

# Supervised Group Exercise in Axial Spondyloarthritis: Patients' Satisfaction and Perspective on Evidence-Based Enhancements

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**Objective.** Supervised group exercise (SGE) has been proven effective in patients with axial spondyloarthritis (SpA), but its contents and dosage do not always comply with current scientific insight. This aim of this study was to describe axial SpA patients' satisfaction with current SGE and perspective on potential evidence-based SGE enhancements.

**Methods.** Patients with axial SpA who participated in SGE in 4 regions in The Netherlands ( $n = 118$ ) completed a cross-sectional survey on their satisfaction with features of their current SGE (8 questions scored on a 3-point Likert scale; 1 overall grade, scored according to an 11-point scale) and their perspective on the introduction of appropriately dosed cardiorespiratory and strengthening exercise, monitoring of exercise intensity, periodic reassessments, patient education, and supervision by physical therapists with specific expertise (4 dichotomous questions and one 5-point Likert scale).

**Results.** Most patients were satisfied with the current total intensity (84 of 112 patients [75%]), duration (93 of 111 patients [84%]), and load (89 of 117 patients [76%]) of the program and the proportion of mobility (102 of 114 patients [90%]), strengthening (90 of 115 patients [78%]), and cardiorespiratory exercise (82 of 114 patients [72%]). The median overall grade of the program was a 7 (interquartile range 7–8). Most patients agreed with the implementation of more frequent (home) exercise (73 of 117 patients [62%]), heart-rate monitoring (97 of 117 patients [83%]), and annual reassessments (97 of 118 patients [82%]), whereas 50% agreed with the introduction of patient education (37 of 74 patients). The majority found supervision by therapists specializing in axial SpA to be of high importance (105 of 118 patients [89%]).

**Conclusion.** The majority of SGE participants with axial SpA were satisfied with current SGE but also agreed with enhancements in line with scientific evidence. Current satisfaction levels indicate that a planned implementation strategy, including education and addressing potential barriers and facilitators for the uptake of enhancements, is warranted.

## INTRODUCTION

Axial spondyloarthritis (SpA) is a chronic inflammatory rheumatic disease that predominantly affects the spine and sacroiliac joints and causes chronic back pain and stiffness. Regular exercise is considered to be a key component in the management of axial SpA (1–3) and has been shown to reduce disease activity, pain, and stiffness and improve physical functioning, chest expansion, spinal mobility, and cardiorespiratory function in patients with axial SpA (4–9). Additionally, regular exercise has the potential to

reduce depressive symptoms (10,11). With supervised group exercise (SGE), greater improvements in quality of life, spinal mobility, and patient global assessment were achieved as compared to unsupervised, individual exercise programs (5,12–15). SGE appears similarly effective for patients with radiographic axial SpA (also known as ankylosing spondylitis) and those with nonradiographic axial SpA (16). Recently, results of a systematic review on the effectiveness of exercise either on land or in water in patients with radiographic axial SpA demonstrated the added value of hydrotherapy and education within SGE (including 35 trials) (17).

Supported by the Dutch Arthritis Society (previously Dutch Arthritis Foundation) (grant BP 14-1-161).

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No potential conflicts of interest relevant to this article were reported.

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Submitted for publication December 6, 2018; accepted in revised form March 26, 2019.

### SIGNIFICANCE & INNOVATIONS

- Recent scientific insight on supervised group exercise (SGE) for patients with axial spondyloarthritis (SpA) recommend appropriately dosed strengthening and cardiorespiratory exercise (in addition to mobility exercise), monitoring of intensity of cardiorespiratory exercise, periodic reassessments, patient education, and guidance by therapists who specialize in axial SpA, yet these aspects may currently be missing in practice.
- The majority of patients with axial SpA who participated in weekly SGE were satisfied with its current contents and mode of delivery.
- The majority of patients with axial SpA would agree with the introduction of program enhancements; however, given the high current satisfaction, a planned and tailored implementation strategy (including education) is warranted.

