Better management of patients with osteoarthritis

Development and nationwide implementation of an evidence based supported self-management programme

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Pedagogical project for Docentship
March 2013

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Abstract

Information, exercise and weight reduction are first line recommendations for osteoarthritis treatment in guidelines. There is a gap between guideline recommendations and clinical practice. This could partly be explained by difficulties translating guidelines to practice. Patients need to self-manage and cope with the disease to ensure lasting treatment of osteoarthritis. Strategies to facilitate compliance are crucial to gain benefits. A supported osteoarthritis self-management programme, incorporating strategies to facilitate patient and health care compliance, was developed. The programme combined peer and health care professional delivered information and individually adapted exercise, delivered by trained physiotherapists.

Aim

To explore feasibility of the evidence based programme in clinical practice, and to study possible effects from implementation on patient satisfaction and compliance.

Methods

Physiotherapists following the programme reported the number of patients treated with the intervention, as well as patient adherence to the intervention to a national quality register, the BOA register. Patient reported compliance to and satisfaction with the programme was assessed at 3 and 12 months follow-up. For the present study physiotherapy clinics delivering at least theory sessions and reporting at least ten patients to the register were defined as “users”.

Results

Data from 9800 consecutive patients from 230 different care-centres in Sweden, followed for three months, showed that 97% attended the theory sessions and 82% volunteered for the individual exercise programme. The intervention was rated as good or very good by 92% of patients, 62% said they used what they had learnt during the course every day, and 91% said they practiced what they had learned during the course at least on a weekly basis. Of 4100 patients followed for 12 months 35% said they used what they had learned every day, and 72% used what they had learned every week.

Conclusion

The supported osteoarthritis self-management programme is feasible in clinical practice, and seem useful and acceptable to patients. The BOA model (www.boaregistrat.se), comprising the self-management programme, education of health care professionals and the national

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quality register, provides a unique opportunity to study processes involved in nationwide implementation of evidence based guidelines in clinical practice.

KEY WORDS:

osteoarthritis, evidence based guidelines, implementation, patient education, exercise
Preface

This project describes the development and implementation of an evidence based self-management programme for patients with hip or knee osteoarthritis. The programme was initiated and developed by me, based on experiences and results from my own research as a PhD-student, and from translating treatment guidelines and the findings from scientific studies within the field of osteoarthritis, both qualitative and quantitative, into clinical practice. I have also developed a two-day education for health care professionals, and since 2006 I have educated over one thousand physiotherapists and occupational therapists that now are delivering the programme to patients nationwide. I was project manager during the three year period in 2008-2010 when the Better management of OsteoArthritis, BOA, was tried out and implemented nationwide, and the National quality register, the BOA-register, was developed. Currently, I am Register director for the BOA-register, for Better Management of patients with Osteoarthritis, and I have consequently done the analyses presented in the results section in this paper.

However, none of this could have been done without help from others. My sincere gratitude to Hanna Bengtsson, Erika Börjesson, Pernilla Chowdary, Ing-Marie Petersson, Frida Christiansson, Ann Bremander, Ingvild Kjeken, and Charlotte Sjödin for their contribution to the development of the evidence based supported osteoarthritis self-management programme, “Spenshults Artrosskola”.

Göran Garellick, Pernilla Chowdary, Therese Jönsson, Ingrid Lundin, Malin Jönsson-Lundgren, Maria Gustafsson, Monica Stålberg, Lena Fransson, Helena Mökander, the Swedish Rheumatism Association and all osteoarthritis communicators who have contributed with their experience in the education of health care professionals.

Leif Dahlberg, Göran Garellick, Kjell Nilsson, Maria Klässbo, Malin Jönsson-Lundgren, Therese Jönsson, Ingrid Lundin, Ninni Sernert, Ingemar Petersson, Lillemor Nyberg and Ingrid Cederlund for their contribution to the design and development of the National quality register, the BOA-register, and as members of the steering committee of BOA.

Last, but not least, all the people with specific skills in statistics and hardware development at Registercentrum Syd, Lund, and Registercentrum VGR, Gothenburg, who have been involved in the development of the database and online reports.

BOA has come to reality with financial support from The Swedish Social Insurance Agency, governmental grants to health care, Västra Götalandsregionen, and the Swedish Association of Local Authorities and Regions.
Introduction

Treating life lasting diseases, like osteoarthritis, need active engagement from both care givers and patients to enable continuous and life lasting treatment. The challenges for health care are not only to inform patients on how and why, but also to ensure adherence to the recommendations. The understanding and interpretation of information is crucial, and to a large extent determined by the mode and delivery of information. This is true for both patients and health care professionals. Although guidelines for treatment of osteoarthritis are available, there is a gap between evidence based treatment and clinical practice [1-4]. This paper concerns the development and evaluation of an evidence based patient education programme for osteoarthritis, and how this programme can be implemented in clinical practice. The effects from this “real-world” practice are explored and discussed from the pedagogical point of view.

