



Universiteit
Leiden
The Netherlands

Promoting physical activity in patients with rheumatoid arthritis

Berg, M.H. van den

Citation

Berg, M. H. van den. (2007, May 31). *Promoting physical activity in patients with rheumatoid arthritis*. Department of Rheumatology, C1-R, Leiden University Medical Center (LUMC), Faculty of Medicine, Leiden University. Retrieved from <https://hdl.handle.net/1887/11997>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/11997>

Note: To cite this publication please use the final published version (if applicable).

Chapter 1

General Introduction



Introduction

Rheumatoid Arthritis (RA) is a chronic inflammatory and systematic disease which predominantly affects the joints. It is characterised by an unpredictable course with periods of exacerbation and remission of disease activity (1). Poly-arthritis is classified as being RA when at least four out of the seven classification criteria formulated by the American College of Rheumatology (ACR; formerly the American Rheumatism Association) are met (2). RA is more common in women than in men and occurs in 0.5–1.0% of the adult population worldwide (3;4). In the Netherlands approximately 150.000 individuals suffer from RA, making it the most common inflammatory joint disease. Patients with RA have an increased risk of osteoporosis (5), cardiovascular disease, and infection (6;7). Moreover, RA is associated with increased mortality, with standardised mortality rates two to three times above normal (8).

Patients with RA show a reduction in physical functioning compared with healthy persons (9;10). In many patients symptoms such as pain, fatigue, stiffness, and decreased muscle strength cause difficulties with daily activities such as dressing, cooking, cleaning, shopping, work, and leisure activities (11). Moreover, RA has been linked to depression, helplessness, anxiety, and in general has a considerable impact on quality of life (12;13).

Non-pharmacological care for patients with RA

Traditionally, the management of RA has been provided mainly by rheumatologists, whose main task is the prescription of drugs and monitoring their effectiveness and safety. In many cases, additional physicians and health care professionals from various disciplines are involved in the management, examples of which are orthopaedic surgeons, rehabilitation specialists, physical therapists, clinical nurse specialists, occupational therapists, dieticians, and social workers. The actions of these professionals are generally directed at the consequences of the RA in terms of the patient's body functions, activities and participation. Moreover, the patient's environment and personal factors are explicitly taken into account (14).

It is generally acknowledged that patients themselves play a central role in the control or reduction of the impact of their disease. These actions are often designated as self-management strategies (15;16). Self-management strategies include activities such as taking medications, wearing splints or braces, using adaptive equipment, monitoring the balance between activity and

rest, obtaining emotional and/or practical support from friends, family or colleagues, or achieving and maintaining sufficient levels of physical activity. Indeed, acquiring a sufficient amount of physical activity is a commonly used and advocated self-management strategy among patients with RA (17;18). Physical activity is defined as any bodily movement resulting in energy expenditure (19). Exercise is included in this definition, since it is considered as a subset of physical activity that pertains to planned, structured and repetitive bodily movements, aimed at improving or maintaining physical fitness.

Physical activity promotion in people with arthritis

Physical activity decreases the risk of cardiovascular disease and a variety of other chronic diseases in the general population, including diabetes mellitus, cancer, obesity, hypertension, osteoporosis and depression (20–22). The scientific evidence linking physical activity to a multitude of health benefits has contributed to various public health efforts to increase physical activity among sedentary persons. Despite these efforts, the majority of the adult population in Western nations does not meet general physical activity recommendations (23–25).

For people with arthritis, besides the general health benefits as described above, various disease specific benefits of regular physical activity have been extensively reported such as reduced pain, improved mental health and delayed disability (26–29). Moreover, it has been found that physical activity or exercise has no deleterious effect on disease activity or radiological joint damage (29–31). Despite the proven health benefits, recent studies have shown that people with arthritis have even higher rates of sedentary behaviour than the general population (32–34).

So far, several socio-demographic and behavioural factors associated with a lack of physical activity and/or exercise among people with arthritis have been identified such as age, gender, education, social support, perceived benefits, and self-efficacy (35–39). Moreover, since income has proven to be positively related to participation in physical activity (40;41) and people with arthritis in general are faced with a lower income compared to their healthy peers (42), lack of financial resources among these patients may serve as a barrier as well. The relatively low levels of physical activity are all the more worrisome as people with arthritis have an increased risk of chronic conditions such as osteoporosis or cardiovascular disease in comparison with the general population because of their arthritis (5;6). Therefore, enhancing physical activity and exercise levels of persons with arthritis is nowadays more and more advocated.