In many countries, SGE for patients with axial SpA was instituted a few decades ago and mostly consisted of mobility, posture, and respiratory exercises (sometimes supplemented with strengthening and cardiorespiratory exercise) that occurred on a weekly or twice weekly basis with a duration of up to 180 minutes (5,18,19). These programs may not be consistent with the current body of knowledge, which suggests that exercise for patients with axial SpA should be individually tailored and include mobility, strengthening, and cardiorespiratory exercise with the right intensity, duration, and frequency (3,5,8,13,15,17,20). In a systematic literature review, Dagfinrud et al (18) examined exercise programs from 12 randomized controlled trials for patients with radiographic axial SpA and reported that most exercise programs included mobility exercise (11 of 12 programs), but only less than half (5 of 12 programs) included strengthening or cardiorespiratory exercise. Strikingly, only 1 exercise program met the American College of Sports Medicine recommendations (21) for developing cardiorespiratory fitness, and none met the recommendations for developing muscular strength (18). It has also been stated that patients should be educated about axial SpA and physical activity, have regular reassessments, and be guided by experts on exercise specifically for those with axial SpA (3,13,15,20,22–24). Patient education on physical activity and patient monitoring currently appear to be lacking (18,25).

All of the aforementioned insights would imply that several enhancements in current practice might be needed in order to improve the contents and quality of SGE for patients with axial SpA. As a prerequisite for successful implementation, it is important to explore the current perspective of various stakeholders on this matter, including patients' perspectives (26–29). The literature on patient perspective, specifically regarding SGE for patients with axial SpA, is scarce. A cross-sectional study by Niedermann et al (26), which used a survey of 575 patients with axial SpA, explored barriers to and facilitators for vigorous cardiorespira-

tory exercise and identified motivation and disease symptoms as the most important factors for implementing vigorous cardiorespiratory training in exercise programs; these results underpinned the need to address motivation and tailor exercise programs to a patient's individual level. Such needs were also demonstrated in a qualitative study by O'Dwyer et al (30), in which the attitudes of 17 patients with axial SpA toward their current exercise program were explored using individual, semistructured interviews and thematic analysis. The study by O'Dwyer and colleagues demonstrated a desire of patients for exercise to be modified to personal abilities and interest. Another qualitative study (31), which included 11 patients distributed throughout 2 focus groups, concluded that patients prefer more education on axial SpA-specific exercise and better monitoring of exercise by specialized therapists. These 3 studies underline the importance that patients with axial SpA attribute to education and personalization of exercise, which could only be made possible with regular monitoring of exercise and periodic reassessments of patients' individual levels, abilities, and interests.

Little is known about the perspectives of axial SpA patients on SGE and potential enhancements. The present study will therefore examine the satisfaction of axial SpA patients with current SGE and their perspective toward proposed enhancements of the contents and guidance of SGE.

### PATIENTS AND METHODS

**Study design.** The present study comprised the baseline data that was gathered between 2015 and 2017 as part of a pilot project on the implementation of enhancements for SGE for axial SpA patients in 4 regions (R1, R2, R3, and R4) in The Netherlands. The baseline assessment included a cross-sectional survey among the participants of an axial SpA-specific SGE. The pilot implementation project is ongoing and includes a baseline assessment of patients' perspectives on current and future SGE, a training of health professionals to apply a set of evidence-based enhancements, and an evaluation of patients' experiences and satisfaction with the revised programs. The proposed enhancements for SGE were based on literature and consisted of 1) periodic reassessments of (changes in) strength, mobility, physical fitness, and functioning, including the setting of individual goals, thereby enabling the development of a personalized exercise program; 2) introduction of appropriately dosed (high intensity) cardiorespiratory and strengthening exercises; 3) introduction of standard monitoring of the intensity of cardiorespiratory exercises; 4) increase of the exercise frequency (by means of home exercise programs); and 5) provision of education on axial SpA-specific exercise.

The study protocol was reviewed by the medical ethical review board of the Leiden University Medical Center (MEC file P14.326), who determined that the study protocol did not need a full review based on the observational nature of the research being embedded in regular care. The study was financially supported by the Dutch Arthritis Society ('ReumaNederland,' grant BP14-1-161).

