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LEARNING TO GUIDE BEHAVIOR CHANGE

**PHYSICAL THERAPISTS' PROMOTION OF
HEALTH-ENHANCING PHYSICAL ACTIVITY
IN PEOPLE WITH RHEUMATOID ARTHRITIS**

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PHYSICAL THERAPISTS' PROMOTION OF HEALTH-ENHANCING PHYSICAL ACTIVITY IN PEOPLE WITH RHEUMATOID ARTHRITIS

THESIS FOR DOCTORAL DEGREE (Ph.D.)

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ABSTRACT

Background and Aim: Physical activity is important for management of rheumatoid arthritis (RA). In the Physical Activity in RA (PARA) 2010 study physical therapists (PTs) delivered a one-year health-enhancing physical activity (HEPA) intervention in people with RA. The PTs' guided behavior change by structured use of behavior change techniques (BCTs) and adapted a biopsychosocial approach during biweekly support group sessions. Since this may not be mainstream practice for PTs it is important to increase the knowledge of what happens when PTs deliver such interventions. The main aim of this thesis was to explore PTs' experiences and behavior delivering a HEPA intervention in people with RA. A secondary aim was to investigate the measurement properties of a scale to assess a mediating variable, exercise self-efficacy, for physical activity in RA.

Participants and Methods: The PTs received a tailored education and training for a total of six days based on Social Cognitive Theory (SCT) principles, including exercises, positive reinforcement and modeling, targeting increased knowledge, skills and self-efficacy to guide behavior change. Twelve PTs enrolled in the PARA 2010 intervention participated in Study I, 10 of them in Study II and 11 in Study III. All were registered PTs and all but two had worked in rheumatology. In Study IV 244 intervention participants with RA from the PARA 2010 study were included in validity tests and 84 of them in test-retest measurements. Study I employed an exploratory qualitative design with semi-structured interviews investigating PTs' experiences delivering the intervention. Study II was a longitudinal case study with questionnaires and logbooks measuring knowledge on physical activity and BCTs, fear-avoidance beliefs and self-efficacy to guide behavior change before and throughout the HEPA intervention. Study III was an explorative study where the PTs were video-recorded during the intervention to explore strategies in their guiding of HEPA behavior. Study IV was a methodological study investigating the reliability and validity of the Swedish Exercise self-efficacy scale (ESES-S).

Results: The results from Study I-III were aggregated into a main theme; the PTs' progression 'From clinical expert to guide', and four categories; 1) 'Education, training and support' where PTs expressed e.g. benefits of feedback on performance and the need for clear tasks and role, 2) 'Challenges in the new role' including e.g. insecurities on when to lead or to follow the group, initial stress and intervention participants not performing physical activity, 3) 'Behaviors in the new role' e.g. the majority of PTs did not totally adhere to the intervention protocol, and PTs altering between information giving and strategies facilitating group interaction to handle challenges, and 4) 'Growing into the new role' e.g. the PTs' progression to guide through increased self-efficacy, relinquishing steering and control over the group and growing in confidence to promote HEPA behaviors. Study IV indicated partial support for construct validity, moderate test-retest reliability and respectable internal consistency of the ESES-S.

Conclusions: The results indicate that PTs adaptation to a new role to guide behavior change takes time and effort and include challenges and growth, and may be assisted by education and training. The ESES-S has sufficient test-retest reliability, but further investigation on construct validity in an RA population is recommended.

SAMMANFATTNING

Bakgrund och syfte: Fysisk aktivitet är en viktig del av behandlingen vid reumatoid artrit (RA). I Physical Activity in RA (PARA) 2010-studien genomförde fysioterapeuter (FT) en ettårig intervention med målsättning att stödja hälsofrämjande fysisk aktivitet (HFA) hos personer med RA i stödgrupper varannan vecka. I interventionen guidade FT i beteendeförändring genom strukturerad användning av utvalda beteendeförändringstekniker (BFT) och ett biospsykosocialt förhållningssätt. Eftersom detta inte är allmän praxis inom fysioterapi är det viktigt att öka kunskapen om vad som händer när FT genomför sådana interventioner. Det huvudsakliga syftet med denna avhandling var att utforska FTs erfarenheter och beteenden när de genomförde en HFA intervention för personer med RA. Ytterligare ett syfte var att undersöka mättegenskaperna hos en skala för bedömning av self-efficacy för träning, som medierar fysisk aktivitet vid RA.

Deltagare och metoder: FT fick en skräddarsydd utbildning och träning under totalt sex dagar som var baserad på Socialkognitiv teori och inkluderade övningar, positiv förstärkning och modellinlärning med målsättning att öka kunskap, färdigheter och self-efficacy för att guida i beteendeförändringar. Tolv registrerade FT med erfarenhet från reumatologi deltog i PARA 2010-studien och inkluderades i Studie I, 10 av dem deltog i Studie II och 11 i Studie III. I Studie IV deltog 244 personer med RA från PARA 2010 studien i validitetsanalysen och 84 av dem i test-retest analyser. Studie I hade en explorativ kvalitativ design med halvstrukturerade intervjuer för att utforska FTs erfarenheter av att genomföra interventionen. Studie II var en longitudinell fallstudie där frågeformulär och loggböcker användes för att undersöka kunskap om fysisk aktivitet och beteendeförändringstekniker, samt rädsla-undvikande och self-efficacy för att guida i beteendeförändringar före och under interventionen. Studie III var en explorativ studie där FT videoinspelades under interventionen och deras strategier för att hantera utmaningar i guidningen av stödgrupperna analyserades. Studie IV var en metodologisk studie som undersökte mättegenskaper hos Exercise Self-Efficacy Scale (ESES-S) för personer med RA.

Resultat: Resultaten från Studie I-III sammanfogades till ett övergripande tema; 'Från klinisk expert till guide' och fyra kategorier: 1) 'Utbildning, träning och stöd' där FT bl.a. uttryckte fördelar med att få feedback på beteende och vikten av att ha en klar roll och uppgifter, 2) 'Utmaningar i den nya rollen' där FT bl.a. uttryckte osäkerhet om när de skulle leda eller följa gruppen, initial stress och när gruppdeltagarna inte utförde fysisk aktivitet, 3) 'Beteenden i den nya rollen' som bl.a. visade att majoriteten av FT inte följde BFT-teknikerna fullt ut, samt att FT varierade mellan att ge information och strategier för att stödja interaktionen i gruppen för att hantera utmaningar, 4) 'Växa in i rollen' till exempel FTs progression mot guide genom ökad self-efficacy, att släppa styrningen och kontrollen över gruppen, samt ökat självförtroende för att stödja HFA beteenden. Studie IV visade att ESES-S test-retest reliabilitet var rimlig och den interna konsistensen var respektabel samt att begreppsvaliditeten delvis stöddes.

Slutsatser: Resultaten indikerar att det tar tid och ansträngning för FT att anpassa sig till en ny roll att guida beteendeförändringar och inkluderar utmaningar samt att växa in i rollen, vilket kan stödjas av utbildning och träning. ESES-S har god test-retest reliabilitet, men dess validitet bör undersökas ytterligare.

LIST OF PUBLICATIONS

- I. Nessen T, Opava CH, Martin C, Demmelmaier I. From clinical expert to guide: experiences from coaching people with rheumatoid arthritis to increased physical activity. *Phys Ther.* 2014 May;94(5):644-53. doi: 10.2522/ptj.20130393.
- II. Nessen T, Opava CH, Demmelmaier I. Learning to guide people with rheumatoid arthritis to health-enhancing physical activity behavior: changes in physical therapists' knowledge, beliefs and behavior. Manuscript.
- III. Nessen T, Opava CH, Martin C, Demmelmaier I. Physical therapists' management of challenging situations in guiding people with rheumatoid arthritis to health-enhancing physical activity behavior. Manuscript
- IV. Nessen T, Demmelmaier I, Nordgren B, Opava CH. The Swedish Exercise Self-Efficacy Scale (ESES-S): reliability and validity in a rheumatoid arthritis population. *Disabil Rehabil.* 2015 Nov;37(22):2130-4. Doi:10.3109/09638288.2014.998780. Epub 2015 Sep 4.