A number of studies have investigated the effectiveness of physical activity interventions with respect to increasing physical activity levels among people with arthritis (43–46). In general, these interventions appear to be effective on the short-term, but problems have been reported with patients' long-term compliance (47–49). Understanding reasons for non-compliance with physical activity interventions is crucial in the process of offering, monitoring and evaluating these interventions for people with arthritis.

Usage of Internet in physical activity promotion

The use of Internet technology has provided new opportunities for promoting various health behaviours such as physical activity. The Internet has significantly expanded over the past years and has become a part of our everyday lives. The number of Internet users has more than doubled since the year 2000, and in 2006 the Internet is available to over one billion people worldwide (50). Internet usage is highest in North America (69%), followed by Australia (54%) and Europe (38%) (50). With respect to patients with arthritis, estimates of Internet usage among these patients varies between 30% and 50% (51–53), with almost 30% of the arthritis population using the Internet to obtain health care information (51).

The Internet can be used to deliver specialised health care services to patients in a cost-effective manner, regardless of geographic location (54–56). Within the rheumatology setting, new models for arthritis management have been developed that involve Internet technology, for example for health record keeping (57), patient monitoring (58;59) or outpatient consultations (60).

With respect to consultations, the use of the Internet and e-mail to promote physical activity has been described in healthy persons (61–67) as well as people with chronic conditions (68;69). The strength of these interventions is that they can reach large numbers of individuals at lower costs than those associated with face-to-face interventions (70;71). In arthritis care, the experience with Internet-based physical activity interventions is limited.

Aim of this thesis

The aim of the present thesis was to study:

1. The engagement of patients with RA in various forms of physical activity and their preferences regarding the delivery of physical activity interventions;

2. The evidence regarding the effectiveness of physical activity interventions delivered by means of the Internet in general and for patients with RA in particular;
3. Barriers and facilitators for the broader implementation of physical activity interventions in patients with arthritis.

This thesis is divided into two parts. **Part 1** describes the current engagement of RA patients with various types of physical activity. In *Chapter 2* the results of a study comparing RA patients' physical activity levels with those of the general Dutch population are presented. *Chapter 3* describes the participation and preferences regarding various types of leisure-time physical activity in patients with RA. **Part 2** focuses on a specific, innovative strategy to promote physical activity, i.e. enhancing physical activity levels by means of interventions delivered through the Internet and e-mail. In *Chapter 4* the results of a randomised controlled trial, comparing the effectiveness of two Internet-based physical activity interventions for patients with RA, are described. *Chapter 5* describes RA patients' engagement and satisfaction with one of these physical activity interventions. *Chapter 6* presents the results of a systematic literature review concerning the effectiveness of Internet-based physical activity interventions for healthy people as well as people with chronic conditions. In *Chapter 7* barriers and facilitators regarding the implementation of physical activity interventions for people with arthritis are described and illustrated by means of a case study. Finally, a summary of the results and a general discussion are given in *Chapter 8*.

