Prescribed Exercise and Behavioural Change

The Influences of Self-efficacy, Stages of Change, and Social Relations

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The fact that physical activity brings health is currently regarded as a given, and an evidence-based given at that. Similarly, it is clear that lack of physical activity is detrimental to health. On the intuitive level, this has long been known; the increase in occupational diseases, sick leave and early retirement in Sweden in the latter half of the 1970s and into the ’80s persuaded doctors to be explicit about the need to complement conventional medical treatment, including physiotherapy, with physical activities, both during and outside of working hours. At that time, it was not possible for physicians to prescribe physical activity. In 2001, the Swedish National Institute of Public Health was set with the task of compiling scientific knowledge regarding the relationship between health and physical activity, and exercise prescription as medical practice took off. A book was published, entitled FYSS, a Swedish acronym for physical activity in disease prevention and treatment, and the similarity to FASS, likewise a book carrying the acronym for pharmaceutical specialties in Sweden, is of course no accident. Like FASS, FYSS is a manual for doctors, an instruction for the prescription of physical activity in the treatment or prevention of various medical conditions. A second edition of FYSS was published in 2008, and the common Swedish acronym for exercise on prescription, FaR (Fysisk aktivitet på recept), now carries the registered trademark symbol and is written FaR®. Prescribed physical activity is, in other words, in full swing.

Does it work, though? There are some evaluations, but it is not possible in this context to compile and present available research. However, idrotsforum.org has previously published some texts on exercise on prescription. In an article from April 2006 Lone Friis Thing reflects on physical activity in a medical paradigm. She sees exercise on prescription as medicalization, and argues that physical inactivity in a population should be seen as a social problem that for its solution requires institutional and structural interventions. In a chronicle, barely a year later, Kirsten Kaya Roessler argues for an approach in which exercise and movement are placed in a context where it becomes meaningful, to respond to the realization that this is not merely a matter of physiology, but very much a psycho-motor and emotional process. Around the same time Helene Bengtsson and Camilla Svensson examined Swedish physicians’ use of exercise on prescription, and in an article they point out that significant efforts are required to train and stimulate doctors to practice prescribed exercise. Sport psychologists Thomas Gjelstrup Bredahl and Kirsten Kaya Roessler in their article in this update demonstrate that it is not unproblematic to get patients with prescribed physical activity to “take their medicine”. The starting point is a local intervention of physical activity on prescription in two Danish counties, which was studied by the researchers to analyze behavioral changes in relation to physical activity. Through interviews at various stages during the “treatment” they’re able to demonstrate all the different barriers that exist and how factors such as self-efficacy and social relations affect the ability to overcome these barriers.
Introduction

In many countries, prescribed exercise is used to facilitate physical activity in a sedentary population at risk of developing, or with, lifestyle diseases (Elley et al., 2003; Harrison et al., 2005; Sorensen et al., 2007). But reviews show that prescribed exercise only has a moderately positive effect (Sorensen et al., 2006) or no effect (Hillsdon et al., 2005) on sustained physical activity level (National Institute for Health and Clinical Excellence, 2006). In recognition of the difficulty helping individuals maintain physically active lifestyles, health psychology researchers emphasise the fact that behaviour change is anchored in a psychological, social and physiological context (Antonovsky, 1979; Biddle & Fox, 1998). Interaction between these factors influences individual health status and the ability and will to change behaviour (De Vries et al., 1998; Fox et al., 1997). Different theoretical perspectives have been used by researchers to assess, explain and predict behaviour change, e.g. belief-attitude theories (Ajzen, 1991), competence-based theories (Bandura, 1986), control-based theories (Deci & Ryan, 1991), stage-based theories (Prochaska & Diclemente, 1983) and hybrid models (Schwarzer, 1992). The transtheoretical model was developed by Prochaska and Diclemente (1983) to describe different stages involved in changing and maintaining behaviour (Prochaska & Diclemente, 1983).

In summary, these theories and models have been used extensively in research on exercise behaviour, although the self-efficacy theory (Bandura, 1986) and the transtheoretical model (Prochaska & Diclemente, 1983) have been used more widely (Biddle et al., 2007; Biddle & Nigg, 2000). These empirically supported models have been shown to be applicable for creating interventions that help people move from one stage to the next. They have offered practitioners the possibility of designing programmes and treatments that are more efficient and effective than interventions in which all individuals are offered the same course of treatment (Biddle et al., 2007). The transtheoretical model suggests individuals’ changing behaviours move through following stages of change: Precontemplation (no intention to change behaviour), Contemplation (intention to change behaviour), Preparation (preparing to change behaviour), Action (changing behaviour) and Maintenance (sustaining behaviour change). The progression through stages is thought to be dynamic, with some individuals progressing through stages, and with others relapsing to previous stages. This model states that behaviour change is not all or nothing, and individuals who stop performing a specific behaviour may intend to start again (Marcus et al., 1992). The self-efficacy theory is an integrated part of the transtheoretical model, as well as processes of change and decisional balance, states that confidence in one’s ability to conduct a given task or behaviour is strongly related to one’s ability to perform that task (Bandura, 1986). Self-efficacy beliefs are closely bound to the accomplishments of behaviour, such as physical activity and exercise (Sallis et al., 1986).