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LIST OF ABBREVIATIONS

ACR	American College of Rheumatology
BCT	Behavior Change Techniques
BPS	Biopsychosocial
CBT	Cognitive Behavioral Theory
EPOC	The Cochrane Effective Practice and Organization of Care Group
ESES-S	Exercise Self-Efficacy Scale–Swedish
FABQ-m	Fear Avoidance Beliefs Questionnaire – modified
HAQ	Stanford Health Assessment Questionnaire Disability Index
HEPA	Health-Enhancing Physical Activity
ICC	Intraclass Correlation Coefficient
IMB	Information-Motivation-Behavioral skills model
IPAQ	International Physical Activity Questionnaire
PARA	Physical Activity in Rheumatoid Arthritis
PCC	Patient-Centered Care
PT	Physical Therapist
R	Pearson’s Correlation Coefficient
RA	Rheumatoid Arthritis
RM	Repetition Maximum
SCT	Social Cognitive Theory
SMART	Specific, Measurable, Acceptable, Realistic, Time-set
SPSS	The Statistical Package for the Social Sciences
TDF	Theory Domains Framework
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TSK	Tampa Scale of Kinesiophobia
TTM	Transtheoretical Model
VAS	Visual Analogue Scale
WCPT	World Confederation for Physical Therapy

1 INTRODUCTION

Changing health behaviors is important in reducing the burden of disease and mortality (1-4). One important task for health care professionals such as PTs is to promote behavior change in their clients. Health behavior change interventions may target specific behaviors for example physical activity, and specific populations such as people with a chronic disease (5). The effectiveness of such interventions can be increased if they are based on psychology and behavior change theories (6, 7). Delivering interventions may require health care professionals to adapt to a new role, applying methods and techniques not used in traditional clinical practice (8). Subsequently, it is of great importance that health care professionals be properly prepared to promote health behavior change and deliver the intervention as intended (9-11). Education, training, and support may be necessary to provide health care professionals with adequate knowledge and skills. Evaluation of health care professionals delivering health behavior change interventions could provide insight into what is required for them to learn to promote health behavior change. Such evaluations could inform health care professionals in similar situations, along with future implementation initiatives. In addition, in order to evaluate outcomes of the interventions it is also important to have measurement instruments for the mediating variables included in the behavior change theories that have been properly evaluated.

The main objective of this doctoral thesis was to evaluate PTs' experiences and behaviors delivering a HEPA intervention after receiving education and training. A secondary objective was to evaluate the measurement properties of a self-report instrument targeting the mediating SCT component of self-efficacy for physical activity.

2 BACKGROUND

2.1 HEALTH BEHAVIORS

It is important to change people's health behaviors in order to reduce the burden of preventable disease, mortality and morbidity around the world (1-4). Unhealthy behaviors such as lack of exercise or physical activity, poor nutrition, tobacco use, and alcohol consumption are also drivers of chronic diseases (12-14), which are the predominant challenge to global health (12). Also known as non-communicable diseases, chronic diseases are prolonged and generally slow to progress, and according to the World Health Organization account for 38 million deaths worldwide (5). One way to decrease the impact of chronic diseases is to change behaviors and lessen the impact of risk factors, such as reducing physical inactivity (5). Health behaviors include actions, mental events, and feelings of individuals and groups (1). Changing behavior often involves substituting one pattern of behavior for another and is an important part of producing a desired outcome (15).

However, it is not always easy and straightforward to change behaviors (6). It may require changing capabilities, increasing motivation, or providing opportunities to engage in an activity (16). To change health behaviors, it may be appropriate to use interventions or programs targeting behavior change and maintenance of the new behavior.

2.2 HEALTH BEHAVIOR CHANGE INTERVENTIONS

Interventions are intentional change strategies that are often complex and can operate on many levels, such as the individual, organizational, or national level (4, 17, 18). Complex interventions are widely used in the health services and entail multiple, and sometimes difficult, changes in behavior by both those delivering and those receiving the intervention (18). Complex interventions may consist of a number of interacting components which influence outcomes such as improved general health or moderation of disease. Complex interventions vary in terms of their degree of flexibility or tailoring that they permit, such as how strict the intervention delivery is supposed to be, according to the intervention protocol (18). Developing, evaluating and implementing health behavior change interventions are important in achieving the desired behavior change and targeted outcomes. In developing the interventions, it is useful to identify the evidence base for behavior change: for example, through systematic reviews of similar interventions. It is also important to identify relevant theories in order to develop a theoretical understanding of what would be the likely process of change (18). To maximize the intervention's potential efficacy in changing health behaviors, there is some mixed evidence that theory-based interventions are more effective than interventions not based on theory (7). It may also be appropriate to use modeling of the process and outcomes before embarking on a full-scale implementation (18). This can be done through trials or intervention studies, which can assist in identifying measures and outcomes. To find out whether an intervention works, it is important to evaluate the intervention's effectiveness and how it operates (18). However, evaluations can be compromised by problems of acceptability, compliance, and delivery of the intervention. Evaluating the processes involved in the delivery of interventions could provide insights into why a successful intervention worked and how it can be

optimized, or why an intervention failed to produce the desired outcomes or produced unexpected consequences (18).

2.3 DELIVERING HEALTH BEHAVIOR CHANGE INTERVENTIONS

This thesis focuses on the delivery of interventions in a clinical intervention study. Evaluation of intervention delivery is important, because it can inform future implementation and dissemination in practice settings. Hence, it is important to evaluate context-specific challenges and facilitators involved in the delivery of interventions. Failure to do so could hinder subsequent translation of research into practice in future implementation initiatives (19). Evaluation of both the delivery of interventions and subsequent implementation initiatives could be explored through many different outcomes (20, 21). The most common outcome is fidelity, also referred to as implementation fidelity, treatment integrity, and treatment fidelity in the literature (22). Fidelity is defined as the degree to which an intervention or program was delivered as prescribed by its developer (9-11). This outcome acts as a potential moderator, impacting the relationship between the interventions and their intended outcomes (11). Adherence is the bottom-line measurement of fidelity, including the subcategory of dose: i.e. the content, frequency, duration, and coverage of the delivered intervention (11, 22). Adherence measures how well those delivering an intervention adhere to the intervention as outlined by its designers (11). Subsequently, in order to understand why and how the intervention was delivered as is was, researchers could evaluate the behaviors, experiences, and attitudes of those delivering the intervention.

2.4 HEALTH CARE PROFESSIONALS

Health care professionals play a central role in delivering health behavior change interventions, for example, in clinical intervention studies. Delivering the intervention with fidelity and quality may require such professionals to change their own behaviors. But changing health care professionals' behavior is not easy, and may be hindered by a variety of barriers (23). The Cochrane Effective Practice and Organization of Care Group (EPOC) identified nine barriers to change in health care professionals in a practice setting: information management, clinical uncertainty, sense of competence, perceptions of liability, patient expectations, standards of practice, financial disincentives, administrative constraints, and others (24). These barriers may be relevant to the delivery of interventions in that they may inform development and tailoring of interventions, and educational programs. There are several strategies that can be employed to change health care professionals' behavior, such as printed educational material, educational meetings, educational outreach initiatives, local opinion leaders, audits and feedback, computerized reminders, and tailored programs (25). Thus, in order to facilitate health care professionals' behavior change and prepare them to deliver an intervention, it is important to design and evaluate education and training programs carefully.

2.5 EDUCATION AND TRAINING OF HEALTH CARE PROFESSIONALS

Education and training programs play an important role in changing health care professionals' behavior (26, 27), subsequently facilitating the delivery of interventions. Education and training may also increase knowledge and skills (26, 27), although an

increased focus on skills training does not necessarily lead to changes in behavior. That said, one constraint on the effectiveness of an intervention is the skill level of the people delivering it (28). An overview of systematic reviews show that relatively successful programs to change professional behavior are characterized by the use of various types of educational outreach, audits and feedback, and reminders (29). However, evidence on how to best achieve behavior change in health care professionals is mixed and somewhat conflicting, and many programs may be effective in some circumstances but not in others (26). For example, one strategy is to use tailored programs, which may be effective if local circumstances are taken into consideration (18, 23). Tailored programs include strategies to change health care professionals' behavior that take into account previously identified determinants, such as EPOC barriers, which could influence and lessen the effectiveness of the program (23, 25). However, the effects of tailoring tend to be moderate to small, and there are still uncertainties regarding which aspects of tailoring are most effective (23). In addition, education and training should be active and targeted, rather than broad (26, 30). It should be multifaceted and comprehensive, and it should include applied skills training and problem solving (31). Education and training may benefit from using a theoretical framework for behavior change (32, 33). Depending on the focus of the intervention, education and training may also facilitate changes in how health care professionals understand and respond to their patients or clients.

2.6 A BIOPSYCHOSOCIAL APPROACH

Biopsychosocial approaches or models are ways that health care professionals view human functioning and understand and respond to patients. The BPS approach complements and expands on the biomedical model, in which patients' reports of illness are mainly applied in the context of identifying and treating disease (34). A BPS approach is multifactorial, integrating psychological and social factors with biological factors, all of which affect and are affected by the person's health (35, 36). Psychological factors may be cognitive (e.g. learning, perceiving, remembering, and thinking), emotional (e.g. subjective feelings, which are affected by and affect thoughts and behavior), or motivational (e.g. why people behave the way they do). The biological factors in BPS are related to the body, such as organs, tissues, and cells (37). One benefit of using a BPS approach is that it provides a holistic view, looking at and understanding the whole person from the molecular to the societal level. This allows health care professionals to guide application of (e.g. medical) knowledge to the needs of each patient (38). However, research has shown that a BPS approach has limitations (39) and is not influential in general praxis in some fields that employ BPS approaches (39, 40). Health care professionals have also found it difficult to embrace BPS approaches (41). Hence, it is important to properly educate health care professionals so they are prepared to apply a BPS approach with integrity, adherence, and quality. In addition, delivering interventions based on behavior change theories may require them to expand their practices from the prevailing biomedical model (8) to include a BPS approach that applies psychosocial techniques.

