Active involvement and long-term goals influence long-term adherence to behavioural graded activity in patients with osteoarthritis: a qualitative study

Cindy Veenhof[1], Timon J van Hasselt[1], Albère JA Köke[2], Joost Dekker[3], Johannes WJ Bijlsma[4] and Cornelia HM van den Ende[1,5]

[1]Netherlands Institute for Health Services Research [2]University Hospital Maastricht [3]VU University Medical Centre Amsterdam [4]University Medical Center Utrecht [5]St Maartenskliniek Nijmegen
The Netherlands

Question: Why do some patients who have received a behavioural graded activity program successfully integrate the activities into their daily lives and others do not? **Design**: Qualitative study. **Participants**: 12 patients were selected according to the model of deliberate sampling for heterogeneity, based on their success with the intervention as assessed on the Patient Global Assessment. **Intervention**: Behavioural graded activity. **Outcome measures**: Data from 12 interviews were coded and analysed using the methods developed in grounded theory. The interviews covered three main themes: aspects related to the content of behavioural graded activity, aspects related to experience with the physiotherapist, and aspects related to characteristics of the participant. **Results**: Interview responses suggest that two factors influence long-term adherence to exercise and activity. First, initial long-term goals rather than short-term goals seem to relate to greater adherence to performing activities in the long term. Second, active involvement by participants in the intervention process seems to relate to greater adherence to performing activities in the long term. **Conclusion**: Although involvement of patients in the intervention process is already part of behavioural graded activity, it would be beneficial to emphasise the importance of active involvement by patients right from the start of the intervention. Furthermore, to increase the success of behavioural graded activity, physiotherapists should gain a clear understanding of the patient's initial motives in undergoing intervention. **[Veenhof C, Hasselt van TJ, Köke AJA, Dekker J, Bijlsma JWJ, Ende van den CHM (2006) Active involvement and long-term goals influence long-term adherence to behavioural graded activity in patients with osteoarthritis: a qualitative study. *Australian Journal of Physiotherapy* 52: 273–278]**

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Introduction

Osteoarthritis, especially of the knee and hip, is the most common joint disorder, causing pain, stiffness, weakness, and instability, thereby threatening mobility and an active lifestyle (Dekker et al 1992, van Baar et al 1998). There is strong evidence that exercise therapy in patients with osteoarthritis of the hip and/or knee, has beneficial short-term effects on pain and physical function. However, beneficial effects of exercise therapy seem to decline over time and finally disappear (Fransen et al 2002, van Baar et al 1999).

To enhance long-term effectiveness, integrating exercise therapy with daily activities based on cognitive behavioural principles and additional booster sessions seems promising. This intervention is based on the assumption that psychosocial factors interfere with the physical function of patients (Lindstrom et al 1992, Linton et al 1993, van Baar et al 2001). Recently, such an intervention, behavioural graded activity, was compared with usual physiotherapeutic care. Usual care was physiotherapy according to the Dutch osteoarthritis guideline which mostly consists of the provision of information and exercise therapy (Vogels et al 2001). Both interventions resulted in long-term benefit, but, in general, no difference was found between interventions in terms of pain (measured using a visual analogue scale and a subscale of the WOMAC – Western Ontario and McMaster Universities Osteoarthritis Index), physical function (measured using a subscale of the WOMAC), and Patient Global Assessment (Veenhof et al in press a).

Since patients with osteoarthritis vary in their impairments and activity limitations, it is likely that some patients will benefit more from behavioural graded activity than others. This was confirmed in subgroup analyses, which demonstrated that patients with a low level of physical functioning benefited more from behavioural graded activity compared to usual care, whereas patients with a high level of physical functioning benefited equally from both interventions. Furthermore, patients with a low level of internal locus of control appeared to benefit more from behavioural graded activity than from usual care (Veenhof et al in press b). However, these subgroup analyses yield only a limited understanding of the benefits of behavioural graded activity.

To further investigate why some patients continued an active lifestyle (ie, continued to perform activities in the long term) after completion of a behavioural graded activity program and others did not, we conducted a qualitative study. To our knowledge, no studies on exercise adherence to behavioural graded activity programs in patients with osteoarthritis have been published. The objective of this study was to investigate which factors explain the difference, after a behavioural graded activity program, between patients who successfully

Table 1. Characteristics of participants.