Self-efficacy and stages of change illustrate important psychological factors for behaviour change (De Vries, 1998; Marshall & Biddle, 2001; Sallis et al., 1989; van Sluijs, 2004). Nevertheless, there is a lack of information concerning how individuals trying to change behaviour during and after prescribed exercise are influenced by these factors. Prior to inclusion in a prescribed exercise intervention, it is important to recognise the significance of the individual’s psychological and social precondition towards behaviour change as a predictor of behaviour change and adherence to a physical activity regimen. Further-
more, it is important to explore changes in psychological condition during and following a prescribed exercise intervention. It is likely that a person’s psychological precondition and development are just as important as outcome predictors as is the intervention itself in terms of maintaining a long-term effect and persistence in a physically active lifestyle.

This resulted in the following research questions: 1) Will participation in prescribed exercise lead to changes in level of self-efficacy towards barriers, stages of change? 2) Will initial levels of self-efficacy towards barriers and stages of change be different for high intensity and lower intensity interventions? 3) Is initial level of self-efficacy towards barriers and stages of change before intervention important for adherence to physical activity? Finally, 4) Are social relations important for participants’ adherence to physical activity during and after prescribed exercise?

Materials and methods

Intervention

A prescribed exercise intervention, called Exercise on Prescription (EoP), was used to initiate physical activity among sedentary individuals at risk of or with lifestyle diseases, in Funen County and Frederiksberg Municipality in Denmark (Bredahl et al., 2008). The Exercise on Prescription programme is divided into two areas:

1) The higher intense TG (Treatment Group) intervention which was directed towards individuals with specific medically controlled lifestyle diseases known to be affected by physical activity (type 2 diabetes, the metabolic syndrome, and cardiovascular diseases). The participants in the TG, referred by their GPs, followed a supervised group-based training intervention along with 8-12 other participants. The training was carried out by physiotherapists or exercise specialists. During the first two months, twice-weekly 1-hour training sessions were completed. During the final two months, one weekly training session was completed, supplemented by one weekly-unassisted training session. This totals to 24 assisted and mandatory training sessions and 8 unassisted training sessions. The group-based training sessions involved elements of aerobic exercise (e.g., Nordic walking, aerobics), strength training, stretching and games. In addition, the participants received motivational counselling at baseline and after four months. The motivational counselling was based upon the principles of motivational interviewing (Miller & Rollnick, 2002). Subsequently they received voluntary phone-based or personal motivational counselling after ten and sixteen months (figure 1).

2) The lower intense PG (Preventive Group) intervention was directed towards citizens at risk of developing lifestyle diseases (type 2 diabetes, the metabolic syndrome, and cardiovascular diseases) due to physical inactivity. The participants in the PG entered the intervention by their own initiative. For the participants in the PG, only motivational counselling (same principles as in the TG) was a structured part of the intervention. Training was carried out unassisted or in existing local sports clubs. Participants in the PG received personal motivational counselling at baseline and after four months. Subsequently they received voluntary phone-based or personal motivational counselling after ten and sixteen months (figure 1).
**Figure 1**  
Schematic overview of Exercise on Prescription in the County of Funen and Municipality of Frederiksberg. Schematic overview of the two groups: The Treatment Group (TG) and the Prevention Group (PG) in Exercise on Prescription. In the TG, the general practitioner (GP) prescribes Exercise on Prescription for sedentary individuals with lifestyle diseases. The individual takes the prescription to a physiotherapist or an Exercise Specialist working with Exercise on Prescription. The participants complete four months of supervised training and motivational counselling. Questionnaires and interviewing are completed at baseline, 4, 10 and 16 months. In the PG, the participant contacts the physiotherapist or exercise specialist working with Exercise on Prescription. The participants are included in the PG if they are sedentary and at risk of developing lifestyle diseases that can be positively influenced by physical activity. The participants carry out unassisted exercise and receive motivational counselling at baseline, 4, 10 and 16 month. Questionnaires and interviewing are completed at baseline, 4, 10 and 16 months.