2.7 BEHAVIOR CHANGE THEORIES

There is increasing interest in using behavior change theories in when designing complex interventions and educational programs, due to the recognition of the

importance of understanding the causal mechanisms of action within interventions and programs (42). Theories readily include knowledge of mediators and moderators, and what human behavior is and what influences human behavior (7). Theories may also guide analysis and offer a framework to support generalizability (33, 43). In addition, BCTs can be selected and refined to allow for replication and accumulation of evidence (44-46). Furthermore, theories may aim to influence behavior change through mechanisms that work on an individual, community, or population levels (47). In a scoping review, Davis et al. identified 82 theories of behavior and behavior change that are of potential relevance when designing and evaluating public health interventions (7). Some of the most frequently used theories of behavior and behavior change are the transtheoretical/stages of change model (TTM), the theory of planned behavior/reasoned action (TPB/TRA), the information-motivation-behavioral skills model (IMB), and SCT (7). However, evidence on use of theory in intervention design and its relationship to intervention effectiveness is conflicting; different sources point to increased, limited, no, and even negative associations (48). Nevertheless, two meta-analyses concluded that SCT accounted for 31% of physical activity behavior, while TPB accounted for 23.9% (49, 50). A systematic review on TTM found seven studies that used all dimensions of TTM; six of them showed short-term effects, and one showed long-term effects on physical activity (51). Subsequently, there is good evidence for the usefulness of these theories when designing physical activity interventions, however it is not easy to know which theory to select for a specific purpose (44).

2.7.1 Social Cognitive Theory

Social cognitive theories can be used to explain intention and to predict clinical behavior in health care professionals, although research on health care professionals' behavior is limited (32). One of the most commonly used behavior change theories in the area of health behaviors is SCT (1, 7, 52). Developed primarily by Albert Bandura (53), one distinctive feature of SCT is that it combines environmental and individual factors when explaining behavior, arguing that they interact and influence each other to result in individual and social change (1). Subsequently, human action and thought are products of an interplay among personal factors (such as cognitions, affect, and biological events), behavior, and the social and physical environment (54). These factors are the foundation of reciprocal determinism, which is a key concept of SCT and allow therapeutic and counseling efforts to be directed at these factors (54). Reciprocal determinism suggests that an individual is both an agent of change and a responder to change (55), in that the individual has the capacity to exercise control over their life and can intentionally make things happen by their actions (56). Key concepts in SCT are self-efficacy, observational learning/modeling (which states that people learn through their own behavior as well as by observing others and the results of those actions (55)), outcome expectations (defined as the individuals beliefs about what consequences are likely to follow if a particular behavior is performed (52)), and self-regulation (which include self-monitoring, performance self-guidance, and corrective self-reactions, enabling people to give shape to appropriate courses of action and motivate and regulate their execution (53, 56)). A review of the use of motivational interventions in exercise and traditional physical therapy included three studies applying SCT principles; these studies point to a positive effect on adherence and also

provide positive but conflicting evidence on effects on exercise and physical activity in patients compared to control groups (57).

2.7.2 Self-efficacy

Self-efficacy, a key concept in SCT, can be defined as a person's belief in their capability to exercise control over their functioning and environment (54, 56). Self-efficacy and has been found to mediate behavior, including health-related behaviors such as physical activity (58-61). Self-efficacy plays an important role in human cognition, motivation, and behavior, in that it allows people to exercise control over their thoughts, feelings, and actions (54). If a person does not believe that they have the power to produce effects by their actions, they have little incentive to act or persevere in the face of difficulties (56). Self-efficacy is primarily formed by interpretations of one's own behaviors, through vicarious experiences of observing others performing tasks, through social persuasions from others, and through physiological feedback (emotional arousal) (54). An intervention or educational program may target any of these four sources to enhance self-efficacy in performing a certain behavior. Self-efficacy is linked to specific situations and tasks, and is temporary and relatively easy to influence (62). Subsequently, it is important to target self-efficacy when seeking to influence specific behaviors.

2.8 MEASURING MEDIATORS OF HEALTH BEHAVIORS

As mediators of health behaviors, it is important to be able to measure SCT concepts such as self-efficacy that are potential determinants of the initiation, adoption, and maintenance of behaviors (63). Mediators can be measured using questionnaires, taking into consideration the mediators' dynamic nature and changes in their magnitude, strength, and generality.

2.8.1 Measurement properties

One central property of measurements is their validity; this is an indication of the extent to which an instrument measures what it is intended to measure. There are two general types of validity: internal and external. Internal validity includes the confidence in that changes in the independent variable are the cause of the results observed in the dependent variable. External validity is the generalizability of results to different situations or populations (64). Construct validity can be measured in order to assess how well one measure aligns with or differs from other measures (64). A second property of measurements is reliability; this concerns the accuracy and consistency of the measurement, and indicates the extent to which measurements taken from the same respondent are similar on repeated applications of the measurement instrument over time (65). Reliability may include tests of the measurement's stability, such as test-retest procedures, and tests of internal consistency that assess whether different individual items measure the same general concept (64). However, measurements of mediators such as self-efficacy cannot be generic, due to their task-, population-, and situational specificity (66). Hence, testing these measurement properties on specific tasks and populations will assist in assessing whether any particular measurement of a mediator is valid and reliable.

2.9 BEHAVIOR CHANGE TECHNIQUES

Linking theories to BCTs allows for replication in research, implementation in real-life situations, syntheses in reviews, and identification of active components (46, 67). Hence, proper specification of an intervention is essential before evaluating its effectiveness (67, 68). It is important to be able to link behavior change theories to BCTs when designing and evaluating theory-based interventions (16, 67). This is also important when developing educational programs targeting behavior change. However, we often lack detailed descriptions of behaviors targeted in complex behavior change interventions, and terminology use is inconsistent (42). With no currently existing standardized language for reporting “active” components in behavior change interventions (69), one method to specify and report intervention content is the BCT taxonomy defined by Michie et al. (46, 67). These BCTs are observable, replicable, and irreducible components of the intervention and their active ingredients (46, 67). The researchers identified 93 BCTs in total, clustered into 16 groups (67). Thus, designing behavior change interventions or educational programs involves specifying the target group (e.g. health care professional or patient) and target behaviors, and identifying mediators of behavior change (barriers and facilitators) (70). Once this has been done, BCTs can be applied to target the mediators of behavior change (70). Key BCTs include goal-setting, self-monitoring, feedback, and action planning (71); these techniques can be used individually or in combination with other BCTs (67). Goal-setting and feedback have some promise in increasing physical activity in an RA population, as reported in a systematic review (72). One meta-analysis found that combinations of the BCTs goal-setting, self-monitoring and feedback was effective in interventions targeting physical activity for chronically ill adults (73). A review among healthy adults found that action planning was associated with higher self-efficacy and physical activity behaviors (74). Finally, a Cochrane review showed that feedback on performance leads to small but potentially important improvements in health care professional’s practice (75).

2.10 PHYSICAL THERAPY

Physical therapy is an established non-evasive health profession well equipped to promote health-enhancing behaviors such as physical activity, weight management, good nutrition, etc. (76, 77). The World Confederation for Physical Therapy (WCPT) states that physical therapy helps people to develop, maintain, and restore movement and functional ability (78). The field is concerned with physical, psychological, emotional, and social wellbeing (78). Physical therapy includes promotion, prevention, treatment/intervention, habilitation, and rehabilitation, and physical therapy practice is not limited to direct patient care but also includes leading, managing, teaching, etc. (78). Physical therapy also aims to identify and maximize quality of life and movement potential in patients, and involves interaction between the physical therapist (PT) and other parties: not only patients but also families and other health care professionals (78). The WCPT also states that interaction between the PT and patient is an integral part of physical therapy, and is necessary to change behaviors that may promote health and wellbeing (78). However, physical therapy has traditionally favored use of a biomedical paradigm in practice settings (79-82). Also, PTs already using interventions that include psychological components report inadequate training and understanding to deliver interventions that extend beyond a biomedical approach (83). Education and

training may be essential to prepare PTs to deliver interventions based on behavior change theories, using a BPS approach.

2.11 RHEUMATOID ARTHRITIS

RA has a global prevalence of 0.24%, with higher prevalence in women and older persons; hence, as the population continues to age, its prevalence will increase substantially (84). RA is a chronic inflammatory autoimmune disease characterized by synovitis, systemic inflammation, and autoantibodies (85). These disease subsets may lead to articular destruction and loss of function and muscle mass (86).

2.11.1 Physical activity in RA

RA is primarily treated with medication (87). However, even though pharmacological treatment has improved in recent years, about 75% of patients do not achieve full remission (88). Non-pharmacological treatments may support people with RA to cope with the consequences of the disease (88). Previous research supports usage of dynamic, aerobic, and stretching exercises, cognitive-behavioral interventions, and patient education and self-management training (88, 89). Subsequently, physical activity is an important component of RA management, and studies have reported overall positive outcomes from physical activity interventions, with no adverse events or exacerbation of the disease (86, 90). Physical activity refers to physical motions by skeletal muscles producing energy expenditure from minimal to maximal intensity, and exercise can be defined as purposeful and planned behavior that results in energy expenditure (90). The effects of physical activity and exercise in people with RA include reduction in pain, fatigue, disability, and impairment of functional capacity, and improved quality of life (91-93). In spite of the positive effects physical activity, the level of physical activity among RA populations seem as low or lower than that of the general population, as well as below international recommendations for a healthy lifestyle (94, 95). Health behavior change interventions can be implemented to promote physical activity in people with RA, and it has been suggested that this is an appropriate way to influence health knowledge, attitudes, and behavior (96). This can be done through interventions such as those targeting self-management that include educational, behavioral, and cognitive approaches to influence knowledge, beliefs and behaviors (96).