Characteristic	Participants											
Gender	F	F	F	F	F	F	M	M	F	F	M	M
Age *(yr)*	69	80	70	71	76	51	71	71	73	75	55	75
Location of osteoarthritis	Hip	Knee	Knee	Knee	Knee	Hip	Knee	Knee	Knee	Knee + hip	Knee	Knee
Pain at baseline *(0 to 10)*	5	7	4	4	5	7	4	8	2	4	8	5
Physical function on baseline *(0 to 68)*[1]	13	39	36	44	13	36	37	10	10	30	?	11
Patient Global Assessment on follow-up *(1 to 8)*[2]	2	7	7	2	7	1	1	2	6	6	1	7
Active lifestyle after intervention[3]	Y	N	Y	Y	N	D	D	Y	Y	Y	N	N

F = female, M = male, Y = yes, N = no, D = doubtful. [1]a higher score indicates worse physical function; [2]1 = completely recovered, 8 = vastly worsened; [3]adherence to activities as reported during the interviews; ? = data missing.

integrate activities in their daily lives and those who do not succeed in integrating activities in their daily lives.

Method

Design In this qualitative study, open-ended, in-depth interviews were conducted with patients with osteoarthritis who had received behavioural graded activity as part of a randomised controlled trial. The interviews were conducted one to six months after the last assessment (which was planned 65 weeks after admission to the trial). This variation in time span was caused by the relatively long inclusion period (1.5 years) of the original trial (Veenhof et al in press a). The study was approved by the Medical Ethical Committee of the VU University Medical Center, Amsterdam. Informed consent was obtained prior to each interview.

Participants We invited a sample of participants from the group who had received behavioural graded activity in the original trial to participate in this qualitative study. Patients were included in the original trial (Veenhof et al in press a) if they were diagnosed with osteoarthritis of the hip or knee according to the clinical criteria of the American College of Rheumatology (Altman et al 1986, Altman et al 1991). Two hundred patients participated in the original trial, 97 receiving behavioural graded activity and 103 receiving usual care. More specific information about the design, participants and intervention of the original trial can be found in Veenhof et al (in press a).

For this study, participants were selected according to the 'model of deliberate sampling for heterogeneity' so that a wide range of participants was represented in the sample. This increases the external validity, enabling results to be generalised to a broader population (Strauss and Corbin 1990). Participants were selected on the basis of the success of the behavioural graded activity measured by their score on Patient Global Assessment (1 = completely recovered; 8 = vastly worsened) (Van der Heijden 1996). One group was selected with a low score (ie, 1–3, ranging from completely recovered to improvement), and one group with a high score (ie, 6–8, ranging from worsened to vastly worsened). The researcher contacted appropriate candidates by phone. Letters with information about the aim and procedures of the study were sent out to interested candidates.

Intervention Behavioural graded activity is a behavioural intervention integrating the concepts of operant conditioning with exercise therapy including booster sessions (Appendix 1). It is based on time-contingency management as described by Fordyce and colleagues (1973) and applied by Lindström and colleagues (1992). The intervention is directed at increasing the level of activities in a time-contingent way, with the goal being to integrate these activities into daily living. Patients have an active role during this intervention while physiotherapists have a coaching role. In the original trial (Veenhof et al in press a), behavioural graded activity was delivered individually to participants by physiotherapists in primary care settings. It was delivered according to strict protocols and included written materials such as education messages, activity diaries, and performance charts. A maximum of 18 sessions were delivered over a 12-week period, followed by five pre-set booster sessions in Week 18, \avioural graded activity. The interview was conducted starting with three main themes: aspects related to the content of the behavioural graded activity intervention, aspects related to experience with the physiotherapist, and aspects related to characteristics of the participant. A conversation developed from these themes and subsequent questions became more specific. New topics brought up by the participant were discussed in follow-up interviews (Strauss and Corbin 1990). Data collection was stopped after 12 interviews since no new relevant data emerged during the last two interviews, which indicated that a saturation point had been reached (Strauss and Corbin 1990). Each interview lasted about 90 minutes and was performed in the participant's home. The interviews were recorded on an audiotape.