Survey of the field

Patient education is a common intervention for several diseases, like cancer, diabetes and asthma [5]. This paper is limited to patient education, osteoarthritis and physiotherapy.

There is currently no cure for osteoarthritis. Osteoarthritis affects a large proportion of the population, with significant costs for society and large impact on perceived health and quality of life for the individual. Interventions aim to prevent deterioration of symptoms, physical function and structural changes. Chronic disease need “chronic treatment” and patients must self-manage and cope in their daily life in one way or another, with or without help from health care, family, friends or society. Patients seek information from different sources including the internet, which in some cases may not be updated or correct. It is a common perception that osteoarthritis is caused by “wear and tear”, and that there is no available treatment other than joint replacement surgery [6, 7]. Only a minority of all people living with osteoarthritis seeks care [8, 9].

Radiographically detectable changes may not be present at the onset of symptoms [10, 11], and association between symptoms and radiographic changes is weak [12-14], although increasing with increased disease severity [15, 16]. To diagnose osteoarthritis, the National Board of Health and Welfare advise clinicians to use clinical examination and medical history [17]. Radiographic examination should only be used to inform surgical interventions or when referring to specialist. Using radiographic findings as a criterion of osteoarthritis, as still is
very common, may delay onset of adequate non-surgical treatment, and the potential preventive effects deteriorate over time.

Self-management programmes are often acknowledged as an important part of care for people with chronic disease, and as a mean to empower patients. Although the clinical guidelines recommend patient education, the evidence of its effect is not so convincing, and several studies have explored the effects of different arthritis self-management programmes with diverging results [5, 18-23]. An Australian randomized controlled study found it hard to recruit participants since both patients and referring health care personnel were hesitative to the need and benefit of self-management programmes [24]. Further, factors like trial setting and methodology, group of patients included, mode of delivery and number of sessions may obstruct generalizability of intervention to clinical practice. There are different models of self-management interventions described, where information is delivered by peers [21] or health care professionals [25], in group or individually [22, 23], based on information only [21], or information and exercise in combination [22, 23]. In addition, the purpose of self-management interventions is often to promote a healthy living and encourage self-efficacy, but the actual changes in psychological or behavioral measures are not well explored [26], or might be significant but of less clinical value [27]. Research from the UK has shown that an intervention aiming at increasing the self-management of patients with knee pain is cost-effective even in the long run [28].

Information, exercise and weight reduction are first line treatments for osteoarthritis in international as well as national treatment guidelines [29, 30] (figure 1). These core treatments should be offered to all patients with hip or knee osteoarthritis as early as possible during the course of disease. For patients with severe symptoms, where non-surgical treatments have been tried and failed, total joint replacement could be considered [17]. However, most patients with disabling osteoarthritis will never be eligible for surgical interventions [31].

Better management of patients with osteoarthritis
Figure 1. Osteoarthritis treatment according to guidelines. Basic treatment, i.e. information, individually adapted exercise and weight reduction, should be offered to all patients as early as possible. Pain relieving treatments, orthotics, walking aids and devices for daily activities are supplementary treatments where basic treatment is not enough. Surgical interventions should be considered when non-surgical treatments have been tried and failed. (www.boaregistret.se)

Guidelines are based on systematic reviews of the literature and expert opinion, and generally give strength of evidence and recommendation. The treatment guidelines by Osteoarthritis research society international (OARSI) have neatly summarized the level of evidence, the level of consensus between international experts, and the strength of recommendation for several non-pharmacological treatment modalities. It emphasizes self-management, and clearly points out the importance of exercise, weight control, and access to information and education [32]. Similarly, in the UK, National institute for health and clinical excellence (NICE) guidelines recommend information, exercise and weight reduction as core treatments, with adjunct pain reducing therapies [33]. Even though the NICE guidelines emphasise the importance of considering individual preferences and needs, both the OARSI and NICE recommendations are still given in more general terms, and may be hard to interpret in

Better management of patients with osteoarthritis
clinical practice. Lack of specific recommendations reflects the lack of detail in publications and also the variety of interventions used in studies. Meta-analyses have revealed that studies involving exercise interventions are diverging with respect to exercise type, intensity and duration, precluding more specific recommendations about exercise. Furthermore, randomised controlled trials on effects of exercise in osteoarthritis have included patients of different ages and needs, with different disease duration and joints involved [34, 35]. This may impair the results compared to clinical practice, since in RCT’s the same intervention is used for all patients, while in clinic patients are individually taken care of.