2.12 THE PARA 2010 INTERVENTION

The PARA 2010 intervention used a longitudinal cohort design and was conducted at multiple locations throughout Sweden. The intervention aimed to promote adoption and maintenance of long-term HEPA in 220 people with RA not currently achieving HEPA recommendations (97). HEPA is defined as activities that maintain or increase muscular strength, i.e. strength training, performed twice weekly, and 30 minutes' moderate intensity aerobic (endurance) physical activity at least five days each week. This aerobic component can be replaced with 20 minutes of vigorous activity three days per week (98). The PARA 2010 intervention included a two-year intervention based on SCT principles including key BCTs, aiming to increase and maintain HEPA. The hypothesis was that increasing HEPA would improve perceived health, reduce pain and fatigue, increase muscle function and aerobic capacity, and have an impact on

psychological factors and prevention of future cardiovascular events (97). The intervention aimed to integrate HEPA into daily routines through exercise sessions at public gyms, physical activity as part of independent daily life, and biweekly one-hour support group sessions led by trained PTs during the first year (97). During the second year intervention participants were encouraged to continue with their own support group sessions (97). PTs also provided guidance on how to work out at the public gyms where the intervention participants were enrolled. Finally, PTs were available once a week for consultations (99). Previously published results on outcomes for participants in the PARA 2010 intervention have shown high retention, reasonable adherence to the program, and some improved HEPA behavior (99).

2.12.1 Guiding in behavior change

In the PARA 2010 intervention the PTs applied SCT principles and BCTs with a biopsychosocial approach targeting behavior change to promote HEPA in people with RA. This implies that the PTs had to guide intervention participants in adhering to the principles of the intervention. Guiding behavior change may require similar skills as those defined for health coaching, including listening, questioning, and reflecting so as to support people with chronic illnesses to manage their disease, focusing on empowering people (100). A systematic review on health coaching interventions reported positive intervention effects on at least one health behavior change outcome in 15 of 16 studies included (101). The review suggest that health coaching is a promising strategy for improving health, although the diversity of interventions, lack of details on these interventions, and the variety of outcomes make it difficult to draw any conclusions from the results in terms of what was responsible for successful versus unsuccessful outcomes (101). Furthermore, guiding people with RA to HEPA systematically using SCT principles and BCTs is not mainstream practice for the PTs (102), and therefore this type of intervention may require education and training targeting PTs' knowledge and skills (26, 31).

2.12.2 Physical therapist education and training

The PTs were key contributors in the PARA 2010 intervention, as they were responsible for delivering the intervention. PTs may be suitable to deliver the intervention as they have expertise in the area of physical activity promotion in the general population (103-105), and in people with chronic disease (106, 107). However, adapting a biopsychosocial approach and systematically applying BCTs may not be part of PTs' mainstream practice (79, 102, 108). Therefore, education and training was crucial to properly prepare PTs to deliver the PARA 2010 intervention. Even with education and training, it is not always easy to apply BCTs, which highlights the need for evaluation of education and training programs, as well as the PTs' behaviors and experiences while delivering the intervention.

3 AIMS

The overall aim was to explore PTs' experiences and behaviors delivering an HEPA intervention in people with RA after receiving an education and training preparing them to apply a SCT perspective using BCTs, and employing a biopsychosocial approach. Additionally, to investigate the measurement properties of a self-report instrument on self-efficacy for physical activity in an RA population.

The studies included in this thesis covered the following specific aims:

Study I

To explore the experiences of PTs in guiding people with RA to HEPA.

Study II

To describe changes over a one-year period in PTs' a) knowledge of BCTs and physical activity in people with RA, b) fear-avoidance beliefs related to the promotion of physical activity in RA, c) self-efficacy in guiding in behavior change, and d) to measure overall adherence in terms of use of BCTs according to a structured protocol.

Study III

To explore PTs' strategies when guiding people with RA to HEPA behavior.

Study IV

To investigate the reliability and validity of the Swedish version of the Exercise Self-Efficacy Scale in an RA population.

4 METHODS

4.1 EDUCATION AND TRAINING IN THE PARA 2010 INTERVENTION

The education and training provided for the PARA 2010 intervention was tailored to prepare PTs to deliver the PARA 2010 intervention targeting HEPA in people with RA. At the end of the education program, the PTs were expected to be able to describe the evidence for HEPA in RA, and describe the evidence for behavior change on increasing and maintaining physical activity. The education focused on teaching the skills that would assist PTs in delivering the PARA 2010 intervention. To enhance their learning and achieve behavior change in the PTs, the education and training was based on SCT principles and focused on practical exercises, positive reinforcement, and modeling—for example through role-play and homework assignments where PTs practiced handling challenging situations that would occur in the support group sessions (97). In addition, one member of the project management team made two on-site visits to each PT during the intervention year—one early in the year and one later on. One of the researchers also provided feedback on the PTs behavior in conjunction with the on-site visits (97). The education provided knowledge on HEPA in RA and strategies to support HEPA behavior (97). During the education program PTs were introduced to study-specific protocols stating core concepts for the group sessions, and a written manual describing group session content. Overall, the education and training aimed to prepare the PTs to provide guidance in key BCTs such as goal-setting, self-monitoring of behavior, feedback on behavior, problem-solving to overcome obstacles, and encouraging peer support as required by the intervention.

The education also served to enhance PTs' own self-efficacy for guiding in behavior change and to reduce fear-avoidance beliefs regarding guiding people with RA toward HEPA. It was hypothesized that this would influence behavior change in the PTs delivering the intervention. Figure 1 shows a flowchart of the intervention.

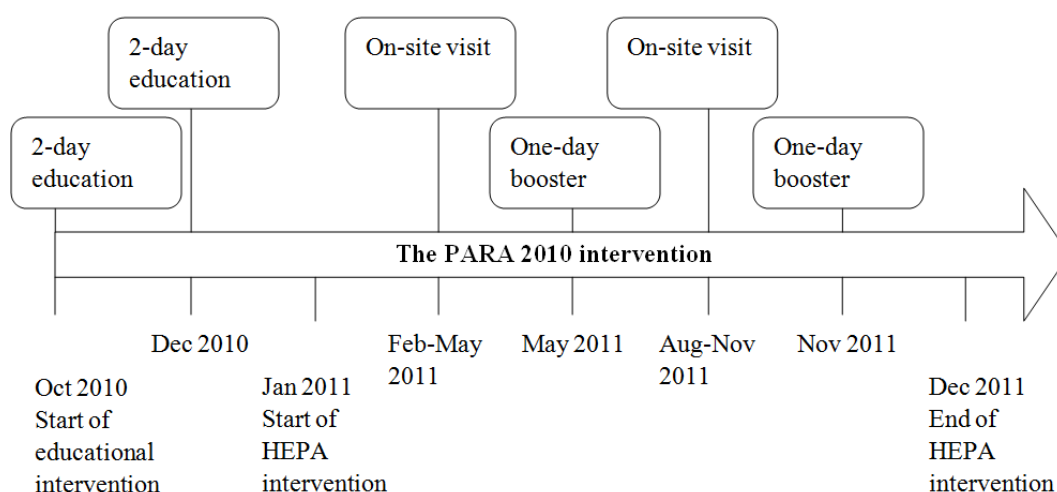


Figure 1. Flow chart of the education and training in the PARA 2010.

The education consisted of six education days and presented information and exercises on evidence-based methods for behavior change in physical activity. The education

program also included information on content and set-up of the group meetings, skills training on how to lead group meetings, homework assignments and role playing on guidance tasks to be carried out during the interventions. The two booster sessions covered feedback and follow-up on the PTs' performance in group sessions. In these sessions PTs watched video-recorded examples of providing guidance in behavior change and also completed homework assignments, role-play exercises, and discussions. During the on-site visits the PTs were videotaped and given feedback on their own behavior. Selected parts of the video recordings were uploaded on a designated website as good examples, providing vicarious learning possibilities and positive reinforcement for the PTs whose recordings were posted. Before the start of the support group sessions, the representative from the project management team asked whether the PT wanted the representative to observe anything in particular. After the support group session, problems were discussed, followed by tips and feedback on behavior from the representative.

4.2 THE PARA 2010 SUPPORT GROUP SESSIONS

The PARA 2010 intervention included support group sessions, which were important to facilitate the intervention participants' acquisition of behavioral skills, enabling them to incorporate HEPA into their daily routines (97). The sessions were moderated by the PTs and took place in designated conference rooms at the gyms where the intervention participants trained. There were 5-10 intervention participants in each group, plus one PT, and each session lasted approximately one hour. The group sessions were based on SCT principles and incorporated key BCTs, including 1) systematically adjusted specific and individual goal-setting, 2) self-monitoring of progress toward the goals, 3) mutual feedback on performance, 4) problem-solving to overcome barriers, and 5) relapse prevention (46, 67). In addition, the group sessions covered specific discussion topics such as "pain and strength training" and "sleep and stress" (97), and occasional expert lectures on topics such as diet and medication. The intervention participants were also given a study-specific handbook that contained topics such as behavior change, HEPA, and exercise. Although the content of the group sessions was provided, PTs were instructed to adjust the content according to the specific needs of the group (97). Furthermore, the group sessions were designed to enable social support, positive reinforcement of HEPA, and observational learning through sharing of experiences among intervention participants (97). During the group sessions discussions on intervention participants knowledge, attitudes, and self-efficacy for HEPA were initiated by the PTs and included in the intervention participants goal-setting (97).