References

1. Pincus T. Long-term outcomes in rheumatoid arthritis. *Br J Rheumatol* 1995; 34 Suppl 2:59–73.
2. Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS et al. The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. *Arthritis Rheum* 1988; 31(3):315–324.
3. Abdel-Nasser AM, Rasker JJ, Valkenburg HA. Epidemiological and clinical aspects relating to the variability of rheumatoid arthritis. *Semin Arthritis Rheum* 1997; 27(2):123–140.
4. Alamanos Y, Drosos AA. Epidemiology of adult rheumatoid arthritis. *Autoimmun Rev* 2005; 4(3):130–136.
5. Haugeberg G, Uhlig T, Falch JA, Halse JI, Kvien TK. Bone mineral density and frequency of osteoporosis in female patients with rheumatoid arthritis: results from 394 patients in the Oslo County Rheumatoid Arthritis register. *Arthritis Rheum* 2000; 43(3):522–530.
6. Mikuls TR. Co-morbidity in rheumatoid arthritis. *Best Pract Res Clin Rheumatol* 2003; 17(5):729–752.
7. Wolfe F, Freundlich B, Straus WL. Increase in cardiovascular and cerebrovascular disease prevalence in rheumatoid arthritis. *J Rheumatol* 2003; 30(1):36–40.
8. Sihvonen S, Korpela M, Laippala P, Mustonen J, Pasternack A. Death rates and causes of death in patients with rheumatoid arthritis: a population-based study. *Scand J Rheumatol* 2004; 33(4):221–227.
9. Steultjens EM, Dekker J, Bouter LM, van Schaardenburg D, van Kuyk MA, Van den Ende CH. Occupational therapy for rheumatoid arthritis: a systematic review. *Arthritis Rheum* 2002; 47(6):672–685.
10. Sokka T, Krishnan E, Hakkinen A, Hannonen P. Functional disability in rheumatoid arthritis patients compared with a community population in Finland. *Arthritis Rheum* 2003; 48(1):59–63.
11. Kosinski M, Kujawski SC, Martin R, Wanke LA, Buatti MC, Ware JE, Jr. et al. Health-related quality of life in early rheumatoid arthritis: impact of disease and treatment response. *Am J Manag Care* 2002; 8(3):231–240.
12. Evers AW, Kraaijmaat FW, Geenen R, Jacobs JW, Bijlsma JW. Longterm predictors of anxiety and depressed mood in early rheumatoid arthritis: a 3 and 5 year followup. *J Rheumatol* 2002; 29(11):2327–2336.
13. Cadena J, Vinaccia S, Perez A, Rico MI, Hinojosa R, Anaya JM. The Impact of Disease Activity on the Quality of Life, Mental Health Status, and Family Dysfunction in Colombian Patients With Rheumatoid Arthritis. *J Clin Rheumatol* 2003; 9(3):142–150.
14. Vliet Vlieland TP. Rehabilitation of people with rheumatoid arthritis. *Best Pract Res Clin Rheumatol* 2003; 17(5):847–861.
15. Keysor JJ, DeVellis BM, DeFries GH, DeVellis RF, Jordan JM, Konrad TR et al. Critical review of arthritis self-management strategy use. *Arthritis Rheum* 2003; 49(5):724–731.
16. Katz PP. Use of self-management behaviors to cope with rheumatoid arthritis stressors. *Arthritis Rheum* 2005; 53(6):939–949.
17. Hammond A. The use of self-management strategies by people with rheumatoid arthritis. *Clin Rehabil* 1998; 12(1):81–87.
18. Veitienė D, Tamulaitienė M. Comparison of self-management methods for osteoarthritis and rheumatoid arthritis. *J Rehabil Med* 2005; 37(1):58–60.
19. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep* 1985; 100(2):126–131.
20. Pate RR, Pratt M, Blair SN, Haskell WL, Macera CA, Bouchard C et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995; 273(5):402–407.