Data analysis The method of data analysis was based on a grounded theory approach (Strauss and Corbin 1990). This inductive data analysis was performed using the software

package WinMax-Pro98. Initially, interview transcripts were read to identify conceptual themes in the text which were then coded. The codes in each interview were then compared and codes expressing related concepts were grouped together to create broader categories that linked codes across interviews. Constant comparison of emerging issues and searching for deviant or negative cases helped to confirm and further develop a tentative theory to which each participant's experiences could contribute (Strauss and Corbin 1990). All interviews were analysed by the same researcher (TH) and a random sample of interviews was analysed by a second investigator (CV). The quality of one interview was poor because the participant did not respond to the questions, so this interview was left out of the analysis.

To increase the validity of the coding framework, additional strategies were adopted. First, two interviews were conducted by two researchers to monitor consistency of the process and completeness of data collection. Second, triangulation of researchers was used, meaning that the researcher and co-researcher first analysed the interviews independently and then compared and discussed the codes and their interpretation. Finally, peer debriefing was used, meaning that interim analyses were discussed by a group of researchers.

Results

Characteristics of participants Letters were sent to 19 patients of whom 13 agreed to participate. Twelve patients participated in the interviews. Six participants had low success and six high success of behavioural graded activity according to their scores on the Patient Global Assessment. Characteristics of the participants are presented in Table 1.

Exercise adherence During the interviews, participants were asked whether they integrated the activities into their daily life (ie, whether they still adhered to the performance of the activities). Six participants reported that they still performed the same level of exercises or activities as during the intervention period. Four participants reported that they did not perform the exercises and activities as was agreed during the intervention period, and the answer of two participants was conflicting.

There was a lack of agreement between score on the Patient Global Assessment and exercise adherence as reported during interview (Table 1). Some participants who scored high on the Patient Global Assessment (eg, because they perceived less pain) did not continue with their activities, while some participants who scored low on the Patient Global Assessment (eg, because their pain remained the same) reported that their level of activities had increased considerably.

Because my complaints disappeared, I was no longer motivated to continue with the exercises and activities (a non-adherent participant with a high score on the Patient Global Assessment).

Although I experience the same level of pain, I have learned to continue with my activities and I realise that I achieve more because of that (an adherent participant with a low score on the Patient Global Assessment).

This lack of agreement may be explained by the different levels on which these two outcome measures were assessed. Exercise adherence is a measure of the process of intervention, while Patient Global Assessment is a measure of the outcome of intervention. Since the main goal of behavioural graded activity was to increase the participant's level of activities, which is closer to the process of intervention, we decided to focus on factors relating to exercise adherence.

Factors relating to exercise adherence To understand why some participants adhered to their exercises and activities after a behavioural graded activity program, and others did not, we analysed whether factors or combination of factors which relate to the exercise adherence of participants could be identified. Factors relating to the content of behavioural graded activity, the experience with the physiotherapist, and the characteristics of the participants were compared. There was no relationship found between most factors (eg, satisfaction with intervention, experience with physiotherapists, participants' time, positive attitude towards physical activity, and social support) and exercise adherence because of a lack of consistency in the results (Table 2). However, a relationship was found for two factors.

First, the initial motivation of the participants played an important role. Some participants were motivated to reach short-term goals, eg, to decrease pain, while others were motivated to reach long-term goals, eg,. to postpone an operation or to live independently for as long as possible. It appeared that all adherent participants were initially motivated to reach long-term goals, while all non-adherent participants reported a short-term initial goal or had no specific goal. These participants tended to stop performing their activities as soon as the short-term goal was obtained. Therefore, there seems to be a relationship between the initial motivation in visiting a physiotherapist and exercise adherence:

I wanted to get rid of the pain. If the pain disappears, why would I bother to continue the exercises? I understand it is better to do the exercises to avoid the pain returning, but, if the pain returns, I will start the exercises again (participant with short-term goal).