4.3 STUDY DESIGN

Study I is an exploratory study using qualitative content analysis. Study II is a longitudinal case study within a one-year physical activity intervention study. Study III is an exploratory study using qualitative video analysis. Study IV is a test-retest reliability and validity study. See table 1 for an overview of Studies I-IV.

Table 1. Overview of Studies I-IV.

	Study I	Study II	Study III	Study IV
Design	Exploratory	Longitudinal case study	Exploratory	Methodological
Participants	12 PTs	10 PTs	11 PTs	244 people with RA
Data sources	Semi-structured interviews	Questionnaires and logbooks	Video recordings	Questionnaires
Data collection	Face-to-face interviews after the intervention within one month of the end of the first year of the PARA 2010 intervention	Questionnaires administered before, during and after, and logbooks during the first year of the PARA 2010 intervention	One recording early on and one recording later on during the first year of the PARA 2010 intervention	Twice before the start of the PARA 2010 intervention, spaced four to six months apart
Analysis	Qualitative content analysis	Descriptive statistics, Friedman's test, Wilcoxon signed-rank test, effect size	Qualitative video analysis	Intraclass Correlation Coefficient (ICC), Cronbach's alpha, Pearson correlation coefficient

4.4 PARTICIPANTS

4.4.1 Studies I-III

A total of 12 PTs enrolled in the PARA 2010 intervention. In Study I all 12 were interviewed. In Study II 10 PTs filled out the questionnaires and logbooks; one was excluded since she was a part of the PARA 2010 project management team, and one withdrew midway through the intervention due to personal reasons. In Study III 11 PTs were videotaped at least once; one PT declined to be videotaped. The 12 PTs were all female registered PTs between the ages of 25 and 59; their experience in the profession ranged from 2 to 32 years (mean 13.8), and all but two had worked with RA patients up to 22 years (mean 5.8). Of the 12 PTs, 7 had additional education in training/exercise in rheumatic diseases, ranging from a one-day program to 20 weeks of university study. Furthermore, 10 had additional education in behavioral science, such as behavioral medicine, motivational interviewing, and cognitive behavior theory, with the duration ranging from a two-day course to 37.5 weeks of university study.

4.4.2 Study IV

The study included 244 people with RA who agreed to participate in the PARA 2010 intervention and enrolled in the baseline assessments. To be eligible, patients had to

have a diagnosis of RA (109), be 18 to 75 years old, be independent in their daily activities (99), and not be achieving recommended levels of physical activity for a healthy lifestyle, and not have other health conditions preventing HEPA. The test-retest investigation included 84 of the 244 participants whom had stable health condition between the measurement occasions.

4.5 DATA COLLECTION AND ANALYSIS

4.5.1 Study I

4.5.1.1 Qualitative interviews

The interviews were semi-structured, and the main areas of inquiry in the interview guide included PTs' experiences guiding people with RA to HEPA, and their experiences in the education and training they received. The interview guide also included a number of follow-up questions, such as "Can you tell me about a typical group meeting?"

4.5.1.2 Data management and analysis

Study I involved a qualitative content analysis based on Graneheim and Lundman (110). The aim of content analysis is to attain a condensed and broad description of the phenomenon (111). This research method subjectively interprets the content of data through a systematic classification process that codes and identifies themes and patterns (112). These themes and patterns are derived inductively and iteratively from the data, and thus the researcher will go back and forth between the original data and the emerging themes. What emerges includes latent content that provides an interpretation of the underlying meaning of the text, and manifest content that describes the visible, obvious components (110).

4.5.2 Study II

4.5.2.1 Logbook

A logbook was developed to measure self-reported use of key BCTs included in the PARA 2010 interventions program protocol. The BCTs included review of behavioral goals, feedback on behavior, social rewards, goal-setting (behavior), and activity planning. The logbooks were also used to measure adherence to the program protocol in accordance to pre-set criteria.

4.5.2.2 Questionnaire

The questionnaire evaluated four main areas:

- PTs' knowledge of physical activity in people with RA, based on international recommendations for the type and amount of physical activity required to increase and maintain health (98, 113, 114).
- PTs' knowledge of BCTs, based on questions about BCTs discussed and used in the PARA 2010 intervention.
- PTs' fear-avoidance beliefs related to the promotion of physical activity in people with RA, measured based on the Fear-Avoidance Beliefs Questionnaire (115) and the Tampa Scale of Kinesiophobia (116).

- PTs' self-efficacy to support HEPA behavior. including questions on PTs' beliefs about their capability to guide the support group sessions, contingent with Bandura's 'Guide for Constructing Self-Efficacy Scales' (117).

4.5.2.3 *Data management and analysis*

Study II involved a quantitative analysis of variables from the questionnaire and the logbook. The methods of analysis in the questionnaire were:

- Descriptive statistics: medians, means and proportions
- Friedman's test, to analyze changes between measurements on a single sample; the test is a non-parametric statistical test. P-values below .05 were considered significant.
- Wilcoxon signed-rank test, used for post-hoc analyses comparing repeated measurements to assess mean rank differences on a single sample; the test is a non-parametric statistical test. P-values below .05 were considered significant.
- Effect size ($r = Z/\sqrt{N}$) was used to measure the degree of difference between measurements.

Adherence was measured through PT reports of use of BCTs in the logbooks. First the intervention year was divided into three phases to represent the initiation phase (first seven support group sessions), adoption phase (the following seven sessions), and maintenance phase (the last six sessions). In order to be considered an "adherer" during each phase, the following criteria had to be met:

- For all phases: BCTs "Follow-up on goal-setting" and "guidance in SMART (S = Specific, M = Measurable, A = Acceptable, R = Realistic, and T = Time-set) goal-setting" had to be applied at each support group session.
- Initiation phase: in addition to the criteria for all phases, at least two of the other three BCTs had to be applied at all but two sessions.
- Adoption and maintenance phases: in addition to the criteria for all phases, at least one of the other three BCTs had to be included.

4.5.3 **Study III**

4.5.3.1 *Video recordings*

The PTs were video-recorded by a member of the PARA 2010 project team during support group sessions. The video recordings were used to inductively observe and assess events and actions that occurred when PTs attempted to guide patients toward HEPA behavior during the support group sessions for the PARA 2010 intervention.

4.5.3.2 *Data management and analysis*

The video recordings were reviewed and analyzed in three main stages based on a methodological framework from Heath et al. that draw from conversation analysis and ethnomethodology, prioritizing situational and interactional accomplishments (118):

- Preliminary review: cataloguing the data, including description and classification.
- Substantive review: a focused review of the data to find additional instances of events enabling comparisons. Consequences, topics, and structure are reviewed.

- Analytic search: refinement of the analysis based on the reviews. Interesting events and phenomena are grouped and labeled, providing the basis for the analysis.

4.5.4 Study IV

4.5.4.1 Data collection

Data were collected by administering the ESES-S (119, 120) to intervention participants on two measurement occasions before the PARA 2010 intervention started. Additional questionnaires and rating scales used to validate the ESES-S were collected at the first occasion.

4.5.4.2 The ESES-S

The ESES-S was used to measure exercise self-efficacy and contained one main question that asked: “How confident are you to exercise?” followed by six items. The six items described barriers to exercise (121):

- In spite of your work schedule
- When physically fatigued
- When exercise is boring
- With minor injuries
- In spite of other time demands
- In spite of family responsibilities

Nine additional rating scales were used in the ESES-S validation:

- Beliefs on how physical activity affects one’s own current pain were measured via four items in the modified Fear-Avoidance Belief Questionnaire (FABQ-m) (115).
- HEPA and exercise was measured using the International Physical Activity Questionnaire (IPAQ) short version (122, 123).
- Two questions were used to measure expected outcomes for physical activity: “How certain are you that HEPA is beneficial for your health in the long run?” and “How certain are you that HEPA has a positive impact on your RA-related difficulties?”
- A 0-100 VAS scale was used to rate general health perception, pain, and fatigue.
- The Stanford Health Assessment Questionnaire (HAQ) was used measure activity limitation (124).
- One item in the EQ-5D was used to measure perception of depressive state (125, 126).