**Interviews**  
To explore the research questions, 28 semi-structured in-depth interviews were conducted with 7 participants, at baseline, after intervention (4 months) and again 10 and 16 months after initiation of the intervention (Dahler-Larsen, 2005; Olsen, 2002).
Informants
In the EoP interventions in general (both the TG and the PG) approximately 750 participated. 213 and 124 (TG and PG) of these participants accepted to take part in a larger questionnaire study (Bredahl et al., 2008). The informants for this study were chosen from these. 7 strategically selected key informants were asked to participate in the interview study (Kvale, 2003). Selection criteria included age, gender, intervention, income, education and employment, and these were used to assure that information gathered was adequate to represent a broad range of participants in both interventions. Only those who signed a written consent were included in the study. Because of the intensive information to be gathered from the participants, the sample was limited to four participants from the TG and three from the PG (table 1).

Interview guide
A semi-structured interview guide was used. The interview guide was divided into specific themes and consisted of several main categories concerning background as well as social and psychological issues. Under each theme, specific working questions were formulated (Kvale, 2003). All interviews were performed in the participants’ homes by the authors and were digitally recorded. The average duration of the interviews was 50 minutes (Olsen, 2002).

Transcribing, condensation and coding
Thematic analysis began when the data were compiled using the interview guide. Interviews were transcribed verbatim based on predetermined rules of transcription. Coding was based upon the initial research questions (Olsen, 2002). To make the coding more precise and increase inter-rater reliability, agreements on coding categories and interpretation were reached by having the author and a colleague analyse the same interview followed by a discussion and adjustment of differences (Olsen, 2002). All of the subsequent coding was done by the author. After coding and reading the interviews through as a whole, the author condensed the interviews by removing recurrences, digressions, pauses and unclear linguistic expressions and the informants’ expressed statements were written together to form shorter phrasing and more concise sentences (Kvale, 2003).

Trial registration
The Danish Data Protection Agency registration number: 2005-41-5248. ClinicalTrials.gov ID: NCT00594360. Due to the non-biological and non-treatment perspective of the study, no registration with the local ethics committee was needed.

Findings
The findings from the interviews are reported in relation to the research questions, and in the following order: self-efficacy, stages of change and social relations.
Table 1: Distribution of gender, age, education, income, work status, and county for the informants of TG and PG.

<table>
<thead>
<tr>
<th>County</th>
<th>Education **</th>
<th>Income, Own (in thousands)</th>
<th>Income, Household (in thousands)</th>
<th>Work Status</th>
<th>Gender</th>
<th>Age±SD</th>
<th>Women (%)</th>
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<td>250 - 299</td>
<td>Sick leave</td>
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*Education 1: 1 = Goes to school, 2 = 7 or fewer years of school, 3 = 8-9 years of school, 4 = 10-11 years of school, 5 = High school level, 6 = Other.**Education 2: 1 = Education as semi-skilled worker, 2 = basic education of business school, 3 = apprentice education or similar, 4 = Other technical education, 5 = Shorter higher education, 6 = medium higher education, 7 = Long higher education.***Income in Danish Crowns: 1= 0 - 99,000; 2= 100,000 - 149,000; 3= 150,000 - 199,000; 4= 200,000 - 249,000; 5= 250,000 - 299,000; 6= 300,000 - 349,000; 7= 350,000 - 399,000; 8= 400,000 - 499,000; 9= 500,000 - 599,000; 10= 600,000 - 699,000; 11= Over 700,000.
Self-efficacy

One aim of the interviews was to explore self-efficacy in relation to experienced barriers and the degree to which the informants in the TG and the PG were able to be physically active in spite of these (Benisovich et al., 1998; Marcus et al., 1992).

In relation to research question one, no long-term change in self-efficacy towards barriers seems to be apparent in members of either the TG or the PG. In the TG, barriers such as bodily discomfort, lack of inclination to exercise, time, transport and practical issues and minimal effects from the intervention were reported as important barriers at all measurement points. They were reported without any indication of self-efficacy towards these barriers being decisively altered. New barriers even seem to appear when the informants are challenged by being physically active on their own.

I must admit that I have not felt like exercising for a while because the things which make exercising all right are missing (e.g., the competitive challenge and the social element) (informant TG).

In the TG, the training programme and the motivational counselling only seem to affect the way the informants articulate their barriers during and immediately after the intense intervention. The training and motivational counselling do not seem to affect self-efficacy of overcoming barriers in the long-term.

Of course you should be able to take care of yourself after the TG. Nobody else holds your hand in your everyday life, but in the TG I think I needed some more follow-up (informant TG).

