Advancing
evidence-based practice
in primary care
physiotherapy

Guideline implementation, clinical practice, and patient preferences

Susanne Bernhardsson

Division of Physiotherapy
Department of Medical and Health Sciences
Linköping University, Sweden

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Knowing is not enough; we must apply. Willing is not enough; we must do.
—Johann Wolfgang von Goethe, 1749-1832

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ABSTRACT

Background: Research on physiotherapy treatment interventions has increased dramatically in the past 25 years and it is a challenge to transfer research findings into clinical practice, so that patients benefit from effective treatment. Development of clinical practice guidelines is a potentially useful strategy to implement research evidence into practice. However, the impact of guideline implementation in Swedish primary care physiotherapy is unknown. To achieve evidence-based practice (EBP), research evidence should be integrated with clinical expertise and patient preferences, but knowledge is limited about these factors in Swedish primary care physiotherapy.

Aims: The overall aim of this thesis was to increase understanding of factors of importance for the implementation of EBP in Swedish primary care physiotherapy. Specific aims were to translate and adapt a questionnaire for the measurement of EBP and guidelines; to investigate physiotherapists' attitudes, knowledge and behaviour related to EBP and guidelines; to examine clinical practice patterns; to develop and evaluate a tailored guideline implementation strategy; and to explore patients' preferences for physiotherapy treatment and decision making.

Methods: The thesis comprises four studies (A-D), reported in five papers. In Study A, a questionnaire for the measurement of aspects of EBP and guidelines was translated and cross-culturally adapted, and tested for validity (n=10) and reliability (n=42). Study B was a cross-sectional study in which this questionnaire was used to survey primary care physiotherapists in the county council Region Västra Götaland (n=271). In Study C, a strategy for the implementation of guidelines was developed and evaluated, using the same questionnaire (n=271 at baseline, n=256 at follow-up), in a prospective, non-randomised, controlled trial. The strategy was based on an implementation model, was tailored to address the determinants of guideline use identified in Study B, and comprised several components including an educational seminar. Study D was an exploratory qualitative study using data from semi-structured interviews with a purposeful sample (n=20) of patients with musculoskeletal disorders treated in primary care physiotherapy. Qualitative content analysis with an inductive approach was used in this study.

Results: The validity and reliability of the questionnaire used in the thesis was found to be satisfactory. Most physiotherapists have a positive regard for evidence-based practice and guidelines, although these attitudes are not fully reflected in the reported use of guidelines. The most important determinants of guideline use were considering guidelines important to facilitate practice and knowing how to integrate patient preferences with guidelines. The tailored, multi-component guideline implementation

significantly affected awareness of, knowledge of, and access to guidelines. Use of guidelines was significantly affected among those who attended an implementation seminar. Clinical practice for common musculoskeletal conditions included interventions supported by evidence of various strengths as well as interventions with insufficient research evidence. The most frequently reported interventions were advice and exercise therapy. The interviewed patients expressed trust and confidence in the professionalism of physiotherapists and in the therapists' ability to choose appropriate treatment, rendering treatment preferences subordinate. This trust seemed to foster active engagement in their physiotherapy.

Conclusions: The adapted questionnaire can be used to reliably measure EBP in physiotherapy. The positive attitudes found do not necessarily translate to guideline use, due to several perceived barriers. The tailored guideline implementation strategy used can be effective to reduce barriers and contribute to increased use of guidelines. The identified clinical practice patterns suggest that physiotherapists rely both on research evidence and their clinical expertise when choosing treatment methods. Patients' trust in their physiotherapist's competence and preference for active engagement in their therapy need to be embraced by the clinician and, together with the therapist's clinical expertise, integrated with guideline use in the clinical decision making. Further research is needed on how the EBP components and different knowledge sources can be integrated in physiotherapy practice, as well as on implementation effects on patient outcomes.

Keywords: evidence-based practice, clinical guidelines, physiotherapy, primary health care, musculoskeletal disorders, patient preferences, Sweden

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LIST OF PUBLICATIONS

This thesis is based on four studies, referred to in the text by the letters A-D. The studies are reported in the following five papers, referred to by Roman numerals.

- I. **S Bernhardsson**, M EH Larsson. Measuring evidence-based practice in physical therapy: translation, adaptation, further development, validation, and reliability test of a questionnaire. *Physical Therapy* 2013;93:819–32. Epub 2013 Feb 21.
- II. **S Bernhardsson**, K Johansson, P Nilsen, B Öberg, M EH Larsson. Determinants of guideline use in primary care physical therapy: a cross-sectional survey of attitudes, knowledge, and behavior. *Physical Therapy* 2014;94:343–354. Epub 2013 Oct 31.
- III. **S Bernhardsson**, M EH Larsson, R Eggertsen, M Fagevik-Olsén, K Johansson, P Nilsen, L Nordeman, MW van Tulder, B Öberg. Evaluation of a tailored, multi-component intervention for implementation of evidence-based clinical practice guidelines in primary care physiotherapy: a non-randomized controlled trial. *BMC Health Services Research* 2014;14:105.
- IV. **S Bernhardsson**, B Öberg, K Johansson, P Nilsen, M EH Larsson. Clinical practice in line with evidence? A survey among primary care physiotherapists in western Sweden. *Journal of Evaluation in Clinical Practice*. Epub 2015 May 19.
- V. **S Bernhardsson**, M EH Larsson, K Johansson, B Öberg. “In the physio we trust”: a qualitative study of patients’ preferences for physiotherapy. Submitted.

ABBREVIATIONS

CPG Clinical practice guideline

LBP Low back pain

EBM Evidence-based medicine

EBP Evidence-based practice

PBE Practice-based knowledge

QCA Qualitative content analysis

QI Quality improvement

SCT Social cognitive theory

TPB Theory of planned behaviour

VGR Västra Götalandsregionen (*Region Västra Götaland*)

TERMS AND CONCEPTS

Several definitions exist for many of the terms and concepts used in implementation science. Below are the definitions that have been used in this thesis.

Clinical practice guidelines	Systematically developed recommendations with the purpose to facilitate for caregivers and patients to make decisions about suitable treatment in specific situations [1].
Clinical expertise	The general skills of clinical practice and the experience of the individual practitioner [2].
Determinant	Factor that might prevent or enable improvements in healthcare professional practice [3]. Used as an umbrella term for both hindering (barriers) and facilitating or enabling factors (facilitators).
Diffusion	The process by which an innovation is communicated through certain channels over time among the participants in a social system [4]; the passive, untargeted, unplanned, and uncontrolled spread of an innovation [5].
Dissemination	An active approach of spreading evidence-based interventions to the target audience via determined channels using planned strategies [5].
Evidence	The available body of facts or information indicating whether a belief or proposition is true or valid [6]. From <i>evidentia</i> (lat): proof, obviousness, quality of being manifest/evident, vividness [7].
Evidence-based medicine	The conscientious explicit and judicious use of current best evidence in making decisions about the care of individual patients [8].
Evidence-based practice	The integration of the best available external research findings with individual clinical expertise and patient preferences [8].
Implementation	The process of putting to use or integrating evidence-based interventions within a setting [5]. From <i>implere</i> (lat): to fill up; to fill, finish, complete; to satisfy, fulfill; to spend (time) [7].

Implementation intervention	Intervention aimed to introduce behaviour change, targeting healthcare professionals, organisations, or systems (as distinguished from clinical intervention, which aims to affect patients)
Implementation research	The scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice and, hence, to improve the quality and effectiveness of health services and care [9].
Implementation strategy	Methods or techniques used to enhance the adoption, implementation, and sustainability of a clinical program or practice [10].
Model	A simplified representation of a phenomenon. A model is more specific, narrower in scope, and more precise than a theory [11]. A process model is used to describe and/or guide the process of translating research into practice [12].
Multi-component intervention	An intervention that includes two or more components [13]. Used synonymously with multifaceted intervention.
Patient preferences	Statements made by individuals regarding the relative desirability of a range of health experiences, treatment options and health states [14].
Practice-based evidence	Collective evidence accumulated from systematic collection of clinical data that is shared and aggregated on a higher level [15].
Shared decision making	The process of clinician and patient jointly participating in a health decision after discussing the options, the benefits and harms, and considering the patient's values, preferences, and circumstances [16].
Theory	A set of interrelated concepts, definitions and propositions that present a systematic view of events or situations by specifying relations among variables, in order to explain or predict the events or situations [17].

INTRODUCTION

This thesis is about physiotherapy practice in Swedish primary care. Initially, my doctoral studies set out to investigate the role of clinical practice guidelines as a tool, or strategy, to implement research evidence in physiotherapy practice. Over these past four years, however, the focus was expanded to also include the perspectives of the clinician and the patient. Together, the three components *research evidence*, *clinical expertise*, and *patients' preferences* are commonly described as the basic building blocks, or pillars, of evidence-based practice (EBP) [8]. The integration of the three components is often depicted as three overlapping circles, but can also be illustrated as in Figure 1—representing how EBP rests on the three pillars, or “legs”.

Figure 1. Evidence-based practice (Larsson 2009 [18], adapted from Sackett et al, 1996 [8])

The studies in the thesis were designed to address knowledge gaps identified in previous research on EBP in physiotherapy. The thesis addresses and assesses the three EBP components in the context of primary care physiotherapy: external research, and its implementation by ways of clinical practice guidelines (Paper II and III); clinical expertise, as manifested in clinical practice patterns (Paper IV); and patients' preferences for physiotherapy (Paper V). Assessment in the quantitative studies was performed with a questionnaire that was translated and cross-culturally adapted specifically for this thesis (Paper I).

The empirical context of the research is primary care physiotherapy in the county council Region Västra Götaland (*Västra Götalandsregionen*, VGR), Sweden. The research emanated from a quality improvement (QI) project, initiated in 2010 by a group of

physiotherapy unit managers in the VGR primary care organisation *Närhälsan*. This project arose from the perceived variation in physiotherapy treatment among the different units in the organisation, and the managers' belief that evidence-based clinical practice guidelines (CPGs) could decrease this variation and support the physiotherapists in using treatment interventions underpinned by research evidence. There was, at that time, a paucity in Sweden of CPGs that were intended for primary care physiotherapy. The QI project focused on the *development* of CPGs, while this research project focused on studying the *implementation* of these CPGs, as well as the other EBP components.

Before the initiative to develop clinical physiotherapy practice guidelines in Närhälsan, Internet searches revealed that the few other physiotherapy guidelines that could be found in Sweden were either old, of insufficient quality, or not relevant for primary care physiotherapy. This sparked the development of our own guidelines, and the design of this research to investigate the use and impact of CPGs as a strategy for EBP implementation. To supplement the guideline-focused studies, two other studies were designed to elucidate the clinician's and the patient's perspectives.

The theoretical context of the research conducted in the thesis is primarily drawn from implementation science; a fast-growing research field that has emerged in the wake of the evidence-based movement based on the recognition that evidence does not spread by itself. Implementation science focuses on investigating factors that may influence the implementation of EBP, as well as the effectiveness of various strategies to transfer research findings into practice. It is a research field awash with theories and models, of which several were used in the thesis.

Although guideline development initiatives are on the rise, implementation of guidelines, and its underpinning evidence, remains an under-researched area in Sweden. This thesis is the first implementation thesis in Sweden that is set in primary care physiotherapy and that addresses the three perspectives of EBP.

BACKGROUND

This chapter begins by providing definitions and an overview of the evolution of EBP before describing physiotherapy practice and introducing the context in which the research was performed: primary care physiotherapy in Sweden. An overview of implementation science is provided, including its development and prior research on EBP and guideline implementation. The chapter concludes with a brief background of research on patients' preferences and shared decision making.

Evidence-based practice

What is evidence?

Evidence, the term and the concept, has become a well used — maybe over-used — word in today's society. It is almost as if putting the term *evidence-based* in front of anything will guarantee high quality and a scientific base, and more or less mandate its use. It is almost as if using the term eliminates the need to think for yourself. It may even appear that the term "obviates the need to describe the quality of the underlying evidence, the magnitude of effects, or the applicability of any of the results in the context, values, and preferences of the patients" [19].

The term *evidence* is, on the one hand, easily defined — the most common definition being the one from the Oxford dictionary: *the available body of facts or information indicating whether a belief or proposition is true or valid* [6]. In everyday terms, evidence is often taken to mean "proof". However, the interpretation of evidence is not black or white.

On the other hand, evidence can be, and has been, interpreted in different ways, in different contexts and in different circumstances — so different definitions have been developed. One interpretation of evidence is that it is synonymous with research findings. Equating evidence to research findings was common during the 1990s, when advocates of EBP emphasised the importance of searching and appraising research to answer clinical questions. Research evidence assumed priority over other sources of evidence, and research evidence tended to be perceived as something stable, certain and "true" [20]. However, the research evidence base for practice is rarely constant, but continually evolving. Because evidence is also interpreted differently by different stake-holder, it is less certain and less value-free than is sometimes acknowledged [20].

However, the notion of what counts as evidence has evolved over the past few decades [21]. Today many researchers, as well as clinicians, seem to agree that research evidence alone is insufficient to inform clinical practice. Research evidence must be

interpreted and applied; to do so, the clinician's experience and expertise are needed. This type of evidence is also called clinical evidence, practice-based evidence, or practice-based or professional knowledge [20, 21]. This knowledge is embedded in practice and is more tacit and intuitive, more hands-on, and is often socially constructed in collaboration with colleagues and patients [21]. In this thesis, evidence is understood as including both types of evidence—research-based and practice-based—and the distinction is specified when necessary.

Origins and evolution of evidence-based practice

The concept of EBP has evolved from the more medicine-focused term *evidence-based medicine* (EBM), which was coined in the early 1990s by a Canadian research group at McMaster University led by professor David Sackett. Although there are many definitions of EBM, all are variations on the one proposed by Sackett et al. in 1996:

Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients [8].

The *practice* of EBM was defined as:

...integrating individual clinical expertise with the best available external clinical evidence from systematic research" and "thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences in making clinical decisions about their care [8].

Hence, the definition of EBP implies a triad of knowledge sources—research evidence, clinical expertise, and patients' preferences—to consider in clinical decision making.

While the origin of EBM is often credited to the Canadian researchers, similar ideas were developed in Oxford, England in the 1970s. One of the important works was by the Scottish physician/epidemiologist Archie Cochrane, who strongly advocated the basing of medical decisions on research, particularly on randomised controlled trials (RCTs) [22]. Before that, clinical epidemiology emerged during the 1950s and 1960s in the United States and Canada, with the intention of using results from population studies as a resource in clinical practice [23]. Of course, the ambition to base medical practice on evidence from research and empirical observation goes much further back in time.

In the 1990s, however, EBM was presented as a new paradigm in medical education and practice, advocating the replacement of anecdotal evidence with research evidence as a basis for clinical decision making. There were three main drivers behind the emergence and spread of what has been described as the EBM movement [24]: a growing concern in some countries that the gap between research

and practice was too great; an increase in the volume of medical literature and new research that was too rapid for clinicians to be able to cope with it; and a recognition that much of the published research was of poor quality.

The principles of EBM spread fast from the field of medicine to other healthcare fields, including physiotherapy, and even beyond to areas such as public health, social services, and education. This resulted in the expansion of the concept from EBM to EBP. The interpretation of the EBP concept has evolved and other definitions have been offered that include other components, such as the patient's clinical state, setting and circumstances (context), healthcare resources, and audit data [25]. However, the original three components remain the core of the concept and emphasise the use and integration of three knowledge sources. In this thesis, EBP is understood as healthcare practice that takes the three original EBP components into account.

Another conceptualisation of EBP is as a (5-step) process of solving clinical questions through finding and critically appraising appropriate research, which can be used in clinical practice for individual patients [26]. These five steps are:

1. Converting the need for information into an answerable question.
2. Finding the best available evidence to answer the question.
3. Critically appraising that evidence for its validity, impact and applicability.
4. Applying the result of this appraisal in the care of the patient and integrating it with clinical expertise and the patient's unique circumstances, values, and preferences.
5. Evaluating the outcome of the measure taken and the effectiveness of the 4 previous steps and striving to improve practice.

This conceptualisation also accentuates the integration of the different sources of knowledge, in Step 4. However, it is a process that puts very high demands on the clinician. Not all clinicians have the skills, inclination, motivation, and time to perform these steps—which is the main reason why CPGs have become an important part of EBP and a central component in the transfer of research evidence to practice. In CPGs, steps 2 and 3 in the process are carried out by guideline developers, leaving steps 1, 4 and 5 to the clinician. So while the original premise of EBP was for healthcare practitioners to examine the medical literature critically, this aim is today all but abandoned [27]. Instead the role of guidelines in EBP has grown to the extent that the two concepts are converging.

Although the importance of integrating the three EBP components is stressed by many researchers, there is no clear guidance on how this integration should occur, or what should be done if the components contradict one another [21, 28]. Furthermore, we do not know how the components are weighted and how to make trade-offs for specific situations and decisions [25].

One way of dealing with the growing volume of literature was the development of systematic reviews, leading to establishment of the Cochrane Collaboration in 1992 [24]. Systematic reviews, preferably with meta-analyses, are the cornerstones of EBP, as they summarise and appraise primary research and make it available to clinicians in a synthesised format. Together with the RCT, systematic reviews are considered the highest form of evidence, positioned at the top of the so-called *evidence hierarchy* [29]. Many varieties of evidence hierarchies, intended to reflect methodological strength of scientific studies, have been developed; an example is provided in Figure 2. Systematic reviews are also the merging point between EBP and guidelines, since they constitute the primary basis for the development of guidelines.

Figure 2. Example of evidence hierarchy (Oxford Centre for Evidence-based Medicine [29])

Beyond this pyramid, different types of EBP resources have appeared in recent years, creating another type of evidence hierarchy in which individual studies are placed at the bottom. Instead, *pre-appraised evidence* of various types—of which clinical guidelines are among the most common—are considered to form a higher level of evidence [30]. By pre-appraised is understood evidence that has undergone a filtering process to include only high quality studies, summarised in an EBP resource such as a guideline, synopsis, or evidence synthesis, and which is regularly updated. Pre-appraised evidence decreases the need for clinicians to search and appraise individual primary studies, and emphasises the benefits of a tool such as guidelines.

Criticism of evidence-based practice

Through the years that EBM/EBP developed, the concept and principles have been much debated. Critics have argued that EBM was a radical restructuring of medical knowledge that discredited more traditional ways of knowledge in medicine, and that used a narrow understanding of evidence [31]. Initially, EBM was often interpreted

such that only evidence from RCTs was trustworthy. This principle has been particularly debated; not all interventions are suitable for this study design. However, it was never the intent of EBM to *only* attach value to the RCT, and today it is increasingly recognised that evidence can be derived from various types of knowledge and various forms of research [21].

Another common criticism of EBP is that it constitutes “cookbook medicine” and that research evidence is not directly applicable to individual patients [32]. However, the need to consider both patient and professional values prior to making medical decisions has been clearly acknowledged by EBP proponents. The incorporation of patient values and clinical expertise in EBP recognises that many aspects of health care depend on individual factors [32].

Related to this position is the criticism that EBP erodes professional status and reduces professional autonomy [25]. In fact, the opposite can be argued: integrating the different knowledge resources as intended and considering all possible contextual determinants requires substantial professional competence and autonomy.

In view of the many pros and cons of EBP, it has been suggested that EBP proponents need to better explain its principles, and especially that these include room for clinical expertise and other types and sources of knowledge [33]. It is important to acknowledge the roles of both patients’ and clinicians’ experiences and preferences, as well as resources and financial, ethical and legal issues—all have a role to play in EBP.

Physiotherapy practice

Physiotherapy is described by the World Confederation for Physical Therapy (WCPT) [34] in its policy statement as:

... the provision of services to individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan. This includes providing services in circumstances where movement and function are threatened by ageing, injury, pain, diseases, disorders, conditions or environmental factors [34].

The WCPT specifically states that the scope of physiotherapy practice should reflect the latest evidence base and that, because the evidence base continually changes, the scope of practice must be dynamic [34]. Although often practiced in close collaboration with other healthcare professions, the physiotherapy discipline is characterised by a substantial degree of autonomy. Practice is always based on clinical, individual, assessments, after which treatment is individualised. Hence, practice is always dynamic in scope and requires both expert clinical skills as well as receptiveness and responsiveness to the individuals who seek the expertise of physiotherapists.

Knowledge bases in physiotherapy

Knowledge can be developed from both research and practice. Traditionally in physiotherapy, knowledge used in the profession has been practice-based. Physiotherapy was originally taught with a master-apprentice model and physiotherapists are, consciously or subconsciously, adding to their personal knowledge base during each patient encounter [24]. This practice-based knowledge is created through reflective processes that enable each physiotherapist to evaluate their practice and learn from their experience.