I continue with my exercises, they are integrated in my daily living. I really know these exercises have beneficial effects and that motivates me to continue with my exercises. The main motivation to do all this is to prevent an operation to get a new hip (participant with long-term goal).

Second, the involvement in the intervention differed among the participants. Some participants reported that they were actively involved in choosing the activities, in gradually increasing these activities, and in using the performance charts. On the other hand, other participants reported that the main decisions were taken by the physiotherapist and that they performed the activities as instructed by the physiotherapist. It appeared that all adherent participants reported that they were actively involved in the whole process and that the physiotherapists had a coaching role during intervention. However, most non-adherent participants reported that the physiotherapist made all decisions (which was sometimes a deliberate choice of the participants). Therefore, it seems that active involvement of the participant facilitates adherence to exercises and activities:

The physiotherapist determined the gradual increase of the exercises; he told me, for example, to increase the exercises by five minutes. I liked it that he told me what to do, nevertheless, he was my physiotherapist (participant not

Table 2. Number of adherent, non-adherent, and unknown-adherent patients for factors relating to exercise adherence.

Factors	Adherent patients (n = 6)	Non-adherent patients (n = 4)	Unknown-adherent patients (n = 2)
High satisfaction with intervention	4	3	2
Positive experience with physiotherapist	4	4	2
Former experience with physiotherapist	3	3	1
Positive attitude towards physical activity	6	3	1
High self-efficacy	5	2	0
Social support	5	1	2
Time available	5	2	1
Motivation for treatment			
short term	0	2[1]	2
long term	6	0	0
Active involvement of patient	6	1	1

[1]two non-adherent patients did not report a motivation for treatment.

actively involved in the intervention).

The approach of the physiotherapist was very democratic, which I appreciated. Together, we discussed the activities and the increase of the activities. I could indicate to what extent I wanted to increase the activities, to what extent I could maintain the exercises (participant actively involved in the intervention).

Discussion

It has become increasingly important to identify subgroups of patients in order to match intervention with the clinical presentation (Childs et al 2004, George and Delitto 2005). The qualitative data analysed in this study provide valuable insight into the specific factors that relate to the success of a behaviourally-based intervention. The findings from this study suggest that two factors influence the success, operationalised as exercise adherence, of behavioural graded activity.

First, initial motivation of long-term goals of patients seems to be positively related to exercise adherence. The initial motivation and values of patients play an important role in accepting the pain and integrating the activities of behavioural graded activity into daily life. According to the Jensen motivation model of pain self-management (Jensen et al 2003), two factors influence patients' readiness to change: belief about the importance of the change (patients' values) and belief about one's ability to engage in behavioural change. This concurs with the recently-developed acceptance approach (McCracken et al 2004), which assumes that the acceptance of chronic pain is an active willingness to engage in meaningful activities in life regardless of pain-related sensation. Therefore, the focus of intervention is not on reducing pain but on reducing the distressing and the disabling influence of pain. An important factor is that activities which are valuable for the individual are the basis of the intervention.

Second, the involvement of patients during intervention seems to relate to the adherence to intervention. This agrees with literature on exercise adherence where a self-regulation approach, characterised by mutual participation of patient and physiotherapist, is suggested to be useful in achieving long-term adherence to exercise (Sluijs and Knibbe 1991). Also, where goals are set explicitly and where patients participate in setting them rehabilitation appears to be more effective (Baker et al 2001). Furthermore, the involvement of patients has a positive influence on self-efficacy, since it enlarges the patient's confidence to execute and accomplish a given task successfully (Bandura 1977). There is growing evidence that self-efficacy functions as a mediator of pain and psychosocial health (Keefe et al 2002).

The success of the behavioural graded activity program as measured by Patient Global Assessment did not correspond with the adherence to activities in the long term. Apparently, Patient Global Assessment measures general health as an outcome of intervention whereas adherence measures the process of intervention. Since the Patient Global Assessment was one of the primary outcome measures of the original trial, and it reflects the opinion of the patients, we assumed it was the best way to select participants. However, the main objective of behavioural graded activity is to integrate activities into daily life. Therefore, adherence to activities in the long-term seems the most appropriate measure to use when analysing factors that influence the success of intervention. Moreover, Patient Global Assessment reports the improvement experienced by patients, implying that they improve over time. However, behavioural graded activity is about coping with impairments such as pain so that patients are motivated to integrate a higher level of activity into their daily lives.