Participants in the PG experienced barriers similar to the TG participants. The informants reported that lack of prioritisation of physical activity, time, transport, practical issues, as well as other participants were the main barriers. Furthermore, barriers related to uncertainty of physical competence, social relations, environment and economy were also mentioned. The PG informants primarily seemed to differ from informants in the TG by not describing bodily illness or pain as a problem. In spite of that, self-efficacy in relation to these barriers does not seem to be altered; the PG informants seemed to increase or maintain their physical activity level, whereas the TG informants seemed to decrease their activity or became totally inactive according to long-term follow-up.

The recurring barriers for both groups could be summarised as follows:

- lack of interest in physical activity,
- difficulty finding the right place to exercise,
- exercise taking important time away from everyday chores,
- being a single mother,
- time spent on transport to and from activities, and
- not being able to make time to exercise.
Otherwise, the primary barriers to becoming physically active are very different from individual to individual and could include barriers such as changing clothes in the presence of strangers or the smell of sweaty floors.

The limitation of movement due to lifestyle diseases and physical discomfort expressed by informants in the TG are exceptions to the homogenous statements of the informants in both groups. This barrier seems to be recurring and especially essential. The bodily condition and the self-efficacy derived thoughts seem especially to inhibit changing towards more physically active behaviour.

In relation to research questions two and three, the informants in both groups at baseline are convinced about their ability to overcome major barriers and become physically active, which indicates a relatively high self-efficacy in relation to barriers. Still, differences between the two groups seem to be apparent. The TG informants seem to express an increased optimism in overcoming barriers compared to the PG informants. At baseline, they are convinced they can overcome their barriers because they have become part of a structured intervention in which training are organised for them. They feel privileged but also obliged to make an effort. The informants in the PG do not seem to feel obliged in the same way. They are not part of a structured intervention and have ambivalent thoughts concerning their own abilities to overcome barriers.

I do not think you can get the opportunity to be a part of an intervention and then just stop. It gives me a greater sense of obligation. I have no right to stop (informant TG).

In conclusion, participants in the TG tended to express a higher initial self-efficacy towards barriers than did participants in the PG group. This is primarily due to the TG’s inclusion in a structured intervention where responsibility is placed on others rather than on the self. But this initial difference in self-efficacy does not seem to influence overcoming barriers in the long-term or increase adherence to physically active behaviour.

To explore the issue of self-efficacy further, the informants were asked if they were aware of any facilitating conditions which could help them become physically active and/or enhance their self-efficacy. Helpful initiatives seemed primarily to be individually determined, but reduced working hours and flexibility on the job were two consistent factors. Increased help from the exercise specialist, easier accessibility to exercise facilities, more spare time to exercise, exercising with family and friends, and individually adjusted and varied exercise programmes were also reported as facilitators. Another facilitating factor mentioned right after the intervention, but also at the long-term assessment, especially by the informants in the TG, was witnessing health improvements and physical capacity increases.

I thrive when I am committed to somebody. I do best in the company of others (informant TG).

Even though informants in both interventions are aware of facilitating factors and discovers new helpful initiatives, it does not seem to effect adaptation of a physically active lifestyle in long-term.
Given the fact that the informants expressed knowledge about barriers and facilitators, it is surprising that the majority of the barriers still existed 12 months after intervention and most of them were just as strong. It seems that neither training plus motivational counseling or motivational counseling alone are effective enough to process fundamental issues of self-efficacy towards barriers. Other factors must influence their ability to change as well.

Exercise is still an obligation. I keep expecting that the benefit will exceed the effort, but I find that hard to imagine (informant TG).

Stages of change
To provide a better overview of the data, findings regarding baseline levels of stages of change and possible differences between groups (research questions two and three) are presented first. Following this, long-term development of stages of change and its effect on physical activity (research question one) are presented.

All of the participants in the TG were referred by their GPs as a result of a regular consultation, and therefore they were suspected to be expecting to receive an ordinary prescription for medication – not exercise. Because of this, the hypothesis was that they would be less ready to change than would be the PG participants, who were included on their own initiative. This prediction was not supported by statements from the informants, suggesting that the initiative, also for the TG informants, to participate in the intervention came from themselves, and not from their GPs.

I read about it in the paper and at one point I said: “I am going to call my GP to see if he knows anything about this”. He did not know much, so it was actually by my request (informant TG).

Preliminary, some of the informants in the PG wanted to be a part of the TG because they thought they needed to do something about their physical health. They addressed their GPs to get a prescription, but were referred to the PG because they did not meet the inclusion criteria.

In general, small differences in stages of change were seemed to be apparent between the informants in the TG and the PG at baseline. The findings indicated that the informants in the TG were found to be in the “preparation” and the “action stage”, based on their answers indicating that they were preparing to start exercising (e.g. making initial contact to a fitness centre) or already had started exercising. The informants in the PG, on the other hand, indicated different initial stages of change. Informants were categorised as belonging to the “contemplation”, “preparation” and “action” stages (table 2).
In relation to research question one, the findings provide insight into the dynamics of the informants’ progression through stages.

