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Integration of behavioral medicine competencies into physiotherapy curriculum in an exemplary Swedish program: rationale, process, and review

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ABSTRACT

In 2004, Mälardalen University, Sweden, introduced a new undergraduate entry-level physiotherapy program. Program developers constructed the curriculum with behavioral medicine content that reflected the contemporary definition and values of the physiotherapy profession aligning it with current best practices, evidence, and the International Classification of Functioning, Disability, and Health (ICF). The new curriculum conceptualized movement and function as modifiable behaviors in that they reflect behavioral contingencies, perceptions, beliefs, and lifestyle factors as well as pathophysiology and environmental factors. The purpose of this article is to describe how one university accordingly structured its new curriculum and its review. We describe the rationale for the curriculum's behavioral medicine content and competencies, its development and implementation, challenges, long-term outcomes, and its related research enterprise. We conclude that physiotherapy practiced by our graduates augments that taught in other programs based on accreditation reviews. With their expanded practice scope, graduates are systematically practicing within the constructs of health and function conceptualized within the ICF. Our intent in sharing our experience is to exemplify one university's initiative to best prepare students with respect to maximizing physiotherapy outcomes as well as establish a dialogue regarding minimum standards of behavioral medicine competencies in physiotherapy education and practice.

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Introduction

When commissioned to develop a new 3-year entry-level undergraduate physiotherapy program in 2004, faculty members at Mälardalen University in Sweden and other curriculum stakeholders redesigned and augmented the conventional internationally recognized entry-level academic curriculum, which is pervasive across physiotherapy programs in Sweden. Bold initiatives related to the integration of behavioral medicine content and competencies within the new curriculum, consistent with holistic patient/client-centered care, were undertaken to maximize physiotherapy outcomes (i.e. movement and functional capacity). The purpose of this article is to describe the rationale for an entry-level physiotherapy program with integrated core behavioral medicine content and competencies as well as its development, characteristics and challenges in its development and implementation. In addition, a review of the program is described along with its research enterprise, which is integral to informing curriculum

content. Our experience may be useful to other programs, which are considering integrating behavioral medicine content and competencies into their curricula in the interest of holistic and best practices.

Rationale

The new curriculum was founded on several premises. First, the definition of physiotherapy and its defining values, as adopted by the World Confederation for Physical Therapy (WCPT), were considered (Table 1) (World Confederation for Physical Therapy, 2015). Physiotherapist practice is committed to maximizing health, largely through improving movement and functional capacity. The WCPT-endorsed International Classification of Functioning, Disability, and Health (ICF) has provided a framework for this purpose (World Health Organization, 2013). The value of maximizing overall health is related to but distinct from minimizing movement limitations; for example, health

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Table 1. Description of physical therapy. Source: World Confederation for Physical Therapy (2015).

"Physical therapy provides 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. Functional movement is central to what it means to be healthy.

Physical therapy is concerned with identifying and maximizing quality of life and movement potential within the spheres of promotion, prevention, treatment/intervention, habilitation, and rehabilitation. This encompasses physical, psychological, emotional, and social wellbeing. Physical therapy involves the interaction between the physical therapist, patients/clients, other health professionals, families, care givers, and communities in a process where movement potential is assessed and goals are agreed upon, using knowledge, and skills unique to physical therapists."

Table 2. Definition of health. Source: World Health Organization (2013).

"Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

protection and promotion, as well as lifestyle-related non-communicable disease (NCD) risk reduction (Table 2).

Movement and function can be conceptualized as modifiable behaviors performed by the patient/client in a specific context. As behaviors, they lend themselves to functional behavior analysis, which emerges from the field of operant psychology (Haynes, Leisen, and Blaine, 1997). Functional behavior analysis has been adapted to the physiotherapist context and applied in clinical physiotherapist research (Åsenlöf, Denison, and Lindberg, 2005; Johansson, 1999; Sandborgh, 2008; Söderlund, 2001). Such an analysis complements standard physiotherapist examination/assessment, as it considers the complexity of factors influencing human behavior. Movement- and function-related as well as modifiable behaviors are analyzed in terms of the biopsychosocial factors that motivate, sustain, and hinder them, making it possible to target interventions accordingly (Åsenlöf, Denison, and Lindberg, 2005; Johansson, 1999; Sandborgh, 2008; Söderlund, 2001).