With the growth of the EBP movement in the 1990s, the role of research and research-based evidence became increasingly important also in physiotherapy. Leading researchers and academics advocated the use of research findings to promote evidence-based physiotherapy [24]. However, practice has been slow to evolve from being primarily practice-based towards being research-based. Despite being advocated by scholars and taught in both undergraduate and graduate physiotherapy schools, use of research evidence in physiotherapy practice is inconsistent. The use of treatment methods supported by strong or moderate scientific evidence of effect, as well as methods with limited or no evidence, have been reported [35, 36]. Not much research has been conducted on clinical physiotherapy practice, and rationales for choice of treatment methods are not clear.

Challenges in applying evidence-based practice in physiotherapy

Although positive attitudes to EBP in physiotherapy have been reported in many studies across several countries [37-41], numerous barriers to applying EBP have been identified. Common barriers including lack of time [36-40], poor confidence in skills to identify and critically appraise research [37, 39-41], poor support from managers and other healthcare professionals [42], and insufficient access to evidence [37, 39, 40]. Another potential barrier for applying evidence in clinical physiotherapy practice may be a mismatch between the output of physiotherapy research and practice requirements, e.g. different outcome measures used in research and practice and the need for research to test single, standardised interventions for evaluation of efficacy, whereas practice commonly comprises multiple interventions and is individualised [43].

Discussing interventions in dichotomous terms of evidence-based versus non-evidence-based is a simplification that may no longer be relevant. Strength of evidence can rather be seen as a continuum from strong to moderate to limited and conflicting/contradictory (Figure 3).

Figure 3. The continuum of evidence

In the context of physiotherapy and other rehabilitation disciplines, the application of EBP may be particularly challenging. Evidence is derived from as high up in the evidence hierarchy as possible, with the RCT being the gold standard. The RCT produces evidence based on aggregated group data, usually obtained under highly controlled conditions. However, in rehabilitation, treatment is typically individualised, which means that research evidence can be difficult to generalise to an individual patient. There are also inherent research challenges with issues such as patient and clinician blinding and placebo control, particularly in exercise interventions. The application of research findings in rehabilitation may therefore be limited [42]. Because of this, practice-based evidence (PBE) may play an important role, particularly in the initial phases of evidence development [15]. It has been argued that PBE study designs include features that address limitations inherent in both randomised trials and traditional observational studies [15]. For example, both a more heterogeneous sampling approach and extensive clinician involvement facilitates generalisability and implementation of this type of study.

Practice-based knowledge, accumulated with clinical experience, may be especially important when it comes to transferring research findings to practice, because it is this knowledge that enables therapists to apply research to the individual patient [43]. The application of EBP requires reflecting practitioners who are able to synthesise research-based knowledge with their own practice-based knowledge acquired through experience [44].

Primary care physiotherapy in Sweden

In Sweden, health care is publically funded and organised in primary and secondary/tertiary care. Primary care is the level of care that accommodates the population's needs for basic health care. Primary care services are typically provided at healthcare centres that are run by the country's 20 county councils. They are responsible for outpatient care, medical treatment, preventive measures, and rehabilitation that do not require hospitals' medical and technical resources [45]. Primary care is also available in the private sector, in which healthcare centres may or may not be publically financed.

Of Sweden's approximately 12,000 practicing physiotherapists, about 47% work in primary care settings [46]. Of those, 50% are publically employed and 50% are private practitioners, either privately employed or self-employed. Public primary care physiotherapy is provided in rehabilitation units but also at many healthcare centres. Physiotherapists in primary care in Sweden work autonomously, with no physician referral necessary. It is common to seek physiotherapy without referral or having first consulted a physician. This increases the requirement for adequate and correct assessment and treatment by the physiotherapist, emphasising the need for up-to-date knowledge about the effectiveness of treatment interventions as well as the need for continual professional education to strengthen and sustain clinical expertise.

Furthermore, recent changes in the Swedish healthcare system, i.e. the introduction of “choice-of-care” systems and new compensation models, are rendering the practice of physiotherapy increasingly complex and impose high demands on physiotherapists to provide effective and efficient management of patients amid high patient turnover [47].

At the outset of this research, in 2010, there was a lack of knowledge about interventions used in primary care physiotherapy in Sweden, the extent to which these are supported by research evidence, and the application of EBP in physiotherapy in Sweden. We therefore designed a study to measure EBP in a primary care context. There was also a lack of an instrument in Swedish to measure EBP variables, requiring the development of such an instrument.

Growth in physiotherapy research

As in most healthcare fields, the volume of physiotherapy research has increased exponentially in the past few decades (Figure 4) [48].

Figure 4. Growth in the number of published randomised controlled trials (RCTs), reviews and guidelines indexed in PEDro (Kamper et al, 2015 [48], reproduced with permission)

In October 2015, the international physiotherapy evidence database “PEDro” contains 25,117 randomised controlled trials, 5,679 systematic reviews and 544 practice guidelines [49]. Of this research, the largest subdiscipline is the musculoskeletal subdiscipline; studies on musculoskeletal conditions, which are the most relevant for primary care physiotherapy, account for 27% of all physiotherapy research indexed

in PEDro. As Figure 4 shows, there is a substantial lag in the growth of CPGs to synthesise research findings.

These numbers are quite intimidating for a practicing physiotherapist who wishes to keep up-to-date with research, and constitute an important rationale for this thesis. How can all these research findings be transferred to the clinician to support and guide clinical decision making? How can they be implemented, adopted, and integrated in clinical practice? How can evidence of effective treatment be applied to the individual patient, and considered together with clinical expertise/experience and the patient's preferences?

Clinical practice guidelines

There are many ways in which research findings can be “packaged” to facilitate implementation of EBP, such as systematic reviews, health technology assessments, clinical pathways, critically appraised topics, EBP journals, and CPGs [21]. While the development and implementation of CPGs can be seen as a strategy to implement EBP, CPGs can also be viewed as implementation objects in themselves. In this thesis, CPGs were both—the strategy used to implement EBP and at the same time, the objects that were implemented.

The most common definition of CPGs was proposed by the American Institute of Medicine in 1992: *systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances* [1]. This definition has been used through the 1990s and the 2000s, and is the definition adopted by the European Region of the WCPT [50]. It is also the definition of guidelines that was used in this research, e.g. on the questionnaire with which data were collected and in the educational sessions that were part of the implementation. The definition was updated in 2011, with the following wording: *Clinical practice guidelines are statements that include recommendations intended to optimise patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options* [51]. The newer definition stresses even more the importance of systematicity in the process of guideline development, as well as the importance of presenting benefits and harms with different treatment options.

The term *guidelines* is more general, wide in scope, and have various interpretations. Guidelines are typically developed and used by policymakers, service organisations, funders or regulatory authorities. The term *CPG* is a subset of guidelines, specifically targeting clinicians and intended to support clinical decision making [52]. In this thesis, however, the terms guidelines and CPGs are used interchangeably.

Guidelines in practice

In today's health care, CPGs have become ubiquitous. They have been described as a key vehicle to bridge the research-to-practice gap and transmit scientific evidence to healthcare professionals, thereby facilitating the implementation of research findings in clinical practice and increasing the extent to which practice is evidence-based [53-55]. Guidelines have a range of purposes, such as improving effectiveness, efficiency, and quality of care and reducing variations in clinical practice [52]. They should provide clearly supported, appropriate and trustworthy recommendations for practice, and should be based on high quality clinical research and clinical expertise, ideally also incorporating the patient's perspective [24, 56]. Guidelines mainly build on systematic reviews, either already conducted or conducted as part of the guideline development. Guidelines can be viewed as a more sophisticated version of clinical research, in that it is repackaged and enhanced into a digestible format, appraised and summarised by experts [21]. Historically based on expert opinion, guideline development has gradually been formalised and evidence-based guidelines have become standard practice [57].

Key benefits of guidelines are that they can contribute to both quality, effectiveness and efficiency of care, provide information about optimal care, and provide digested summaries and syntheses of research. They can also provide external accountability, constitute a basis for teaching and for interdisciplinary cooperation, and assist decision-makers in setting healthcare priorities [56]. Other purposes of guidelines include serving as basis for policy, planning, evaluation, and quality improvement [58].

Nevertheless, criticism of guidelines is not uncommon. As with EBP, the most frequent argument against guidelines is that they constitute "cookbook medicine" and that they therefore might encounter professional resistance [59]. To counter this argument and prevent tension between guidelines and clinicians, it is important to emphasise that guidelines are not intended to replace, but to complement, professional knowledge and expertise. Other potential limitations of guidelines that have been raised are that they might cause unrealistic expectations and loss of professional autonomy, they might be misused by governmental authorities, and that there is a risk for legal consequences [59].

Guideline development in Sweden

Guidelines can be developed centrally, at a national level, or locally, or they can be adapted at a local level. In Sweden, national guidelines are developed by the Swedish National Board of Health and Welfare (*Socialstyrelsen*), with the aim to support allocation and prioritisation of healthcare resources among Sweden's 20 county councils [60]. Some professional organisations, some of Sweden's large hospitals, and some of the county councils develop CPGs, or care programs, aiming to support

clinical decision making. The Swedish Association of Physiotherapists began a guideline development program in the late 2000s, but this program almost exclusively focused on secondary care, i.e. hospital-based, treatment. In primary care physiotherapy, CPGs are scarce.

Internationally, many practice guidelines were developed in the 2000s, but it is important that guidelines are available in the mother tongue of clinicians. Internet searches in the planning phase of this project resulted in only a few other Swedish physiotherapy guidelines that were relevant for primary care physiotherapy, and they were found to be either old or of insufficient quality.

Implementation science

Implementation science is a research field that has grown rapidly in the wake of the EBP movement. Because the amount of clinical research is growing extremely fast, the need for increased knowledge about effective methods to implement research findings into clinical practice is becoming increasingly important. Implementation science is concerned with the challenge of bridging the gap between research and practice, and the dissemination of research findings.

The term implementation is one of many terms used to describe the process to bridge this research-to-practice gap, or to move knowledge into action. Synonyms—to various, and overlapping, degrees—are knowledge translation, knowledge transfer, knowledge exchange, research utilisation, diffusion, and dissemination [61]. While knowledge translation or transfer is the more common term in North America, implementation is commonly used in Europe and other parts of the world.

Many different research traditions were forerunners of implementation science, including diffusion of innovation, rural sociology, communication, marketing, and organisational development [25]. Although implementation research is sometimes considered a new research field, its growth was already strong in the 1960s and 1970s, although at that time with a focus on implementation of public policies [62], as distinct from today's focus on implementation of EBP.

An important predecessor of implementation, both in term and in concept, is diffusion, understood as *the process through which an innovation, defined as an idea perceived as new, spreads via certain communication channels over time among members of a social system* [4]. Over the years, this term has come to signify a certain type of innovation spread. Three key terms are used for the spread of innovations, which can be described as positioned along a continuum: *diffusion* is the passive, unplanned, untargeted, informal spread of new practices; *dissemination* is the active spread of new practices to the target group using planned, formal strategies; and *implementation* is the process of mainstreaming or integrating new practices within a setting [5, 63]. More pragmatic terms can also be used to illustrate this continuum (Figure 5). Beyond

implementation, *sustainability* might also be considered—making an innovation routine until it reaches obsolescence [63].

Figure 5. The continuum of diffusion-to-implementation (based on Greenhalgh et al, 2004 [63])

Implementation theories, models and frameworks

The use of theory in implementation research has received increasing attention [11, 56, 64–66]. Many implementation researchers have advocated the benefits, and necessity, of basing an implementation strategy on theory [11, 64, 65, 67]. Theory can be used to explain, support and facilitate the complex process of implementation of behavioural change; increase the possibility to draw general conclusions on the effectiveness of the implementation strategy; and enable the identification of causal mechanisms [11]. Furthermore, using theory provides a process and structure to support the development of a strategy or intervention and to guide its evaluation, thereby facilitating a better understanding of the extent to which the implementation intervention is effective, generalisable and replicable [11, 67]. It has been proposed that the different ways that theory is applied in implementation research can be organised in five categories: 1) as a general philosophical framework for the research; 2) as a guide to select educational strategies; 3) as a way of identifying variables for correlation or prediction; 4) as a way of identifying variables to measure implementation effectiveness; and 5) as a guide or framework to qualitative study design and/or analysis [68].

Also in rehabilitation, there is growing recognition of the importance of implementation activities to ensure that research findings are integrated into clinical practice, of implementation research to evaluate implementation efforts, and of the use of theory in implementation interventions [68, 69]. The use of a conceptual framework to guide the design of implementation interventions has particularly been advocated.

Not everyone agrees that using theory in implementation is important. Critics have argued that there is, in fact, no evidence that using theory in implementation is more effective than a pragmatic approach that uses common sense [70, 71]. It seems, however, that theory proponents far outweigh the critics, and that most researchers today agree about the benefits of using theory in implementation. An additional important benefit of using a theory or model is that doing so is a test of the theory/model and its applicability, which contributes to building an evidence base for that theory/model and advances the implementation research field [66].

An abundance of theories, models and frameworks have emerged in implementation science during recent years [11, 56, 64]. An overview by Tabak et al. [66] identified over 100 models used in dissemination and implementation research. Some of the theories

and models originate from psychology, sociology and organisational theory, and some have been developed specifically for use in implementation [12]. Disciplines that have exerted particular influence on implementation theory and models include psychology, sociology, innovation, organisational behaviour, and research utilisation [66].

The concepts of theories, models and frameworks are often used interchangeably although they are in fact distinct concepts (see Definitions). Like the one used in this thesis, models are typically based on one or several theories, and many models are used as frameworks—contributing to the confusion in terminology. Several efforts have been made to organise and categorise the various theoretical approaches. The overview by Tabak et al. [66] constitute one such effort, with the purpose of facilitating the selection of an appropriate theory for an implementation project. The authors categorised models for dissemination and implementation research depending on the scope of the model, from broad to narrow and specific; from where they fit on the dissemination to implementation continuum; and at what socioecologic level the model operates.

Another substantial categorisation effort was recently done by Nilsen [12], who proposed a taxonomy in which the various theoretical approaches were classified in three broad categories based on their different purposes:

- describing and/or guiding the process of translating research into practice (process models)
- understanding and/or explaining what influences implementation outcomes (determinant frameworks, classic theories, and implementation theories)
- evaluating implementation (evaluation frameworks).

In this thesis a process model was used, with the aim to guide the implementation process. Process models are useful to support an implementation project such as the one carried out in this thesis. They have also been referred to as (planned) action models [12] or stage models [5]. One such process model is the Grol and Wensing implementation of change model [56], used in this thesis and described below in the Theoretical framework chapter.

Some of the classic theories aiming to understand or explain which factors may potentially influence implementation outcomes are also relevant for this thesis. Of particular relevance, in both the quantitative and qualitative studies, are two behaviour change theories (also called attitude theories or social cognitive theories), which are also described in the Theoretical framework chapter.

Rogers' diffusion of innovation theory [4] is one of the earliest theories that have greatly influenced implementation science; also of relevance for this thesis. Many of the concepts and theories that are used in today's implementation science emanate from this seminal work, which synthesised over 500 studies on how innovations are

spread and adopted, predominantly in American farming. In his 1962 systematic review, Rogers coined concepts such as innovation attributes, adopter categories, and change agents—concepts that have, in various forms, remained important in the development of implementation science. Over time, the diffusion paradigm has spread to other research fields, such as knowledge translation, technology transfer and, in the 1990s, EBP. Today, the diffusion of innovation theory continues to be among the most widely used theories in guideline implementation [65]. The theory, with emphasis on elements of particular relevance to this thesis, is described in the Theoretical framework chapter.

In spite of the many theories and models available, few guideline implementation interventions have been theory-based. A systematic review published in 2010 revealed that only 6% of 235 included studies on guideline implementation explicitly used theory, with implicit use noted in another 16% [65]. In rehabilitation, use of theory is even more rare. Another systematic review, also published in 2010, investigated the extent to which three common theories were used in implementation across different healthcare disciplines, and found that only three of the 90 included studies were performed in rehabilitation; none of them in physiotherapy [68]. In physiotherapy, only one previous study, set in the Netherlands, that used a behaviour change model has been found [72]. In view of the many benefits of using theory, there is therefore a clear need for theory-informed guideline implementation studies in physiotherapy.

Implementation strategies

In addition to selecting a theory or a model, another important decision when planning an implementation project concerns which implementation strategy to use. Strategies have “unparalleled importance” in implementation science, as they constitute the *how to* component of changing healthcare practice [73]. Implementations strategies and implementation interventions are often used synonymously. In this thesis, a strategy is viewed as a broader concept, similar to approach and defining *how* something *is to be done*, whereas an intervention is *what is actually done*. Hence, besides the distinction between *how* and *what*, there is also a temporal relationship between the two concepts, with strategy preceding intervention.

Broad approaches

Three main approaches to implementation strategies have been defined by Grol et al. [56]: 1) the *educational approach*, emphasising learning and the receivers’ internal motivation; 2) the *epidemiological approach*, viewing the receiver as making decisions on the basis of rational arguments, emphasising EBM, treatment effects and guidelines; and 3) the *marketing approach*, emphasising that the implementation object is “attractively” packaged and meets the needs of the target group. Elements from all three approaches were of relevance for the guideline implementation study conducted in the thesis.

Guidelines are often initiated from either a *top-down* or a *bottom-up* perspective. With a top-down origin, initiation of guideline production typically comes from managers or politicians, who aim for effectiveness and efficiency. With a bottom-up origin, initiation comes from clinicians, who perceive a lack of or a need for guidelines [56]. In the guideline implementation project described in this thesis, initiation was originated by physiotherapy unit managers, whose main concern was a perceived variation in practice. However, the project team consisted of practicing physiotherapists who perceived a need for guidelines. Hence, both perspectives were combined and resulted in a *peer-to-peer* approach, whereby the project team developed and implemented the guidelines among their peers.

Types of strategies

As with theories, a large number of different implementation strategies have been developed; more than 70 strategies were recently identified in a systematic review [74]. With this many strategies, the need to classify and categorise them is obvious, and—as was done for theories—many attempts to do so have been made. A recent review identified more than 50 different classification schemes [75]. Half of them were published after 2010, indicating the current strong interest in implementation strategies and the perceived need to classify them. Of the classifications, about half were labeled as taxonomies, and the remaining as “lists” or frameworks.

The most widely used taxonomy of implementation strategies was developed by the Cochrane Collaborations’ Effective Practice and Organisation of Care Group, EPOC [13]. This taxonomy classifies implementation strategies in four broad categories: *educational* (and quality assurance), *organisational*, *financial*, and *regulatory*. The first two categories are substantially more used than the last two [76, 77]. The educational category, aimed at professionals, is the most relevant to this thesis. It contains the following more specific strategies:

- Audit and feedback
- Distribution of educational materials (including guidelines)
- Educational meetings
- Educational outreach
- Local consensus processes
- Local opinion leaders
- Tailoring (previously referred to as Marketing)
- Mass media
- Patient-mediated interventions
- Reminders

The EPOC taxonomy has been adapted or extended by several researchers. The most relevant for this thesis is the taxonomy proposed by Mazza et al. [76], who particularly studied the relevance of the taxonomy for guideline implementation and refined it. Among other changes, the first category was renamed *professional*. The authors found

that a majority, 57%, of the studies in their review were at the professional level and 39% at the organisational level. Sixty per cent of guideline implementation studies had used a multi-component strategy, and the three most common strategies at the professional level were distribution of guideline material, identification of barriers for implementation, and education of healthcare professionals.

The strategy to tailor an implementation intervention to identified barriers and facilitators, used in this thesis, can encompass several of the other categories in the taxonomy, depending on the needs identified. Tailored strategies are defined as “strategies to improve professional practice that are planned, taking account of prospectively identified determinants of practice” [78]. This is a strategy that has received much attention in implementation research in recent years. Tailoring can involve several aspects. Typically, the strategy is tailored to a specific target group, possibly even differentiating between different subgroups, and to barriers and facilitators that have been identified in this target group. Different strategies can also be developed for different levels, i.e. individual/group level, organisation level, population level [79]. Different approaches have been suggested to link determinants with strategies, from theory-based [80] to more pragmatic “common sense” approaches [70, 71].

Effectiveness of implementation strategies

The effectiveness of the many different implementation strategies can be summarised as quite small, inconsistent, and variable across contexts and outcomes. Many attempts have been made to evaluate and summarise strategy effectiveness. One such summary, of implementation strategies in various health contexts, was presented in a (non-systematic) review by Grimshaw et al. [81]. Based on a number of Cochrane reviews, the authors collated magnitudes of effect of the different strategies (Table 1).