Immediately after the intervention, only one of four informants in the TG had progressed positively through stages, whereas three had relapsed and were now physically inactive, contemplating or preparing (table 2). However, six months after the intervention, three of four informants in the TG had succeeded in becoming regularly physically active even though the informants’ attitudes towards exercise had not changed. Exercise was considered an obligation and participation a necessity for preventing physical degradation, but motivation and enthusiasm were felt and experienced as well. Subsequently, 16 months after initiation of the intervention, all four informants in the TG were inactive, contemplating or preparing. Physiological explanations and practical issues were given as primary reasons for not being physically active.

The informants in the PG seem to have a more persistent progression through the stages. Basically, a positive progression through the stages can be seen for the informants in the PG. All informants in the PG manage to become more physically active in long-term. Two informants even manage to sustain their physical activity long enough to be categorised in the “maintenance” stage (table 2).

Immediately after the intervention, all informants in the PG had increased their amount of physical activity. The increase in physical activity had occurred primarily by increasing everyday activities (e.g., walking) and only on one occasion by making concrete plans for doing fitness exercise.

I have not had the resources to start up exercising as fast as I had expected. I had expected to be roller skating and training at a fitness centre by now (informant PG).

After 10 months, two of the three informants in the PG had maintained their physical activity level. At this point, different attitudes existed between the informants. One informant found exercising to be a waste of time and the cause of her back pain. Another informant felt that physical activity was motivating and had integrated exercising as a structured part of his life. One informant was still located in the preparation stage, primarily due to her social barriers towards other participants. Subsequently, 16 months after initiation of the intervention, the informants in the PG had succeeded in staying physically active. They had managed to generate more time and motivation to exercise regularly.
The findings indicate that the PG informants had greater success in becoming physically active than did the TG informants (table 2). Even though long-term adherence to physical activity is an important aim of participation in Exercise on Prescription, no real persistent long-term progression through the stages can be seen for the four informants from the TG. It seems as if they are dynamically moving back and forth through stages, with relapses to earlier stages of change (table 2). As predicted by the hypotheses, the initial level of stages of change was suspected to be important in predicting long-term behaviour change in both groups. In contrast to this, the findings showed that an initial higher level of stage of change was not critical.

In addition to information about stage progress, the analyses of stages of change indicated interesting new findings. The type of attitude towards physical activity and exercise seemed to be a more important characteristic for long-term adherence to physical activity. Statements from TG informants suggest that their participation in general was facilitated by a critical need to change their lifestyles, a fear of dying and an obligation towards themselves, their family and the intervention. Their attitude and motivation to participate in the intervention were primarily influenced by a conception of them exercising due to an obligation to prevent getting seriously ill or dying from their diseases. In contrast to this, the PG informants seem to express interest and motivation to become more physically active to alter their well being in everyday life. It seems like the PG informants are using the intervention as an aid to pursue individual goals of becoming healthier.

**Social Relations**

The influence of social relations is investigated in relation to research question four, to explore whether specific social relations influence and facilitate physical activity behaviour. In this study, social relations are defined as relationships with family and friends, general practitioners, the exercise specialist and other participants in the intervention.

**Family and Friends**

In general, family was expressed as influential regarding exercise behaviour and adherence to a physically active lifestyle after intervention in both groups. A supportive family environment was stated as facilitating and conducive for adherence, whereas being a single mother seemed to impede increased exercise behaviour.

She (daughter) slows down a part of my life. I have nobody who is able to take care of her yet. It slows me down a little and that irritates me (informant TG).

In relation to friends, the interviewed informants stated that a close-knit behavioural pattern amongst friends can be a barrier for behaviour change. Furthermore, none of the informants had friends who exercised on a regular basis.

You do not change your social relations and when you try to change your behaviour they notice it. In the beginning it is cool to be different, but after a few months seeing the same people, you have returned to your old habits (informant PG).
**General practitioner**

It was hypothesised that the general practitioner was a key person in motivating and influencing the participants (Camaione et al., 1997; McKenna & Vernon, 2004). The GP wrote the referral to the TG or sent participants to the PG if they did not meet the inclusion criteria of the TG. Surprisingly, none of the informants in the TG or the PG considered their GPs as important in their decision to participate. Furthermore, they stated that their GP did not know much about the intervention besides their ability to give the referral.

We only talked about it when I talked with her about getting started exercising. Neither my old nor my new GP has mentioned the PG. It is like they have no interest in it. But at the same time they tell me to do something to help myself (informant PG).