**Setting.** In The Netherlands, SGE for axial SpA patients is mostly organized by local patient associations for people with rheumatic diseases. Of all 82 local patient associations affiliated with the Dutch Arthritis Society in The Netherlands, 18 organize SGE for axial SpA patients. Six of these, geographically spread across The Netherlands, were approached for participation in the pilot implementation project. Four were willing to participate and were located in Leiden (R1), The Hague (R2), Mid Limburg (R3), and The Gooi (R4). Two regions were unwilling to participate, 1 region without explanation and the other because of the inability of the involved physical therapists to attend the training needed to apply the SGE enhancements. The SGE groups from the 18 local associations that organize SGE for axial SpA patients are guided by physical or exercise therapists. The majority of these therapists had guided these groups for at least 5 years, but only less than half had attended additional training in leading patients with a rheumatic disease. Reimbursement for SGE varies between SGE participants' health insurance programs; some participants receive full or partial reimbursement, and some receive none. Some SGE participants also receive individual physical therapy in addition to SGE.

**Characteristics of SGE.** The SGE classes in the 4 included regions had all been in effect since the early 1990s and were based on a program used in a randomized controlled trial (19). That program was administered weekly and consisted of 3 elements, including land-based training that comprised mobility exercises, sports activities, and hydrotherapy. The present SGE programs in the 4 regions were similar in the sense that they were administered weekly and had the same structure (i.e., using land-based training, sports activities, and hydrotherapy) (see Supplementary Appendix A, available on the *Arthritis Care & Research* web site at <http://onlinelibrary.wiley.com/doi/10.1002/acr.23892/abstract>). However, there were differences regarding the features of the land-based training, with cardiorespiratory exercise only being regularly employed in region R3. There was also a difference in the total duration of the program, which varied between 90 and 135 minutes, due to differences in duration and structure of the land-based training. In regions R1 and R3, 45 minutes were spent on mobility, strengthening, and/or cardiorespiratory exercises, followed by 45 minutes of sports activities, whereas in regions R2 and R4, 45–60 minutes were spent in total on both land-based training and sports activities. These differences may have been caused over time by preferences of the separate SGE regions. Hydrotherapy lasted 45 minutes in all regions.

**Patients.** The implementation project started in region R1 in 2015 and was continued in 2017 in the other 3 regions. A package of numbered pen and paper questionnaires and patient information letters was sent to the 4 local patient associations, who were responsible for inviting their SGE participants for study participation. These local patient associations arranged the distribution and collection of questionnaires among the SGE participants,

and they alone maintained the link between the numbered questionnaire and SGE participants to guarantee anonymity. Patients were eligible for the study if they were willing and able to fill in the survey, and they were reminded by their patient association when the questionnaire was not returned within 2 weeks after issuance. Eventually, the local patient associations returned all completed pen and paper questionnaires to the researchers.

**Assessments.** The survey was self-developed and first pilot-tested by SGE members in region R1. Consequently, 1 question was slightly modified and 1 was removed. The final survey consisted of 3 parts. The first part comprised patient characteristics, including sex, age, year of diagnosis, medication use (painkillers, nonsteroidal antiinflammatory drugs, disease-modifying antirheumatic drugs, and biologics), duration of exercise group participation, and number of days per week in which they are active for  $\geq 30$  minutes with at least a moderate intensity. Patients reporting  $\geq 5$  days of activity for  $\geq 30$  minutes were classified as being active according to the European League Against Rheumatism recommendations for physical activity in people with inflammatory arthritis and osteoarthritis (20).

The second part of the survey assessed patient satisfaction toward the current contents and guidance of their SGE as follows: 1) how they experienced the overall intensity, duration, and load of the exercise programs (too much, just right, or not enough), 2) how satisfied they were with the composition of the program, i.e., the proportion of mobility, strengthening, and cardiorespiratory exercises (too much, enough, or too little), 3) how they experienced the opportunities for personal exercises and adjustments (too little, sufficient, or not necessary), 4) which positive effects they experienced as a result of the group exercise, and 5) how they graded the SGE program overall (grades 0–10, anchors 0 = “very bad” and 10 = “excellent”).

The third part of the survey evaluated the patients' perspectives on potential SGE enhancements, including their views toward periodic (annual) reassessments of mobility, strength, fitness, and physical function (in favor or not), heart-rate monitoring (in favor or not), exercising more than once a week (in favor or not), receiving education about exercise and axial SpA (in favor or not), and the importance of being guided by a therapist who specialized in axial SpA (“extremely important,” “very important,” “neutral,” “unimportant,” or “very unimportant”).