4.5.4.3 Data management and analysis

The hypotheses for construct validity were that ESES-S should have positive convergent correlation with HEPA, exercise, and outcome expectations on physical activity (127, 128), and negative correlation with pain, activity limitation, and fear avoidance beliefs (129-131). In addition, for divergent validity ESES-S should have no correlation with age or gender. The methods of analysis included:

- Intraclass correlation coefficient (ICC) was used to assess test-retest reliability. Agreement at a 95% confidence interval was classified as: $ICC \leq 0.4 =$ poor; $> 0.4 - \leq 0.8 =$ moderate; and $> 0.8 =$ good (132).
- The Pearson correlation coefficient (r) was used to assess construct validity. Hypotheses were formulated based on previous research on self-efficacy correlations to other variables included in the study. Point-biserial correlations was used to calculate the relation between interval and dichotomized variables (133). The correlation coefficient (r) was evaluated as: $0.0 - 0.2 =$ very weak relationship; $> 0.2 - 0.4 =$ weak; $> 0.4 - 0.6 =$ moderate; $> 0.6 - 0.8 =$ strong; $> 0.8 - 1.0 =$ very strong (134).
- Cronbach's alpha was used to assess whether ESES-S items measured common constructs and the corrected item-total correlation. Alpha coefficients for common constructs were: $0.7 - 0.8 =$ minimally acceptable; $> 0.8 - 0.9 =$ acceptable; and $> 0.9 =$ very good (135, 136), for corrected item-total correlations, over 0.4 was considered good (137).

4.6 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Stockholm Regional Ethical Review Board (2010/1232-31/1 and 2011/1241-32). In Studies I-III the PTs gave their written consent before participating in the study, and in Study IV the intervention participants in the PARA 2010 intervention gave their written consent before filling out the questionnaires. Both the PTs and intervention participants were informed that they could withdraw from the study at any time without negative consequences, and that all personal information was confidential.

5 RESULTS

5.1 STUDIES I-III

One overarching theme and four categories were extracted from Studies I to III (Figure 2).

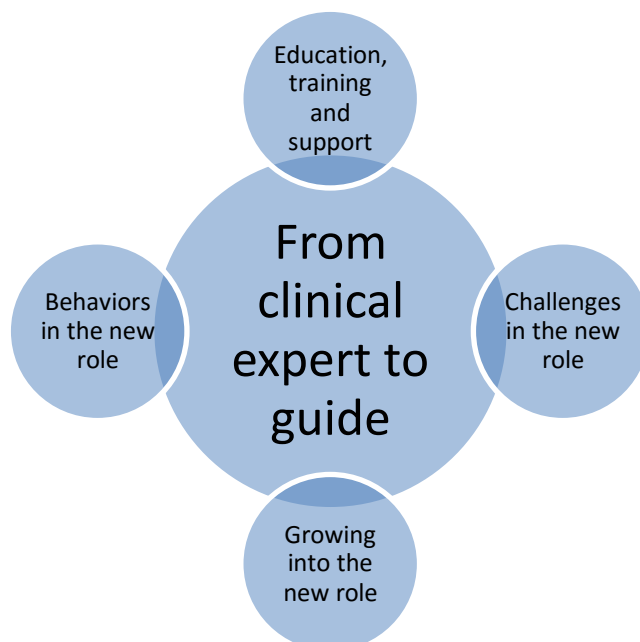


Figure 2. Illustration of the theme “From clinical expert to guide,” and four categories; “education, training, and support,” “challenges in the new role,” “behaviors in the new role,” and “growing into the new role.”

5.1.1 Theme: From clinical expert to guide

5.1.1.1 Study I

A theme was extracted from the interviews with the PTs. This theme implies that the PTs were successively changing their behaviors from a clinical expert to integrating it with a guiding role. The new role included PTs’ systematic use of SCT principles and BCTs and application of a biopsychosocial approach, assisting in guiding people with RA to adopt and maintain physical activity.

5.1.2 Category 1: Education, training, and support

5.1.2.1 Study I

The PTs’ thoughts on the education program and support are described in Study I as the PTs wanting clarity on their tasks and role, and an understanding of the intervention. This was specifically emphasized early in the intervention. Individualized feedback on their behavior was considered important. They thought it was beneficial for self-examination of their own behavior and provided information on personal strengths and skills, as well as practical tips on how to behave. Furthermore, PTs felt that positive feedback on behavior provided practical tips, and revealed strengths. The feedback assisted them in overcoming challenges by increasing their confidence in their tasks

and role which reduced stress. The PTs also stated that the education and support made them feel involved and a part of the project as a whole. Finally, the educational material (e.g. handbooks) and their use at the support group sessions had some strengths and limitations. The materials were viewed as relevant and supportive but it also made it difficult to prioritize due to the many topics to be covered. Also, some parts were felt to be repetitive, such as goal-setting. In addition, parts of the education content were not used by the PTs, mainly due to lack of time allocated for this content. This included instruments, handouts, and a web site for support and interaction among PTs.

5.1.3 Category 2: Challenges in the new role

5.1.3.1 Study I

Study I presented challenges for the PTs to change behavior in delivering the PARA 2010 intervention. The challenges mainly came from the tasks to be performed in the intervention. The PTs were insecure when to lead and follow during the group sessions: e.g., whether and when they should act as guides or teachers providing information. They did not know how to guide each intervention participant, and at times they felt like intervention participants expected them to lead the group (such as to be in charge of the group, giving directives), which partly conflicted with their role as guides. Additionally, PTs felt insecure in the guiding role and the task they were expected to perform. Thus, the PTs reported initial stress early on in the intervention, with one stressor being insufficient time to deliver the content they felt was necessary during the support group sessions. Other stressors included not knowing how to organize the support group sessions and not knowing how to achieve a good group dynamic. Also, PTs perceived practical issues such as time constraints to cover all aspects of the support group sessions as challenges.

5.1.3.2 Study III

In Study III the analysis of video recordings revealed three areas of potential challenges for the PTs. The first was when the intervention participants reported barriers to performing physical activity, including physical and psychological issues. Second, challenges also occurred when intervention participants did not use the structured activity planning, including the activity planning tool in the intervention handbook. Third, PTs encountered challenges when intervention participants experienced negative and positive outcomes of physical activity, mainly provided via the feedback received on results from tests of aerobic capacity, lower extremity muscle function, and grip strength.

5.1.4 Category 3: Behaviors in the new role

5.1.4.1 Study II

Study II provided information on the PTs' use of BCTs included in the intervention protocol and their adherence to key BCTs, according to pre-set criteria. Aggregate use of BCTs during the PARA 2010 intervention year as reported in the logbooks is presented as mean percentages, indicating a slightly decreasing trend over time (Figure 3).

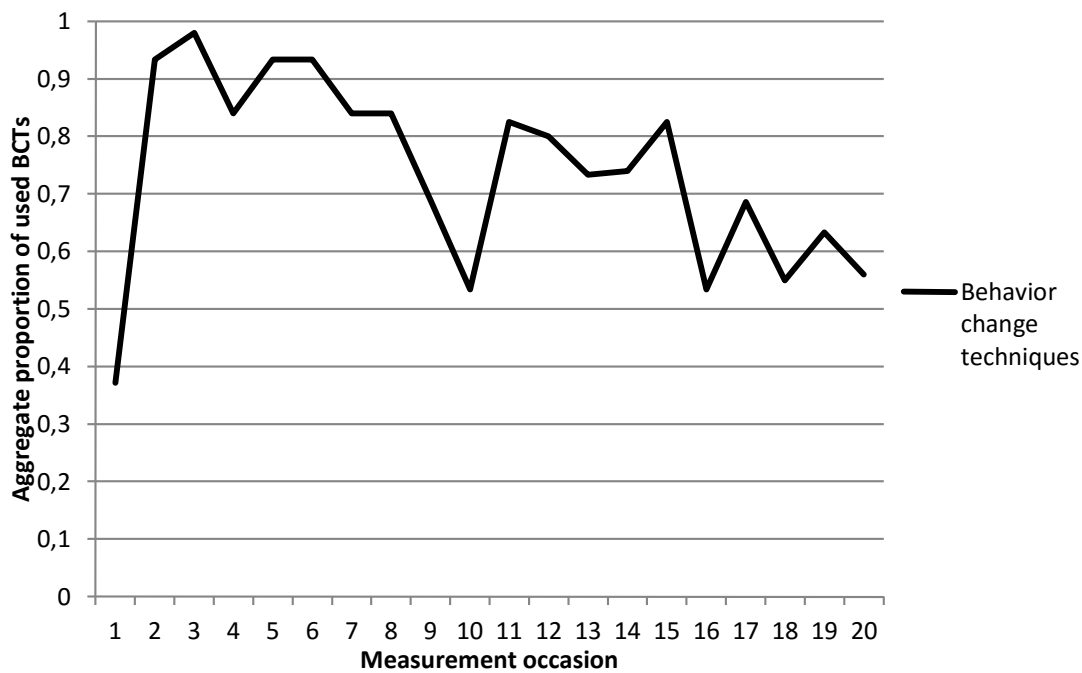


Figure 3. Aggregate proportion of PTs' self-reported use/non-use of BCTs (n = 10).

In phase 1 (the initiation phase), three of ten PTs fulfilled the pre-set criteria for adherence. In phases 2 (the adoption phase) and 3 (the maintenance phase), two of the three PTs that were adherers in phase 1 also met the criteria. No additional PT fulfilled the criteria for adherence.