Several studies have shown that evidence-based guidelines are seldom reflected in clinical practice and that patients with hip or knee osteoarthritis are referred to surgery without having tried non-surgical treatments [2-4]. In Sweden, surveys from different geographic regions have shown that more than 50% of patients with hip or knee osteoarthritis are referred to surgery without receiving core treatment. The gap between evidence-based treatment, or guidelines, and clinical practice can have several explanations. The obstacles on health care (i.e. physiotherapy) level could be related to health economics, resources, feasibility, effectiveness, and difficulties in interpreting and translating treatment guidelines into clinically useful and applicable treatments [1, 36]. Obstacles to effective implementation are also found at patient level as well as on political and organisational level [37].

Biomechanical factors are important in the progress of osteoarthritis [38-43], and therefore need to be considered when designing exercise programmes. More specifically, quadriceps strength has been pointed out as a potential protective factor for knee osteoarthritis [44], and reduced lower extremity function seem to increase the risk of knee osteoarthritis development [11]. To simply introduce quadriceps strengthening exercises, without considering the neuromuscular function may be less effective, and even increase the risk of progress [42]. Lately, research has focused more on the role of foot and hip function in knee osteoarthritis [45-47], indicating that there is a need to treat each joint dysfunction as a part of the whole. Supervised neuromuscular exercises, combining proximal strength and lower extremity function may decrease the medial compartment knee joint load in patients with knee osteoarthritis [48]. Isolated hip abductor strengthening exercises have showed positive effects on knee symptoms, but not on biomechanical factors of the knee [49, 50]. In physiotherapy clinic, joint problems are treated as a part of whole body function.

*Better management of patients with osteoarthritis*
A randomized controlled trial on exercise in middle-aged patients with moderate to severe knee osteoarthritis revealed no effect on pain or physical function on group level compared to a living-as-usual control group [51]. The within group differences, however, were large with some individuals improving largely and others deteriorating as much. No measures could statistically explain these differences. An adjunct qualitative study, exploring the thoughts and beliefs of osteoarthritis and exercise as treatment among patients in the exercise group showed that all patients, even those who had experienced a large improvement in pain and function, harbored doubts about exercise for osteoarthritis [52]. They were afraid that exercise would cause further harm to their already poor knee joints, and also that they themselves would do something wrong during exercise. They were all reluctant to exercise as treatment. This indicates that there is no such thing as “one-size-fits-all” in exercise, and the experienced benefit from exercise on pain and function is not enough to motivate patients to keep on exercising.

Pain is a common symptom in osteoarthritis, often in relation to weight bearing, and often perceived as threatening by patients. Chronic pain as in osteoarthritis needs a different understanding as well as different coping strategies compared to acute pain, which often signals injury or risk of injury. The underlying physiological processes in acute and chronic pain are different, but the pain signal is perceived in a similar way and could be hard for patients to separate. Most often, people have learned to handle acute pain by avoiding the “threat” of injury, i.e. the burning fire or the sharp edge. Avoiding weight bearing pain, as in osteoarthritis, by avoiding painful activities increase the risk of reduced physical function and disability over time [53], and of inactivity related diseases like cardiovascular disorders, diabetes and cancer. On the other hand, ignoring or transforming pain increase the risk of more severe pain [53]. A model of “acceptable pain” has successfully been used in clinic for patients with chronic pain. The model allows pain during exercise if pain is perceived as ‘acceptable’ by the patient or does not exceed five on a 0-10 scale, and has normalized within twenty-four hours [54]. This model can be used as a tool for patients to monitor pain during activity.

Factors other than those related to knee osteoarthritis are involved in patients’ decision making [55, 56]. Patients are at different stages of motivation to lifestyle changes [57, 58] and many of them tend to comply in the short term (i.e. during the intervention) out of duty or a desire to please the physiotherapist [52, 59]. Psychological models such as stage of change, a transtheoretical model of behavioural change [60], self-determination theory, a theory of
motivation and factors influencing motivation [61], and relapse prevention model, a model to identify risk factors for relapse to an unfavourable behaviour, and strategies to cope [62], are not regularly reported or described as parts of interventions for patients with osteoarthritis, but could possibly be useful to overcome obstacles to compliance related to motivation. Since osteoarthritis is a life lasting condition, exercise and physical activity need to be performed regularly over time, as a part of a permanent life style change. To achieve a more physically active life style in the long run, the physiotherapist need to determine on what stage of motivation the patient is, and aim for one step at a time. A patient who has never exercised before, and believe that exercise might harm the osteoarthritic joint, is not likely to adhere to exercise in the long run. They might not even be willing to try.