Informants considered their GPs to be a peripheral person with no impact on their behaviour. Neither the informants in the PG or the TG have experienced their GP as a supportive, motivating or influential person in relation to the intervention. They find that the GP is concerned about physiological issues and not participation or adherence to physical activity.

**Exercise Specialist**

Some informants found the role of the exercise specialist very important, motivating and a great influence on their behavioural change process. Some even appointed the success of their adherence to the exercise specialist. Others stated that their consultations with the exercise specialist were a waste of time. They did not find the guidance and suggestions from the exercise specialist useful or suitable for their situation. 16 months after initiation of the intervention, several of the informants stated that they would have preferred the exercise specialist’s counselling to last for a longer period to help them adhere to their exercise behaviours.

**Other participants**

In general, the informants discussed the role of the other participants in two different ways. Firstly, the other participants were described as an essential network within which the informants could feel secure because of the homogeneity of the group. The support from the group and the obligation towards the other participants were indicated as important factors for helping the informants stay physically active.

If you are part of a group then you are responsible for it; that is obvious. If you start with fourteen people, you will have to be fourteen people every time, otherwise the group will shut down. You have a social obligation to be there (informant TG).

In contrast, other participants could also be seen as barriers, limiting and intimidating. Statements indicated that the informants did not feel a sense of connectedness with the others, a general resistance towards being part of a larger group or disliking being with other sweaty, malodorous people.
I think of them as indolent, at least it is the way I perceive them. It was the same way I perceived myself when my GP suggested the TG – an intervention for indolent people (informant TG).

Overall, family was indicated as the strongest facilitator or barrier. The exercise specialist like other participants could be a motivating and effective key persons as well as discouraging, whereas the GP was described as without significance.

**Discussion**

**Self-efficacy**
In relation to research question one, the informants express apparently similar barriers towards becoming physically active and, except for baseline values, their self-efficacy towards these barriers seems to be quite similar. In spite of this similarity, the PG informants appear to become more physically active in the long-term. Moreover, the two groups can also be distinguished from each other in one essential area. Having a lifestyle disease or bodily symptoms was described by informants in the TG as a very influential barrier, which to a great degree negatively influenced their self-efficacy in becoming more physically active. The PG informants, who primarily describe moderate barriers, such as comfort, transport and facilities, did not suggest the same significance. This significance seems to be decisive in the TG informants’ behaviour change and affects their self-efficacy in their ability to become physically active in the long-term (Biddle & Mutrie, 2007; Sallis & Hovell, 1990). This difference between groups could possibly provide some of the explanation as to why the PG informants seem to be successful to a greater degree in becoming physically active than are the TG informants (Sallis & Hovell, 1990). More research is needed to investigate if lifestyle diseases are hampering physical activity interventions and to investigate if specific lifestyle diseases (e.g., type-2 diabetes, hypertension, ischaemic heart disease) are more hampering for behaviour change than others. Knowledge of this would provide the possibility to differentiate the action needed to facilitate behaviour change.

Another possible explanation to the seemingly long-term difference in physical activity between the TG and the PG could be the reason the two groups give for their decision to participate in the interventions. The PG informants indicate, to a greater degree than do the TG informants, that their participation is based upon motivation to get involved in physical activity. The TG informants seemed to see their participation as treatment and an obligation, instead of choice or interest. This is consistent with literature showing motivation or interest as important incentives for being physically active, but also major barriers if not present during behaviour change or in the progression through stages of change (Biddle & Mutrie, 2007; Sallis & Hovell, 1990). The informants in the TG seem to use the intervention in the same way one would take prescribed medication. When the intervention stops they expect to be cured. They do not, as findings indicate, use the intervention as a springboard to health development as the PG informants did, but rather as a closed package.

When the intervention ends and they are themselves responsible for their physical activity, they do not seem to continue doing physical activity unassisted.
It is possible that the intervention period is too short to have any real impact on self-efficacy in relation to barriers. Research shows that self-efficacy is a significant predictor of exercise behaviour in the early and middle stages of an exercise programme and therefore an increased effort to improve participants’ self-efficacy in the earlier stage of the intervention could be needed (McAuley et al., 1994). Furthermore, the transition from the intervention programme to unassisted training, which is described as a key element of the intervention (Müller et al., 2007), seemed to produce new barriers in addition to those already existing. The TG informants switched from a structured programme, in which others were responsible, to unassisted physical activity. This change in responsibility seemed to affect the TG informants’ self-efficacy towards barriers to such a degree that adherence to physical activity failed to happen. Furthermore, informants in both groups indicated a need for a prolonged period of counselling from the exercise specialist. This indicates that the motivational counselling and the interventions were not effective enough or the right method to adequately influence self-efficacy.

