42	7 (3–10)	0.686
Outcome expectations					
Health (NRS; range 1–10)	244	10 (10–10)	42	10 (10–10)	0.749
Symptoms (NRS; range 1–10)	244	9 (7–10)	42	10 (7–10)	0.219
Current physical activity (IPAQ)					0.377
Yes	54 (22)		12 (29)		
No	188 (77)		30 (71)		
Missing	2 (1)		0		
Maintained physical activity (ESAI)					
Yes	0		0		
No	238 (98)		39 (93)		
Missing	6 (2)		3 (7)		

* IQR = interquartile range; VAS = visual analog scale; HAQ = Stanford Health Assessment Questionnaire; ESES = Exercise Self-Efficacy Scale; SSEB = Scales to Measure Social Support for Exercise Behaviors; mFABQ = modified Fear-Avoidance Beliefs Questionnaire; NRS = numerical rating scale; IPAQ = International Physical Activity Questionnaire; ESAI = Exercise Stage Assessment Instrument.
† *P* for comparison between eligible and not eligible participants.
‡ $P < 0.01$.

The reasons among those actively declining participation were "training center too distant" (40%); "no time due to family, work, or other reasons" (18%); "too expensive" (17%); "feeling well and not in need of exercise" (9%); "bothered by injury/comorbidity" (6%); "RA too active/disabling" (5%); and "no energy to participate" (5%). The reasons for declining that were given for the open-ended question by 263 individuals included the following: recently undergone surgery, participation in other studies, fully occupied with other activities, 1-year commitment is too long, pregnancy, and not motivated.

Third step: assessed versus withdrew. Of those accepting participation, 244 (85%) of 286 individuals were assessed at baseline and 42 individuals (15%) withdrew. Those assessed reported less fatigue ($P = 0.009$) compared with those withdrawing (Table 3).

The reasons for withdrawing before the baseline assessments included "dislike training center," "prefer yoga," "changed mind about participation," "recent cancer diagnosis," "recent foot injury," "foot ulcer," "aortic aneurysm," "too expensive," "time constraints," and "logistic problems related to time or place of assessments or training." Of those withdrawing, 6 (14%) of 42 individuals could not be reached for appointment scheduling and, in 5 (12%) of 42 cases, the reasons for withdrawal were unknown.

DISCUSSION

To our knowledge, this is the first study describing in detail the selection procedure for a long-term PA trial outside a clinical setting in a large and well-defined cohort of patients with RA. This study clearly showed the difficulties in recruiting participants for such trials and the consequences for the generalization of their results.

Of our targeted population, 8% were assessed at baseline, compared with 4–73% in previous RA exercise trials (12,13). Of those eligible for a Dutch exercise trial, 18% were randomized (12), but the target sample included only those living close to the training center and there was no charge for exercise, which was continuously supervised. Implementation of a similar exercise program in Belgium ended up with 4% of the potentially eligible participants (13). Because it was unclear how the patients were informed by their rheumatologists and expected to sign up for the program, the low attendance rate is hard to explain. A subsequent survey on general willingness to participate in an exercise program at convenient times and places resulted in 73% showing interest to participate (13). This is probably comparable to the 62% of our target sample that, in the first step, were generally interested in participation in a PA program that was not yet specified as to the time, place, mode, or cost and could therefore be expected by potential participants as conveniently organized.

The sociodemographic factors related to eligibility and acceptance of our PA trial mainly resembled those previously described as correlates or determinants of PA in the general population (28) and in subpopulations of people with RA (12,13,29,30). However, our finding that a larger proportion of those with children ages <18 years were eligible was unexpected. While caring for young children is often described as a barrier to PA (31), it may still be that people with RA are particularly interested in staying fit to be able to care for their children. Conversely, it may also be that a larger proportion of parents with young children were eligible because they did not already reach health-enhancing PA levels. Income is a well-documented determinant for PA participation in the general population (28); therefore, it was not an unexpected finding in our study, which still contradicts previous findings among people with RA where income did not seem important for exercise participation (12). One explanation might be that participation in our PA trial was not for free, and another explanation is that Sweden is a sparsely populated country, with people in rural areas having high transportation costs.