Table 1. Effectiveness of implementation strategies (modified from Grimshaw et al, 2012 [81])

Implementation strategy	Number of studies	Median magnitude of effect
Distribution of educational material	23	4.3% (IQR -8.0% to +9.6%)
Educational meetings	81	6.0% (IQR +1.8% to 15.3%) (Larger effects when attendance high, for mixed interactive and didactic meetings and interactive meetings. Smaller effects for complex behaviours)
Educational outreach	69	4.8%-6.0% (IQR +3.0% to + 16.0%) (Effects less certain for changing more complex behaviours)
Local opinion leaders	18	12.0% (IQR +6.0% to +14.5%)
Audit and feedback	118	5.0% (IQR +3% to +11%) (Larger effects if low baseline compliance)
Computerised reminders	28	4.2% (IQR +0.8% to +18.8%)
Tailored interventions	26	OR 1.52 (95% CI 1.27 to 1.82, p<.001)

IQR=interquartile range; OR=odds ratio; CI=confidence interval

This table shows that interventions such as distribution of educational material (e.g. guidelines) [82], interactive education [83], and reminders [84] are effective, and that the average magnitude of effect lies between 4% and 12%.

Two other reviews have focused on guideline implementation more specifically. Gagliardi et al. found that most guideline implementation strategies are effective; 88% of included studies in their review achieved positive effects [77]. Most of the strategies were multi-component and included education and print material. Brusamento et al. focused on management of chronic diseases in primary care, and found guideline implementation strategies fully or partially effective in 12 of the 21 included studies, but ineffective in 9 studies [85]. Although multifaceted strategies appeared somewhat more effective than single-component strategies, the authors were not able to determine the most successful strategy due to varied effect sizes across studies.

Evidence for the effectiveness of a tailored implementation strategy is growing [78, 81, 86]. The Cochrane review in Table 1 was recently updated, and found moderate evidence that interventions tailored to identified determinants of practice were more likely to improve professional practice (e.g. adherence to guideline recommendations) than no intervention or non-tailored interventions (OR 1.56 (95% CI 1.27 to 1.93, $p < 0.001$) [78]. Nevertheless, the effects of tailored implementations were variable and tended to be small to moderate, and the authors concluded that more research is needed on how to best tailor the intervention.

Two overarching strategies were used in this thesis that are not included in the EPOC taxonomy; basing implementation on theory and using a multi-component strategy. There is some evidence that behaviour change interventions that are informed by theory are more effective than those that are not [66, 87], but there is a paucity of research that can corroborate this finding, especially concerning change of professional behaviours.

Using a multi-component strategy is commonly—and logically—believed to be more effective than single-component interventions. However, the literature is contradictory regarding this aspect. A recent overview of 25 systematic reviews found no relationship between the number of intervention components and the effectiveness of the intervention [88]. In their extensive 2004 systematic review, Grimshaw et al. [89] found that more intervention components did not necessarily translate to better effect, but that it was plausible that multi-component interventions built upon assessment of barriers and a coherent theoretical base could be more effective than single interventions. Most recently, Gagliardi et al. [77] also concluded, in their 2015 scoping review, that there appeared to be no association between positive implementation effects and number or type of strategies.

Other studies have reached different conclusions. An overview of systematic reviews by Boaz et al. [90] found multi-component interventions to be more effective than single interventions, with effect sizes ranging from small to moderate. Several other systematic reviews also support the effectiveness of active, multi-component strategies to implement change in professional behaviour [56, 85, 91-94]. Hence,

evidence is inconclusive regarding multi-component versus single-component strategies.

Guideline implementation

Using guidelines as a strategy for implementation of EBP involves both rigorous development of the guidelines and an equally rigorous implementation. For guidelines to be used, they need to be implemented in a structured and sustainable manner [95]. Evidence-based guidelines should be accompanied by evidence-based implementation [96], i.e. by using strategies that have been proven effective. However, many guidelines are passively distributed, and many guideline developers consider implementation to be the responsibility of the target users [97]. Guideline implementation has been described as a slow, complex and often haphazard process, which can be influenced by many factors [56, 98]. Factors that have frequently been proposed as potential determinants of successful guideline implementation include: characteristics of the implementation object (e.g. guidelines); strategies for the implementation; internal and external context; and characteristics of the target group [4, 56, 99, 100].

Key steps in the guideline implementation process have been suggested to be: tailoring of the guidelines, assessing barriers for their use, selecting and tailoring implementation interventions, and monitoring guideline use and outcomes [53]. Several types of barriers for guideline use exist, such as barriers related to the guideline itself, the healthcare professional who will use it, the scientific evidence, the patient, and the health system [101]. Barriers can be identified in several ways, both through previous research and by assessing needs in the target population, by using quantitative and/or qualitative methods. Using different methods is recommended [3, 102].

Previous research on guideline implementation in physiotherapy

Recent systematic reviews of EBP implementation strategies are summarised and presented in Appendix 1. Since most EBP implementation studies have been conducted in settings other than physiotherapy, the systematic reviews were scrutinised to identify studies set in this context. As can be seen in the Appendix 1 table, this overview revealed that only three RCTs [41, 103, 104] (included in six of the ten reviews) have been conducted in physiotherapy settings. Two of those three studies evaluated implementation using a guideline strategy and the third evaluated an educational program. The results of these studies were promising but inconclusive, with different effects on different outcomes. Only one of the systematic reviews focused on physiotherapy, and concluded (based on the three identified RCTs) that there is some evidence from physiotherapy settings that active, multi-component

strategies with an educational component are more effective than passive, single intervention strategies—on some outcomes, but not on others [105]. Positive effects were seen in knowledge and behaviour, but not in attitudes, patient outcomes, or cost of care, and effects were mostly small.

Besides RCTs, eight observational studies, of variable quality and size, and one qualitative study on EBP implementation in physiotherapy settings were also included in some of the reviews. One relevant RCT [106], not included in any of the reviews, was also identified. The results of these studies were mixed, but showed a tendency for improved self-reported attitudes or knowledge after what was mostly multi-component strategies that included education.

The most recent systematic review found that most implementation studies in rehabilitation used a multi-component strategy, with educational components being the most frequent [107]. However, that review did not evaluate effectiveness of the different implementation interventions. In summary, while the use of a tailored, active, multi-component strategy for implementation of EBP in physiotherapy has been recommended [94], evidence is inconclusive regarding whether such a strategy can be effective in this context.

The use of CPGs in physiotherapy has been shown to contribute to EBP and improve both quality of care and patient outcomes [36, 108, 109]. This stresses the need to promote and increase guideline use, and to evaluate implementation efforts aiming to do so. The effectiveness of the strategy to implement CPGs as a means to enhance EBP has not been studied in Sweden before.

Patient preferences

Patients' preferences and values have been an underemphasised part of EBP. Guidelines tend to focus on treatment effectiveness on outcomes defined by professionals with little emphasis placed on patient preferences [110]. The need to incorporate patients' preferences in both guideline development and implementation has lately been underscored [110-112]. To facilitate shared decision making, guideline recommendations should to a larger extent consider patients' contexts, goals, values, and preferences [111]. It has been shown that a guideline is more likely to be adhered to if patient preferences are similar to the guideline recommendations, and preferences can therefore influence healthcare practitioners' use of guidelines [113].

Patient preferences can cover areas such as treatment methods, level of involvement in clinical decision making, and the type and amount of information patients want from their clinician [114]. They can be influenced by personal values and attitudes, health beliefs and expectations, and other cognitive, emotional and relationship factors [115]. Other factors that are likely to influence preferences are prior illness and healthcare experiences, diagnosis and health condition, demographic factors, and the relation with the caregiver [116].

Integrating patient preferences with guideline use implies that making decisions about treatment needs to be a shared responsibility between patient and clinician. The participation by patients in healthcare decisions has been promoted for a long time by the World Health Organization and other organisations [117]. Patient participation in clinical decision making, e.g. by expressing their preferences, is a core component of person-centred care [118], which is characterised by respectful and individualised care that empowers patients to actively engage in their care [119]. The concept of shared decision making is making inroads in EBM/EBP circles, although the relationship between the two concepts may not be self-evident for all. In fact, shared decision making is just as essential to quality health care as is EBP; the two concepts have been described as “interdependent” [16]. Also in a physiotherapy context, it has been suggested that many patients want to be engaged in the management of their problem [120].

Research on patient preferences has primarily been conducted in various medical contexts, including cancer or other life-threatening diseases, surgical methods and general practice [121]. In spite of the high prevalence of musculoskeletal pain, said to affect about a third of all adults across Europe [122], there is a paucity of studies investigating which treatment interventions this patient population prefers. In the physiotherapy context, little is known about patients’ preferences related to treatment and decision making. Because musculoskeletal pain is one of the most common reasons for seeking primary care physiotherapy, it is important to explore preferences for physiotherapy treatment and management in this population. A better understanding of patients’ preferences can facilitate their integration with CPGs, thereby raising CPG quality, facilitate shared decision making, and ultimately enhance EBP and guideline implementation.

THEORETICAL APPROACHES

Several theories have informed this research and provide frames of reference. This chapter presents the theories that are relevant for the thesis: the behaviour change theories that informed the research on attitudes, knowledge and behaviour performed in the quantitative studies; the theory-based implementation model used; and the part of the diffusion of innovation theory that is used to discuss some of the research findings.

Behaviour change theories

Behaviour change processes are inherent in implementation of EBP [123] and theories that contribute to explaining such processes are therefore relevant for this research. A widely used behaviour change theory was developed by Fishbein and Ajzen in the 1970s; the theory of reasoned action [124], later expanded to the theory of planned behaviour (TPB) [125]. Both theories highlight the importance of attitudes in influencing behaviour.

The TPB hypothesises that an attitude towards a certain behaviour (for example, guideline use) is a determinant of intention to perform that behaviour, which in turn is a predictor of the behaviour in question [125]. The strength of an individual's intention (or motivation) to engage in a behaviour and the perceived degree of control over that behaviour are viewed as determinants of engaging in the behaviour. The TPB proposes that strength of intention is determined by three variables: attitudes towards the behaviour (beliefs about consequences of the behaviour and evaluations of those consequences); subjective norms (perceptions of the views of others about the behaviour); and perceived behavioural control (beliefs about factors that may facilitate or inhibit the behaviour, e.g. organisational barriers and patient preferences).

The TPB has been frequently used in implementation research to predict and/or explain various behaviours related to the use of research in clinical practice [12, 126]. It has been shown that the theory performs well for predicting behaviour and even better for predicting intention in different healthcare contexts and for different types of behaviours and guidelines [126, 127]. Although the TPB has not been extensively applied to explain practitioners' adherence to EBP, it has been proposed as a useful, systematic tool to identify barriers and facilitators of change and can be helpful in selecting appropriate types of interventions [128].

Bandura's social cognitive theory (SCT) is another theory that is relevant for this thesis [129]. This theory describes the importance of self-efficacy, i.e. the perceived

capability to perform a task. It proposes that behaviour is determined by incentives and three kinds of expectancies (situation-outcome expectancies, outcome expectancies, and self-efficacy expectancies). Self-efficacy is considered an important contributor to accomplishing a performance. The SCT also emphasises the importance of the social environment in which a behaviour takes place, and suggests that there is continuous interaction between the professional, his or her performance, and this environment [129].

Both the aforementioned theories have relevance for this thesis, and have influenced both development of the measurement tool used in the quantitative studies and the factors explored as potential determinants of EBP. In the qualitative study, both theories were also drawn upon as a framework to analyse how patient preferences are formed. As is not uncommon in qualitative research, no theory was explicitly determined *a priori*—instead findings were aligned with relevant theories during the data analysis.

Grol and Wensing's implementation of change model

Behaviour change is a process that is often assumed to take place in sequential steps, or phases [130]. Grol and Wensing have developed a prescriptive process model concerning the implementation of evidence-based practice in terms of behaviour change [56]. This model has guided the quantitative studies in this thesis from the outset, and has been used as a framework to structure and support planning, execution and evaluation of the guideline implementation process.

The model was selected because it is both theory-based and pragmatic. It draws on a comprehensive overview and synthesis of theories concerning behaviour change of relevance in implementation research and for this thesis; both classic behaviour change theories and more recent process theories that are intended to guide the planning and execution of implementation research projects. It is pragmatic in that it emphasises a systematic, logic, and sequential step-by-step process, which provides a structured approach for the implementation process. Furthermore, it is consistent with standard project management processes, which typically begin by a problem or needs analysis and development of a plan based on that analysis, followed by planning of activities and monitoring the effects of those activities.

The theories for behavioural change that are synthesised in the Grol and Wensing model include theories related to individual professionals, theories on the influence of the social interaction and context, and theories related the organisational and economic context [56]. These different types of theories are all potentially relevant for describing and explaining effective implementation of change, and to the research conducted in this thesis. Most of the research in the thesis focused on the individual clinician, making a theory on this level appropriate. Theories on the individual level can, in their

turn, be divided in four categories; cognitive theories, educational theories, attitude theories and motivation or stages of change theories [56]. For the purposes of this research, cognitive theory was considered particularly relevant for implementation of EBP, since it focuses on rational thinking and decision processes and builds on the assumption that clinicians make rational choices based on knowledge. Educational theories, notably adult learning theories, state that people learn better and are more motivated to change behaviour when they start from problems that they have experienced in practice [56], which also has relevance to the implementation of EBP. Attitude theories are also relevant, as they make the assumption that individuals' behaviour is based on their attitudes. Theories on the impact of the environment that emphasise social interaction and context, notably workplace and colleagues, could also be considered relevant.

Hence, all of these types of theories were considered relevant for our project to increase EBP in physiotherapy practice, and the implementation model by Grol and Wensing was a good fit, synthesising and integrating all of these types of theories. The model comprises five sequential steps, presented in Table 2.

Table 2. The Grol and Wensing implementation model (Grol et al, 2005 [56])

Step	Description	Key elements
1.	Development of concrete proposal/targets for improvement or change	New practice routines, guidelines, techniques or procedures; consideration of quality, target group needs, usability, availability, attractiveness
2.	Analysis of performance, target group and setting	Current practice, performance indicators, context, target group characteristics, barriers and facilitators
3.	Development/selection of strategies and measures to change practice	Linking identified factors to dissemination and implementation strategies; balance between desired effects and available resources
4.	Development, testing and execution of implementation plan	Activities, timetables, tasks, structures, personnel, resources
5.	(Continuous) evaluation and (where necessary) adapting plan	Results, goals achievement, repeat performance assessment

The model was modified in 2013 by its developers [130]. The main differences are that step 2 now is divided in two different steps, that contextual considerations are emphasised more explicitly, and that an additional step has been added that underscores the need for sustained integration of changes in routine care. Furthermore, the 2013 version is of a more cyclical nature, suggesting that implementation and evaluation should be continuous. The application of the 2005 model in the implementation project (Study B and C) is described in the Methods chapter.

Rogers' theory of diffusion of innovations

One of the most widely applied theories in implementation research is the classic diffusion of innovation theory that explains how innovations are spread and adopted [12, 65]. The theory was popularised by Everett Rogers (3) and was first presented in his 1962 review of diffusion of innovation studies. With innovation is understood “any idea, practice, or object that is perceived as new by an individual or other unit of adoption” [4]. The theory was originally developed in the 1940s in the field of agriculture, and aimed to explain how a new idea is spread and adopted. It is built around four important elements of diffusion: the *innovation* itself, *communication channels* through which it is spread, the *time* this process takes, and the *social system*, i.e. context/setting, in which the innovation is spread. The theory proposes that the adoption of new ideas, practices, and artefacts is influenced by the interaction among the innovation, the adopter, and the environment.

The theory also identifies personality characteristics associated with the likelihood that an individual will adopt an innovation, and characterises adopters in five categories: innovators adopt an innovation first, followed by early adopters, early majority, late majority, and, lastly, laggards.

Importantly, the theory proposes five major attributes of an innovation, such as guidelines, as being essential for its successful spread and adoption: the innovation's *relative advantage* (how much better the innovation is perceived to be relative to current techniques, tools or methods); its *compatibility* (the degree to which the innovation is consistent with the adopters' values, needs, and past experiences); its *complexity* or difficulty to learn (how easy or difficult it will be to use the innovation); its *trialability* or testability (how easy it is to try the innovation); and its *observability* (how visible the effects of the innovation are) [4]. Of relevance for this thesis: not only are these tenets grounded in theory, but there is empirical evidence to support them [63]. It is particularly useful to discuss guideline characteristics in relation to these attributes of innovation, which is done in the Discussion chapter of the thesis.

RATIONALE FOR THE THESIS

Scoping literatures searches conducted during the planning of this thesis revealed a knowledge gap concerning the effectiveness of guidelines as a strategy to implement EBP, particularly in certain contexts. Previous research on guideline implementation in Sweden has been conducted in hospital settings and concerned other disciplines: nursing, psychiatry and neonatal care [131-133]. No studies were found on implementation of EBP or guidelines in primary care physiotherapy. Because physiotherapists in Sweden are first-line practitioners and practice autonomously, without need for medical referral, guidelines can be expected to play an important role in clinical decision making. In an international perspective, only two studies were found on physiotherapy guideline implementation that used a controlled research design [103, 104], indicating that knowledge is limited about the effectiveness of guideline implementation strategies in this context. Therefore, more research on this topic is needed, particularly in a Swedish primary care physiotherapy context. Increased knowledge of the impact of guideline implementation is important for decisions on how to support practitioners in the uptake of research findings, and how to disseminate research findings effectively.

There is also a paucity of knowledge concerning factors that may hinder or facilitate the use of guidelines and application of EBP among physiotherapists in Sweden, as well as the extent of guideline use in primary care physiotherapy. Increased knowledge of these factors is important for the development of effective implementation strategies.

Clinical expertise and experience is an important component of EBP, as manifested in clinical practice patterns, and has not been investigated in primary care physiotherapy. Increased knowledge of practice patterns and clinical experience is needed to supplement the research-based knowledge that inform CPGs.

To examine variables related to EBP and CPGs, as well as clinical practice patterns, a valid and reliable measurement instrument is needed. No such instrument was available in Swedish.

The patient perspective is equally important, and knowledge is limited about which treatment methods patients who seek physiotherapy prefer and the role of these preferences in clinical decision making. This indicates a need to explore patients' preferences for physiotherapy treatment and management, to facilitate clinical decision making and the integration of patient preferences with the use of guidelines.

Ultimately, exploring ways to increase the application of EBP and to facilitate the integration of the EBP components is important so that evidence-based, effective treatments are provided to patients, thereby increasing the quality of care in physiotherapy.

AIMS

Overall aim

The overall aim of this thesis was to generate knowledge that will increase understanding of factors of importance for the implementation of EBP in Swedish primary care physiotherapy, including implementation of research evidence via clinical practice guidelines as well as the clinician's and patient's perspectives.

Specific aims

Specific aims of the included papers were:

- To translate, cross-culturally adapt and further develop a questionnaire for the measurement of attitudes, knowledge, behaviour, prerequisites, and barriers related to EBP and guideline in physiotherapy; and to test the validity and reliability of the adapted questionnaire (Paper I)
- To investigate the above variables in a sample of Swedish primary care physiotherapists and to explore associations of self-reported use of guidelines with these social-cognitive factors along with demographic and workplace characteristics (Paper II)
- To develop a tailored, multi-component strategy for the implementation of evidence-based guidelines and evaluate its effectiveness on process outcomes (Paper III)
- To examine clinical practice concerning common musculoskeletal disorders, the extent to which practice is supported by research-based evidence, and associations with demographic variables (Paper IV)
- To explore patients' preferences for physiotherapy treatment and management (Paper V).

METHODS

This chapter first presents epistemological perspectives on the research performed and on EBP, followed by descriptions of the methods used in the individual studies.

Epistemological perspectives

This thesis employs several different research designs, intended to answer different types of research questions. Not only are the research designs different, but also the epistemological perspectives that frame the studies.

In the quantitative studies, *logical positivism* is the dominant epistemological paradigm. This paradigm—in which medical science is deeply rooted—is founded on the empiricist principles of natural science, emphasising that knowledge should be derived from what is objectively observable, measurable and verifiable, and that can be logically explained [134]. This perspective corresponds well with the foundational principle of EBP that emphasises that medical and health practices should be informed by knowledge based on objective empirical evidence from observations and quantitative analysis [31].

Qualitative studies draw on another type of objectivity, where the researcher inevitably becomes a part of the creation of knowledge. The study of patient preferences involved a complex, unquantifiable phenomenon, which required a different approach and a research design that can generate a more holistic form of knowledge. A paradigm that better represents this view on knowledge creation is *critical realism*. This perspective challenges the notion of an absolute truth of knowledge and recognises that we cannot be positive, or certain, about our claims of knowledge when studying human attitudes or behaviour [135]. In critical realism, it is accepted that “things happen” and that different stake-holders may have different interpretations of their significance that need to be incorporated in the analysis [136]. Critical realism belongs in the interpretive paradigm, which is interested in the study of meanings that social actors attach to their actions, for example what shapes the pattern of interactions between clinicians and patients [136]. Greater interest is taken in understanding subjective experience than objective data. An interpretive approach is particularly relevant for the type of research question addressed in Study D, where the aim was to describe, interpret, and explain a complex phenomenon.