In relation to research questions two and three and self-efficacy towards barriers at baseline, both groups express a great deal of optimism concerning becoming physically active. Even though level of self-efficacy seems high in both groups, a difference between the two was apparent. The TG informants seemed to express an increased optimism in overcoming barriers at baseline than did informants from the PG, because they were included in a structured intervention in which responsibility is placed with others, not on themselves. In spite of the TG informants’ seemingly higher initial self-efficacy towards becoming more physically active, no increased effect of the higher level of baseline self-efficacy were seen on the development of long-term physical activity.

**Stages of change**

In relation to research question one, it seems that the PG intervention helped the informants move progressively through stages, whereas the TG informants had quite a dynamic process of change. Primarily right after the structured programme, the informants in the TG seemed to succeed at being physically active, but long-term adherence was not evident. Relapse to earlier stages of change were apparent (table 2).

In relation to research questions two and three, the initial level of stages of change does not seem to influence compliance or adherence to long-term physical activity. In contrast to the hypotheses, the informants from both groups seemed to show about the same precondition and initial level with regards to level of stages of change. In spite of this, the informants in the PG group seemed to have greater success in becoming physically active in the long-term than did the informants in the treatment group. Based on findings from previous studies of prescribed exercise (Kallings et al., 2008) and due to the more intense intervention, the TG informants were expected to progress more positively through stages than were the PG informants. The findings of this study are, however, also supported by research showing inconsistent results of stage-based physical activity interventions promoted in primary care (Sorensen et al., 2006; van Sluijs et al., 2004). One possibility is that the precondition of stages of change is not crucial for the informants’ behaviour change. The findings indicate that attitude and intrinsic motivation towards physical activity seem to be better predictors of adherence to physical activity. Furthermore, being referred to an
exercise intervention seems to produce feelings of obligation and avoidance of responsibility, which are not conducive for behaviour change.

**Social relations**
The findings concerning family and friends in general are in accordance with literature indicating supportive family environment as important for achieving behaviour change (Stroebe, 2000; Thurston & Green, 2004; Trost et al., 2002). Friends were also considered influential, and informants indicated that in a close-knit social pattern it could be difficult to break with long standing habits.

The findings indicate that the GPs did not influence the participants’ physical activity. This is in accord with research showing that it does not matter which care provider delivers an intervention (Fleming & Godwin, 2008); but it is in contrast to research showing the GP as an important person in facilitating behaviour change (Camaione et al., 1997; McKenna & Vernon, 2004; Schutzer & Graves, 2004). Seen from an interactional perspective, the traditional biomedical consultation lasting approximately 8 minutes is not comprehensive enough to encompass all relevant factors in the individual change process (Hutton & Gunn, 2007). In contrast, the exercise specialist is mentioned by a majority of the informants in both groups as an important person for facilitating behaviour change. But, in spite of this indicated importance, it is evident that the exercise specialist does not influence self-efficacy towards barriers or progress through stages of change enough for the informants to overcome their primary barriers or adhere to a physically active lifestyle in the long-term.

Since a majority of the participants argue that the exercise specialist contributed positively to their change process, the future role of an external counsellor or care person in prescribed exercise interventions should be considered.

A study of prescribed exercise intervention in Denmark, with an increased amount of motivational counselling from both physiotherapists and dieticians, indicated moderately positive results (Roessler & Ibsen, 2009). It is possible that motivational counselling used in the right way and in the right amount could have significant influence on adherence to a physically active lifestyle (Ntoumanis & Biddle, 1999). These findings are in accordance with literature showing the motivational counsellor in primary care as a key person in facilitating change (Müller et al., 2007; Steptoe et al., 2000), but also showing varied success from counselling in regards to physical activity and behaviour change (Petrella & Lattanzio, 2002). This underlines the possibility of implementing a motivational counsellor in prescribed exercise interventions, but also a need for research documenting which kind of counselling yields the greatest effect.

In prescribed exercise, the group training constitutes a substantial part of the intervention and therefore a potential area of influence. Within an organised exercise group, interpersonal influence can be present (or missing) in the interaction between participants, between participants and exercise specialists, but also between participants and the surrounding environment (e.g., family and friends). In the study, the role of the other participants was expressed in different ways. The other participants were often described as constituting an essential network in which the informants could feel secure because of the homogeneity of the group. The support from the group and the obligation towards the other participants were indicated as important factors to help the informants stay physically active.
The informants in both interventions also express scepticism towards other participants and experience them as limiting and intimidating. Examples of this could be informants not feeling a sense of connectedness with the others, a general resistance towards being part of a larger group or disliking being with other people doing physical activity. To be a part of a group does not naturally lead to a successful and improved change process (Munich, 1993; Schein, 2006). In this study, a reason for that could be that some participants are concerned about being categorised or stigmatised as fragile or indolent individuals because they are grouped with other people (e.g., overweight, inactive, indolent) with whom they do not desire to identify themselves.