21. Lakka TA, Bouchard C. Physical activity, obesity and cardiovascular diseases. *Handb Exp Pharmacol* 2005;(170):137–163.
22. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. *CMAJ* 2006; 174(6):801–809.
23. Jones DA, Ainsworth BE, Croft JB, Macera CA, Lloyd EE, Yusuf HR. Moderate leisure-time physical activity: who is meeting the public health recommendations? A national cross-sectional study. *Arch Fam Med* 1998; 7(3):285–289.
24. Varo JJ, Martinez-Gonzalez MA, Irala-Estevez J, Kearney J, Gibney M, Martinez JA. Distribution and determinants of sedentary lifestyles in the European Union. *Int J Epidemiol* 2003; 32(1):138–146.
25. Brown DW, Balluz LS, Heath GW, Moriarty DG, Ford ES, Giles WH et al. Associations between recommended levels of physical activity and health-related quality of life. Findings from the 2001 Behavioral Risk Factor Surveillance System (BRFSS) survey. *Prev Med* 2003; 37(5):520–528.
26. Westby MD, Wade JP, Rangno KK, Berkowitz J. A randomized controlled trial to evaluate the effectiveness of an exercise program in women with rheumatoid arthritis taking low dose prednisone. *J Rheumatol* 2000; 27(7):1674–1680.
27. Stenstrom CH, Minor MA. Evidence for the benefit of aerobic and strengthening exercise in rheumatoid arthritis. *Arthritis Rheum* 2003; 49(3):428–434.
28. Fransen M, McConnell S, Bell M. Exercise for osteoarthritis of the hip or knee. *Cochrane Database Syst Rev* 2003;(3):CD004286.
29. De Jong Z, Vlieland TP. Safety of exercise in patients with rheumatoid arthritis. *Curr Opin Rheumatol* 2005; 17(2):177–182.
30. Van den Ende CH, Hazes JM, Le Cessie S, Mulder WJ, Belfor DG, Breedveld FC et al. Comparison of high and low intensity training in well controlled rheumatoid arthritis. Results of a randomised clinical trial. *Ann Rheum Dis* 1996; 55(11):798–805.
31. Neuberger GB, Press AN, Lindsley HB, Hinton R, Cagle PE, Carlson K et al. Effects of exercise on fatigue, aerobic fitness, and disease activity measures in persons with rheumatoid arthritis. *Res Nurs Health* 1997; 20(3):195–204.
32. Hootman JM, Macera CA, Ham SA, Helmick CG, Snizek JE. Physical activity levels among the general US adult population and in adults with and without arthritis. *Arthritis Rheum* 2003; 49(1):129–135.
33. Fontaine KR, Heo M, Bathon J. Are US adults with arthritis meeting public health recommendations for physical activity? *Arthritis Rheum* 2004; 50(2):624–628.
34. Eurenus E, Stenstrom CH. Physical activity, physical fitness, and general health perception among individuals with rheumatoid arthritis. *Arthritis Rheum* 2005; 53(1):48–55.
35. Fontaine KR, Haaz S. Risk factors for lack of recent exercise in adults with self-reported, professionally diagnosed arthritis. *J Clin Rheumatol* 2006; 12(2):66–69.
36. Shin YH, Hur HK, Pender NJ, Jang HJ, Kim MS. Exercise self-efficacy, exercise benefits and barriers, and commitment to a plan for exercise among Korean women with osteoporosis and osteoarthritis. *Int J Nurs Stud* 2006; 43(1):3–10.
37. Gecht MR, Connell KJ, Sinacore JM, Prohaska TR. A survey of exercise beliefs and exercise habits among people with arthritis. *Arthritis Care Res* 1996; 9(2):82–88.
38. Eurenus E, Biguet G, Stenstrom CH. Attitudes toward physical activity among people with rheumatoid arthritis. *Physiother Theory Pract* 2003; 19:53–62.
39. Der Ananian C, Wilcox S, Saunders R, Watkins K, Evans A. Factors that influence exercise among adults with arthritis in three activity levels. *Prev Chronic Dis* 2006; 3(3):A81.
40. Estabrooks PA, Lee RE, Gyurcsik NC. Resources for physical activity participation: does availability and accessibility differ by neighborhood socioeconomic status? *Ann Behav Med* 2003; 25(2):100–104.