Development of the programme

Based on the above mentioned concerns, and the identified gaps between evidence based guidelines and clinical practice, we felt the need to first of all develop a programme for evidence based management of osteoarthritis. Strategies to facilitate implementation and dissemination in physiotherapy clinical practice as well as patients’ compliance to the intervention needed to be incorporated in the programme development. Firstly, we hypothesized that a “ready-to-use” programme based on existing evidence would be feasible in clinical practice and possible to disseminate through education. Second, we assumed that the possibility to adapt the intervention to local (physiotherapy practice) or personal (patient) preferences is crucial for acceptability. Thirdly, we hypothesized that patients with good experiences of exercise as treatment can be used as “role models”, to transform information into knowledge important for adherence/compliance.

The evidence-based supported osteoarthritis self-management programme was developed and tried out at Spenshult Hospital for Rheumatic Diseases in 2006 (Figure 1). The content was based on existing evidence, national and international treatment guidelines, as well as patients’ views, thoughts and tolerability of treatment and exercise for osteoarthritis. Focus was on information and individually adapted training.

Four focus groups with patients from specialist care (rheumatology) and primary care were conducted to inform about key content and mode of delivery from the patient perspective. The questions that were discussed were *What information is important to include in a patient education programme? Who do you think should provide this information?* Based on the (unpublished) results from these focus groups, and the fact that health economic discussions
are often obstructing successful implementations [36], the personnel resources were minimized to allied health care professionals (i.e. physiotherapist and occupational therapist). A rough calculation, based on the national fee per health care visit paid by patients, compensation from the county council to the health care clinic per visit, the health care professional’s total time spent in intervention, and cost per hour for physiotherapists showed that an intervention with three theoretical sessions held by health care professionals (one at each session), and a minimum of seven patients in each group, could be completed with economic balance. Based on experience from group interventions it was suggested that the number of participants in each group should not exceed twelve, to ensure interaction and patient involvement in group discussions.

Target group
Patients who seek care due to hip or knee pain could be referred by health care providers or self-refer for the programme. They were eligible if there was non-traumatic pain, sufficient to seek care and attributed by a clinician to the hip or knee. A clinical examination was performed by a trained physical therapist to differentiate symptoms caused by osteoarthritis from symptoms caused by chronic wide spread pain, or other more severe diseases, such as inflammatory joint disease or cancer. Radiographic examination was not necessary, and the clinical diagnosis was determined using symptoms, clinical examination and anamnese [17]. Patients with sequel hip fracture, chronic wide spread pain, inflammatory joint disease or cancer were excluded. Patients who did not understand the Swedish language were treated individually, and thus not included in this group education.

Minimal intervention - Information
The supported osteoarthritis self-management programme consisted of minimum two theoretical sessions of about 90 minutes, held as group sessions with 7-12 participants in each group. This was defined as the ‘minimal intervention’ (figure 2). The minimal intervention could not be modified, but physiotherapists could choose to adjust the content or sessions besides the minimal intervention to suit their clinical routines and resources.

The first session contained information about the pathology and aetiology of osteoarthritis, available treatments and treatment guidelines. The second session, about exercise in osteoarthritis, comprised issues about why exercise is needed, obstacles to exercise, how exercises can be incorporated in daily life, and self-management strategies to reduce pain and symptoms. Ideally, the third session was held by an osteoarthritis communicator, i.e. a patient
with OA who had been trained through the European Osteoarthritis Communicator Programme [63] to teach about the lived experience with OA, as well as his or her personal experience of non-surgical interventions. The osteoarthritis communicator had good experiences from self-management like exercise and physical activity. Osteoarthritis communicators collaborated in the programme out of their own interest and of desire to help others, and their contribution to the supported self-management programme was free of charge to health care. The distribution of contact between health care and osteoarthritis communicators was administered by the Swedish Rheumatism Association.

Thus, the supported osteoarthritis self-management programme combined peer and health care professional delivered information and individually adapted exercise, delivered by trained physiotherapists. The overall aim of the intervention was to increase patients’ self-efficacy to actually self-manage the disease and to increase the level of physical activity and thereby improve health related quality of life, reduce sick leave and the use of health care.