Some years ago, the debate was fierce between a positivist and an interpretive viewpoint, associated with the advocacy of quantitative versus qualitative research methodologies. Today, this tension has decreased considerably and a consensus has

gradually emerged among researchers of accepting both perspectives as valid and providing useful, relevant and trustworthy knowledge [137]. Also EBP has seen an evolution from the early positivist tradition to a post-positivistic perspective, acknowledging that everything cannot be tested in an RCT, that evidence is a dynamic concept, that there is always a degree of uncertainty in all study findings, and that what we know today may differ tomorrow. Today, there is agreement among leading EBP opinion leaders that other research designs are necessary for certain research questions, and that also qualitative research has its place [31].

Hence, the different epistemological perspectives do not need to be in conflict with each other, or mutually exclusive. On the contrary, there are possible convergences, and different paradigms can be used in different phases of research. Quantitative and qualitative research designs supplement each other and, together, paint a more comprehensive picture of a research topic. The methods used in this thesis are based on the assumption that knowledge can be derived in many ways and that different research questions require different designs. This is congruent with the assumption noted earlier (see p. 9) that knowledge can be generated from both research and practice.

Study designs

A variety of study designs were used, depending on the different research questions at hand. Of the four studies included in the thesis, three were quantitative studies and one used a qualitative research design. An overview of the four studies is presented in Table 3.

Table 3. Overview of the studies included in the thesis

	Study A	Study B	Study C	Study D
	Paper I	Paper II and IV	Paper III	Paper V
Study design	Instrument development, validation and reliability study	Cross-sectional study	Prospective, controlled intervention study	Descriptive, explorative interview study
Participants	Validation: strategic sample of primary care PTs (n=10); test-retest reliability: convenience sample of primary care PTs (n=42)	Primary care PTs in Region Västra Götaland (n=271)	Primary care PTs in Region Västra Götaland (n=256)	Purposeful sample of patients with musculoskeletal pain (n= 20), recruited from a rehabilitation practice in Gothenburg.
Aims	1) To translate and culturally adapt a questionnaire to a Swedish primary care context in order to measure various aspects of EBP and guidelines in physiotherapy; 2) to further develop the questionnaire; 3) to test validity and reliability.	<u>Paper II:</u> To describe self-reported attitudes, knowledge, behaviour, prerequisites, and barriers related to EBP and guidelines, and to explore associations to self-reported use of guidelines. <u>Paper IV:</u> To describe self-reported use of interventions for common musculo-skeletal conditions.	To evaluate the effectiveness on process outcomes of a tailored implementation intervention of evidence-based physiotherapy practice guidelines.	To explore and describe patients' preferences for physiotherapy treatment and participation in clinical decision making.
Methods	Translation and cross-cultural adaptation to a Swedish primary care physiotherapy context. A draft version was pilot-tested for content and face validity (n=10) and a revised version was tested for test-retest reliability (n=42).	Web-based survey using the questionnaire developed in Study A.	A theory-informed, evidence-based implementation strategy was developed based on barriers and facilitators identified in Study B. An implementation intervention was carried out in one group of PTs while another group was control. Data were collected with the questionnaire from Study A.	Individual, semi-structured interviews before visit to PT
Data collection (yr)	2010	2010	2010 and 2011	2014
Data analysis	Descriptive statistics and percentage of agreement between test and retest occasions, using the Svensson method.	Descriptive statistics and logistic regression analyses. Odds ratios and 95% confidence intervals were calculated.	Pearson's χ^2 test for between-group differences in proportions. Approximative z-tests for differences in change between the groups.	Qualitative content analysis with inductive approach.

PT=physiotherapist

First, an instrument development study was undertaken, including translating and adapting an existing questionnaire and testing of validity and reliability of the adapted Swedish version. Second, a cross-sectional survey was performed using the adapted questionnaire. The third study had a two-fold design: development of a guideline implementation strategy (see below) followed by evaluation of the implementation in a prospective, non-randomised, controlled intervention study. The strategy development was based on a review of current literature and prevailing implementation theories, as well as barriers and facilitators that had been identified in the survey. The evaluation was performed using the adapted questionnaire and using the results from the survey as baseline values. The implementation objects, the guidelines, were developed in parallel with the first two studies but are not part of the thesis. A timeline of the three quantitative studies and the guideline development project is presented in Figure 6.

Figure 6. Timeline of Studies A-C. Blue items relate to the research project, orange items to the QI project

In the fourth study, an explorative qualitative research design was used, comprising individual semi-structured interviews that were analysed with inductive qualitative content analysis.

Procedures

Guideline development

The development of the three CPGs that were implemented in this project was carried out by a guideline development team comprised of six primary care physiotherapists (5 female, 1 male, average age 45.2 years), with an average of 14 years of primary care physiotherapy experience. Three team members had master's degrees in physiotherapy and three had postgraduate training in EBP skills. The three CPGs concerned low back pain (LBP), neck pain, and subacromial pain. The guideline development process included systematic database searches, critical appraisal of the evidence base using the GRADE system [138], and formulating evidence-based

practice recommendations. Rigorous and transparent guideline development methods were used, because this is considered essential to enhance credibility, and subsequently acceptance and use of the guidelines [97]. To support and structure the development process, it was guided by a 7-step guideline development model presented by Burgers et al. [59]. Table 4 summarises how the model was applied in this project.

Table 4. Model for guideline development

Step	Model term	Interpretation/application/activities in project
1	Topic selection	Relevance: needs assessment, scope
2	Preparation	Working groups, templates, planning
3	Development of draft guideline	Systematic reviews, summaries, consensus, recommendations
4	Consultation	Applicability: external reviewers, pilot testing in the target group
5	Authorisation	Approval by management
6	Design	Availability and readability ("attractiveness"): style, length, clinical relevance
7	Evaluation and revision	Evaluation of use after implementation, updating

To illustrate format and content, an overview of one of the guidelines is provided in Appendix 2.

Questionnaire development (Study A)

To be able to measure the variables of interest related to EBP and guidelines, the literature was scoped for existing potentially suitable measurement instruments. Of the instruments identified, a questionnaire developed by Jette et al. [37] was considered particularly suitable because it had been developed specifically for use in physiotherapy contexts and because it addressed the social cognitive factors we aimed to assess. Also, it had been used previously in several countries. For these reasons, this questionnaire was selected as the basis for developing a Swedish questionnaire. With permission from the developers, the questionnaire was translated and cross-culturally adapted to a Swedish primary care physiotherapy context, using a rigorous forward-backward translation process [139]. The adaptation included removal of items not relevant to the Swedish context, addition of new items, and rephrasing some items. This work was performed by an expert panel of four physiotherapists, all with postgraduate education and with an average of 13 years of clinical experience in primary care physiotherapy and specialisation in musculoskeletal physical therapy. The questionnaire was further developed to suit the purposes of this research, by the construction of additional items concerning guidelines. A draft version was pilot-tested for face and content validity and a revised version was tested for reliability.

Development of the implementation strategy (Studies B-C)

The GroI and Wensing implementation model [56] was used to plan and support the implementation process. The model, its adaptation to the clinical and organisational context of primary care physiotherapy in VGR and its application to the strategy development, is illustrated in Figure 7.

Figure 7. The GroI and Wensing implementation model [56] and how it was adapted to our project

Steps one and two of the model were carried out in parallel, as the needs analysis in step two was instrumental in the development of the CPGs in step one. As part of step two, baseline data were collected in the form of a cross-sectional survey, Study B. Input was also solicited in the survey as to which conditions there was the highest need for guidelines, which underpinned the choice of topics. The conditions chosen, LBP, neck pain, and subacromial pain, are also referenced in the literature as the three most common reasons to consult a physician or physiotherapist in primary care (136).

The implementation strategy developed in step three was directed at the individual level and, to a smaller extent, at the organisational level. The targets for the implementation were the physiotherapists in VGR primary care (see below). The core component of the strategy was an educational element directed at the individual level and designed to inform the physiotherapists about the guidelines, stimulate discussion about the guidelines, teach the basic principles of EBP, and address misconceptions about EBP that had emerged from the survey. The implementation seminar primarily targeted the physiotherapists' knowledge, skills, intentions, and behaviour, particularly regarding the use of guidelines. At the organisational level, the strategy focused on addressing the barriers identified in the baseline survey, specifically targeting access to and availability of guidelines. The design of the implementation

strategy and selection and design of components were informed by the effectiveness of various implementation strategies reported in systematic reviews [78, 81-83, 140].

In step four, the actual implementation activities were planned, and the plan was executed (see below). In step five, the implementation was evaluated using the same questionnaire as in the baseline survey.

Implementation intervention (Study C)

The implementation plan carried out in step four of the model comprised a multi-component intervention, conducted over a 3-month period and comprising the following components:

- Guidelines in printed and electronic formats
- A 3-hour implementation seminar (core component)
- A specially developed guideline website
- Links from local intranets to the guideline website
- Bi-monthly email reminders
- Patient information leaflets, in printed and electronic format
- Email and telephone support by the project manager.

Physiotherapists in the control group received no intervention and continued to practice as usual, i.e., according to individual knowledge and experience. They did not receive any of the newly developed CPGs, nor any information about the guideline website or the ongoing guideline project. Publically available physiotherapy and multidisciplinary guidelines, searchable on the Internet, were available to both groups during the study.

Setting and participants

Setting

The empirical context of this research was public primary care physiotherapy in Västra Götaland. This is a geographic region in western Sweden in which 1.6 million inhabitants receive public health services from the county council “Region Västra Götaland” (*Västra Götalandsregionen*, VGR). All studies were conducted within the county council. Primary care in VGR is organised in the division *Närhälsan*, comprising about 200 healthcare centres and 60 rehabilitation units in which physiotherapy services are provided. *Närhälsan* was at the time of data collection organisationally divided into five primary care areas, all covering a mix of urban and rural areas.

Participants

In Study A, a strategic sample of primary care PTs (n=10) and a convenience sample of primary care physiotherapists (n=64) participated in the validation and reliability test, respectively. The sample for the validity test included eight women and two men; median age 35 years. For the reliability test, 42 physiotherapists (65%) responded twice. 37 respondents were women and 5 were men, spread across various age groups.

In Study B, all primary care physiotherapists employed in VGR in October 2010 (n=419, excluding the guideline development group) were eligible to participate, and were invited to respond to the questionnaire. 271 responded (response rate 64.7%). The physiotherapists were invited to participate via an email with a link to the web-based questionnaire. Three reminders were sent at 1-week intervals.

In Study C, the sample at baseline was the same as above. Of the 419 participants, 171 of 256 physiotherapists in the intervention group (66.8%) and 100 of 163 physiotherapists in the control group (61.3%) responded. For the follow-up survey, all primary care physiotherapists employed in VGR in October 2011 (n=448, excluding the guideline development group) were invited to respond. Of these, 168 of 277 physiotherapists in the intervention group (60.6%) and 88 of 171 physiotherapists in the control group (51.5%) responded. Of the 277 physiotherapists in the intervention group, 186 participated in the implementation seminars, and 97 of those (52.2%) responded to the follow-up survey. The invitation and reminder procedures were the same as in Study B. The difference in eligible participants between the two surveys was due to staff turnover. This turnover was calculated, based on the email distribution lists for the two surveys, as approximately 10%; a figure that was also confirmed by VGR's human resource department.

In Study D, patients with musculoskeletal pain (n=20) were recruited from a physiotherapy clinic in Gothenburg, Sweden. A purposeful sampling strategy was used [137], aiming at obtaining a maximum variation of gender, age, and musculoskeletal condition.

Participant characteristics are presented in the respective paper. A flow chart of participants is provided in Figure 8.

Figure 8. Flow chart of participants in the studies. N/A=not applicable

Inclusion criteria

For Study A, inclusion criteria were to be a primary care physiotherapists and *not* be employed in VGR.

For Studies B and C, inclusion criteria were to be employed as a physiotherapist in primary care in VGR. Members of the guideline development group were excluded (n=6).

For Study D, inclusion criteria were: Age over 18 years, ability to speak and understand Swedish, seeking physiotherapy for musculoskeletal pain in the low back, neck or shoulder. An equal distribution of men and women and maximum variation in age, socio-economic background, pain duration and previous experiences of physiotherapy treatment were sought.

Data collection and outcomes measured

Studies A-C

In **Studies A-C** data were collected with the same instrument; the web-based questionnaire developed in Study A. The questionnaire includes items reflecting various aspects of EBP, guidelines, and practice, and covered the following domains: attitudes towards EBP and guidelines (12 items); knowledge about EBP resources and

guidelines (4 items); behaviour, including common EBP components such as reading scientific articles and searching databases, as well as the use of guidelines (3 items); prerequisites and barriers for EBP and guidelines (4 items); and clinical practice relating to treatment for subacute low back pain, subacute neck pain, and subacromial pain (3 items). Most items were ordered-category items, ranging from “strongly disagree” to “strongly agree.” The item on frequency of use of guidelines ranged from “very infrequently or never” to “very frequently.” The items on knowledge of guidelines and how and where to find them were 3-point items with “yes”, “partially” and “no” response options. The items on clinical practice were multiple-response items.

The questionnaire was used for data collection in November 2010 (n=271) and November 2011 (n=256). The first data collection provided data for Study B and baseline data for Study C. Demographic data collected included sex, age, education level and years of work experience from primary care and specialist accreditation.

Primary outcomes in **Study B/Paper II** were attitudes, knowledge, behaviour, prerequisites, and barriers related to EBP and, in particular, guidelines. Secondary outcomes were associations between the above variables and self-reported use of guidelines, as well as associations between demographic characteristics and the various EBP outcomes and frequent use of guidelines, respectively.

Primary outcomes in **Study B/Paper IV** were the self-reported use of interventions for subacute low back pain, subacute neck pain, and subacromial pain. Secondary outcomes were associations between the above variables and demographic characteristics.

In **Study C**, data were collected before and after the implementation intervention. Primary outcomes in Study C were the self-reported awareness of, knowledge of, access to, and use of guidelines. For assessment of the impact of participation in the core component, the seminar, an item was added to the questionnaire asking about attendance. Secondary outcomes were attitudes towards EBP and guidelines. Demographic variables, educational variables, and variables related to work and the workplace were also collected.

Study D

In **Study D**, data were collected from individual interviews with patients with musculoskeletal disorders (n=20). All interviews were conducted by the PhD candidate. Background and demographic data were collected with a purpose-constructed form before the interview; thereafter the interview was semi-structured.

The interviews were held between February and May 2014. Sixteen of the interviews were held in a conference room at the clinic, one in an informant’s home and one at an informant’s place of work. Two interviews were conducted via telephone.

The interviews were semi-structured and followed an interview guide. The interview guide was piloted in two interviews, and slightly modified. It comprised four domains with an initial open-ended question for each (Table 5). Data collection was terminated after 20 interviews because the aimed for variation in demographic characteristics was achieved, and no new information seemed to be forthcoming (the so called redundancy criterion [137]). The interviews lasted between 16 and 43 minutes (average 24 minutes), were audio-recorded, and transcribed verbatim.

Table 5. The interview guide used in Study D

Question areas with initial question	
1. Earlier experiences of physiotherapy	<i>Have you received earlier treatment for your pain? Can you tell me about your rehabilitation?</i>
2. Preferences for treatment	<i>What are your expectations of the upcoming visit to a physiotherapist?</i>
3. Expectations of the physiotherapy treatment period about to begin	<i>What are your expectations for your upcoming rehabilitation?</i>
4. Participation in decision making	<i>How do you see your own role now that you will see a physiotherapist?</i>
Probing questions	
<i>Can you describe further? Can you exemplify/explain? What did you think about that? When you said ____, what do you mean?</i>	

Data analysis

Statistical analyses

Since all data were categorical, non-parametric statistics were used in all quantitative studies. Descriptive statistics are presented in numbers and proportions.

In **Study A**, test-retest analyses were performed using the Svensson method [141]. Percentages of agreement between the two tests were analysed on an item basis. Systematic and individual disagreements between the two tests were calculated. The Svensson method was chosen because it can separate systematic disagreement from random individual disagreement.

In **Study B**, frequencies and distributions were analysed using descriptive statistics. Logistic regression analyses were performed to examine associations between variables:

- Paper II: associations between “frequent guideline use” as dependent variable and the different EBP and guideline variables as independent variables. Response categories for both dependent and independent variables were dichotomised for the regression analyses. For variables where subsamples were small, categories were collapsed. Variables that were significantly associated with guideline use in univariate analyses were entered in a multiple logistic regression model. The stepwise forward

conditional method was used in the univariate analyses, and the enter method in the multiple analyses. In significant models, associations were expressed as odds ratios (OR) with 95% confidence intervals (CI) for each level of the independent variables.

- Paper IV: Interventions were first categorised according to strength of evidence and combined into new variables. These new variables were entered as dependent variables and analysed against demographic factors as independent variables. In cases where significant associations were identified, further analyses of associations to individual interventions were performed. An alpha level of 0.05 was considered significant.

In **Study C**, differences between groups were analysed using the Pearson's χ^2 test. For the primary outcomes, absolute changes between baseline and follow-up in proportions answering "frequently/very frequently" or "yes" were computed. Differences in change between the groups were analysed using an approximative z-test. Before the analysis, the response categories were dichotomised into the two highest and lowest categories. For the primary outcomes, primary analyses of data for all physiotherapists in the intervention group were performed, regardless of whether they had participated in the implementation seminar, the main component of the intervention (corresponding to "intention-to-treat" analysis). Secondary analysis was restricted to those participants who actually participated in the seminar and responded to the follow-up questionnaire (corresponding to "per-protocol" analysis). A significance level of $p < 0.05$ was used in Studies B and C.

Statistical analyses in Study A were performed with a Microsoft Excel® macro constructed by the developer [142], and in Studies B and C with IBM Statistical Package for Social Sciences (SPSS), version 19-20. An overview of the statistical methods used in Studies A-C is shown in Table 6.

Table 6. Statistical methods used in Studies A-C

	Study A	Study B	Study C
Descriptive statistics	X	X	X
Svensson method	X		
Univariate logistic regression analysis		X	
Multiple logistic regression analysis		X	
Pearson's χ^2 test			X
Approximative z-test			X

Content analysis

In Study D, data were analysed using content analysis; an empirically grounded analytical method that aims to provide new insights and increase understanding of a phenomenon that is difficult to observe [143]. The method involves an explorative

process aiming to draw conclusions (inferential aim) or make predictions (predictive aim); in this study, the aim was inferential.

Content analysis comprises analysis of the manifest and latent content of a body of text (or other communicated material), in order to ascertain its meaning [143]. Over the years, several different, but overlapping, approaches to content analysis have been developed [143]. The analysis technique has evolved substantially over time and from its origin in the field of communication theory to many other fields, including health services research. One evolution is from being a strictly quantitative method, involving numeric counts of words, terms, and sentences, to two distinct approaches: a quantitative and a qualitative approach. Another evolution is from being originally mainly descriptive, to also include interpretation of latent content, at various depths [144]. In this research, contemporary *qualitative content analysis* (QCA) was used, defined as *a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use that involves a close reading of textual matter, reorganising relevant parts into analytical categories, and creating a narrative of scholarly interest pertaining to the meanings and uses of the analysed text* [143].

The analytical procedure presented by Graneheim and Lundman [144] was followed, which involved systematic reading and analysis of the collected data to understand their meaning for the informants. Both manifest and latent content of the transcribed interviews were analysed. The former is presented in categories and the latter expressed in a theme. An inductive approach was used; the analysis was data-driven rather than guided by a pre-defined theory or hypothesis. The unit of analysis was the transcribed interview. The analytical process began by listening to the audio file and reading the transcript several times, to obtain an overview of the material and a sense of the whole. The transcript was analysed systematically for meaning units, which were condensed and coded. The codes were organised hierarchically in sub-categories and categories; which subsequently were compared for differences and similarities, with the aim of being internally as homogeneous and externally as heterogeneous as possible [143]. Up until this point in the analysis, codes and categories were still close to the data and on a descriptive level (manifest content). In the last stage of the analysis, an overarching theme that could be identified across the categories was conceptualised from the underlying (latent) content. QSR International's NVivo 10 qualitative data analysis software was used to support systematic management of the data. Organisation and labelling of the categories and theme were continually checked and modified throughout the analytical process, and discussed between the co-researchers until consensus was reached. To strengthen the analysis and provide analyst triangulation, several of the interviews were independently coded by another researcher. Quotations from the interviews were used to elucidate the different categories by providing illustrative examples of the meaning of the categories.

Ethical considerations

All data in this thesis were managed in accordance with the Helsinki declaration of ethical principles for medical research involving human subjects [145]. All questionnaires in Studies A-C were filled out anonymously and responses could not be traced back to the respondents. A statement in the questionnaire informed the respondents that the data collected would be used both in organisational quality improvement and in research, and that their responding to the survey indicated their informed consent to participate. Information was provided about the purpose of the questionnaire and of the research study, and that responding to the survey was voluntary. The results are presented on a group level with no possibility to identify individuals and there were no perceived risks of harm to individuals.