In future, it would be interesting to investigate the difference that may exist between the participants who integrated activities into daily life and those who did not. Although the specific consequences of non-adherence to activities among patients with osteoarthritis have not been well studied (Marks and Allegrante 2005), the expectancy is that it is likely to result in a deconditioned state.

Although this qualitative study is a valuable source of information, there are some limitations that deserve attention. First, recall bias needs to be taken into account, since patients were interviewed quite a long time after the intervention (1 to 6 months after the last assessment). Furthermore, the sample size was small—12 respondents participated in the interviews. However, during the last two

interviews, no new relevant information emerged which indicates that a saturation point had been reached (Strauss and Corbin 1990).

The information from this study is useful for implementing behavioural graded activity. Although the involvement of patients in the intervention process is already part of behavioural graded activity, it would be beneficial to emphasise the importance of active involvement of the patient right from the start. Furthermore, to increase the success of behavioural graded activity, physiotherapists should consider the patients' initial goals and values.

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Correspondence Cindy Veenhof, NIVEL, PO Box 1568, 3500 BN Utrecht, The Netherlands. Email: c.veenhof@nivel.nl

References

Altman R, Alarcon G, Appelrouth D, Bloch D, Borenstein D, Brandt K, Brown C, Cooke TD, Daniel W, Feldman D (1991) The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hip. *Arthritis and Rheumatism* 34: 505–514.

Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, Christy W, Cooke TD, Greenwald R, Hochberg M (1986) Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. *Arthritis and Rheumatism* 29: 1039–1049.

Baker SM, Marshak HH, Rice GT, Zimmerman GJ (2001) Patient participation in physical therapy goal setting. *Physical Therapy* 81: 1118–1126.

Bandura A (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review* 84: 191–215.

Childs JD, Fritz JM, Flynn TW, Irrgang JJ, Johnson KK, Majkowski GR, Delitto A (2004) A clinical prediction rule to identify patients with low back pain most likely to benefit from spinal manipulation: a validation study. *Annals of Internal Medicine* 141: 920–928.

Dekker J, Boot B, van der Woude LH, Bijlsma JW (1992) Pain and disability in osteoarthritis: a review of biobehavioral mechanisms. *Journal of Behavioral Medicine* 15: 189–214.

Fordyce WE, Fowler RS, Lehmann JF, Delateur BJ, Sand PL, Trieschmann RB (1973) Operant conditioning in the treatment of chronic pain. *Archives of Physical Medicine and Rehabilitation* 54: 399–408.

Fransen M, McConnell S, Bell M (2002) Therapeutic exercise for people with osteoarthritis of the hip or knee. A systematic review. *Journal of Rheumatology* 29: 1737–1745.

George SZ, Delitto A (2005) Clinical examination variables discriminate among treatment-based classification groups: a study of construct validity in patients with acute low back pain. *Physical Therapy* 85: 306–314.

Jensen MP, Nielson WR. Kerns RD (2003) Toward the development of a motivational model of pain self-management. *Journal of Pain* 4: 477–492.

Keefe FJ, Smith SJ, Buffington AL, Gibson J, Studts JL. Caldwell DS (2002) Recent advances and future directions in the biopsychosocial assessment and treatment of arthritis. *Journal of Consulting and Clinical Psychology* 70: 640–655.

Lindstrom I, Ohlund C, Eek C, Wallin L, Peterson LE, Fordyce WE, Nachemson AL (1992) The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioral approach. *Physical Therapy* 72: 279–290.

Linton SJ, Hellsing AL, Andersson D (1993) A controlled study of the effects of an early intervention on acute musculoskeletal pain problems. *Pain* 54: 353–359.

Marks R, Allegrante JP (2005) Chronic osteoarthritis and adherence to exercise: a review of the literature. *Journal of Aging and Physical Activity* 13: 434–460.

McCracken LM, Carson JW, Eccleston C, Keefe FJ (2004) Acceptance and change in the context of chronic pain. *Pain* 109: 4–7.