In a fourth part of the survey, which was applicable only to region R1, 6 more questions were used. These included preferences toward the following: 1) engaging in SGE more often but for less time, twice weekly (in favor or not), and SGE combined with an alternative exercise activity (in favor or not); 2) delivery of additional individual exercise (leaflet/internet, personally tailored, app/DVD, remote guidance, on own initiative, or not in favor); 3) delivery of additional guided exercise (regular sport, other axial SpA-specific exercise group, axial SpA-specific webcam guidance, personally tailored with expert guidance, or not in favor);

**Table 1.** Characteristics of axial SpA patients participating in SGE in 4 regions in The Netherlands\*

	Overall (n = 118)	R1 (n = 43)	R2 (n = 17)	R3 (n = 35)	R4 (n = 23)	P†
Female sex	42 (35.6)	12 (27.9)	7 (41.2)	14 (40)	9 (39.1)	0.62
Age, mean ± SD years	59.7 ± 11.6	58.5 ± 12.8	56.2 ± 11.6	62.6 ± 10.3	60.2 ± 10.7	0.24
Disease duration, mean ± SD years	24.9 ± 14.2	25.1 ± 17.7	24.1 ± 8.5	24.9 ± 11.1	25.0 ± 15.3	0.99
Medication use						
Painkiller	28 (23.7)	10 (23.3)	6 (35.3)	7 (20.0)	5 (21.7)	0.66
NSAID	64 (54.2)	25 (58.1)	4 (23.5)	21 (60.0)	14 (60.9)	0.06
DMARD	10 (8.5)	3 (7.0)	1 (5.9)	2 (5.7)	4 (17.4)	0.40
Biologic	19 (16.1)	5 (11.6)	4 (23.5)	6 (17.1)	4 (17.4)	0.71
None	27 (22.9)	7 (16.3)	5 (29.4)	9 (25.7)	6 (26.1)	0.22
Days per week active ≥30 minutes						
Mean ± SD days	4.8 ± 2.2	4.5 ± 2.3	4.9 ± 2.1	4.9 ± 2.1	5.5 ± 2.0	0.40
≥5 days, no./total no. (%)	66/107 (61.7)	21/39 (53.8)	8/13 (61.5)	20/33 (60.6)	17/22 (77.3)	0.22
SGE, mean ± SD years	17.8 ± 9.9	14.7 ± 9.1	20.7 ± 10.0	20.8 ± 10.4	17.0 ± 9.4	0.03
Reimbursement						
Full	52 (44.1)	41 (95.3)	1 (5.9)	6 (17.1)	4 (17.4)	<0.001
Partial	18 (15.3)	2 (4.7)	4 (23.5)	5 (14.3)	7 (30.4)	0.03
None	48 (40.7)	0 (0)	12 (70.6)	24 (68.6)	12 (52.2)	<0.001

\* Values are the number (%) unless indicated otherwise. SpA = spondyloarthritis; SGE = supervised group exercise; NSAID = nonsteroidal antiinflammatory drug; DMARD = disease-modifying antirheumatic drug.

† P value of chi-square test for categorical data and of one-way analysis of variance for continuous data.  $P < 0.05$  indicates a significant difference between the 4 regions.

4) duration of additional exercise (<1 hour, 1 hour, 1.5 hours, or >1.5 hours); 5) frequency of additional exercise (1, 2, 3, or >3 extra weekly sessions); and 6) willingness to pay for additional exercise sessions (amount per session in €).

**Statistical analyses.** First, descriptive statistics were used for the characteristics of the study participants, their satisfaction with current SGE, and agreement with potential enhancements, both for the total group and for the 4 regions. Results were reported as frequencies (and percentages), mean ± SD, or median with interquartile range, where appropriate. To examine any differences between the 4 regions, one-way analysis of variance (ANOVA) was used for continuous data, with a Bonferroni post hoc test to determine which regions differed and a chi-square test for categorical data. Both one-way ANOVA and chi-square tests are useful for comparing 4 groups for statistical significance. Analyses were performed using SPSS, version 23.

## RESULTS

**Participants.** The survey was sent to 130 participants and was returned by 118 (91%), with similar return rates in the 4 regions: region R1, 43 of 48 participants (90%); region R2, 17 of 18 participants (94%); region R3, 35 of 41 participants (85%); and region R4, 23 of 23 participants (100%). Table 1 shows patient characteristics overall and for each region separately. The majority of patients (64%) were male, and the mean ± SD age was 60 ± 12 years. Overall, the characteristics of the patients in the 4 regions were similar, except for the extent to which SGE was reimbursed ( $\chi^2(6) = 76.86$ ,  $P < 0.001$ ) and the duration of SGE participation, which was shorter in region R1 than in region R3 ( $F(3,111) = 3.12$ ,  $P < 0.05$ ).