The participating individuals in Study D provided their written informed consent before the interview, after having received written and verbal information about the study. This information included aspects of voluntary participation and the possibility to withdraw at any time without explanation and without it affecting their continued care. The interviews were not intended to influence the participants and there was little perceived risk of harm. The interview topic per se was not particularly sensitive or personal; although for people living with pain, their pain is always personal and individual and therefore could be a sensitive matter. Transcripts were de-identified before being discussed with co-researchers. Participants' responses are presented in such a way that no individual could be identified. All data are kept so that no unauthorised person has access to the material.

Studies C and D were approved by the local Research Ethical Review Board in Gothenburg, Sweden (Reference no. 780-11 and 990-12, respectively). For Studies A and B, ethics approval was, according to Swedish law and confirmed in an advisory statement by the Regional Ethics Review Board of Gothenburg, not necessary.

RESULTS

In this chapter, the results from the individual studies are revisited in a more comprehensive perspective. After summarising the main findings of the quantitative studies, additional results are presented in thematic order rather than chronological order, beginning with the studies pertaining to research/guideline use—the research “leg” of the EBP model. Detailed results are reported in the separate papers.

Summary of findings from the quantitative studies

Main findings of the quantitative studies are summarised in Table 7 and briefly elaborated on below.

Table 7. Summary of main findings in Studies A-C

	Study A	Study B		Study C
	Paper I	Paper II	Paper IV	Paper III
Main findings	The questionnaire was found to have good validity and acceptable reliability for measuring self-reported attitudes, knowledge, behaviour, prerequisites, and barriers related to EBP and guidelines among physiotherapists in primary care.	Most respondents had positive attitudes towards EBP and guidelines, but few were aware of guidelines and knew where to find them. Fewer than half reported using guidelines frequently. The most important barriers to using guidelines were lack of time, poor availability and access to guidelines. Positive attitudes, awareness of guidelines, considering guidelines to facilitate practice, and knowing how to integrate patient preferences with guideline use were associated with frequent use of guidelines.	Respondents reported using a wide range of treatment interventions. The most common interventions across the three conditions were advice on posture, advice to stay active, and different types of exercise. Most of these interventions were supported by evidence, but interventions with insufficient evidence, were also used to various extents. Few associations to demographic factors were found.	A tailored, theory- and evidence-informed, multi-component intervention for the implementation of guidelines had a positive effect on awareness of, knowledge of, and access to guidelines, among physiotherapists in primary care in western Sweden. Use of guidelines was significantly affected in those who attended the implementation seminar.

The questionnaire (Study A)

The translation and development process in Study A resulted in a first draft of the questionnaire containing a total of **51 items**; 48 EBP variables and 3 clinical practice variables. In the validity test, all ten pilot testers reported that the aspects of EBP that the questionnaire addressed were relevant to their practice, but that it contained some ambiguities. After revision, which included rephrasing and removing items, the questionnaire contained **41 items**.

For the EBP variables, the test-retest analysis showed a median percentage of agreement between the two tests of 67% (range 41%-81%). For the three clinical practice variables, percentages of agreement ranged between 67% and 100%. After revision or removal of items with low agreement and/or ceiling effects, **34 items** remained in the final questionnaire.

Eight of the items concern demographic and workplace characteristics. Twenty-three items represent four EBP domains: attitudes towards EBP and guidelines (12 items); knowledge about EBP resources and guidelines (4 items); behaviour related to EBP and guidelines (3 items); and prerequisites and barriers related to EBP and guidelines (4 items). The remaining three items represent clinical practice for the musculoskeletal conditions LBP, neck pain, and subacromial pain.

The final version of the questionnaire was considered to have good face and content validity and acceptable reliability for measuring self-reported attitudes, knowledge, behaviour, prerequisites, and barriers related to EBP and guidelines among physiotherapists in primary care. The questionnaire is attached in Appendix 3.

Determinants of guideline use (Study B/Paper II)

Prerequisites for guideline use

The main findings reported in Paper II were that attitudes towards EBP and guidelines were predominantly very positive, but that the self-reported behaviour did not fully reflect this. For example, a clear majority of the responding physiotherapists (90%) agreed or strongly agreed that EBP is necessary, helpful in decision making (83%), and that it is important to use guidelines (96%). However, awareness of and perceived access to guidelines and other EBP resources were quite limited (Figure 9). A third of the respondents stated that they were aware of the existence of guidelines relevant to their work (61% were aware to some extent). Only 13% stated that they knew where to find guidelines (65% to some extent), and as few as 9% stated that they had easy access to relevant guidelines at their workplace (53% to some extent)—the remaining 37% answered that they did not have easy access to relevant guidelines. A majority (68%) reported knowing how to integrate patient preferences with guidelines.

Figure 9. Prerequisites for guideline use: Self-reported awareness, knowledge and access to guidelines

Associations to demographic variables

Some of the significant associations between demographic factors and EBP variables were: Attitudes towards EBP were more positive among younger physiotherapists and those with few years of experience (OR 3.13, 95% CI 1.00–9.78). Self-efficacy concerning EBP was greater among those with a postgraduate degree (OR 11.10, 95% CI 1.38–89.13). Men were more likely than women to consider EBP helpful in decision making (OR 2.02, 95% CI 1.02–3.97), but less likely to know how to integrate patient preferences with guidelines (OR 0.55, 95% CI 0.31–0.97). Physiotherapists with less than 5 years of work experience in primary care (OR 3.29, 95% CI 1.26–8.62) and those with a postgraduate degree (OR 13.50, 95% CI 3.13–58.18) were more likely to know where to find guidelines. A postgraduate degree was also associated with perceiving easy access to guidelines (OR 7.20, 95% CI 1.55–33.44).

Barriers for guideline use

The main perceived barrier for guideline use was lack of time, reported by two thirds of the respondents. Other barriers were reported by 20%–45% of the respondents (Figure 10). In the category “Other”, the most often reported barrier was lack of support from superiors.

Figure 10. Self-reported barriers for guideline use

Guideline use

Forty-seven percent of the respondents reported using guidelines frequently or very frequently, 41% sometimes, and 12% infrequently or never.

Factors associated with frequent guideline use

In the univariate analyses, 15 factors were found significantly associated with frequent use of guidelines. In the final multiple regression model, the following five variables remained significantly associated with frequent use of guidelines:

- Considering guidelines important to facilitate practice (OR 10.11, 95% CI 2.47–41.33)
- Knowing how to integrate patient preferences with guidelines (OR 5.58, 95% CI 2.47–12.58)
- Not feeling that EBP creates unreasonable demands (OR 3.25 (1.68–6.28))
- Being aware that guidelines exist (OR 2.95, 95% CI 1.49–5.86)
- Not believing that strong evidence is lacking for most treatments (OR 2.89, 95% CI 1.53–5.46).

No associations were found between demographic or workplace characteristics and the use of guidelines.

Effects of the guideline implementation (Study C)

Primary outcomes

At follow-up, a significantly higher proportion of physiotherapists in the intervention group than in the control group reported being aware of guidelines, knowing where to find guidelines, and having easy access to guidelines (Table 8). The difference in frequent guideline use was not statistically significant in intention-to-treat analysis, but when only those who participated in the implementation seminar were analysed (corresponding to “per protocol” analysis), also this variable reached significance.

Table 8. Absolute difference between the groups at follow-up

	IG	CG	Absolute difference	p-value
Aware that guidelines exist	59%	44%	15%	<0.001
Knowing where to find guidelines	40%	16%	24%	<0.001
Easy access to guidelines	26%	7%	19%	<0.001
Frequent use of guidelines (ITT)	55%	48%	7%	0.081
Frequent use of guidelines (PP)	63%	48%	15%	0.043

IG=intervention group; CG=control group.

Another way to examine the effect of the implementation is to analyse the difference between the groups in the *change* in proportions from baseline to follow-up. These between-group differences were also statistically significant for three of the four primary outcomes (Table 9). The proportions of physiotherapists reporting awareness of, knowledge of, and easy access to guidelines increased significantly more in the intervention group than in the control group. However, the change in frequent use of guidelines did not differ significantly. Differences in proportions were between 9% and 22%.

Table 9. Change from baseline to follow-up and absolute difference between the groups

	IG	CG	Absolute difference	p-value
Aware that guidelines exist	+28%	+7%	21%	0.023
Knowing where to find guidelines	+25%	+5%	20%	0.007
Easy access to guidelines	+17%	-4%	22%	<0.001
Frequent use of guidelines	+9%	0%	9%	0.302

IG=intervention group; CG=control group.

Secondary outcomes

There were virtually no differences in the attitude variables. Only one statistically significant difference was found: 89% in the intervention group vs. 85% in the control group agreed that they considered EBP helpful in decision making ($p=0.018$).

Clinical practice (Study B/Paper IV)

The survey respondents reported using a wide range of treatment interventions—up to 16 different types—for the three musculoskeletal conditions. For each condition, respondents reported using a median of 7 (range 1-16) interventions. The most common interventions across the three conditions were advice on posture (reported by 82%–94% of the respondents), advice to stay active (86%–92%), and different types of exercise (65%–92%). These interventions were predominantly supported by evidence, with the exception of advice on posture. However, interventions with insufficient evidence, such as advice on posture, TENS and aquatic exercise, were also used to various extents (by 29%–96% of the respondents). Modalities such as laser therapy and ultrasound were sparingly used (<5%), which is in line with evidence. Reported frequencies of interventions used for the three conditions are summarised in Figure 11.

Few associations were identified between the use of various interventions and demographic variables. For neck pain, use of evidence-based interventions was associated with gender—men were more likely to use a combination of exercise and manual therapy (OR 2.18, 95% CI 1.23–3.88). Further analysis of this gender difference showed that male physiotherapists used manipulation (OR 9.77, 95% CI 4.18–22.82) and mobilisation (OR 2.96, 95% CI 1.61–5.44) to a significantly larger extent than their female colleagues. For subacromial pain, respondents with more than five years work experience in primary care were more likely than those with five years or less experience to use interventions supported by moderate evidence (OR 2.35, 95% CI 1.13–4.11).

Figure 11. Reported frequency of interventions used for LBP, neck pain and subacromial pain

Patient preferences for physiotherapy (Study D)

The analysis in the qualitative study resulted in six categories with an overarching theme, illustrating patients' preferences for physiotherapy (Figure 12). The theme, conceptualised based on the latent content in the interviews, was formulated as: *Trust in the physiotherapist fosters active engagement in therapy*. The six categories were constructed from 17 sub-categories that were based on the manifest content in the interviews. Two of the categories describe treatment preferences, two explore reasons for treatment preferences, and two relate to the decision-making process. Each category comprises 2-4 sub-categories.

Figure 12. Theme, categories, and sub-categories resulting from the qualitative content analysis performed in Study D

Preferences for active treatment strategies, such as exercise and advice for self-management, were expressed. Preferences for passive treatments, primarily acupuncture (because the informants had heard that it works well) or massage therapy (because “it feels good”), were also expressed. Both these types of preferences were perceived as allowing the informants to actively engage in their therapy. Treatment preferences were consistent across the three musculoskeletal conditions. Key influencers on treatment preferences were previous experiences and media, which also appeared to influence expectations for management and desire for participation in decision making. The informants expressed a preference for being involved in the clinical decision making, to varying extents. Both preferences for an active role and for sharing decision making, as well as preferences for a more passive role, were expressed. Expectations for a professional management were reflected in trust and confidence in physiotherapists' skills and competence, expectations for good outcomes, and believing that treatment methods should be evidence-based. While both experiences and the extent to which informants preferred to participate in

decision making varied, trust in the physiotherapist's ability to choose and guide treatment and confidence in the skills and competence of the profession were evident across the interviews. This trust and confidence in the physiotherapist seemed to stimulate the informants to actively engage in their therapy, regardless of both preferred treatment methods and preferred role in decision making.

If they [the physiotherapist] say it's better so... so that's what I'll do. /.../ I trust them. It's my job to do what they say I should do. I have to work on it. I'm the one that has to do the job.

The analysis also revealed potential links between the concepts of experience, satisfaction, expectations, and preferences. Previous experience, whether positive or negative, resulted in either satisfaction or disappointment and was a strong influencer on preferences—partially via high or low expectations, which might act as mediators. The potential relationships between these constructs are illustrated in Figure 13. This figure can be seen as a conceptual description of how the phenomenon under study, preferences, might be formed. Relationships were interpreted to be bidirectional, suggesting a sequential loop process of how the various concepts may potentially influence one another and contribute to the formation of preferences.

Figure 13. Potential links between experience, satisfaction, expectations and preferences

DISCUSSION OF RESULTS

In this chapter, main findings of the thesis are interpreted and discussed in relation to other research, within a framework of the EBP model. The main focus is on the implementation study, positioned in the research “leg” of EBP. The discussion of study findings is followed by an elaboration on integration of the components. A more detailed discussion of the findings is provided in the respective paper.

Research evidence

Determinants of guideline use

Facilitators

Study B revealed highly positive attitudes towards EBP, which is consistent with many other studies [146, 147]. A recent systematic review by da Silva et al. [147] of EBP knowledge, skills, behaviour, opinions and barriers among physiotherapists in various countries concluded that positive attitudes towards EBP were apparent across all 12 studies in the review. The associations identified in our study between younger age and less experience, and positive attitudes, are also consistent with other studies [37, 39, 148]—probably confirming the inroads EBP has made into undergraduate physiotherapy education in Sweden. It is highly likely that those who graduated in the 2000s have a greater understanding of EBP than those who graduated in the 1990s or earlier.

Attitudes towards guidelines were also highly positive, which is less unanimously supported in previous research. Considerably less positive attitudes towards guidelines were expressed in an earlier Swedish study [149], possibly explained by an increased focus in physiotherapy on EBP and guidelines in the years since that study was performed. In a qualitative Dutch study, even unfavourable attitudes towards guidelines were expressed [150]. These differences in attitudes may be related to national and cultural differences, different data collection methods, and possible misperceptions of the EBP concept.

The strongest determinant of guideline use identified in Study B was the attitude that guidelines are important to facilitate practice. This suggests an understanding of the purpose of guidelines, as well as a perceived need for guidelines to support clinical decision making. Another important determinant was the ability to integrate patient preferences with guidelines, which implies an understanding of the EBP concept and that guidelines can and should be adapted to the individual patient. The association

between attitudes such as the aforementioned and use of EBP is supported by a systematic review, in which attitudes and beliefs about research and EBP were identified as significant predictors of self-reported use of research evidence in allied health [151].

Barriers

Study B also revealed perceived problems with being aware of, locating, and accessing guidelines—important prerequisites for using them—and this was among the barriers that the subsequent implementation strategy sought to address. Despite the positive attitudes, these barriers hindered a frequent use of guidelines for many of the physiotherapists, demonstrating that the link between attitudes and behaviour hypothesised in the TPB [125] may not always be possible to establish, and that other mediating factors may be important. It seems there is still a way to go before positive attitudes are translated into a more evidence-based practice. The review by da Silva et al. [147] concluded that physiotherapists consider that many barriers still exist for the implementation of EBP and that they need to improve their knowledge, skills and behaviour related to EBP.

Awareness has been proposed as the first step towards use/adherence to guidelines, in the Pathman awareness-to-adherence model [152]. This model proposes that to adhere to practice guidelines, clinicians must first become *aware* of the guidelines, then *agree* with them, *adopt* them in their practice, and, lastly, regularly *adhere* to them. In line with this model, the findings of Study B reveal a similar sequential path to guideline use. As the green “yes” bars in Figure 9 suggest, there was a fall-off in the proportion of physiotherapists who answered yes in each step of the different prerequisites that were measured. A corresponding increase of how these prerequisites were not perceived as existing can be seen in the yellow “no” bars. This pattern in the path from awareness towards adherence/use is consistent with the findings of Mickan et al. [153], who reviewed the “leakage” from research publication to guideline utilisation in 11 medical guideline studies. They found an average leakage of 15% between each step in the Pathman model. Our findings generally support the Pathman model, as well as the findings by Mickan et al. [153], and can be potentially useful in identifying where efforts to enhance guideline use could be focused.

Two thirds of the respondents reported that lack of time prevented them from using guidelines. This barrier is by far the most frequently cited barrier for applying EBP and guidelines, not only by physiotherapists in many countries [146, 147] but across all healthcare disciplines [154-156]. In physiotherapy, the review by da Silva et al. [147] found that lack of time was reported by 31% to 94% in the included studies. Lack of time can be both a personal and an organisational barrier. It is not likely to be reduced without organisational or managerial support, for instance by provision of protected work time. It also highlights the need for evidence to be summarised in brief formats such as CPGs, to minimise time spent searching for and reading literature. The issue of perceived lack of time is particularly relevant in the context within which the study was performed, in view of preparations for the upcoming “choice-of-care”

model that was soon to be implemented in VGR. This model would entail a dramatic change in payment models, going from a more flexible, individually controlled system to a highly centrally controlled system putting additional time pressure on both clinicians and managers.

Other barriers reported were the perception that CPGs are too generic; limited awareness, availability and access to CPGs; and lack of support or encouragement to use CPGs from superiors. The latter are primarily organisational barriers, and could be related to the primary care context of this research. Some differences have been reported in previous research, notably two Swedish studies. Heiwe et al. [157] reported better access in a Swedish hospital setting. Nilsagård & Lohse [148] reported even higher proportions of physiotherapists who perceived a lack of interest from supervisors—across different settings, but more in municipality settings.

Guideline use

The proportion of physiotherapists who reported frequent use of guidelines (47%), was similar to what has been reported in other countries (40% to 61%) [39, 109, 158]. The rate of guideline use can be viewed from several perspectives. First; in view of the highly positive attitudes, it may be surprising that “only” about half of the respondents in Study B stated that they use guidelines frequently in their practice. But considering that many were not aware that guidelines existed, knew how and where to find them, or had easy access to them, half is actually surprisingly high.

Second; guideline use is likely to vary—for different diagnoses, different phases of rehabilitation, different severity of the condition, and between and within different practices. It is not known what “optimal” guideline use might be. Most likely, the goal of 100% of practitioners using or adhering to guidelines 100% of the time, is neither realistic nor desirable. Some might argue that adherence to guidelines is synonymous with EBP [159]. This position, however, implies a misunderstanding of the intent of guidelines. There are many situations in which adhering to a guideline is not desired, and the clinician must instead rely on other sources of knowledge, including own experience and patient preferences. This would still constitute EBP according to its definition. Therefore, it cannot be assumed that the physiotherapists who reported using guidelines only sometimes, or even infrequently, do not practice according to the principles of EBP.

The positive attitudes found can be seen as conceptual use of guidelines—a predecessor of instrumental use [22]. Guideline use can be explicit or implicit, complete or partial, conceptual or instrumental [22, 160]. It is not likely that a physiotherapist will explicitly, or instrumentally, use all recommendations in a guideline. But (s)he might use one or more of them implicitly or conceptually. If so, how would that person respond to this question? The question on frequency of guideline use was likely particularly difficult to interpret, and was likely interpreted differently by the respondents. The complexity of measuring this kind of behaviour means that the finding should be interpreted with caution.

Effects of the implementation in relation to other studies

... in Sweden (non-physiotherapy settings)

To the best of our knowledge, only two studies that evaluated guideline implementation had been conducted in Sweden prior to this research, none of them in a physiotherapy setting. Forsner et al. [132] demonstrated good effects of an active, multi-component implementation strategy (local implementation teams, seminars, feedback and workshops) for psychiatry CPGs, versus a control group that only received the guidelines via passive dissemination. Wallin et al. [133] studied the uptake of national guidelines for neonatal nursing care. One year after an implementation (presentation at national conference, publication in professional journal, mailing of the guidelines), 12% of 35 included units used the guideline to a large or very large extent, 35% to some extent, while 53% used them sparingly or not at all. A direct comparison of results with our study is not possible, due to differences in outcome measures and unit of analysis. In the first of these studies, a more intensive implementation, involving more activities, were performed, and the effects appear to be larger than in our research, suggesting that “more is better”. However, more activities mean higher costs, which also must be taken under consideration. Effects of the implementation of the neonatal guidelines seem to have been consistent with our results, with varied guideline use after the implementation.

A recent study investigated the effects of an implementation of national guidelines for acute otitis media in a Swedish paediatric hospital [161]. That implementation strategy was labelled an information campaign, and comprised distribution of printed educational material, presentation at weekly meetings, and patient leaflets. The study showed no difference in guideline adherence after vs. before the implementation. In comparison to our study, the intervention contained fewer components and a briefer educational session, which may explain the non-significant outcome.

... internationally (physiotherapy settings)

In comparison with previous guideline implementation studies in physiotherapy, the results of our study are fairly consistent with the effects reported in those studies, which varied between 5% and 44%. Two previous studies on guideline implementation in physiotherapy compared an active implementation strategy with passive dissemination of guidelines; for LBP in the Netherlands [103], and for whiplash disorders in Australia [104]. The implementation in both studies was mainly based on educational meetings, and also included reminders. The Dutch study showed a 12% higher adherence to guidelines after the implementation. The Australian study showed a 44% higher adherence to two of five guideline recommendations, but no difference in the other three, rendering the results somewhat inconclusive.