Sluijs EM, Knibbe JJ (1991) Patient compliance with exercises: different theoretical approaches to short-term and l–term compliance. *Patient Education and Counseling* 17: 191–204.

Strauss AL, Corbin J (1990) Basics of Qualitative Research. Grounded theory procedures and techniques. London: Sage.

van Baar ME, Assendelft WJ, Dekker J, Oostendorp RA, Bijlsma JW (1999) Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review of randomized clinical trials. *Arthritis and Rheumatism* 42: 1361–1369.

van Baar ME, Dekker J, Lemmens JA, Oostendorp RA, Bijlsma JW (1998) Pain and disability in patients with osteoarthritis of hip or knee: the relationship with articular, kinesiological, and psychological characteristics. *Journal of Rheumatology* 25: 125–133.

van Baar ME, Dekker J, Oostendorp RA, Bijl D, Voorn TB, Bijlsma JW (2001) Effectiveness of exercise in patients with osteoarthritis of hip or knee: nine months' follow up. *Annals of Rheumatic Diseases* 60: 1123–1130.

Van der Heijden GJMG (1996) Shoulder Disorder Treatment: Efficacy of ultrasoundtherapy and electrotherapy. Maastricht: University Press Maastricht.

Veenhof C, Köke AJA, Dekker J, Oostendorp RAB, Bijlsma JWJ, Tulder van MW, Ende van den CHM (in press a) Effectiveness of behavioral graded activity in patients with osteoarthritis of hip and/or knee: a randomized controlled trial. *Arthritis and Rheumatism (Arthritis Care and Research)*.

Veenhof C, Van den Ende CHM, Dekker J, Köke AJA, Oostendorp RAB, Bijlsma JWJ (in press b) Which patients with osteoarthritis of hip and/or knee benefit most from behavioral graded activity? *International Journal of Behavioral Medicine*.

Vogels EMHM, Hendriks HJM, Baar van ME, Dekker J, Hopman-Rock M, Oostendorp RAB, Hullegie WAMM, Bloo H, Hilberdink WKHA, Munneke M, Verhoef J (2001) Clinical practice guidelines for physical therapy in patients with osteoarthritis of the hip or knee. Amersfoort: KNGF.

Appendix 1. Behavioural graded activity

Content	Behavioural graded activity consists of three phases: Starting phase: Provision of educational messages, selection of problematic activities and treatment goals, and determination of baseline value. Treatment phase: Increase of the selected activities, gradually and in a time-contingent way, by means of an exercise program, which is reproduced in performance charts. Integration phase: Support and reinforcement of the behavioural change and integration of the increased level of activities in daily living (maximum of 7 sessions in five determined booster sessions in Week 18, 25, 34, 42, and 55).
Educational messages	Improvement of function, not pain relief, is the primary goal of the intervention. Exercise and physical activity are recommended. The performance of physical activity should not depend on the amount of pain.
Activities	Problematic activities (maximum of 3) are selected by patients on activity list. Individually tailored exercises, to improve impairments limiting the performance of these activities, are selected.
Goals	For each activity and each exercise, short-term and long-term goals are set and recorded on an agreement form.
Baseline values	To determine baseline values, patients perform the selected activities until (pain) tolerance during 1 week and record these activities in a diary.
Gradually increasing exercise program	An individually-based scheme is made on a time-contingent basis for each activity and exercise, starting slightly under baseline values and gradually increasing towards the pre-set short term goal. Patients should not under-perform nor over-perform this gradually increasing scheme.
Visual reproduction	Performance charts are used to record and visualise the performance of activities and exercises.
Reinforcement	Positive reinforcement is given towards healthy and active behaviour; pain behaviour is extinguished.
Stopping rule	The gradual increase of activities has to be interrupted when an active inflammatory process is suspected or diagnosed (eg, redness of the knee, increase in knee effusion, comparable complaints). Hereafter, the increase of activities starts at a lower level. In case of recurrent inflammatory processes, the treatment goal needs to be changed and the rate of increasing activities needs to be decelerated.
Duration	Maximum of 18 sessions within first 12 weeks. Additional booster sessions in Week 18, 25, 34, 42, and 55