**Patients' satisfaction with current SGE.** The results of the patients' experiences and satisfaction with current SGE are shown in Table 2. Overall, the majority of patients were satisfied with the SGE. Most participants viewed cardiorespiratory (72%) and strengthening (78%) exercise as receiving enough attention, even in the regions where these exercise types are not included. The proportions of patients judging cardiorespiratory exercise and strengthening as getting too little attention were 27% and 21%, respectively, whereas the proportion of patients perceiving mobility exercise as getting too little attention was 9%. Chi-square test findings showed that significantly more participants in R3, the sole location that targeted cardiorespiratory as well as strengthening and mobility exercise, graded their SGE with at least a score of 7, which was the overall median SGE grade ( $\chi^2(3) = 8.16$ ,  $P < 0.05$ ) (Table 2). Also, significantly fewer participants from the SGE programs with the longest duration (regions R1 and R3) judged the SGE duration as being too short ( $\chi^2(3) = 16.22$ ,  $P < 0.01$ ).

### Patients' perspective on potential SGE enhancements.

In Table 3, the perspective of participants toward potential SGE enhancements is shown. Most proposed enhancements were positively appraised by the majority of patients, with the proportions being highest for the introduction of heart-rate monitoring (83%) and annual reassessments (82%). However, 37% of participants were not in favor of exercising more than once a week in any form (either supervised or unsupervised and group or individual), and 50% expressed a need for education on axial SpA and exercise. Almost all SGE participants (89%) found exercise guidance by a therapist specializing in axial SpA very or extremely important. Analysis using the chi-square test showed that in regions R1 and R2, where the land-based training did not specifically focus on strength-