The contradictory statements of group interaction are in accordance with research showing factors like cohesiveness, imparting of information and universality of suffering as important in group processes (Agazarian & Janoff, 1993; Yalom, 1985). A report recommending how to organise prescribed exercise in Denmark also emphasises the importance of the training group (Müller et al., 2007). This discussion of the potential of the exercise group illustrates that to avoid impeding effects and to utilise the full potential of an exercise group, the interpersonal processes within the group should be facilitated or managed to enable a positive impact for all participants.

The distinction between temporary (e.g., GP, exercise specialist, other participants) and established (e.g., family and friends) social relations is important to discuss. Even though informants stated that some temporary social relations were of significant importance, little or no behaviour change happened in relation to these. This could indicate that even though temporary social relations holds potential, established social relations seem to have even stronger impact on change processes. This is in accordance with literature underlining the difficulty in unfreezing, restructuring and refreezing established social relations in efforts to obtain new behaviours (Schein, 2006). Moreover, it is in accord with research documenting behaviour as determined by contextual factors surrounding the individual and not only by individual psychological factors (Christensen & Albertsen, 2002; Johannessen, 2005; Ottesen, 1993; Thing, 2005).

**Bias and imprecision**

The answers to the research questions should be considered as providing in-depth knowledge on specific important factors for individuals trying to change behaviour in prescribed exercise interventions. Despite a small number of participants, valuable knowledge has been gained from these individuals trying to change behaviour. Some comparisons between the two groups have been made and differences indicated. Since the number of participants argues for the use of an explorative and not a comparative approach, it is necessary to be critical when interpreting the findings. Differences between groups would be better assessed by applying a quantitative design. Thus, it could be discussed whether the findings of the study, and the potential differences indicated between the two groups, are in fact related to the interventions or just a coincidence based on sample selection bias. Supporting this, the two groups show many similar characteristics, indicating that the findings are made unclear by the small number of informants and a clearer picture could be gained from including a larger number of participants. But recurring and consistent answers within the groups indicate that relevant knowledge can be gained from the study, from an explorative
but also a comparative angle, even though precautions must be taken with interpretations of the latter findings.

**Conclusion**

Despite the limited number of informants, the findings of the study add new and valuable information and provide knowledge of prescribed exercise, behaviour change and influence from self-efficacy, stages of change and social relation. The findings suggest that fundamental differences between self-efficacy towards major (e.g. lifestyle diseases) and moderate barriers (e.g. time) exist between the two groups. This possibly provides some of the explanation for the indicated differences between the groups in terms of adherence to long-term physical activity. Moreover, a positive attitude towards or interest in physical activity seems to be a stronger predictor of adherence to physical activity than obligation, stages of change or self-efficacy. The study elucidates valuable information on the role of selected social relations. It could be concluded that an external care person (motivational counsellor or exercise specialist) holds potential for playing an important role in future prescribed exercise interventions. However, the type, amount and duration of the counselling need to be explored to a greater extend. Even though the GPs in this study are mentioned as without influence, research shows GPs as important in facilitating change. To strengthen the knowledge of and develop the GP’s influence in prescribed exercise, future research should investigate the impact possibility of the GP in prescribed exercise interventions. Social relations during the intervention, such as, family, friends and training group were shown as important potential areas of influence. The training or exercise group were shown to yield great potential in influencing the change process and adherence of the individual. If the potential of group processes and interactions between individuals are facilitated in an empirically substantiated way, this could contribute to a successful change process toward a physically active lifestyle. Hence, additional studies on the role of the training group are needed.

Additionally, the limited effect of individual psychological factors (self-efficacy and stages of change) and the two different interventions on adherence to physical activity indicate that other fundamental areas could be more influential. Social relations, such as family and friends, could be an example of potential areas of such significance. Thus, their attitude towards change of lifestyle and physical activity may affect adherence to a physically active lifestyle to a greater degree than initially assumed. Further research is needed to establish this connection.

To increase the potential for adherence to a physically active lifestyle for individuals who have been prescribed exercise, it is important to incorporate findings from health psychology concerning behaviour change to generate an optimal milieu for change. Findings from this study indicate that physical activity and structured motivational counselling directed towards individual psychological parameters are not enough. Social relations and psychological issues concerning the impact of lifestyle diseases on physical condition, attitude towards physical activity and obligation needs to be explored as well. Additional studies to elucidate these issues are required.
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