Interestingly, disease-related factors did not seem to have much importance for eligibility or acceptance, which is in contrast to findings of de Jong et al in 2003 (32). This might indicate that RA is generally better controlled today (33). Another explanation could be that the modes and settings of the Dutch program and our current program differed, and thus attracted different target groups. Perceived fatigue was, however, higher among participants who withdrew from the baseline assessments in our study, which might indicate that people with more fatigue, although eligible and willing to participate in PA trials, were not included. This is particularly alarming because fatigue in RA is associated with physical inactivity (30) and potentially reversible by it (34,35). Psychosocial factors, such as social support for exercise and outcome expectations of PA, seemed to have a consistent impact on eligibility or acceptance. A lack of social support from family and friends was related to nonparticipation in our trial. While support from health professionals has previously been described as important for PA in the general population (36) and among people with RA (37–39), the role of family and friends has not previously been described in this subpopulation. Our findings are of concern because high social support from those closest to the individual is a well-documented factor for PA behavior (28,40,41); furthermore, those eligible for and accepting participation had higher expectations of PA, which corresponds well with previous findings (12,42). Fear-avoidance beliefs were higher among those declining participation in our trial than those who accepted. This indicates that fear of exercise-related injury or risk of increased symptoms is still present among people with RA, despite the increasing body of knowledge contradicting this (1). Self-efficacy was previously reported as related to participation in an RA exercise program (12); however, we did not find this to be the case. One explanation might be that the scale used in our study was not specific enough to capture self-efficacy to overcome the range of potential barriers for PA in our sample.

A lack of time, being too busy, the training center being too far away, and comorbid conditions have previously been reported as barriers to PA (29) and resembled our results. However, because PA prevents cardiovascular morbidity and requires long-term commitment (probably

at a certain cost) and maintenance even in periods of perceived wellness, it is unfortunate that such requirements are used as excuses for withdrawing from PA programs. This has not previously been reported and needs further consideration because exercise and PA are still seen as parts of reimbursed rehabilitation measures in periods of threatened functioning, rather than a proactive strategy to prevent disability and comorbidity.

The major strengths of the present study were our large well-defined sample and the detailed description of the entire selection procedure. We used a comprehensive set of assessment methods validated for use in people with musculoskeletal diseases; however, it should be noted that not all methods were yet validated for the RA population. Other factors than those explored in our study could presumably offer additional explanations for participation in PA trials, but our participants had the opportunity to provide additional reasons for nonparticipation in each step of the procedure. We have previously reported that those not responding to our questionnaire differed from responders in a number of ways, which may have limited the generalizability of our results (9). Another potential limitation of our study was the lack of data on disease activity, which may, however, be fairly well reflected in our data on general health, pain, fatigue, and activity limitation.

Despite the fact that PA is safe and beneficial in people with RA (1), our results indicate that only a small minority of individuals with RA are reached for PA trials and, presumably, also for clinical PA programs. Therefore, it is of concern that a substantial proportion of people with RA have never been advised by health professionals about PA despite its perceived significance (38,43), and also that patients perceive a lack of knowledge about PA among health professionals (44). It is therefore likely that health professionals need more education on the safety, benefit, and prescription of PA among people with RA (45), as well as on the use of evidence-based behavioral change techniques for its promotion (46,47). Based on our results, it would be particularly important to recognize and address fear-avoidance beliefs, social support for exercise, and outcome expectations of PA.

We suggest that future studies should focus on identifying people with poor socioeconomic conditions, low social support for exercise, low PA expectations, and high fear-avoidance beliefs to explore how PA trials should be designed to attract these people. Such knowledge is probably not gained from randomized controlled trials, but rather from other types of designs and analyses that will expand insights in this area (48). Furthermore, we recommend prospective studies examining the outcome of PA trials among people with RA in settings outside the clinical health care system to explore the type of support needed from health professionals, as well as the most efficient behavioral techniques promoting a physically active lifestyle.

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AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be published. Ms Nordgren had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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