**Table 2.** Experiences and satisfaction of axial SpA patients with current SGE in 4 regions in The Netherlands\*

	Overall (n = 118)	R1 (n = 43)	R2 (n = 17)	R3 (n = 35)	R4 (n = 23)	P†
Overall intensity						
Too high	11/112 (9.8)	4/41 (9.8)	0/14 (0)	5/34 (14.7)	2/23 (8.7)	0.43
Just right	84/112 (75)	31/41 (75.6)	11/14 (78.6)	27/34 (79.4)	15/23 (65.2)	0.71
Too low	17/112 (15.2)	6/41 (14.6)	3/14 (21.4)	2/34 (5.9)	6/23 (26.1)	0.18
Overall duration						
Minutes	115	135	100	135	90	
Too long	9/111 (8.1)	5/41 (12.2)	1/15 (6.7)	3/32 (9.4)	0/23 (0)	0.39
Just right	93/111 (83.8)	36/41 (87.8)	12/15 (80)	28/32 (87.5)	17/23 (73.9)	0.64
Too short	9/111 (8.1)	0/41 (0)	2/15 (13.3)	1/32 (3.1)	6/23 (26.1)	0.001
Overall load						
Too heavy	15/117 (12.8)	6/43 (14)	1/17 (5.9)	4/34 (11.4)	4/23 (17.4)	0.73
Just right	89/117 (76.1)	31/43 (72.1)	12/17 (70.6)	29/34 (82.9)	17/23 (73.9)	0.67
Too easy	13/117 (11.1)	6/43 (14)	4/17 (23.6)	1/34 (2.9)	2/23 (9.7)	0.13
Mobility exercises						
Too much attention	2/114 (1.8)	0/41 (0)	0/15 (0)	2/35 (5.7)	0/23 (0)	0.19
Just right attention	102/114 (89.5)	37/41 (90.2)	11/15 (73.3)	32/35 (91.4)	22/23 (95.7)	0.03
Too little attention	10/114 (8.8)	4/41 (9.8)	4/15 (26.7)	1/35 (2.9)	1/23 (4.3)	0.07
Strengthening exercises						
Too much attention	1/115 (0.9)	0/42 (0)	0/15 (0)	1/35 (2.9)	0/23 (0)	0.50
Enough attention	90/115 (78.3)	32/42 (76.2)	11/15 (73.3)	28/35 (80)	19/23 (82.6)	0.55
Too little attention	24/115 (20.9)	10/42 (23.8)	4/15 (26.7)	6/35 (17.1)	4/23 (17.4)	0.88
Cardiorespiratory exercises						
Too much attention	1/114 (0.9)	1/42 (2.4)	0/15 (0)	0/35 (0)	0/22 (0)	0.62
Enough attention	82/114 (71.9)	29/42 (69)	11/15 (73.3)	28/35 (80)	14/22 (63.6)	0.37
Too little attention	31/114 (27.2)	12/42 (28.6)	4/15 (26.7)	7/35 (20)	8/22 (36.4)	0.64
Opportunities personal exercise						
Too little	18/116 (15.5)	9/43 (20.9)	0/16 (0)	4/35 (11.4)	5/22 (22.7)	0.15
Sufficient	49/116 (42.2)	20/43 (46.5)	9/16 (56.3)	11/35 (31.4)	9/22 (40.9)	0.41
Not necessary	49/116 (42.2)	14/43 (32.6)	7/16 (43.8)	20/35 (57.1)	8/22 (36.4)	0.15
Experienced effects						
No deterioration	96/118 (81.4)	32/43 (74.4)	14/17 (82.4)	29/35 (82.9)	21/23 (91.3)	0.40
Less stiffness	70/118 (59.3)	26/43 (60.5)	11/17 (64.7)	16/35 (45.7)	17/23 (73.9)	0.18
More endurance	31/118 (26.3)	13/43 (30.2)	5/17 (29.4)	8/35 (22.9)	5/23 (21.7)	0.83
Less pain	23/118 (19.5)	10/43 (23.3)	3/17 (17.6)	6/35 (17.1)	4/23 (17.4)	0.89
More strength	21/118 (17.8)	7/43 (16.3)	3/17 (17.6)	6/35 (17.1)	5/23 (21.7)	0.96
Less medication	20/118 (16.9)	9/43 (20.9)	2/17 (11.8)	6/35 (17.1)	3/23 (13)	0.79
Other	34/118 (28.8)	14/43 (32.6)	8/17 (47.1)	7/35 (20)	5/23 (21.7)	0.18
None	4/118 (3.4)	2/43 (4.7)	0/17 (0)	2/35 (5.7)	0/23 (0)	0.53
SGE grade						
Median (IQR)	7 (7-8)	8 (7-8)	7 (6-8)	8 (7-8)	7 (7-8)	0.47
Grade ≥7	103/118 (87.2)	36/43 (83.7)	12/17 (70.6)	34/35 (97.2)	20/23 (91.2)	0.04

\* Values are the number/total number (%) of participants unless indicated otherwise. SpA = spondyloarthritis; SGE = supervised group exercise; IQR = interquartile range.

† P value of chi-square test for categorical data and of one-way analysis of variance for continuous data. P < 0.05 indicates a significant difference between the 4 regions.

ening and cardiorespiratory exercise, fewer patients were in favor of heart-rate monitoring ( $\chi^2(3) = 21.82, P < 0.001$ ) (Table 3). The proportion of participants willing to exercise more frequently was lower in regions R1 and R3, where SGE takes the longest ( $\chi^2(3) = 18.84, P < 0.001$ ). Finally, the proportion of participants in favor of education was significantly higher in region R2 ( $\chi^2(2) = 8.64, P < 0.05$ ).

Table 4 shows the patients' perspective on additional exercise activities besides current SGE, which was only measured in the pilot in region R1. Almost half of participants (45%) would agree to initiate an alternative individual or guided exercise activity in addition to their SGE. Personally tailored exercise was favored as additional exercise by the highest proportion of participants. An

exercise duration of 1.5 hours, with a frequency of once a week (in addition to current SGE), was most in favor.

## DISCUSSION

The present study examined both the satisfaction with current SGE and the views toward potential, evidence-based enhancements for patients with axial SpA. Most participants appeared to be satisfied with the current SGE, but nevertheless, the majority also agreed with most of the proposed enhancements, including periodic reassessments, heart-rate monitoring, and exercising more frequently.