A smaller impact was seen after implementation of a guideline for LBP among physiotherapists and other musculoskeletal practitioners in the UK [106]. In that study, a 5% difference in guideline adherence rate was reported between an implementation via posted information of a guideline for LBP and the control group who received no

intervention. This poor effect supports the conclusions of the other two studies, that an active implementation is necessary; simply distributing the guidelines is not enough. Other studies on guideline implementation in physiotherapy have used a before-after design with no control group, which precludes comparison of findings.

In general, effects of implementation interventions are known to be modest. As could be seen in Table 1, average effects of different guideline implementation strategies on performance or process of care were between 4% and 12%, consistent with the findings of our study.

An important implementation effect was that not only did *frequent* guideline use increase, particularly, and significantly, among those who attended the seminar—but *infrequent* guideline use decreased significantly. This implies that, after the implementation, very few physiotherapists practice without consideration of the CPGs.

Factors influencing the implementation outcome

Many factors are likely to have influenced the effects of the implementation. In Rogers' terminology, they can be structured under the four elements of diffusion (see Theoretical framework chapter): *innovation attributes*, *communication channels*, *time*, and *social system* [4].

Innovation attributes (guideline characteristics)

Relative advantage: do the guidelines have advantages compared with existing practices? Because they did not differ much from existing practice, the guidelines implemented in our study may have been perceived as not having much of a relative advantage.

Compatibility: are the guidelines consistent with the users' needs, values, practices, and socio-cultural norms? As the results from Study C show, clinical practice was to a large extent in line with research evidence already before the guideline implementation, meaning that the guidelines were indeed quite compatible with existing practice. However, this very fact might explain the modest effect on the use of guidelines; the guidelines did not introduce any new or revolutionary treatment methods, but rather presented evidence levels for interventions that were part of existing practice—so using the guidelines frequently might not have been perceived as necessary. It may even be possible that the guidelines were so congruent with existing practice (i.e. not perceived as something new), that some physiotherapists might have considered it unnecessary to use them.

Complexity: are the guidelines understandable and possible to implement? This issue was considered already in the guideline development strategy in our project. The guidelines were intentionally kept as brief as possible, and were designed to be easy to use and not complex.

Trialability: can the guidelines be tested on a smaller scale before full implementation? Our guidelines were pilot tested on a small sample, and revised, before the implementation process began. Furthermore, each physiotherapist could of course try the guideline on one or several patients, before deciding to use them more routinely.

Observability: can the benefits of using the guidelines be observed? Here, we need to distinguish between benefits for patients and benefits for clinicians. Due to the compatibility of our guidelines with existing practice, benefits for patients were not readily apparent and observing effects in patients might be difficult. But because the guidelines answered a perceived need for and a lack of guidelines, the benefit for the physiotherapists may have been more apparent.

While the work of Rogers dealt with innovations in general terms, other researchers have investigated the innovation attributes more specifically in relation to guidelines. Of the five types of attributes, Grilli and Lomas [162] showed trialability to be the most important attribute of guidelines, enhancing adherence, while complexity is negatively associated with adherence. These criteria were met in our project. Francke et al. [93] identified three guideline characteristics as the most important: complexity, whether they are evidence-based, and whether they are developed by members of the target group and experts. In our project, these determinants for implementation success were all addressed in the guideline development process.

An updated and more guideline-specific version of Rogers' attributes that emphasises implementation aspects to a greater extent, is the guideline implementability framework, developed by Gagliardi et al. [163]. This framework describes eight domains of guideline characteristics that may enhance their implementation: adaptability, usability, relevance, validity, applicability, communicability, resource implications, and implementation and evaluation [163]. The framework developers also point out that the last domain, implementation and evaluation, was absent in most guidelines, even high-quality ones. In our guideline development work, implementation aspects were considered important and the guidelines contained a paragraph on how implementation was planned, as well as any expected change in resource requirements; addressing these two domains directly. The other domains of adaptability, usability, relevance, validity, applicability and communicability were addressed in the guideline development and formulation of recommendations, for example by detailed methodology descriptions and by not including interventions that were irrelevant for Swedish primary care physiotherapy.

Communication channels (implementation strategy)

Several communication channels were used in the implementation process. Information about the guideline contents was distributed both by email and verbally in the seminars. Information was also communicated in the bimonthly email reminders and via the guideline website.

The tailoring strategy used was perceived as useful and relevant. Implementation specialists recently rated identification of barriers and facilitators and local needs assessment among the most important implementation strategies [164]. Many of the identified determinants were addressed in the content of the implementation seminar, the core component of the intervention. An important part of the seminar was interactive group discussions among the participants. In feedback received by participants after the seminars, this was an appreciated component. Interactive group discussions have also been suggested as one of the possible tailoring mechanisms that could enhance the impact of educational meetings in implementation [165]. Other determinants were addressed by creating the guideline website.

Using a multi-component strategy was considered relevant because the implementation strategy aimed to address several issues. As described in the Background chapter, evidence for a multi-component strategy is contradictory. A possible reason for the different conclusions in different systematic reviews could be a problem of definition; what is considered one or multiple components is likely to differ among researchers. For example, educational outreach could be seen by some as just one component, but is likely to include several components such as instruction, feedback, reminders, and support [56]. A drawback of multi-component interventions is that it is difficult to distinguish which component was influential or which component to modify if there is little change [53]. Potential interaction effects between different interventions are also difficult to assess. Moreover, multifaceted interventions are likely to be more costly than single-component interventions.

Gagliardi et al. [77] found in their recent review of implementation strategies for common medical guidelines that the most common strategies were educational meetings, print material or reminders for professionals; or education, print material or counselling for patients. In our study, all three of those interventions for professionals were used, and one of the patient-oriented interventions, print material. Mazza et al. [76] identified a slightly different set of the three most commonly used interventions at the professional level: distribution of guideline material, identification of barriers for implementation, and education of healthcare professionals—all of which were included in our strategy. Also in rehabilitation, a recent systematic review by Jones et al. [107] reported that about 70% of included studies used a multi-component strategy for implementation of EBP, and that education-related strategies were predominant—also consistent with our strategy.

Time (awareness-to-adoption/adherence)

Awareness was the variable that was affected the most by the implementation (Table 9). Awareness has been described both by Rogers as the first step in the adoption process [4] and, as discussed earlier, by Pathman et al. in the awareness-to-adherence path [152]. As discussed earlier, a leakage between the various prerequisites for guideline use was established at baseline. Therefore, the improvement in awareness is an important first step towards increasing guideline use. The improvement in access was expected, since the creation of the guideline website specifically addressed this

barrier. The two mediating factors, knowledge of where to find guidelines and having easy access, are closely related. Both those items were addressed, and facilitated, by the creation of the website.

The measurement point after the implementation is likely to have influenced the results. Time is an important component in both the implementation process and the adoption process [4]. The implementation seminars took place in March through September 2011. The second survey was conducted in November. If the survey had taken place immediately following the seminar (which was not possible because they were spread out in time) the results might have been different. The guidelines were then new and there was much talk about them at the various clinics. On the other hand—had the survey taken place a year later, the results might also have been different. The process of changing behaviour and adopting an innovation or a new practice takes time, and is likely to vary within the target group. Rogers [4] described how the length of the adoption period of an innovation varies among different types of adopter. There were likely some “innovators” and “early adopters” among those who attended the seminars, as it is equally likely that the majority, both early and late, might have needed more time to actually start using the guidelines (“adopt the innovation”). There may even be “laggards” who resisted the guideline completely, remaining within those 4% who reported that they almost never use guidelines. However, there is little empirical support of these stereo-type classifications [63], and they cannot be used as explanatory variables.

Social system (context)

Even though the 2005 Grol and Wensing model used in this research does not account for context as explicitly as some other implementation models, the context was continually considered in the project planning and execution. The importance of context in behaviour change projects such as implementation projects has been widely recognised [63, 166-168]. Organisational change processes, such as a shift to a more evidence-based practice, are highly context-dependent and are likely to vary from one healthcare organisation to another [136]. Context involves both organisation (inner context)—particularly relevant in this case because the implementation study took place within an organisation—and society (outer context) [63]. A context can be more or less “receptive”, as defined by the following features: leadership and vision, clear goals and priorities, high quality data capture systems, and risk-taking climate [63]. The organisation within which this research took place, VGR, meets many of these criteria, but as with many large organisations, the goals and visions of executive management may not always trickle down through the organisational hierarchy, limiting receptiveness. The roles of both line managers and middle managers have been suggested to be critical when implementing new programs or interventions [169-171]. Line managers have been described as the link between senior management, where interventions are initiated, and the operating level charged with the actual implementation, and have a crucial role in translating organisational policies and management decisions into daily practice [170]. In VGR, line managers are well

equipped to be able to control and support their staff in the direction of their choice, but their attitudes towards EBP and guidelines are likely to vary. This is likely to explain, at least partially, the varying proportion of physiotherapists that participated in the seminar from the different units, and may have influenced the impact of the implementation.

The influence of the outer context on implementation outcomes warrants some consideration. A contextual aspect that may in fact have affected the result negatively, is the autonomy ingrained in the Swedish physiotherapy profession. Used to making their own treatment decisions, the use of guidelines to guide these decisions might have been perceived as unnecessary by some of the respondents. On the other hand, the autonomy might also create a greater demand for guidelines.

Clinical expertise

The clinical practice patterns identified in Study B were consistent across the three musculoskeletal conditions examined and showed that the most frequently reported interventions were advice and therapeutic exercises of various types, but that many other interventions also were used (Figure 11). The wide range of interventions used shows that physiotherapists have a “tool box” of interventions that can be adapted to the individual and the clinical findings, and which constitutes an important basis for clinical decision making.

For all three conditions, a clear preference was demonstrated for the two interventions exercise (of various types) and advice (to stay active and concerning posture). The preference for exercise interventions for LBP is consistent with findings from other European physiotherapy samples [36, 172], but differed slightly from Canadian samples [35, 173] in which electrotherapeutic and thermal modalities were used to a larger extent. For neck pain, the preference for exercise strategies is consistent with earlier research [174], but both thermal modalities and manual therapies have been reported to a higher extent in a sample consisting of physiotherapists from different countries. For subacromial pain, the findings are supported by an earlier Swedish study [175] and a Belgian study [176], reporting similar use of exercise. The Belgian physiotherapists, however, also reported higher use of manual therapy.

Clinical practice mirrored to a large extent the evidence as presented in the literature. The active treatment strategy of providing therapeutic exercises that was preferred by most physiotherapists is supported by, for the most part, evidence of moderate strength. The use of interventions that were not underpinned by research evidence to the same extent may suggest limited awareness of the body of evidence for the various interventions, the complexity of the varying evidence levels, and a need for evidence-based CPGs to facilitate treatment choices. Furthermore, it suggests that the physiotherapists also relied on their clinical experience and expertise.

One of the few gender differences that were found merits some consideration. The most striking difference was the higher likelihood in male physiotherapists to use manipulation or mobilisation, which was seen in treatment for neck pain, but not LBP or subacromial pain. This finding is supported by Carlesso et al. [177], who reported higher use of cervical manipulation by male than by female manipulative physiotherapists in Canada, and by Stenberg et al. [178], who found that men focused their treatment on joint mobility to a larger extent than women in another sample of physiotherapists in Sweden. The Canadian researchers attributed the difference to a higher fear of adverse events among the female therapists, whereas the Swedish researchers suggested that the difference in treatment choices might be related to gender norms and attitudes; the preference of male physiotherapists for focusing on joint mobility might be influenced by a rational goal orientation and a biomechanical approach that may be more common among men, while a tendency in female physiotherapists of a more holistic thinking might lead to less focus on a particular body part and more focus on the whole body, as well as on psychosocial factors. This notion is supported by an earlier Swedish survey, in which more female than male physiotherapists endorsed a holistic view of treatment that focused on the whole person rather than body parts [179]. Similar findings have been shown in other disciplines. A review of gender roles in musculoskeletal pain conditions showed that physicians' gender stereotypes, as well as their own gender, appeared to influence treatment decisions [180]. Male physicians were more likely to address physiologic pain mechanisms whereas female physicians were more likely to consider psychosocial aspects of pain. Hence, there is some support for gender stereotypes in clinician treatment choices, although over-generalisation should be avoided and gender differences need to be further explored.

Manual treatment seems to be more appealing to male than to female physiotherapists in Sweden. The proportion of male members of the orthopaedic manual therapy (OMT) section of the Swedish Association of Physiotherapists is 40% and the proportion of men with specialist certification in OMT is 35%, while the total proportion of male physiotherapists in Sweden is only 20% [46].

The CPG for neck pain implemented in this research included a recommendation for combining exercise with manual therapy. This could potentially be a barrier for guideline use among the female physiotherapists, in view of their lesser likelihood to treat neck pain with manual therapy. It may be worthwhile to pay more attention to gender differences when designing implementation strategies than what was done in this research.

Patients' preferences

The main finding of the qualitative study was not what we had anticipated. We set out to primarily explore and describe which treatment methods patients with musculoskeletal pain in their back, neck or shoulder prefer, as well as their preferences for participation in clinical decision making. It turned out that the study participants had difficulties pinpointing a particular method of preference. Instead, the inductive analysis revealed a strong trust in the physiotherapist's skills, and a belief in the physiotherapist's professional competence and ability to choose appropriate treatment. This seemed to foster active engagement in their physiotherapy.

While novel to physiotherapy, the theme of trust that emerged from the interviews has been recognised in other healthcare disciplines. In a recent Cochrane review, trust was described as a fundamental component of the relationship between patient and physician, and was associated with increased satisfaction, adherence to treatment, and continuity of care [181]. This trust in the physiotherapist, together with the relatively weak treatment preferences, suggests that the therapist has a key role in choosing the best treatment. In keeping with the EBP principles, this requires the physiotherapist to combine their knowledge sources—external research evidence and their own clinical expertise—and use their clinical judgement. At the same time, the patients' preference for participation in the clinical decision making needs to be embraced and patients should be engaged in both decision and in their therapy.

Although interpreted as subordinate to this trust, a preference for an active treatment strategy emerged from the interviews, involving some form of exercise coupled with advice for self-management. This finding is supported by other studies set in Northern Ireland [182] and in Australia [183, 184], where patients also expressed a preference for exercise as well as advice. The preference for exercise is also consistent with preferences of physiotherapists, as demonstrated by Study B in this thesis, as well as other studies [172, 174, 176]. As discussed in Study B, the preference for exercise is also supported by evidence—constituting an example of the three EBP components all pointing in the same direction.

The factor that seemed to influence treatment preferences the most was earlier experience, with expectations potentially playing a mediating role. The link between experience and expectations has been found in earlier research [185, 186]. In our study, expectations were largely consistent with preferences. Some exceptions to this were seen, particularly among those who were less satisfied with previous physiotherapy. Expectations have been suggested to influence satisfaction [187, 188]. Although the opposite relationship between satisfaction and expectation emerged in our study, the concepts are closely linked with the link presumably bidirectional. Experience seems to influence satisfaction even more than expectations, and preferences and expectations have been referred to as determinants of patient satisfaction with care [187], which, in turn, is considered an indicator of quality of care [188, 189]. This underscores the importance of eliciting not only preferences for both treatment and

participation in decision making, but also patients' earlier experience, satisfaction, and expectations.

The potential relationships between these concepts that emerged in the study are represented in many behaviour change theories, underscoring the relevance of the identified influences on preferences. Experience can be interpreted as past behaviour, which is an important predictor of behaviour in Triandis' theory of interpersonal behaviour [190]. Treatment preferences can be viewed as patients' behavioural intention or the actual behaviour, i.e. the act of choosing a treatment method, which, according to the TPB is influenced by various factors [125]. Expectations pertaining to the perception of possible consequences of one's action (e.g. choosing a treatment), can, according to Bandura's SCT, also predict behaviour [129]. Satisfaction may be viewed as an attitude to the treatment in question, formed by expectations. Attitude is an individual's overall evaluation of a behaviour, suggested as a predictor of behavioural intention and enactment [124]. A predictable relationship between the intentions of a health professional and their subsequent behaviour also has been shown empirically [191].

Integration into evidence-based practice

In an attempt to integrate the findings from the three EBP components that have been investigated in this thesis, the main findings can be summarised as: 1) EBP and CPGs are used to varying extents, and the tailored guideline implementation strategy facilitated use; 2) clinical practice is largely in line with evidence, but methods that are not supported by research evidence are also used, where physiotherapists instead rely on their clinical expertise and experience; and 3) patients express great trust in their physiotherapist and place less importance on particular treatment methods.

The roles and the integration of the three components are not self-evident. The role of research evidence is rather distinct, and understandable and agreeable for most clinicians. Its application in practice is easy to justify. The research evidence component is conceptually different from the other two components; it denotes published, collective evidence, whereas clinical expertise and patient preferences primarily relate to the individual level [20]. Viewed in this light, the levels of guideline use showed in this research forms a solid basis for integration with the other components.

The role of clinical expertise and experience is more ambiguous and can be conceptualised at both collective and individual levels. At the collective level, clinical expertise can be examined and data accumulated as in this study, and the results can be used to provide clinical evidence, or practice-based evidence (PBE) that supplements research evidence. At the individual level, clinical expertise is at the core

of clinical decision making and used to integrate the different knowledge sources into clinical decisions.

In another sense, the patient preference component is also conceptually different from the others. Patient preferences might not be perceived as evidence, at least not at a collective level. At an individual level, they can form evidence of what is important to the patient, both based on their previous experiences of care and knowledge of their own body and circumstances [20]. The trust in the physiotherapist that was expressed in this research has limited generalisability and cannot be interpreted as reducing the need for eliciting individual patient preferences in each patient encounter. On the contrary, while providing some insight into how patients may reason, the findings underscore the importance of incorporating individual patient preferences in the clinical decision.

Hence, the integration of the three knowledge sources, as intended by the EBM founders, remains a challenge. There are at least two crossroads in clinical practice where this integration can take place. One is in CPG development, where including clinical evidence, as well as any available knowledge on patient preferences, will raise the quality of the CPG and contribute to more nuanced recommendations. The other is in real time practice where the integration means a coherent and sensible melding of the three perspectives [20].

The concepts of EBP and PBE could be viewed as two different paradigms, representing opposite approaches to knowledge. The former assumes accumulation of evidence from research in a more centrally controlled, top down approach, while the latter involves a bottom up approach that involves collecting data at practitioner level that can be aggregated and form a higher-order evidence base [192]. PBE studies are conducted close to clinical practice with less strict requirements concerning study design. This entails a risk for lower internal validity, but maybe more useful knowledge in the local context where it is produced.

The value of PBE is increasingly acknowledged, in physiotherapy as well as in health care in general, and the previously supreme reign of the RCT is diminishing. Manifestations of this are the growing recognition of the importance of well-conducted observational studies; a growing respect for qualitative research in the EBP and guideline communities, today counted among the sources of evidence; and an increasing awareness that quantitative research does not always provide sufficiently rich knowledge [21].

Therefore, EBP and PBE should not be seen as opposite paradigms but rather as complementary approaches, both necessary to build a robust and relevant knowledge base. A combination of the two paradigms could be used as an overarching model for broadening our knowledge base in physiotherapy. Both approaches have their own benefits and drawbacks, but together they provide a more comprehensive model for the accumulation of knowledge. As this research has shown, the three knowledge sources provide diverse and complementary forms of evidence that, when combined, can support physiotherapists in achieving a “true” EBP for the benefit of their patients.

METHODOLOGICAL CONSIDERATIONS

This chapter first discusses general strengths and limitations of the quantitative studies. This is followed by some further elaborations on the methods used in the respective study, and on integration of the research with a QI project. Trustworthiness of the findings from the qualitative study and generalisability of the findings from the quantitative studies are discussed, followed by some ethical reflections of the research.

General strengths and limitations

All data in the quantitative studies were self-reported, entailing a risk that responses were affected by social desirability bias. Attitudes, knowledge and behaviour are complex concepts, and their measurement is difficult. Since we cannot observe or measure the combination of cognitive and emotional factors that inform a person's attitudes, we must use some kind of proxy—most commonly self-report. Attitudes cannot be measured on a linear continuum, but are often expressed in categories, with anchors such as in our study, strongly agree and strongly disagree [193]. We cannot know whether attitudes reported in a questionnaire represent the “true” attitudes of a person—but neither can we know that other constructs that we measure represent the truth. There may be errors of measurement and variations in space or time.

Self-reported behaviour among the physiotherapists was measured in terms of use of guidelines, use of various treatment interventions, and EBP-related behaviours, e.g. reading scientific literature. Self-reported behaviour is a commonly used proxy measure for actual behaviour. However, the extent of any discordance between what we say that we do and what we actually do, remains largely unknown. A systematic review of behaviour proxy measures found the accuracy of clinician self-report to be variable and that evidence for the validity of clinician self-report was inconclusive [194].