Better management of patients with OsteoArthritis (BOA)

**Assessment**
Individual visit PT

**Osteoarthritis Education**

**Occasion 1**
- What is OA
- Risk factors
- Symptoms
- Treatment

**Occasion 2**
- Exercise
- Physical activity in daily living
- Coping
- Self-management

**Occasion 3**
Osteoarthritis communicator
- To live with OA

**Minimal Intervention**

**Optional:**
- Exercise (individual visit): individually adapted exercise program
- Group exercise (6 weeks): supervised exercise using individual program

**Follow-up I**
(3 months)
Individual visit PT

**Follow-up II**
(12 months)
Postal questionnaires

*Figure 2. Disposition of the supported osteoarthritis self-management programme for patients.*
Additional theory sessions could be provided where clinical resources were available. These sessions could for example include information about weight loss and diet, pharmacological and surgical treatment, hand function and activities to reduce symptoms due to hand osteoarthritis, and could be provided by dieticians, physicians or occupational therapists.

**Exercise - Optional sessions**

One purpose of the theoretical sessions was to explain the mechanisms behind the possible benefits of specific exercises, increase the patients’ inner motivation to exercise, and to make the individual exercise programme “an offer they can’t resist”. However, patients could choose to decline exercise if they were not motivated at the time. The individual exercise programme, based on the patient’s specific needs and goals, was presented and tried out during a one-to-one session. Patients could thereafter choose to perform exercises on their own, or to attend physiotherapist supervised exercise classes twice per week for six weeks, using their individual programme together with others from the programme. The physiotherapist provided support, advice and individual adjustments when needed.

Exercises for strength were not specified, but based on biomechanical principles, basically to ensure proximal strength, align hip-knee-ankle, and have good neuromuscular control [48]. These principles can be applied to most exercises, leaving a good opportunity for individual adaptation, and can be found (in Swedish) at

[http://www.karolinska.se/upload/Webbsektionen/Tema%20Artros/knaartros_ovingar.pdf](http://www.karolinska.se/upload/Webbsektionen/Tema%20Artros/knaartros_ovingar.pdf) In addition, patients’ consciousness about the alignment and neuromuscular control during activity is emphasized. Patients were told to perform exercises with hip-knee-ankle alignment and control enough to be able to stop in any position at any time (“when I snap my fingers”). Intensity and progress of exercises were based on individual function and capacity, as well as the ability to keep alignment and control. The model of acceptable pain was used to cope with pain during exercise [54]. If pain occasionally exceeded the acceptable limit, this was used as a learning process, and the dosage of activity was adapted accordingly to reach the acceptable pain level again.

Strategies to incorporate exercises and physical activity in daily living, and how to continue a physically active life style were continuously discussed during the entire course. A brief home exercise programme, consisting of one or two daily exercises meant to be incorporated in daily life and practiced for only a few minutes per day, was introduced parallel to the
individual programme. Exercises were chosen and suggested based on the individual need, preferences and physical function of the patient.

To support compliance to an active lifestyle an individual visit was scheduled three months after the first visit, regardless of whether patients chose to participate in exercise or not. During this visit, the focus was discussion on how exercises and physical activity was incorporated in daily life. Patients were also informed that a 12-month follow-up would be conducted based on a postal questionnaire.

Implementation and dissemination

The supported osteoarthritis self-management programme was incorporated in a Swedish national programme, “Better management of patients with osteoarthritis” (BOA). BOA was introduced as a 3-year joint project between four geographic regions to implement treatment guidelines in clinical practice for people with hip or knee osteoarthritis. The project was supported financially by the national social insurance office and financial support from the Swedish government to the regional authorities (Dagmar-medel), with the specific aims to reduce the costs for society, and improve the health related quality of life (HRQoL) for the individual living with hip or knee osteoarthritis. The intention of BOA was to offer all patients equivalent and adequate treatment, according to guidelines, regardless of where they lived or sought health care. BOA developed three main branches of activities: patient education (supported osteoarthritis self-management programme), staff training in the implementation and evaluation of the intervention to insure equivalency of content and presentation, and a national quality register to collect patient reported outcomes before and after the supported self-management programme, the BOA register.

To ensure standardisation and facilitate implementation, all physiotherapists and occupational therapists involved in the supported osteoarthritis self-management programme were educated over two days about the structure and intention of the intervention, the existing bulk of evidence of osteoarthritis pathology, epidemiology and treatment as well as pedagogical/motivational theories for life-style changes. Lectures were given by a physiotherapist with experience from research and from the development of the supported osteoarthritis self-management programme (CT), an orthopaedic surgeon talking about the importance of non-surgical treatment and evaluation of results, an occupational therapist talking about the existing evidence for non-surgical treatment of hand osteoarthritis, a physiotherapist with practical experience from setting up and holding the self-management
programme, and an osteoarthritis communicator talking about the potential benefits from collaboration between the patient organisation and health care.