41. Kavanagh AM, Goller JL, King T, Jolley D, Crawford D, Turrell G. Urban area disadvantage and physical activity: a multilevel study in Melbourne, Australia. *J Epidemiol Community Health* 2005; 59(11):934–940.
42. Kochevar RJ, Kaplan RM, Weisman M. Financial and career losses due to rheumatoid arthritis: a pilot study. *J Rheumatol* 1997; 24(8):1527–1530.
43. Halbert J, Crotty M, Weller D, Ahern M, Silagy C. Primary care-based physical activity programs: effectiveness in sedentary older patients with osteoarthritis symptoms. *Arthritis Rheum* 2001; 45(3):228–234.
44. Boudaugh ML. Arthritis Foundation community-based physical activity programs: effectiveness and implementation issues. *Arthritis Rheum* 2003; 49(3):463–470.
45. Talbot LA, Gaines JM, Huynh TN, Metter EJ. A home-based pedometer-driven walking program to increase physical activity in older adults with osteoarthritis of the knee: a preliminary study. *J Am Geriatr Soc* 2003; 51(3):387–392.
46. Hughes SL, Seymour RB, Campbell R, Pollak N, Huber G, Sharma L. Impact of the fit and strong intervention on older adults with osteoarthritis. *Gerontologist* 2004; 44(2):217–228.
47. Campbell R, Evans M, Tucker M, Quilty B, Dieppe P, Donovan JL. Why don't patients do their exercises? Understanding non-compliance with physiotherapy in patients with osteoarthritis of the knee. *J Epidemiol Community Health* 2001; 55(2):132–138.
48. Damush TM, Perkins SM, Mikesky AE, Roberts M, O'Dea J. Motivational factors influencing older adults diagnosed with knee osteoarthritis to join and maintain an exercise program. *J Aging Phys Act* 2005; 13(1):45–60.
49. Van Gool CH, Penninx BW, Kempen GI, Rejeski WJ, Miller GD, Van Eijk JT et al. Effects of exercise adherence on physical function among overweight older adults with knee osteoarthritis. *Arthritis Rheum* 2005; 53(1):24–32.
50. Internet World Stats. World Internet Users and Population Statistics 2006. Available at: <http://www.internetworldstats.com/stats.htm>. 2006. Ref Type: Internet Communication
51. Gordon MM, Capell HA, Madhok R. The use of the Internet as a resource for health information among patients attending a rheumatology clinic. *Rheumatology (Oxford)* 2002; 41(12):1402–1405.
52. Tak SH, Hong SH. Use of the Internet for health information by older adults with arthritis. *Orthop Nurs* 2005; 24(2):134–138.
53. Richter JG, Becker A, Specker C, Monser R. Disease-oriented Internet use in outpatients with inflammatory rheumatic diseases [Eng. trans.]. *Zeitschrift für Rheumatologie* 2004; 63:216–222.
54. Leggett P, Graham L, Steele K, Gilliland A, Stevenson M, O'Reilly D et al. Telerheumatology--diagnostic accuracy and acceptability to patient, specialist, and general practitioner. *Br J Gen Pract* 2001; 51(470):746–748.
55. Harrison R, Clayton W, Wallace P. Can telemedicine be used to improve communication between primary and secondary care? *BMJ* 1996; 313(7069):1377–1380.
56. Whitten P, Love B. Patient and provider satisfaction with the use of telemedicine: overview and rationale for cautious enthusiasm. *J Postgrad Med* 2005; 51(4):294–300.
57. Eklund B, Jostira-Enquist I. Sustains--direct access for the patient to the medical record over the Internet. *Stud Health Technol Inform* 2004; 100:182–189.
58. Athale N, Sturley A, Skoczen S, Kavanaugh A, Lenert L. A web-compatible instrument for measuring self-reported disease activity in arthritis. *J Rheumatol* 2004; 31(2):223–228.
59. Brophy S, Hunniford T, Taylor G, Menon A, Roussou T, Calin A. Assessment of disease severity (in terms of function) using the internet. *J Rheumatol* 2004; 31(9):1819–1822.
60. Pal B, Laing H, Estrach C. A cyberclinic in rheumatology. *J R Coll Physicians Lond* 1999; 33(2):161–162.
61. Rovniak LS, Hovell MF, Wojcik JR, Winett RA, Martinez-Donate AP. Enhancing theoretical fidelity: an e-mail-based walking program demonstration. *Am J Health Promot* 2005; 20(2):85–95.

62. Hageman PA, Walker SN, Pullen CH. Tailored versus standard internet-delivered interventions to promote physical activity in older women. *J Geriatr Phys Ther* 2005; 28(1):28–33.
63. Plotnikoff RC, McCargar LJ, Wilson PM, Loucaides CA. Efficacy of an E-mail intervention for the promotion of physical activity and nutrition behavior in the workplace context. *Am J Health Promot* 2005; 19(6):422–429.
64. Marshall AL, Leslie ER, Bauman AE, Marcus BH, Owen N. Print versus website physical activity programs: a randomized trial. *Am J Prev Med* 2003; 25(2):88–94.
65. Napolitano MA, Fotheringham M, Tate D, Sciamanna C, Leslie E, Owen N et al. Evaluation of an internet-based physical activity intervention: a preliminary investigation. *Ann Behav Med* 2003; 25(2):92–99.
66. Tate DF, Wing RR, Winett RA. Using Internet technology to deliver a behavioral weight loss program. *JAMA* 2001; 285(9):1172–1177.
67. Tate DF, Jackvony EH, Wing RR. Effects of Internet behavioral counseling on weight loss in adults at risk for type 2 diabetes: a randomized trial. *JAMA* 2003; 289(14):1833–1836.
68. Kosma M, Cardinal BJ, McCubbin JA. A pilot study of a web-based physical activity motivational program for adults with physical disabilities. *Disabil Rehabil* 2005; 27(23):1435–1442.
69. McKay HG, King D, Eakin EG, Seeley JR, Glasgow RE. The diabetes network internet-based physical activity intervention: a randomized pilot study. *Diabetes Care* 2001; 24(8):1328–1334.
70. Marcus BH, Nigg CR, Riebe D, Forsyth LH. Interactive communication strategies: implications for population-based physical-activity promotion. *Am J Prev Med* 2000; 19(2):121–126.
71. Marcus BH, Owen N, Forsyth LH, Cavill NA, Fridinger F. Physical activity interventions using mass media, print media, and information technology. *Am J Prev Med* 1998; 15(4):362–378.