A risk of sampling bias is inevitable, and a possible reason for the positive attitudes found already before the implementation. Physiotherapists who choose to respond to a questionnaire about EBP are likely to have positive attitudes towards EBP and guidelines. Hence, there is a risk that data from non-participants were not missing at random. The response rates in Study B and Study C, 65% and 57%, respectively, were higher than in other studies examining EBP in physiotherapy, which have varied between 45% and 54% [37-39, 148]. Analyses of external missing data from non-participants were not possible due to the anonymisation of the questionnaire, and we cannot know whether non-participants differed from the participants.

All respondents were publicly employed physiotherapists. Private practitioners, who also provide outpatient services at the primary care level, might have responded differently.

Questionnaire development

The translation, adaptation, further development, and testing conducted in Study A resulted in a valid and reliable questionnaire for measuring EBP that suited the purpose of this research. The results of the reliability test are largely consistent with those for the original questionnaire by Jette et al. [37].

Other potentially relevant questionnaires could have been used, but none were identified that had been specifically developed for the physiotherapy context. Most questionnaires aiming to measure EBP have been developed for use in various teaching contexts [195-197]. Furthermore, they do not include items about guidelines. Measuring guideline use and determinants for this was essential for this research, because we developed an implementation strategy based on guidelines and wanted to measure the impact of guidelines. Another potentially relevant questionnaire for the measurement of aspects of EBP is the EBP Attitude Scale, developed by Aarons et al. [198]. This instrument measures domains of attitudes in more depth. However, it was also not developed for use in physiotherapy, and also does not include any items on guidelines, making it less suitable for our purpose.

Strengths of this study are the rigorous translation process and the sophisticated statistical analysis conducted. The Svensson method used to analyse test-retest reliability is not widely known, but this rank-invariant method was considered the most appropriate method because it takes into account that the data are paired and assessed on ordinal rating scales. A more common method used for ordinal data is the weighted kappa method [199]. However, the Svensson method is unique in its ability to separate systematic disagreements in categorisation from random individual disagreements—an important property in the development of an instrument to ensure its stability. Furthermore, unlike the kappa method, the Svensson method is valid regardless of the number of categories [141].

Lastly, it is a strength of the questionnaire that it had already been in use in several other countries. It was only minimally adapted for the Swedish primary care physiotherapy context, which can facilitate comparisons between different countries where the same questionnaire has been used.

Assessing practice and determinants

The intent of the second study was to analyse the current situation and to learn about the target group; their attitudes, knowledge, behaviours, needs and potential determinants for guideline use. A key step related to the subsequent implementation was to identify barriers and facilitators for using EBP and guidelines so that the implementation strategy could be tailored to address these determinants. We limited this assessment to using a survey. This is the most commonly used method to assess barriers for research use [101], but the survey could have been accompanied by a qualitative method, for example interviews of the physiotherapists, to identify other potential determinants. A combination of methods to identify determinants is considered optimal, and should ideally include both quantitative and qualitative methods, e.g. survey, interviews and literature review [102]. In most cases, a large number of potential determinants are likely to emerge.

Assessment of barriers was performed in the form of a multiple-choice question in the survey. The list of response options was generated based on both literature and brainstorming within the guideline project team. The open question, in which further elaboration was solicited from those who ticked the box “Other”, allowed for additional barriers to be identified. Flottorp et al. [3] have recently developed a checklist for identifying determinants of practice that can assist in designing/selecting appropriate methods. The checklist includes over 50 potential determinants, from which the most relevant and practical to address can be selected. In our case, the selection was guided by the survey as well as findings from the literature, and was done as a form of brainstorming in the guideline development group. Brainstorming has been reported to be the most effective method to identify determinants, as well as being a quick and inexpensive method to identify a large number of determinants, and therefore highly relevant to tailored implementation projects [102]. Assessing and addressing determinants is a complex matter; it is likely that there are associations and interactions between different barriers, and it is not impossible that removing one barrier may increase the influence of others [47]. Furthermore, the cross-sectional design does not allow any firm conclusions to be drawn concerning causal relationships between determinants and the outcome variable.

The implementation study

A major limitation of the implementation study is that only process outcomes at practitioner level were measured. Patient outcomes were not measured, due to the complexity and time this would have required. However, a strong suggestion for future research is that the hurdles of measuring patient outcomes are overcome and

that this is done. The focus on the practitioner level also entailed that contextual factors, particularly those related to the organisation, were considered only marginally in this research. Many aspects related to the organisation need to be considered, such as leadership, organisational culture, climate, and readiness for change [146, 200].

The use of a control group is a strength compared to the before–after design often used in implementation research. Of course, randomisation would have been optimal, so the non-randomised design could be considered a weakness. However, both groups in our study were comparable at baseline, which increases the confidence with which the observed changes can be attributed to the intervention.

Outcomes were only assessed in the short term. Immediately after the follow-up measurement, the guidelines were released also to the control group, preventing longer term follow-up using a controlled study design.

Using theory

Many benefits from the use of theory in implementation research have been shown (see Background chapter). Of the five ways in which theory can be applied in implementation research [68], three were used in this thesis: First, a theory-based model guided the selection and development of the implementation strategy and supported the implementation planning and execution process. Second, the outcomes selected to measure implementation effects and collected with the survey questionnaire were informed by several behavioural change theories. Third, theory was used to discuss some of the findings.

The Grol and Wensing implementation model [56] used to facilitate the implementation process was selected for two main reasons. First, because it is based on several theories that were considered relevant for the project and for the research questions at hand. It combined an educational approach, an epidemiological approach, and a marketing approach, thereby meeting many of the needs that we had identified and wanted to address. Second, because the model was perceived as coherent, pragmatic and consistent with standard project management procedures in the VGR organisation.

The model provided a sound basis to systematically create a structure and process for the implementing and evaluation of our project. It was perceived as easy to follow, and supportive of both the guideline development and implementation processes. However, because the model is rather pragmatic and integrates theories in a non-explicit way, it might have been less suitable for gaining a deeper understanding of how change was achieved. Another strategy that might have been more effective to reach that goal, could have been to link intervention components, or behaviour change techniques, more specifically to theories of behaviour change [201]. Although this

might have been beneficial, it would also have made the project more complex and, hence, required more time.

A limitation of the Grol and Wensing model is that it lacks guidance on selecting and using evaluation measures. Although measures are particularly important for the assessment of both implementation outcomes and model constructs, this lack of measures for assessment is a common limitation of many implementation models [66]. Instead, we selected and measured outcomes according to the domains of the questionnaire, which were mainly derived from social cognitive theories.

Integrating research with quality improvement

Both implementation science and QI share the goal of improving healthcare quality. Integrating research with QI entails both benefits and limitations. The benefits seem to outnumber the limitations, and the synergy effects in our project were many. The origin of the guideline development and implementation project in form of a QI project entailed initial funding of the project. This funding covered a substantial portion of the project planning, initial literature scoping, developing and testing of the questionnaire, and the guideline development. Conducting research on an improvement initiative provides a unique learning opportunity for both researchers and the organisation [202]. Without research, learning about the implementation process is often lost because of a primary focus on outcome improvements. This research focused on process improvements, which may be equally or more important for learning about implementation processes.

For the organisation, benefits of the research resulted in a more rigorous implementation process, as well as more rigorous evaluation than what is normally done in QI projects. A drawback for the organisation is that the research part of the project slowed down the implementation process, particularly for the control group where the guidelines were not implemented until a later phase.

Benefits for this research of the QI integration and the managerial origin of the project include that a certain support from management was ensured. However, this support was not consistent at all levels. Another benefit was the provision of an arena for the implementation research. This entailed access to both a relevant study population and an infrastructure within which the implementation activities, e.g. the seminars and the website, could be performed. Conducting the research in a “real world” clinical setting, such as the VGR primary care physiotherapy organisation, also increases external validity of the research [203]. A further benefit of conducting research on a QI initiative is that findings from QI can contribute to evidence-based healthcare by providing better information about local improvement efforts [204].

Drawbacks were that the two perspectives on the project had somewhat different, albeit overlapping and not conflicting, goals (increasing knowledge vs improving

quality), and that the integration entailed a time pressure that did not always benefit the research project.

The joint project benefited from having a project manager who was familiar with the target group/organisation, knew by experience some of the needs and barriers that were prevalent in the population, and had both a clinical and a research perspective. It has been recognised that individuals who are involved in making changes in care systems understand more about mechanisms and context than what is possible for an outside evaluator [205].

The qualitative study

The qualitative research design used in Study D was chosen to gain a greater understanding of how patients perceive physiotherapy, what treatment methods they prefer and why, and how they view participation in decision making and in therapy. QCA is an appropriate method for identifying variations in terms of similarities and differences in a text (124). Preferences are likely to vary between individuals but there also may be aspects that are similar or common, making QCA a suitable method for this study. The inductive approach used is suitable when existing theory or research literature about a phenomenon is limited or fragmented and when you want to let the categories emerge from the data [206, 207].

Advantages with QCA is that it is a clearly structured method and that it entails staying close to the analysed text and the informants' own words. It is mainly a descriptive method, but allows for some interpretation and, unlike other similar qualitative methods, distinguishes between manifest and latent content by presenting them in categories and theme, respectively. Weaknesses of the method include that it is a less established analytical process than some other qualitative approaches, and that the analysis procedure is labour-intensive and time-consuming.

The potential relationships between the constructs emerged inductively at the end of the data analysis. Because it was not the primary aim of the study, this conceptualisation was not included in the paper.

Trustworthiness of findings

Validity, reliability and generalisability of the findings from the qualitative study are discussed below in the tradition of qualitative research, where various aspects of trustworthiness are described using the concepts credibility, dependability, and transferability [144].

Credibility

Credibility concerns the confidence in how well data and processes of analysis address the intended focus [144]. This was enhanced by including a purposeful sample that was varied in terms of gender, age, and musculoskeletal condition, contributing to a richer variation of the phenomena under study. Individual semi-structured interviews were used as the data collection method, to capture a variety of individual perceptions and experiences. In determining sample size, a balance between achieving variation and a manageable amount of data was aimed for, and the amount of data collected was judged to be sufficient to answer the research question in a credible way.

The risk of selection bias was minimised by recruiting participants via the clinic receptionists. The data collection could potentially have been affected by the informants exaggerating positive views of physiotherapy in order to please the interviewer. To minimise the risk for this social desirability bias, the interviewer's profession was not disclosed unless specifically asked for.

Another potential kind of bias could be the interviewer's pre-understanding of the phenomenon under study. As a primary care clinician, the interviewer was quite familiar with the patient group as such, and had an idea of what kind of preferences many patients may hold. However, each patient is unique and each patient's unique preferences were solicited in the interviews with an open mind that they would vary and a curiosity to find out reasons for each person's preferences.

Transparency of the data collection and analysis processes was strived for by describing them in detail in the paper. To reduce the risk for systematic bias and further increase credibility, several types of triangulation were used in the analytical process. The use of representative quotations in the text further enhances credibility of the study.

Dependability

The issue of dependability involves consideration of the degree to which data change over time as well as consistency in the data collection [144]. These factors were addressed by using the interview guide, following the same procedure, and questioning the same areas in every interview. All interviews were carried out during a relatively short period of time which further strengthens consistency. Other ways dependability was enhanced were maintaining a continuous dialogue between the authors and, because dependability is closely linked to credibility, by detailed reporting of the study process.

Transferability

Transferability (the extent to which the findings can be transferred to other settings or groups) is enhanced by clear and detailed descriptions of informants, setting, and data collection and analysis processes, which enables readers to decide whether the study findings are relevant to another situation, context, or population [144]. The informants, analytical process, and results were therefore described in sufficient detail to facilitate the readers' ability to assess transferability of the findings. It is important to note that

all informants were Swedish-speaking and of Swedish origin, and that no conclusions can be made as to the transferability of the findings to e.g. foreign-born individuals, who may have different cultural and social perspectives and attitudes.

Reflexivity and reciprocity

Another important quality criteria is reflexivity, which emphasises the importance of introspection, self-questioning and self-understanding, as well as taking seriously the responsibility to accurately communicate the perspective of the informants [137]. Reflexivity involves the scrutiny of the research process and the researchers themselves, and how the actions and the role of the interviewer might affect the informants and the study results [137]. This was continually reflected upon by the interviewer and discussed among the co-researchers throughout the study. In this study, not only the informants but also their physiotherapists and therefore the clinical decision-making and possibly the whole rehabilitation process may have been affected by the interviews. This was considered already in formulating the interview questions, and throughout the study.

Reciprocity, a mutual exchange between researcher and informant [137], was considered in light of the interviewer being a physiotherapist and interviewing patients seeking physiotherapy. Questions related to the patients' conditions or treatments inevitably came up during the interviews. In order to keep the interviews focused on the research questions at hand, these questions were deferred to after the interview, but were then answered briefly to give the informants something in return for their time and trouble to participate in the interview.

Whether the study results can be confirmed in other studies and be useful in clinical practice—i.e. confirmability—remains to be explored.

Overall generalisability of thesis findings

The study population in the quantitative studies (physiotherapists in VGR), is similar in age and gender distribution to the national population of physiotherapists in Sweden. The findings are therefore likely to be applicable to primary care physiotherapists in other parts of Sweden, particularly those who work in the public sector. They might also be applicable to other countries where the profession, as well as language and healthcare systems, is similar.

The findings of the qualitative study might be transferable to other similar Swedish-speaking patients in other situations and settings, both public and private, in Swedish primary care. The reader must judge transferability of the findings based on the descriptions of the informants, the setting, and the data collection and analysis processes.

Ethical reflections

There are some ethical considerations in relation to the implementation intervention. The implementation activities and the evaluation of the implementation were performed as part of both the county council QI project and the research project. Because the implementation seminar was part of the QI project and also can be considered as regular continued education, it was not considered necessary to inform the seminar participants that the seminars were part of a research project. To be completely correct from an ethical perspective, one might argue that participants should have been informed about this and given their informed consent. However, it was our intention to not influence their attitudes and behaviour by informing them that the seminar was part of a study, to avoid a study bias in their responses to the post-intervention questionnaire. We saw no ethical risks with not informing the participants, because the intervention was not expected to cause any physical or psychological harm in any way. Also, study participants should normally be informed that their participation is voluntary and that they can withdraw at any time. In this project, physiotherapists from all units in the intervention group were invited to the implementation seminar by their respective unit manager. How the unit managers chose to invite or direct their staff to attend the seminar was beyond our control and was never known by us. It was probably handled in different ways by the different managers. Some of them sent all of their staff while others just sent one or two representatives, possibly reflecting their own attitude towards guidelines or maybe just clinical reality. Hence, participating physiotherapists were unaware of the fact that their participation in the seminar was part of a study. While it can be considered a grey zone whether information collected for one purpose (QI) can be used for another (research) [208], this is not uncommon in other forms of research, for example registry studies that are used for both research and quality monitoring.

Another ethical issue arises from the fact that I, the PhD candidate, conducted research on activities that I, the project manager, together with a co-member of the project team, conducted myself. At the time of the implementation seminars, the project team consisted of two people: a colleague and me. There is, hence, a kind of "action research" aspect of this situation. Action research involves close collaboration between researcher and practitioners, or practitioners as researchers within their own organisation, and emphasises the promotion of change within the own organisation [209]. My dual roles raise the issue of a potential conflict of interest, both in conducting the research and in presenting the results: I of course wanted the results to be as positive as possible. I believed in the importance of the work that we did, and that the guidelines would be well received by my physiotherapist colleagues, and that they would make a difference. However, the data were of course not manipulated in any way. To verify that the analyses were correct, my co-researchers, who had not the same vested interest, and the statistician, also had access to and reviewed the data.

CONCLUSIONS AND IMPLICATIONS

Conclusions

This thesis contributes to knowledge on factors of importance for the implementation of EBP in Swedish primary care physiotherapy. Main conclusions of the studies are:

- The adapted and translated questionnaire is a valid, reliable and useful instrument to measure aspects of EBP and guidelines in a Swedish primary care physiotherapy context.
- While most physiotherapists' have positive attitudes towards EBP and guidelines and agree that EBP is necessary in daily practice, these attitudes do not necessarily translate into guideline use, due to several perceived barriers. The barriers and facilitators identified constitute important determinants for guideline use that can be addressed in implementation strategies.
- A tailored, theory- and evidence-informed, multi-component implementation of guidelines can be effective on improving process outcomes that are prerequisites for guideline use. To increase use of guidelines, participation in educational meetings appears to be important.
- Clinical physiotherapy practice for musculoskeletal disorders comprises primarily active treatment strategies, such as different types of exercises. The wide range of interventions used, supported by research evidence to various extents, suggest that physiotherapists rely both on research evidence and their clinical expertise when choosing treatment methods.
- Patients have trust and confidence in the competence and skills of the physiotherapist, which seems to foster a preference to actively engage in therapy. Preferences for particular treatment methods appear to be subordinate, while participating in decision making is important.

The findings on the use of research-based evidence, clinical practice patterns, and patient preferences provide knowledge on the roles of the different sources of knowledge to inform practice and provide good quality of care. The findings also provide a basis for further research on effective ways to integrate knowledge sources in clinical practice.

Implications for organisations/practices

The findings from the research in this thesis primarily have implications for organisations/management, but also for clinical practice and research.

- The instrument developed in this research can be used to reliably measure aspects of EBP and guidelines, both for QI and research purposes. It could be used in contexts other than physiotherapy, with minimal change, and in other countries—particularly the other Scandinavian countries, whose language and healthcare culture are similar to Sweden.
- The findings from the survey study concerning barriers and facilitators for guideline use can form the basis for implementation strategies. To ensure ready uptake of research evidence, it is important for organisations to address those determinants, or prerequisites, for example by ensuring availability and easy access to CPGs and other evidence resources. The identified determinants of guideline use should be considered both in QI efforts and when designing implementation and educational endeavors.
- The identified main barrier to using guidelines—lack of time—implies a need for research evidence to be summarised and presented to clinicians in a digested and easily accessible format, such as CPGs. This is particularly important in today's production-oriented climate in Swedish health care, which allows little time for anything besides the core task of treating patients.
- Organisations such as VGR have unique opportunities to collect data on both practice and patient outcomes through electronic medical records systems. Ensuring such data collection on a routine basis would enable both continuous monitoring of guideline use, accumulating and aggregating data to build PBE, and evaluating practice impact on patient outcomes. Based on these data, quality indicators could be developed and linked to future updated versions of the CPGs.
- The modest results on guideline use of the implementation intervention imply that it may take more than a brief educational intervention, comprising just one seminar. Effective implementation can be expected to take time, and achieving sustained use of guidelines in everyday practice may require repeated educational measures and reminders.
- Several routes could be pursued to increase the use of CPGs by physiotherapists in Sweden, and both national and local initiatives could be beneficial. While there might be benefits to coordinate the production of CPGs among different stakeholders, such as county councils and professional organisations, implementation may be more suitable for local adaptation. Insufficient use of guidelines is generally attributed to characteristics of the guideline, effectiveness of the chosen implementation strategies, and contextual factors that impact the implementation process and outcomes [56]. In accordance with these alternatives, the first route to consider is whether something can be done

to further improve the content and methodology of the guidelines themselves. Second, it may be worthwhile to test a different implementation strategy. Possible strategies could be to include other components, such as additional education sessions or identifying and using trustworthy local opinion leaders; a strategy that has been proven effective in other contexts [81]. Third, the organisation is an important contextual factor and involving managers at different organisational levels is likely to enhance implementation efforts. A recent systematic review identified organisational leadership as a modifier for implementation success, acting through leadership support [210]. In our project, middle-level managers were involved in project initiation, but their support and enthusiasm was not necessarily passed on to first-line manager at the various units—as might have been demonstrated by the varied attendance at the seminars. Also, support even higher up in the organisation, from executive managers, would be beneficial, as it would lend more credibility to the project.

- Before embarking on additional and expanded implementation interventions, costs need to be considered. Educational sessions require the time and effort of a project team, entailing additional costs. Organisations and their decision-makers therefore need to carefully weigh expected costs and potential benefits of planned implementation efforts, before realising them.
- The use of a process model to support planning and execution of implementation can be recommended, both for conducting implementation projects in practice and in studying implementation processes. Basing an implementation strategy on theory can facilitate understanding of influencing factors.
- The wide range of treatment interventions used in clinical practice, as well as the variable research evidence underpinning the interventions, points to a need for high quality CPGs to support and guide clinicians in choosing effective treatments. The knowledge acquired on clinical practice patterns can be used in CPGs, to supplement research evidence. It may also be useful in clinical decision making to complement, and be integrated with, research evidence. The thesis proposes that this is where the benefits of a combination of EBP and PBE can be most clearly achieved.
- The increased understanding, provided by the qualitative study, of the role of patient preferences in primary care physiotherapy management, is important for both process and outcome of rehabilitation. The trust and confidence in the physiotherapists' professional competence that were expressed by the patients, as well as their preference for active involvement in therapy, should be embraced by both clinicians and the organisation within which they practice. The findings suggest a need for the physiotherapist to be aware not only of their patients' treatment preferences, but also of the *strength* of these preferences, as well as the patients' preference concerning participation in decision making.