The exercise principles used in the self-management programme were presented during the two-day course and tried during practical sessions, but no specific exercises were recommended. Course participants received a DVD with instructions and examples, and they were encouraged to apply the principles on exercises they normally practice. A "bank" of exercises, which could be used for inspiration or to "copy-paste" an individual programme, was provided.

All material necessary to start the supported osteoarthritis self-management programme at the care centre where they work was provided, including a detailed manual for delivery and evaluation of the intervention and a "ready-to-use" power-point. Perceived or imagined obstacles to clinical implementation and possible solutions were highlighted in group discussions to facilitate fidelity, to actively involve practitioners in the translation and adaptation of the programme into clinical practice, and thereby to prevent relapse into old work habits [62, 64]. Physiotherapists starting up a supported osteoarthritis self-management programme at their practice had full access to support from course leader and administrator.

Aim of the study

The aim was to explore feasibility of the evidence based programme, the supported osteoarthritis self-management programme, in clinical practice, and to study possible effects from implementation on patient satisfaction and compliance.
Methods

Physiotherapists reported the use of the supported osteoarthritis self-management programme, the number of patients included in intervention, and patient adherence to the intervention to the BOA-register. They also reported yearly, or when changes were made, the mode of delivery of in clinical practice, i.e. if they had made any adaptations of programme to fit clinical routines, as well as if they used minimal intervention or had added additional sessions or resources. For the present study physiotherapy clinics using minimal intervention and reporting at least ten patients to the register were defined as “users”.

Patient reported outcome measures were assessed at baseline, 3 and 12 months, and registered in the BOA register by the physiotherapist. A complete list of outcome variables can be found in table 1. For the present study only compliance and patient satisfaction was used.

Table 1. Key variables in the BOA-register.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline visit</th>
<th>3 months visit</th>
<th>12 months postal questionnaire</th>
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<td>Clinical examination</td>
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<td>Weight</td>
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<td>Self-efficacy (ASES)(^1)</td>
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<td>X</td>
<td>X</td>
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<td>Work participation</td>
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<td>Fear avoidance</td>
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<td>Physical activity level *</td>
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<td>Health related quality of life (EQ-5D) *</td>
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<td>Pain severity (VAS) *</td>
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<td>Co-morbidities (Charnley index) *</td>
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<td>Satisfaction</td>
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\(^1\)Arthritis self-efficacy scale (Lorig 1989)

* from the Swedish Hip arthroplasty register
Results

The ready-to-use programme, including a “minimal intervention” of two theoretical sessions held by health professionals and one session held by an osteoarthritis communicator, has been accepted by health care professionals and is now used in all counties and regions of Sweden. In practice, this means that patients could receive equal treatment according to existing guidelines for hip or knee osteoarthritis wherever they seek care (http://www.boaregistret.se/en/karta.aspx).

The supported osteoarthritis self-management programme has proved to be a feasible way of treating hip and knee osteoarthritis. By the end of year 2012 around 1200 physiotherapists around Sweden had been trained to deliver and evaluate the programme in a standardised way. Five hundred and forty-seven of them, representing 230 physical therapy practices geographically spread over Sweden, reported data to the BOA-register. The register now comprises a patient group of sufficient size for observational studies of effects from implementation of evidence-based guidelines in clinical practice; by February 2012 about 16000 patients from physiotherapy practices all over Sweden were registered with a baseline visit, about 9800 were followed for three months and 4000 had yet completed 12 months follow-up. The numbers of both patients and practices are continuously increasing.

By mid February 2013 data from 9 800 consecutive patients from 230 different care-centres in Sweden, followed for three months, showed that nearly all (97%) attended the theory sessions and 82% volunteered for the individual exercise programme. The supported osteoarthritis self-management programme was rated as good or very good by 92%, and 62% said they used what they had learnt during the course every day. Nearly all or 91% said they practiced what they had learned during the course in their everyday life on a weekly basis. Of 4100 patients followed for 12 months 82% rated the supported osteoarthritis self-management programme as good or very good, 35% said they used what they had learned every day, and 72% used what they had learned every week (Figure 3). The dropout rate over 12 months was 23%, where 9% had hip or knee replacement surgery and 14% interrupted the intervention for reasons other than surgery.

Better management of patients with osteoarthritis
Figure 3. The proportion of patients reporting how often they use what they have learned during the supported osteoarthritis self-management programme on a daily, weekly or monthly basis. Cross-sectional data at three and twelve months follow-up.
Discussion

The present study confirms the hypothesis that a ready-to-use programme, translating evidence based guidelines for osteoarthritis into clinical practice is well accepted and could be disseminated nationwide. Possible explanations of successful implementation are the adjunct staff education, the opportunity for physiotherapists to make adjustments in the programme without compromising the core content, the opportunity for patients to opt for exercise in smaller portions and when they are readily motivated, and the use of a “role-model” to make the information about life style changes and physical activity more comprehensible and relevant to patients.