**Table 3.** Participants' perspective on potential, evidence-based enhancements of SGE for axial SpA patients in 4 regions of The Netherlands\*

	Overall (n = 118)	R1 (n = 43)	R2 (n = 17)	R3 (n = 35)	R4 (n = 23)	P†
Periodic reassessment, in favor	97/118 (82.2)	31/43 (72.1)	16/17 (94.1)	28/35 (80)	22/23 (95.7)	0.06
Heart-rate monitoring, in favor‡	97/117 (82.9)	27/43 (62.8)	14/17 (82.4)	34/35 (97.1)	22/22 (100)	<0.001
Exercise more frequently, in favor	73/116 (62.4)	19/42 (45.2)	14/16 (87.5)	19/35 (54.3)	21/23 (91.3)	<0.001
Education axial SpA and exercise, in favor§	37/74 (50)	NA	13/16 (81.3)	16/35 (45.7)	8/23 (34.8)	0.01
Importance of expert guidance						
Extremely important	51/118 (43.2)	16/43 (37.2)	10/17 (58.8)	15/35 (42.9)	10/23 (43.5)	0.51
Very important	54/118 (45.8)	21/43 (48.8)	6/17 (35.3)	16/35 (45.7)	11/23 (47.8)	0.81
Neutral	11/118 (9.3)	4/43 (9.3)	1/17 (5.9)	4/35 (11.4)	2/23 (8.7)	0.93
Unimportant	1/118 (0.8)	1/43 (2.3)	0/17 (0)	0/35 (0)	0/23 (0)	0.62
Very unimportant	0/118 (0)	0/43 (0)	0/17 (0)	0/35 (0)	0/23 (0)	NA

\* Values are the number/total number (%) of participants unless indicated otherwise. SGE = supervised group exercise; SpA = spondyloarthritis; NA = not applicable.

† P value of chi-square test for categorical data and of one-way analysis of variance for continuous data.  $P < 0.05$  indicates a significant difference between the 4 regions.

‡ In region 1 (R1), the view on heart-rate monitoring during 20–30 minutes of bike exercise was asked, and in the other regions, just the view on heart-rate monitoring was asked.

§ Not measured in R1.

The findings of the present study are highly important for a successful implementation of proposed SGE enhancements and are in line with the findings of studies by Niedermann et al (26), Curbelo Rodríguez et al (31), and O'Dwyer et al (30), which endorse the importance of education, periodic reassessments, and monitoring of exercise, as these components are needed to personalize exercise. Including such components in an SGE would require the guiding therapists to specialize in exercise for patients with axial SpA, and patients in the present study viewed this expertise by the SGE guidance as very important. However, less than half of the SGE therapists from our study had attended additional training in guiding patients with a rheumatic disease. Therefore, training on guiding patients with axial SpA who participate in SGE could be developed and offered to all SGE therapists.

A potential point of concern of the findings of the present study is that even in the regions where cardiorespiratory and strengthening exercise were not included, a majority of SGE participants viewed cardiorespiratory and strengthening exercise as receiving enough attention. This view suggests a knowledge gap regarding the health benefits of these exercise types. Therefore, a planned implementation strategy, which includes education on the importance of adequate and frequent exercise and addresses potential barriers to and facilitators for the uptake of certain SGE enhancements, is warranted (26). Such a strategy is especially important because appropriately dosed cardiorespiratory and strengthening exercises are rarely included in SGE for patients with axial SpA (18) even though these exercises have been recommended by current scientific insights (3,5,8,13,15). This implementation strategy also applies to increasing participants' exercise frequency since 37% of participants did not agree to exercising more than once a week, which is not enough for a physiologic training effect (18). The views on this subject show high variability between exercise regions, which could be explained by the varying duration of SGE. A larger proportion of

participants from SGE classes with a shorter duration were willing to exercise more frequently than participants from classes with a longer duration. This is in line with other studies (26,32,33) that have shown that time is an important factor for exercise behavior. Since the present study and a previous study (30) have shown that most patients preferred a personally tailored exercise program in addition to SGE, it might be desirable (from a patient's perspective) to combine relatively shorter SGE with a personal (home) exercise program. Future research should examine ways to motivate more patients to engage in more frequent and adequate exercise.

Education on important components of exercise for patients with axial SpA should not only be used to facilitate implementation of SGE enhancements but also as part of the SGE. Despite the relatively long participation in SGE and disease duration, approximately one-half of the participants still indicated a need for education on exercise and axial SpA. This is in line with findings from a study by Fontaine et al (25), which showed that less than one-half (42%) of arthritis patients report ever being advised on physical activity, and findings from a study by Curbelo Rodríguez and colleagues (31), which showed that patients with SpA demand more exercise education. Future studies should further examine educational needs. Acknowledgment of the patients' perspective might stimulate positive attitude, self-efficacy, and motivation toward group exercise among (potential) SGE participants have been shown to determine exercise behavior in patients with axial SpA (26,32–36).