Furthermore, within the profession, health protection, health promotion, and NCD risk-factor reduction have become high priorities. In light of the extant literature, attention to lifestyle factors may reduce the recurrence of functional limitations, and improve sustained long-term movement, and function outcomes and overall health (Table 3) (Dean and Söderlund, 2015).

Behavioral medicine practice within the physiotherapy context

In building the curriculum, the planners and developers were committed to including behavioral content and

Table 3. Definition of health promotion from the Ottawa Charter on Health Promotion World Health Organization (1986).

"Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental, and social well-being, an individual or group must be able to identify and realize aspirations, satisfy needs, and change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well-being."

competencies, which had been established by a recognized scholarly consortium. The International Society for Behavioral Medicine is such a body. It defines behavioral medicine as an interdisciplinary field dealing with the integration of psychosocial, behavioral and biomedical knowledge, which is relevant for health promotion, diagnosis, treatment, and rehabilitation (International Society of Behavioral Medicine, 2014). Within this context, the physiotherapist conducts a comprehensive examination/assessment of the behaviors underlying the patient's/client's movement and functional capacity complaints, complementing the standard pathophysiologically and biomechanically based examination/assessment. The physiotherapist then provides evidence-informed individualized instructions and recommendations to the patient/client based on shared decision-making. The instructions and recommendations are designed and delivered consistent with the patient's/client's needs and wants regarding knowledge, literacy, learning style, autonomy, cognitions, and beliefs about health as well as his or her disability, shared goal setting, and readiness to change health-related behavior (Denison and Åsenlöf, 2012). Consistent with the ICF, movement and functional ability are fundamental to the patients'/clients' ability to achieve their personal activity and social participation goals and, correspondingly, to their health-related quality of life.

For example, consider a person who is unable to stand from a chair, a limitation that contributes to limited physical activity and social participation. The inability to stand is influenced by physical factors, such as weakness, balance, or motor-coordination problems or a chair that is too low, in addition to behavioral factors, such as low self-efficacy for standing, fear of falling, and a desire for assistance from others, or social interaction with family members or healthcare staff. From a behavioral medicine perspective, the physiotherapist analyzes which factors influence the patient's/client's inability to stand and which should be targeted to manage this issue (behavioral, pathophysiological/biomechanical, environmental, personal, or some combination).

Support for inclusion of behavioral competencies into the curriculum

The need to incorporate behavioral competencies as core content within the new curriculum was supported by empirical evidence and deficiencies in the current strategies aimed at supporting and motivating patients/clients with regard to movement and functional behaviors in their daily activities. Competency in conducting a functional behavior analysis of prioritized daily activities is fundamental to a behavioral medicine approach as well as targeting the identified behavioral factors in treatment. According to the psychology literature (Turk, 2003), behavior analysis involves the analysis of behavioral factors, which can influence movement and function. Thus, functional behavior analysis identifies facilitators of and barriers to effective behavior modification and informs shared patient/client-directed goal setting and management, thereby offering the potential for improved outcomes.

Support for including behavioral medicine content and competencies into entry-level professional education (in turn, practice) comes from the growing evidence for an integrated behavioral medicine approach in physiotherapist practice, mainly from the area of pain research (Johansson, 1999; Sandborgh, 2008; Söderlund, 2001). Such an approach has superior short-term (Åsenlöf, Denison, and Lindberg, 2005; Cederbom et al., 2014) and long-term effects on functional recovery and pain control (Åsenlöf, Denison, and Lindberg, 2009; Bring, Åsenlöf, and Söderlund, 2016; Friedrich, Gittler, Arendasy, and Friedrich, 2005), compared with standard physiotherapy interventions alone. Two systematic reviews support a behavioral medicine approach to rehabilitation (Janssen, Gucht, Dusseldorp, and Maes, 2013; Morris, MacGillivray, and Mcfarlane, 2014). In addition, Foster and Delitto (2011) argued that entry-level professional education is a starting point for promoting the biopsychosocial model of health and supporting a behavioral medicine approach in physiotherapist practice, where behavior change can be integrated as core professional competencies. Although models of human behavior and behavior change have emerged in physiotherapy curricula (Bodner, Rhodes, Miller, and Dean, 2012), systematic application of such knowledge and skills in examination/assessment has been limited, and evaluation of interventions and outcomes, which is needed to enable patients/clients to achieve and sustain their activity and participation goals, has been variable (Bodner, Rhodes, Miller, and Dean, 2012).