If a treatment model, like the supported osteoarthritis self-management programme, is presented with just a “ready-to-use” power-point, a manual for use and no further instructions on why, what, how or when, the content could be interpreted and presented with large variations and the treatment effect is likely to be influenced. Implementation fidelity is defined as the degree to which programmes are provided as intended [67]. In the area of health care, implementation fidelity has predominantly been used in psychology, and it holds several components: adherence (including competence), dose, quality of programme delivery, participant responsiveness, and programme differentiation [67, 68]. Programme differentiation means identifying the “essential components” of an intervention [69]. Lack of implementation fidelity can lead to poor outcomes and false negative conclusions about treatment effect, so called type-III error [70]. Perfect adherence to a protocol could also have a bad influence on outcome, as shown in a study of drug counselling [68]. Education or information about the purpose and reasons for certain recommendations might be a prerequisite for successful implementation and equal treatment.

Guidelines are most often developed from meta-analyses of RCTs, designed to evaluate the effect of a specific treatment. Meta-analyses of exercise and self-management interventions for osteoarthritis have shown small but positive effects on symptoms, physical function and psychological outcomes [5, 34, 35]. RCTs are less feasible in exercise interventions, where blinding to treatment is hard to do, and personal factors like motivation and attitudes are hard to control for. In addition, RCTs do not reflect the physical therapy treatment in clinical practice, where patients are treated individually based on goals, needs, and previous experiences, and also based on the beliefs and preferences of the physiotherapist. It is not known how this individual approach influences the treatment effect. A survey in the UK showed that more than one third of the physiotherapists held doubts about the benefit of

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exercise in knee osteoarthritis, and believed that compliance and maintenance largely were patient responsibilities [71]. Thus, an intervention with positive effect in an RCT could be either more effective or completely meaningless when implemented in clinical practice [34, 72, 73]. Motivation to initiate a change may differ from motivation to maintain a certain life style. Introduction of exercise may have better compliance due to a desire to please from the patients [52] compared to maintenance of life style changes, that requires an inner motivation [62]. In the BOA-register 72% of the patients reported that they used what they had learned on at least a weekly basis after 12 months. Individual supervision, support and follow-up are highly valued by patients, and should not be underestimated [52].

To successfully implement a change in practice or lifestyle it is important to gain a general acceptance, or internalization, for the model. The self-determination approach emphasize internalization, and describe this as “the process of transforming external regulations into internal regulations and, when the process functions optimally, integrating those regulations into one's sense of self” ([61], p 120). In the present study, the opportunity to adapt the programme might have been a key factor to integrate new thinking into an already existing context or reality. Adaptations of programmes or guidelines are common when they are implemented in clinical practice, and might be necessary to suit both local practice and individual needs [74, 75]. Adherence to intervention can be flexible as long as there is fidelity to the “essential components”, i.e. the components required to get the desired effect from intervention. We hypothesised that the information given by physiotherapists was the essential component, and labelled it “minimal intervention”. Thus, physiotherapists were allowed to modify and adjust the programme but not to exclude or change the minimal intervention. This probably made the programme more easily applied in clinical reality and routines.

Patients with osteoarthritis are well aware of the general benefits of physical activity, but 50% are inactive and in the pre contemplation stage of change, i.e. not really considering to even start being physically active [58, 76]. This needs to be considered when physiotherapists recommend patients start exercising. Patients often harbour doubts about exercise in osteoarthritis, despite having experienced a reduction in pain from exercise [52, 77], and despite the well documented benefits from exercise in osteoarthritis. Osteoarthritis is a chronic condition, thus, exercise and physical activity need to be performed regularly over time, as a part of a permanent life style change to be effective. The World Health
Organisation (WHO) recommends every adult to be physically active at moderate intensity at least 150 minutes per week, in bouts of at least 10 minutes [78]. This can be hard to achieve for many patients with osteoarthritis, who have never been physically active before [79]. Another obstacle could be related to pain during ambulation and weight bearing activities, possibly causing fear of movement [79]. Pain is an individual experience and osteoarthritis pain fluctuates over time. A pain coping tool therefore needs to be individual and flexible. The model of “acceptable pain” was presented to patients during the theoretical sessions, and used in practice during exercise sessions in the supported osteoarthritis self-management programme. Acceptable pain could vary from day to day, and this tool allowed for activity to be adjusted continuously, and patients were encouraged to use it in daily activities as well as during exercise. This tool moved the responsibility and control of pain and activity from therapist to patient, which may be crucial in enabling patients to self-manage.