The present study had a number of limitations. First, although the survey was pilot-tested, it consisted of nonvalidated questions. Since the satisfaction and views were only questioned with a survey, the patient perspective could not be fully assessed. Additional use of qualitative methods, like semistructured interviews with patients to get insight into potential barriers and facilitators, could be of value before actual implementation. Second,

**Table 4.** Specific views on nature of guidance duration and frequency of additional exercise besides current SGE of participants in Region 1\*

	R1 (n = 43)
Exercise more often	
SGE twice a week	10 (23.3)
SGE combined with an alternative individual or group exercise activity	19 (45.2)
Delivery of additional individual exercise	
From leaflet or internet	3 (7.0)
Personally tailored	10 (23.3)
From app or DVD	6 (14.0)
Remote, interactive guidance (through app, online, or e-mail)	4 (9.3)
On own initiative	6 (14.0)
Not in favor of individual exercise	8 (18.6)
Delivery of additional guided exercise	
Regular sport with non-axial SpA-specific guidance	1 (2.3)
Another axial SpA-specific group exercise activity	6 (14.0)
Axial SpA-specific exercise with online webcam guidance	2 (4.7)
Personally tailored exercise program with expert guidance	7 (16.3)
Not in favor of another organized exercise activity	7 (16.3)
Duration additional exercise	
<1 hour	1 (2.3)
1 hour	6 (14.0)
1.5 hours	8 (18.6)
>1.5 hours	2 (4.7)
Frequency of additional exercise (besides current SGE)	
1 extra weekly session	12 (27.9)
2 extra weekly sessions	4 (9.3)
3 extra weekly sessions	0 (0)
>3 extra weekly sessions	0 (0)
Willingness to pay at most for 1 session of additional exercise (n = 16)	
Median amount (IQR)	€7.00 (€5–€10)
Most often reported amount, no. (%)	€10.00 (5 [31])

\* Values are the number (%) unless indicated otherwise. SGE = supervised group exercise; SpA = spondyloarthritis; IQR = interquartile range.

despite the known effects of exercise on psychosocial well-being (10,11), questions on perceived effects of SGE only addressed physical health. It is, however, conceivable that our observation that patients (on average) participate in SGE for many years is related to perceived positive effects that go beyond physical functioning. Furthermore, the study results might have limited generalizability. Although the study included 4 different regions spread throughout The Netherlands and a comparable sex ratio to other studies (23,37,38), the generalizability to other countries and the entire axial SpA population is limited. This limited generalizability is due to the fact that participants mainly represented relatively older axial SpA patients with a long disease duration and long SGE participation, and there were some dissimilarities between the SGE regions (see Supplementary Appendix A, available on the *Arthritis Care & Research* web site at <http://onlinelibrary.wiley.com/doi/10.1002/acr.23892/abstract>). Finally, the proportion of patients with either radiographic or nonradiographic axial SpA is unknown, which made it impossible to show differences between these patient subgroups.

In future research, the perspectives of other stakeholders (health care insurance plans and SGE guidance) should also be investigated. Moreover, studies should further explore educa-

tional needs and ways to motivate patients for more frequent and adequate exercise. Lastly, after implementation of the proposed enhancements, the perspective of SGE participants should be examined again to give insight into future possibilities to further increase SGE satisfaction and adherence.

In conclusion, although the majority of participants were satisfied with the current SGE, they would also agree with the proposed SGE enhancements. Due to the high satisfaction with the current SGE, a planned implementation strategy is warranted that would include education on the importance of the enhancements and anticipate potential barriers to and facilitators for the incorporation of enhancements. Future research should focus on the educational needs of axial SpA patients and ways to motivate them to exercise more frequently. Also, patient satisfaction and perspective should be reexamined after implementation of SGE enhancements.

**ACKNOWLEDGMENTS**

The authors thank The Dutch Arthritis Society and all participants, coordinators, boards, and guiding therapists from the 4 included SGE regions.

## 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 submitted for publication. Dr. Vliet Vlieland 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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