For some patients, the kind of treatment provided may not matter at all, and for others it may be of utmost importance.

Suggestions for future research

Although this thesis provides new knowledge about several aspects of EBP in physiotherapy, many new research questions have arisen. Measuring EBP and effects of implementation interventions is very complex, and very important. Continued research is needed to evaluate effects of different implementation strategies.

- Other implementation strategies should be developed and evaluated, for instance a strategy with several education sessions or using local opinion leaders. In view of the modest effect on guideline use and the considerable resources required to carry out an active, multi-component strategy such as the one performed in this research, evaluating a simpler strategy could also provide valuable knowledge.
- Linking intervention components, or behaviour change techniques, to specific theories of behaviour change could facilitate a greater understanding of what works and what does not work.
- Future research should aim to collect data so that individual changes from baseline to follow-up can be analysed.
- Stronger research design, i.e. a cluster-randomised trial design, as well as long-term follow-up, is needed.
- This thesis has focused on process outcomes. There is a dire need to evaluate implementation effects on patients' health outcomes more extensively.
- There is a need to investigate organisational and contextual factors and how they influence implementation outcomes, at both process and outcome level, as well as the potential interaction with individual determinants of guideline use.
- Qualitative studies, e.g. focus group interviews of physiotherapists, may further improve our understanding of practice determinants and how EBP and guidelines are perceived.
- In view of the small-to-moderate magnitude of effect, shown in this research as well as for other implementation strategies, another important area for future research is to evaluate the cost-effectiveness of different guideline implementation strategies. The challenges many healthcare organisations face include providing an environment that facilitates for its practitioners to continue to offer high quality health care and rehabilitation, while at the same time streamlining and optimising patient flows and containing healthcare costs.
- Further evaluation of clinical practice could be performed using a PBE study design. This would entail setting up a clinician project team, necessary

infrastructure and study database, and collect process and patient data from medical records and/or study-specific instruments.

- Further research is also needed on how patients' preferences for physiotherapy treatment and decision making are elicited and accommodated by the physiotherapist in clinical decision making, and how they could be better integrated with the use of guidelines.
- Validity and reliability of the questionnaire need to be further investigated, in other settings and contexts. Testing of psychometric properties is an ongoing process that will benefit from further research and also from using other analytical methods.

Closing reflections

So what did this research contribute? Did it confirm what we already knew, or thought we knew? Did it make some assumptions more explicit? Did it shed some light on what makes some use guidelines more than others? Did it confirm that physiotherapists in primary care were already applying EBP? Did it confirm that implementation research is extremely complex, with many measuring challenges? Did it shed some light on how primary care physiotherapists work, and on what our *raison d'être*, the patients, think about our work? Does it point the way to what we must research next?

I believe the answer is yes to these questions. Sometimes it is important to make explicit what we think that we know from intuition or own experience. This actually goes back to the core of EBP—the principle of not basing decisions on intuition, tacit knowledge or experience alone. Hopefully, this research has contributed to advancing EBP in primary care physiotherapy. By implementing guidelines and improving prerequisites for guideline use, better conditions for the transfer of research findings were created. In the chain of implementing research into practice, we thereby may have reached a partial goal. By taking a closer look at the other two EBP components and describing both clinical practice and patients' views, a more complete and multi-faceted picture of EBP in primary care physiotherapy was achieved.

Physiotherapy is a profession in continuous development and in which reflection is an essential element. We have gone from primarily using our hands to a greater use of our brains and mouth, i.e. from an emphasis on manual therapy to today's more holistic, biopsychosocial-oriented approach—incorporating psycho-social factors, and thinking, reflecting, discussing and collaborating with the patient. In my own journey through these past four years of doctoral studies on the subject of EBP, I have gone from being a rather uncritical evidence missionary, propagating that all practices must be clearly supported by research evidence, to now being a firm believer in the integration of the three EBP components, the value of tacit professional knowledge, and that PBE must also be counted as evidence. I believe that evidence from both research and practice is essential for the patient's (and the physiotherapist's!) best, and that their integration with each other, as well as with the patient's individual values and preferences, are optimal to support clinical decision making, provide effective treatment, and enhance quality of care.

SVENSK SAMMANFATTNING

(SUMMARY IN SWEDISH)

*Främjande av evidensbaserad praktik inom fysioterapi i primärvården:
implementering av riktlinjer samt klinisk praxis och patienters preferenser*

Bakgrund: Evidensbaserad praktik (EBP) innebär att integrera forskningsresultat, klinisk erfarenhet och expertis samt patientens preferenser. Ett evidensbaserat arbetssätt bidrar till att patienter får effektiv behandling av god kvalitet. Nya fysioterapeutiska behandlingsmetoder utvecklas och utvärderas i forskning i snabb takt och dessa forskningsresultat behöver nå ut i praktiken snabbt och effektivt. Kliniska behandlingsriktlinjer kan underlätta implementeringen av forskningsresultat i praktiken och har visats kunna bidra till EBP, förbättra behandlingsresultat och vårdkvalitet samt minska kostnader. Det saknas kunskap om i vilken utsträckning riktlinjer används inom svensk fysioterapi, vilka faktorer som påverkar användande av riktlinjer samt om effekten av olika strategier för implementering av EBP. Skräddarsydd implementering har visats vara effektiv inom andra områden i hälso- och sjukvård men ingen studie har tidigare gjorts av implementering inom svensk fysioterapi. Det saknas även kunskap om vilka de mest förekommande fysioterapeutiska behandlingsmetoderna är samt vilka metoder patienter föredrar och i vilken utsträckning man vill delta i behandlingsbeslut.

Syfte: Det övergripande syftet med avhandlingen var att öka kunskapen om viktiga faktorer för implementering av EBP inom fysioterapi i primärvård. Specifika syften var 1) att anpassa ett frågeformulär för att mäta attityder, kunskap, beteende samt hinder och möjligheter för att tillämpa EBP och riktlinjer, 2) att undersöka dessa faktorer bland sjukgymnaster/fysioterapeuter i primärvård, 3) att kartlägga användandet av olika behandlingsmetoder, 4) att utvärdera en skräddarsydd implementeringsstrategi och 5) att utforska patienters preferenser för fysioterapeutisk behandling och beslutsfattande.

Metoder: I delstudie A utvecklades ett frågeformulär för att mäta attityder, kunskap, beteende, förutsättningar och hinder relaterade till EBP och riktlinjer. Ett amerikanskt frågeformulär översattes, kulturanpassades, vidareutvecklades, validerades (n=10) samt reliabilitetstestades (n=42). I delstudie B användes detta frågeformulär för att kartlägga dessa variabler bland sjukgymnaster i primärvården i Västra Götalandsregionen (VGR) (n=271), med huvudsyftet att undersöka determinanter för användande av riktlinjer samt vilka behandlingsmetoder som var vanligast och hur

detta kliniska mönster förhöll sig relativt forskningsresultat. I delstudie C utvecklades en implementeringsstrategi som låg till grund för en intervention inom vilken tre nyutvecklade riktlinjer introducerades. Interventionen genomfördes i tre primärvårdsområden medan övriga två utgjorde kontrollgrupp, och utvärderades med samma frågeformulär (n=271 före intervention, n=256 efter intervention). Strategin utvecklades med hjälp av en 5-steps implementeringsmodell och skraddarsyddes till de determinanter som identifierats i delstudie B. Primära utfall var kännedom, kunskap, tillgång och användande av riktlinjer. Sekundära utfall var attityder till EBP och riktlinjer. I delstudie D utforskades patientens preferenser för fysioterapeutiska behandlingsmetoder och omhändertagande i en intervjustudie (n=20) och data analyserades med kvalitativ innehållsanalys.

Resultat: Frågeformulärets validitet och reliabilitet bedömdes vara god efter översättning, anpassning, testning och revidering. Positiva attityder, kännedom om riktlinjer, att anse riktlinjer viktiga för att underlätta arbetet samt att kunna integrera patientens preferenser med riktlinjer identifierades som determinanter för användande av riktlinjer. Den skraddarsydda implementeringen av riktlinjer gav signifikanta effekter på tre av de fyra primära utfallsmåten. Deltagande i seminariet resulterade i signifikant effekt även på användande av riktlinjer. Sjukgymnaster använder i huvudsak aktiva behandlingsstrategier såsom träning och rådgivning, vilket har stöd i forskningen, men även i stor utsträckning behandlingsmetoder för vilka det saknas forskningsstöd. Patienter sätter stor tilltro till sjukgymnasters professionella kompetens, föredrar en aktiv behandlingsstrategi samt att delta i det kliniska beslutsfattandet.

Slutsatser: Det översatta och anpassade frågeformuläret kan användas för att mäta EBP i fysioterapi på ett reliabelt sätt. Trots positiva attityder till EBP och riktlinjer är dåligt utbud och tillgång till riktlinjer hinder för att använda riktlinjer regelbundet. Den skraddarsydda implementeringsstrategin för riktlinjer kan vara effektiv för att öka förutsättningar för samt användande av riktlinjer och därmed evidensbaserad praktik inom fysioterapi i primärvård. Användandet av olika behandlingsmetoder visar att både forskningsevidens och klinisk expertis ligger till grund för val av behandlingsmetod. Patienternas tillit till sjukgymnastens kompetens och vilja att delta aktivt i sin behandling bör tas tillvara och, tillsammans med den kliniska expertisen integreras med riktlinjer i det kliniska beslutsfattandet.

Avhandlingen har genererat ny kunskap om de olika EBP-komponenternas roll inom fysioterapi i svensk primärvård, ökad förståelse för faktorer som är viktiga för en framgångsrik implementering samt kunskap om klinisk erfarenhet och patientens preferenser. Avhandlingens resultat kan också utgöra grund för fortsatt forskning om hur EBP-komponenterna och olika kunskapskällor kan integreras för att informera fysioterapeutisk praxis och förbättra vårdkvalitet. Fortsatt forskning behövs även avseende implementeringseffekter på patientutfall.

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APPENDICES

Appendix 1: Overview of systematic reviews of EBP implementation strategies

First author, yr	No of SRs/ prim studies	No. of PT studies	Quality of included studies	Setting/ target group	Impl'n object	Main findings
Grimshaw, 2004 [89]	235	NR ¹	Poor	Health care	Guidelines	Median improvement 6% (multi-component interventions) to 14% (reminders)
Francke, 2008 ² [93]	12/670	NR ¹	10 low, 2 high	Health care	Guidelines	Multiple components more effective; Identification of determinants of guideline use
Hakkennes, 2008 [211]	14, of which 12 RCTs	3	Varied (0-6 on 7-point scale)	Allied health	Guidelines	Varied effects. Multi-component interventions no more effective than single intervention strategies
Prior, 2008 ² [92]	33/714	NR ¹	Medium (Amstar 6)	Health care	Guidelines	Multiple interventions, interactive education and reminders most effective implementation strategies
van der Wees, 2008 [105]	3 RCTs	3	Medium (mean 4 on 7-point scale)	Physiotherapy	Guidelines	An active, multifaceted strategy was effective in improving knowledge and behaviour, but not attitudes, patient outcomes, or cost of care. Effects were mostly small.
Menon, 2009 [212]	12, of which 3 RCTs	7, of which 3 RCTs ³	Various (3-7 on 10-point scale)	Rehabilitation	Guidelines	Participation in an active, multi-component implementation intervention resulted in improved knowledge and behaviour, but not attitudes.
Boaz, 2011 ² [90]	13/313	3	10 high, 3 medium	Health care	Research	Multi-component more effective, small to moderate effect size
Scott, 2012 [213]	32, of which 7 RCTs	7, of which 3 RCTs ⁴	Generally low	Allied health	Research	Mixed effects, only 4 studies showed significant effects; educational meetings predominant strategy
Brusamento, 2012 [85]	21, of which 16 RCTs	0	Varied	Primary care (general practice)	Guidelines	Mixed effects: 12 showed positive effects, 9 showed no effect
Jones, 2015 [107]	26	11, of which 3 RCTs ⁴	Low to medium	Rehabilitation	Evidence	Positive effects on professional outcomes but not on patient outcomes

1) Majority physicians; 2) Overview of systematic review; 3) remaining studies were before-after or case-series studies; 4) remaining studies were before-after, time-series, cross-sectional and qualitative studies. SR=systematic review; RCT=randomised controlled trial; PT=physiotherapy; NR=not reported

Appendix 2: Guideline format and content

[illegible]

The guidelines are 5-6 pages long, excluding references and appendices. The appendices include a summary of included systematic reviews, recommended outcome measures with use instructions, and patient information leaflets.

Appendix 3: Questionnaire

Questionnaire on the use of and attitudes toward guidelines, evidence-based practice (EBP), guidelines and treatment methods

EBP = Evidence-Based Practice, is defined as "integrating the best available external clinical evidence from systematic research with individual clinical experience and patient preferences" (1)

A. The first part of the questionnaire is about personal/demographic information.

1. Are you male or female?

- ☐ Male ☐ Female

2. To which age group do you belong?

- ☐ 20-29 years ☐ 30-39 years ☐ 40-49 years ☐ 50-59 years ☐ 60+ years

3. For how many years have you worked as a physical therapist in primary care?

- ☐ < 3 years ☐ 3-5 years ☐ 6-10 years ☐ 11-15 years ☐ 16-20 years ☐ > 20 years

4. What is your highest degree in physical therapy?

- ☐ < 2,5 year education
☐ 2,5 year education
☐ 3 year education/Bachelor's degree
☐ Master's degree (1 year)
☐ Master's degree (2 years)
☐ PhD student
☐ Doctorate degree

5. Do you have a specialist certificate from LSR?

- ☐ Yes ☐ No

5b. If yes, in which area: _____

6. In which primary care area do you work?

- ☐ Göteborg
☐ Södra Bohuslän
☐ Fyrbodalen
☐ Södra Älvsborg
☐ Skaraborg

7. How many physical therapists work at your main place of work?

- ☐ <3 ☐ 3-5 ☐ 6-10 ☐ 11-15 ☐ > 15

8. How big portion of your total work time do you spend with patient care (including patient administration)?

- ☐ <25% ☐ 26-50% ☐ 51-75% ☐ > 75%

B. The following part is about attitudes toward, use of, and perceived benefits and limitations of EBP.

EBP = Evidence-Based Practice, is defined as "integrating the best available external clinical evidence from systematic research with individual clinical experience and patient preferences" (1)

Answer the questions by checking the response alternative you consider the most suitable.

9. I consider it necessary to apply EBP in the daily practice of physical therapy.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

10. I think it creates unreasonable demands to apply EBP in my daily work.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

11. I want to learn and improve the knowledge and skills necessary to apply EBP in my work.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

12. Strong evidence is lacking for most treatments that I use for my patients.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

13. EBP can help me make decisions in the choice of treatment.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

14. Number of scientific articles related to my clinical work that I read, during a typical month.

- ☐ ≤ 1 article ☐ 2-5 articles ☐ 6-10 articles ☐ 11-15 articles ☐ 16+ articles

15. Number of times I use PubMed or other databases to search literature that is relevant to my clinical work, during a typical month.

- ☐ ≤ 1 time ☐ 2-5 times ☐ 6-10 times ☐ 11-15 times ☐ 16+ times

16. I know how to access relevant databases via VG Region's e-library.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

17. At my place of work the use of current research is encouraged.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

18. I feel confident in my ability to find relevant research to answer my clinical questions.

- ☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

19. I feel confident in my ability to treat my patients according to current evidence.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

C. The following part is about attitudes toward and use of clinical practice guidelines. Guidelines are "systematically developed recommendations with the purpose to facilitate for caregivers and patients to make decisions about suitable treatment in specific situations" (2). In this survey, guidelines mean evidence based clinical practice guidelines for physical therapy.

20. I consider it important that easily available evidence-based guidelines related to my work exist.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

21. I consider it important to use evidence-based guidelines in my work.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

22. I'm aware that evidence-based guidelines for diagnoses relevant to my work exist.

☐ Yes ☐ Partially ☐ No

23. I know how and where to find evidence-based guidelines related to my work on the Internet.

☐ Yes ☐ Partially ☐ No

24. I have fast and easy access to relevant evidence-based guidelines at my place of work.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

25. I use evidence-based guidelines in my work.

☐ Very seldom or never ☐ Seldom ☐ Sometimes ☐ Quite often ☐ Very often

26. I can integrate the patient's preferences with evidence-based guidelines.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

27. Evidence-based guidelines are important to facilitate my work.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

28. Evidence-based guidelines are important so that the patients receive the best possible treatment.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

29. Evidence-based guidelines are important so that patients receive equal treatment.

☐ Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree

30. For which diagnoses would you benefit the most from having evidence-based guidelines? State up to five diagnoses.

31. Mark the factors below that constitute the greatest barriers to using evidence-based guidelines.

You can mark as many as you wish.

- ☐ Lack of time
- ☐ None or too few guidelines exist for my patient groups
- ☐ Don't know where to find guidelines
- ☐ Takes too long time to read guidelines
- ☐ Guidelines are too general and too unspecific
- ☐ Guidelines are too much "recipe" and don't let me decide what is most appropriate
- ☐ Lack of support from my colleagues at my place of work
- ☐ Lack of interest
- ☐ Other

31b. If you answered "Other", please state what.

D. The last part is about treatment methods for three common diagnoses.

32. Which treatment methods do you use for a typical patient who seeks help for unspecific, subacute (3-12 weeks), low back pain? Mark all methods that you use.

- ☐ Advice to rest and offload your back
- ☐ Advice to go for walks and stay as active as possible
- ☐ Advice to avoid unfavorable movements or activities
- ☐ Advice to return to normal activities
- ☐ Advice on posture
- ☐ Ergonomic advice
- ☐ Advice targeting fear of movement
- ☐ Back school
- ☐ Massage
- ☐ Mobilisation techniques
- ☐ Manipulation techniques
- ☐ Aerobic exercise
- ☐ Stabilisation exercise
- ☐ Range of motion exercise
- ☐ MDT/McKenzie
- ☐ Pool exercise
- ☐ Supervised MTT exercise
- ☐ Home exercise
- ☐ TENS
- ☐ Ultrasound
- ☐ Acupuncture

- ☐ Laser
- ☐ Heat
- ☐ Cold
- ☐ Traction
- ☐ Back support/orthosis
- ☐ Behavioural therapy
- ☐ Other

32b. Please state specific methods/concept that you use.

33. Which treatment methods do you use for a typical patient who seeks help for unspecific, subacute (3-12 weeks), neck pain (non-WAD)? Mark all methods that you use.

- ☐ Neck collar
- ☐ Advice to go for walks and stay as active as possible
- ☐ Advice to avoid unfavorable movements or activities
- ☐ Advice on posture
- ☐ Ergonomic advice
- ☐ Massage
- ☐ Mobilization techniques
- ☐ Manipulation techniques
- ☐ Aerobic exercise
- ☐ Stabilization exercise
- ☐ Range of motion exercise
- ☐ MDT/McKenzie
- ☐ Pool exercise
- ☐ Supervised MTT exercise
- ☐ Home exercise
- ☐ TENS
- ☐ Ultrasound
- ☐ Acupuncture
- ☐ Laser
- ☐ Heat
- ☐ Cold
- ☐ Traction
- ☐ Behavioural therapy
- ☐ Other

33b. Please state specific methods/concept that you use.

34. Which treatment methods do you use for a typical patient who seeks help for subacromial pain?
Mark all methods that you use.

- ☐ Advice to use the arm as much as possible in everyday activities
- ☐ Advice not to use the arm in everyday activities but rest and offload it
- ☐ Advice to avoid unfavourable movements/activities
- ☐ Advice on posture
- ☐ Ergonomic advice
- ☐ Massage
- ☐ Mobilisation techniques
- ☐ Manipulation techniques
- ☐ Aerobic exercise
- ☐ Strength exercise
- ☐ Range of motion exercise
- ☐ Pool exercise
- ☐ Supervised MTT exercise
- ☐ Home exercise
- ☐ TENS
- ☐ Ultrasound
- ☐ Acupuncture
- ☐ Laser
- ☐ Heat
- ☐ Cold
- ☐ Traction
- ☐ Deep transverse frictions
- ☐ Axelina
- ☐ Behavioural therapy
- ☐ Other

34b. Please state specific methods/concept that you use.

Do you have any other comments on EBP, guidelines and treatment methods?

Your answers are completely anonymous and no answers can be tracked to a particular person. By answering the survey you accept that your answers are treated by computer and can be used also in research.

1. Sackett et al, 1996.
2. LSR/Field & Lohr, 1992.

Publications

The articles associated with this thesis have been removed for copyright reasons. For more details about these see:

<http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-122558>