5.1.4.2 Study III

In Study III the PTs applied a variety of strategies aiming to overcome the three main challenges detected during the video recordings. PT strategies to address the first challenge (i.e. intervention participants presenting barriers to performing physical activity) included involving intervention participants to provide social support to each other, inviting intervention participants to discussions on problem solving, and initiating discussions on acceptance of barriers and review of plans for future physical activity. PT strategies to address the second challenge (i.e. intervention participants not using structured action planning for physical activity) included providing information about the advantages of action planning and inviting intervention participants to discuss the benefits of action planning. Finally, PT strategies used to address the third challenge (i.e. intervention participants experiencing both negative and positive outcomes of physical activity) included providing information and initiating discussions about the health consequences of physical activity. PTs alternated between the different strategies, even for the same challenge, providing information and instructions to the group, as well as inviting intervention participants to share experiences and interact.

5.1.5 Category 4: Growing into the new role

5.1.5.1 Study I

Study I describes the process of how the PTs started to change their behaviors and include use of SCT principles and BCTs. This meant that they started to relinquish the steering and control they initially felt they had to adopt during the support group

meetings. The PTs felt they did not have to act as leaders or teachers, telling the intervention participants what to do, and could instead let the needs and wishes of the intervention participants guide the agenda. The PTs also started to feel comfortable to promote the adoption and maintenance of HEPA behaviors by providing information and initiating discussions on the intervention topics. They promoted an open atmosphere during support group sessions and let intervention participants take more responsibility for their behavior. As they grew into the role, PTs gradually gained confidence and became comfortable with their tasks and role. This included acknowledging the new role, finding ways of guiding that suited them and the situation, subsequently starting to feel more like members of the group rather than teachers. PTs adapted to the group and did not follow the intervention handbook and protocol strictly. Finally, PTs stated that they had started to apply what they learned during the education and training program and from guiding the support groups, in other contexts such as clinical practice.

5.1.5.2 Study II

In Study II, PTs' knowledge of BCTs increased significantly between the first measurement occasion prior to education and training and all subsequent measurements, before, during, and after the intervention (Wilcoxon signed-rank test produced z values between -1.97 and -2.41, p -values between .016 and .049, and effect sizes between 0.62 and 0.76). PTs' self-efficacy to guide behavior change was relatively strong throughout all measurement occasions and increased significantly between the first measurement occasion prior to education and training and the last measurement occasion after the training (Wilcoxon signed-rank test; $z = -2.35$, $p = .019$, effect size $r = 0.74$). PTs' knowledge of physical activity indicated that they had good knowledge before participating in the education and training program, during the intervention, and after the intervention. PTs' fear-avoidance beliefs with respect to intervention participants' physical activity remained modest at all measurement occasions.

5.2 STUDY IV

5.2.1 Measurement properties of the ESES-S

5.2.1.1 Reliability

The ICC indicated moderate agreement between measurement occasions 1 and 2 for ESES-S total score and for items 1-6. For the total score, ICC was 0.59 (95% CI, 0.37-0.73), and for items 1-6 it was 0.45 (CI 0.17-0.64, $n = 86$), 0.42 (CI 0.13-0.62, $n = 89$), 0.43 (CI 0.13-0.62, $n = 88$), 0.67 (CI 0.50-0.79, $n = 89$), 0.61 (CI 0.40-0.74, $n = 87$), 0.56 (CI 0.33-0.71, $n = 87$) respectively. The ESES-S had respectable interrelatedness of items (Cronbach's alpha 0.87 at the first measurement occasion and 0.89 at the second). The corrected item-total correlations were good for the ESES-S single items. The ESES-S total score had a mean of 32 (CI, 29-34) at the first measurement occasion and 35 (CI, 32-37) at the second.

5.2.1.2 Validity

Pearson's correlation coefficient (r) was used to calculate construct validity. Significant weak correlations were found between ESES-S and HEPA and outcome expectations

representing construct convergent validity. Absence of correlations with age and gender supported divergent construct validity.

6 DISCUSSION

The objectives of this thesis were to explore and evaluate PTs' experiences and behaviors in delivering an intervention promoting HEPA in people with RA, and also to investigate the measurement properties of a self-efficacy questionnaire.

6.1 MAIN FINDINGS

The main findings in this thesis are included in the theme and the four categories presented in the results, as well as in the measurement properties for ESES-S.

6.1.1 Theme: From clinical expert to guide

Study I shows the PTs' progression from clinical experts to guides, learning to promote health behavior changes in the intervention participants. This implies that changing and maintaining health care professionals' behavior to include systematic application of BCTs with a biopsychosocial approach is indeed possible, although it is not easy or instantaneous (33). There was much for the PTs to learn, in terms of both knowledge and skills, and several barriers and challenges occurred along the way that they had to overcome. The progression from clinical expert to guide was related to the categories presented in the results (see Figure 2).

6.1.2 Category 1: Education, training, and support

Education and training may be key contributors to PTs' behavior change (29). The PTs reported the need for clear tasks and role in delivering the intervention while applying a biopsychosocial approach systematically using BCTs. A study of PTs' consultations in back pain care also revealed significant challenges to incorporating a biopsychosocial approach with traditional biomedical physical therapy, and concluded that PTs may benefit from further training and mentoring support (138). However, learning to promote behavior change is a progression that includes learning and applying new skills. Consequently, the need for clear tasks and roles may decrease over time with increased experience and skills. Education and training could reduce an initial lack of skills, possibly by providing additional applied skills training and very clear guidelines on how to adhere to the intervention.

PTs appreciated feedback on individual performance from the PARA 2010 project management team, as they felt more confident in delivering the intervention. Including this kind of feedback on intervention delivery could be a key point in achieving the levels of autonomy and competency required for health care professionals to grow and change their own behaviors. Supporting this conclusion, a systematic review looking at what interventions best promote health care professionals' behavior change in health care practice highlighted feedback as one of the components that offered the best chance of success in improving professional practice and/or patient outcomes (29). However, it could be financially and logistically problematic to have a project management team to offer feedback in both clinical intervention studies and clinical practice implementations, especially over longer periods of time. Other, less resource-intensive methods such as peer coaching could be a solution to this issue. Peer coaching uses collaborative learning through observational learning and feedback, etc. establishing goals or outcome expectations affecting motivation and self-efficacy. Peer

coaching can be effective in improving adherence and potentially fostering knowledge acquisition and competence (139-141).

The PTs also felt included in the PARA 2010 intervention, possibly because of the close connection to the project management team during the intervention; this could have had a positive influence on PTs motivation (142). Thus, even if a peer system is in place it could be important for the people delivering the intervention to feel they are an integral part of the project, getting the support they need, and having a connection to the project management team.

6.1.3 Category 2: Challenges in the new role

In Study I the PTs felt insecure about what exactly they were supposed to do during the support group sessions and when to do it. This implies that at least initially, they would have preferred a very specific agenda, which also coincided with their desire for clear, practical timeframes and logistics regarding the delivery of the intervention. Also, more pre-intervention effort could be focusing on increasing PTs confidence, e.g. their self-efficacy to guide behavior change, subsequently influencing motivation and behavior change (143). All in all, the challenges potentially affected the PTs' feeling of stress, especially early in the intervention year. The stressors in Study I were related to perceived time pressure, not knowing how to organize the meetings, and not knowing how to achieve a good group dynamic. The challenges complement and share similarities with the EPOC barriers to change, such as initial stress corresponding to the barrier "clinical understanding". It is important to both identify challenges and develop strategies to address such challenges. They could be specifically targeted in the education and training in future implementation initiatives. In Study III additional challenges were observed when PTs were delivering the intervention. These occurred when intervention participants did not want to follow the program, and when they received information on the effects their behaviors in the form of positive and negative health consequences. As a supplement to the challenges in Study III a qualitative study interviewing people with RA identified perceived barriers to physical activity, such as fear of the disease taking control of their lives and their need to stay in control (144). Other barriers included personal routines, social support, and environmental influence (144). These challenges and barriers could add to our understanding of how people with RA perceive physical activity and could inform on what obstacles PTs may encounter, and the formulation of intervention strategies.

6.1.4 Category 3: Behaviors in the new role

Study III showed that the PTs employed a number of strategies to deal with a variety of challenges. These strategies consisted of communication approaches drawn from two rather distinct directions: in one PTs acted more as teachers, providing instructions and information, and in the other PTs provided guidance to involve and engage intervention participants to interact. The strategies targeted social support, problem solving, planning, and health consequences in the intervention participants. Interestingly, the PTs shifted back and forth between different strategies with no apparent effort or preference for any specific way of dealing with challenges. Encouraging intervention participants to interact implies a collaborative relationship, which is a central concept in patient-centered care (PCC) (145, 146). There are many definitions of PCC (34, 146-148); it describes health care professionals' involvement of patients in health care

discussions and decisions focusing on their needs, including a BPS approach (34). Such collaboration has been shown to improve patients' self-management and adherence to treatment and to provide positive effects on general health and patient satisfaction (146, 148, 149). However, the PTs also used strategies that involved the provision of information and advice, which may be beneficial in many situations (150). Confirming this, a review among healthy adults showed that interventions that include the provision of instructions were associated with higher levels of self-efficacy and physical activity (74). Acknowledging the potential usefulness of both collaborative and information-giving strategies in dealing with challenges in delivering the intervention is valuable information for implementation initiatives.