Rather than introducing 150 minutes of moderate exercise at once, a more successful approach might be to introduce exercise “at all” and less ambitious. The philosophy behind the rather limited recommendation of home exercises in the current study is based on a belief that five minutes of exercise per day, performed as part of daily life, has larger impact on function and health than a 30 minute exercise programme that is left in a drawer with a bad conscious after two weeks. The first line recommendation to patients that are reluctant to training might be to rise from sitting down every now and then, to accumulate and incorporate five minutes of functional training per day into 35 minutes per week, rather than start exercising for half an hour several days a week. In fact, to interrupt inactivity might be as important as being physically active or exercise [80]. Based on the self-determination theory [61], the individual exercise programme and exercise sessions in the supported osteoarthritis self-management programme were optional parts to the patients. The theoretical sessions served to achieve integration, i.e. internal motivation, and a desire to learn the individual programme and to integrate exercises or physical activity into their daily life. The supervised exercise sessions allow for patients to ask questions and learn how to modify exercise programme depending on progress or restrictions, and for physiotherapists to provide feedback on performance quality and neuromuscular control. A temporary failure or lack of motivation could be acknowledged, discussed and treated as a normal part of the process [62].

Guidelines do not include patients' views or advice on how to motivate patients. In clinic patients sometimes resign or reply to recommendations to exercise saying “That’s easy for
you to say. You are healthy and not in pain”. It is obvious that they cannot identify themselves with an at least seemingly healthy physiotherapist or doctor. In addition, the health care provider – patient relationship may seem hierarchic. In the supported osteoarthritis self-management programme the model of “speaking in layman’s terms” was used to overcome this obstacle to information dissemination. By using so called “expert patients” or osteoarthritis communicators who have experienced the positive effect from a physically active lifestyle and let them give their story, patients hear the same information but from another perspective. The information might seem more acceptable and relevant, and if provided by someone they can identify themselves with, who have tried and succeeded, the odds that they themselves will give it a try may increase. Peers confirmed the applicability of the recommendations given by physiotherapists, and thereby increased internalization. The high proportion of patients in this study reporting that they used what they have learnt at least on a weekly basis indicate that this was a successful model.

Patients need to adopt a cognitive based approach to activities and also learn active pain coping strategies. However, effects from exercise do not become evident until after about 6-8 weeks of practicing, are perishable, and after a year most of the effects level out. The challenge is compliance. Patients are to be involved in their health care, not only in decision making and choice of treatment, but also through more active responsibility for their health and changes in lifestyle [61, 81]. In chronic diseases, like arthritis, the autonomy of patients becomes even more important to maintain good health and condition without health care professionals.

Patient reported outcomes and compliance are recorded in the BOA-register, a national quality register. Information on health related quality of life, pain and physical activity in people with hip or knee osteoarthritis can be accumulated from all care units using the supported osteoarthritis self-management programme. Future observational studies can be conducted to explore the effects from implementing evidence-based guidelines in clinical care, as well as factors influencing the results. There are currently 106 national quality registries in Sweden. A national quality register contains individualized data concerning patient problems, medical interventions, and outcomes after treatment within healthcare production. It is annually monitored and approved for financial support by an Executive Committee (www.kvalitetsregister.se). National quality registries are supported financially by the Swedish authority of local authorities and regions. Since data are individualized and based

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on the personal identification number, these variables could be merged, after ethical approval. Data from the BOA-register can be merged with national registries comprising for example cost per patient, sick leave and health care consumption.

**Conclusion**
The supported osteoarthritis self-management programme is feasible in clinical practice, and seem useful and acceptable to patients. The BOA model (www.boaregistret.se), comprising the self-management programme, education of health care professionals and the national quality register, provides a unique opportunity to study processes involved in nationwide implementation of evidence based guidelines in clinical practice. By merging with other registries, the BOA model also allows future studies to explore factors influencing compliance, health care seeking, treatment outcome and cost effectiveness in osteoarthritis.

**Acknowledgements**
Thank you to colleagues at Spenshult Hospital involved in the development of the supported self-management programme, especially Hanna Bengtsson, Erica Börjesson, Pernilla Chowdary, Ing-Marie Petersson and Ann Bremander. Equal thanks to Ingvild Kjeken at Nasjonalt reumatologisk rehabiliterings- og kompetansenesenter, Norway, The Swedish Rheumatism Association, and the BOA-steering group for valuable contribution to the development of this programme and model.

Grants were received from Västra Götalands regionen, The Swedish Association of Local Authorities and Regions, the National social insurance office, and financial support from the Swedish government to the regional authorities (Dagmar-medel).
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