Study II measured self-reported use of BCTs and adherence to the interventions program protocol according to pre-set criteria. The use of BCTs in the intervention was overall adequate (Figure 3). However, only a minority of the PTs achieved full adherence. The usefulness of the key BCT, goal-setting, is supported in the literature, as it has been found to positively influence physical activity in a healthy population (74, 151). The failure to consistently use the key BCTs follow-up and guidance of goal-setting, which were to be included in all group sessions, may have been because the PTs found it repetitious and difficult to motivate the use of goal-setting at every support group meeting. There are also indications from a previous study that the PARA 2010 intervention participants found goal-setting repetitious and tedious (152).

6.1.5 Category 4: Growing into the new role

Over time the PTs started to grow into the new role, guiding behavior change. This growth may have been influenced by the education provided and experience gained while delivering the intervention. Study I shows that PTs became more confident in promoting HEPA in accordance with the intervention, as well as with handling the group. Confidence may be important for participant-PT interaction, as indicated by patients in a qualitative systematic review on interactions in musculoskeletal physical therapy (153). Relinquishing steering and control allowed intervention participants to take control and become active partners in managing their health behaviors, which then promoted intervention participants' empowerment and self-management. The usefulness of self-management is supported in a systematic literature review which reported that self-management courses delivered to in patients with chronic musculoskeletal pain by health care professionals had beneficial effects for several outcomes, such as pain (154). In addition, self-management interventions delivered to groups may build patient confidence and increase social interaction (154). In Study I the PTs also found that they started to use their acquired skills in other contexts, indicating confidence in the application of the BCTs and methods used to deliver the intervention. This is also an indication of the PTs growing into the role and embracing the biopsychosocial approach, suggesting that PTs were adopting new behavioral patterns and replacing or supplementing old ones. The results of study II indicate that the PARA 2010 education and training, in combination with experience, increased PTs' knowledge of BCTs and self-efficacy, which potentially could have yielded a positive effect on changing their behavior and their adherence to the intervention (54, 155). A systematic review supports the notion of self-efficacy as an important determinant for adherence to clinical guidelines (155). Knowledge of physical activity was good, which was to be expected, considering the PTs' expertise in physical activity (83). The PTs

had few fear-avoidance beliefs, which also may benefit adherence. This is in line with a systematic review showing that elevated fear-avoidance beliefs are related to lower adherence to treatment guidelines and to advising limitation of physical activity (156). This suggests that for this particular PT sample, less effort would be required to support those components. However, for other health care professionals who are less familiar with physical activity and people with RA, these areas may present more challenges and require additional education and training.

6.1.6 Measurement properties of the ESES-S

Self-efficacy is an important mediator and determinant of health behaviors such as physical activity (127). However, since self-efficacy is task-, situation- and population-specific, it is valuable to know how self-efficacy performs in each specific condition. For example, people with RA may have preconceived notions that physical activity could negatively influence their disease and bodies, and that it may be painful. A systematic review reported a weak and mixed positive association between physical activity and self-efficacy in people with RA (60). The results in Study IV suggest that reliability is satisfactory overall, but the validity of the scale according to the set of hypotheses may be questionable; the scale should be used with this in mind. One reason for the moderate validity could be faulty hypotheses. Some of the hypothesized correlations were not unequivocally supported by the evidence, e.g. self-efficacy and physical activity (157). Thus, the hypotheses could have benefited from comparisons to gold standards or additional variables such as fatigue.

6.2 METHODOLOGICAL CONSIDERATIONS

6.2.1 Studies I and III

6.2.1.1 Trustworthiness

Methods to establish trustworthiness in qualitative research include credibility, dependability and transferability. In Study I credibility was influenced by choosing to use all participating PTs using audio-recorded interviews; this provided richness and variation, as well as the amount of information necessary to answer the research questions. Subcategories and categories were compared with all available code groups and illustrative quotations by the first, third, and second author until agreement was reached on. Respondent validity was checked by allowing for discussions on introducing the theme, categories, and subcategories at a group meeting with the participating PTs. In Study III credibility was potentially negatively affected by not using all available PTs in the study. However, the PT who were not video-recorded did so due to personal reasons, and the information provided by the recordings was extensive, allowing for a rich and accurate description of the phenomena. In Study I dependability could have been adversely affected by the evolving interview process. However, the main and follow-up questions in the interview guide were followed for all PTs. In Study III dependability was influenced by investigator triangulation by several of the authors in the study throughout the review and analysis process. Transferability implies that results can be transferred to situations and contexts beyond the study context. In Studies I and III transferability was not directly the purpose; the results show what was experienced in these unique situations. However, it is up to the reader to decide what may be of interest and importance that can be transferred to other populations, contexts, and settings.

6.2.2 Studies II and IV

6.2.2.1 Reliability and internal and external validity

Reliability of the questionnaire in Study II was tested on 14 practicing PTs in Sweden who were not participating in the PARA 2010 intervention, with ICC classified as “good” (132). In Study IV, ICC was moderate (132) between two measurement occasions. Internal validity attempts to draw inferences of cause and effect or casual relationships: for example, the effects of an intervention or program. The primary intervention in this thesis was the education and training received by the PTs. Overall, there is no attempt to draw cause-effect conclusions from the study designs, and only Study II investigated PT knowledge and beliefs before and after the education and training to some extent, using Friedman’s test and the Wilcoxon signed-rank test between measurements. External validity includes generalizability, which implies that results from a particular study can be applied in all environments related to the context being studied (158). Generalizability was not the main purpose of Study II, which was a case study and instead allows for reflection on a particular PT population. Study IV was based on a relatively large (> 30) sample and provides generalizability for a specific population of RA less affected by the disease, with potentially higher tolerance for exercise, lower fear-avoidance beliefs, and higher expectations than those who declined to participate in the study or the general RA population (159). In addition, all data in Studies II and IV were collected through self-reports and may contain bias (160).

6.2.2.2 Additional methodological considerations for Study IV

The data included in Study IV are not intervals or ratios, which would suggest use of non-parametric tests. However, the data followed a normal distribution, which is one factor that points toward the use of parametric tests, and the larger sample size (> 30) allows for the use of parametric tests due to the central limit theorem. Parametric tests are also more powerful, minimizing type II errors. These considerations subsequently led to the choice to use parametric tests. Additional bias in Study IV was; the long test-retest interval (161) that might have led to changes in self-efficacy, not having a representative RA population with potentially higher support for exercise, lower fear-avoidance beliefs, and higher expectations than those declining to participate in the study (159).

6.3 IMPLICATIONS

This thesis provides information and understanding for the development of interventions, implementation initiatives, and for health care professionals in their daily practices. This information and understanding relates to how health care professionals can learn to guide behavior change and promote change in physical activity in group settings for people with RA. In addition, the results may increase our knowledge on the transition between a biopsychosocial and the prevailing biomedical model. How PTs learned to guide behavior change and transition to a biopsychosocial approach is illustrated by their progression from clinical experts to guides, including challenges, behaviors, growth, and education and training. Education programs could reduce challenges and promote growth, through for example, feedback on behavior and increased self-efficacy. The strategies used to deal with challenges could also be

informative to health care professionals in providing practical examples on how to handle such challenges, as well as for future implementation initiatives.

Study IV analyzed the properties of measurements in the ESES-S, which could inform health care professionals in the use of the instrument when investigating self-efficacy for exercise among people with RA. The analysis indicates that the construct validity for people with RA should be investigated further.

6.4 FUTURE RESEARCH

Future research could investigate implementation of HEPA interventions in people with RA in clinical practice, and could include the processes of translating research to practice as well as analyzing factors influencing implementation outcomes.

Implementation initiatives could also include evaluation and identification of important components and mechanisms of change such as self-efficacy, through randomized controlled trials. In addition, future research should also evaluate fidelity (e.g. adherence to intervention delivery and implementation of interventions) allowing for a better understanding on how and why an intervention works and the degree which the intervention is delivered as intended (11). For interventions targeting PTs' behavior change, action research could be used to generate new knowledge and simultaneously improve the interventions (162). Investigations on cost-effectiveness to be able to judge whether interventions of the resource demanding type such as the PARA 2010 would also be important to judge if the intervention provides good value, and the viability of future implementation in clinical practice settings (163). In Study IV further studies on construct and predictive validity is warranted to assure the validity of the ESES-S.

6.5 CONCLUSIONS

The results may inform future development of interventions and implementation initiatives and indicate that:

- Adapting to a new role that includes guiding in HEPA behavior in people with RA, applying BCTs with a biopsychosocial approach, is a progression and includes challenges and a gradual growth into the role, and may be assisted by education and training.
- Feedback on behavior is perceived beneficial for PTs' self-examination and confidence to deliver a HEPA intervention in people with RA applying BCTs with a biopsychosocial approach.
- Education and training based on SCT principles, including practical exercises, positive reinforcement and modeling, increase PTs' self-efficacy to guide behavior change among people with RA and PTs' knowledge on BCTs.
- Good knowledge on variables important to deliver a HEPA intervention for people with RA did not result in full adherence, calling for closer monitoring and feedback on behavior.
- In response to challenges in guiding people with RA to HEPA behavior PTs adapted their pedagogical strategies to the demands of the situations, altering between information giving and inviting group peers to interaction and discussion.
- ESES-S is reliable, but needs further investigation on construct validity in an RA population.

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