A second line of reasoning that supports the incorporation of behavioral competencies as core content

within the new curriculum includes consistency with the WCPT-endorsed ICF. According to the ICF, movement and function are fundamental to activity and social participation; in addition, they depend on psychosocial and behavioral as well as physical and pathological factors. Third, health maximization is part of the contemporary definition of physiotherapy. The WHO's definition of health as a complete state of physical, mental, and emotional wellbeing underpins the ICF (World Health Organization, 1948). Fourth, lifestyle-related NCDs remain at epidemic levels globally, with their risk factors affecting children as well as adults (Dean, 2009; Dean et al., 2015a; World Health Organization, 2017). The WHO strongly advocates modifying lifestyle behaviors to offset this global trend, and advances have been made within the profession to assess these behaviors in every patient/client (Dean et al., 2011, 2014, 2015b; World Health Organization, 2017). Fifth, NCD risk factors include musculoskeletal conditions (Dean et al., 2015a). Examining a patient's/client's lifestyle reveals the degree to which an underlying musculoskeletal problem may be attributable to causes other than primary musculoskeletal dysfunction, such as unhealthy body mass or inactivity. Correcting lifestyle factors alone could alleviate the presenting problem, reduce its recurrence, and limit the need for conventional physiotherapy or biomedical interventions while improving health overall. Sixth, in this era of long-term chronic conditions, behavioral attributes can largely determine the degree to which patients/clients will live successfully (i.e. thrive rather than survive) with conditions such as chronic pain and cancer (Wells, Avers, and Brooks, 2012). Thus, physiotherapists' knowledge about and competencies related to understanding the behavioral profile and needs of an individual will help tailor an individualized treatment program.

The seventh line of reasoning, which curriculum planners and developers considered to be essential for maximizing movement and functional outcomes, was related to the need for physiotherapists to be effective communicators capable of accepting, empathizing, validating, supporting, and motivating their patients/clients (Rea, Hopp Marshak, Neish, and Davis, 2004). To achieve these attributes, students in our program are exposed to various communication models in the theoretical and practical components of their professional education program. Communication competencies are also essential in teaching patients/clients about self-management strategies to augment the benefits of physiotherapy. Techniques, for example, from Motivational Interviewing (Rollnick, Miller, and Butler, 2008) and Acceptance and Commitment

Therapy (Hayes, Strosahl, and Wilson, 2012) are taught and practiced. The goal is to empower patients/clients and ensure concordance with management. Concordance implies agreement and shared decision-making between the physiotherapist and the patient/client (Horne, Barber, Elliott, and Morgan, 2005). Finally, patients/clients today are typically complex, often presenting with multi-morbidities, NCD risk factors, and/or living with one or more disabilities requiring one or more medications. In light of the global trend toward autonomous practice, physiotherapists need exceptional skills in communicating with other health professionals to best coordinate and streamline a given patient's/client's overall management.

Program development and characteristics

The development and sustainability of the uniquely conceived entry-level physiotherapy program depends on the partnership between the university and regional healthcare sector. Anchoring the program and its content within local contexts was essential when refining the didactic content for inclusion in the new curriculum as well as identifying the practical content associated with the behavioral medicine competencies needed by students in their clinical placements. Several years before launching the program, collaboration was initiated with the regional healthcare sector. Advisory panels, consisting of decision makers from the healthcare management and administrations in the two county councils adjacent to the university, physiotherapist practitioners, and representatives from the university, discussed the new curriculum content. In addition, an advisory board was established, including physiotherapist representatives from the regional healthcare sector as well as students and educators from the university. This advisory board remains in place to ensure the quality and on-going improvement of the program. At the time the physiotherapy program was launched in 2004, there was no pre-existing program at the university. Several adjustments have been made to the program over the years, and the input from the advisory board has been integral to this process.

Formal accreditations and reviews of physiotherapy programs in Sweden are performed by the Higher Education Authority (www.uka.se), formerly known as the Swedish National Agency for Higher Education (Häger-Ross and Sundelin, 2007). In the Häger-Ross and Sundelin (2007) review, the authority queried whether practical skills were being adequately taught in the program prior to clinical placements. Thus, together with the advisory board and clinical supervisors, the curricula was restructured and new pre-

clinical courses developed to ensure that the practical skills needed for clinical placements were taught and rigorously assessed before the clinical placement period. In the Swedish Higher Education Authority (2013) review, this concern was no longer an issue and our program was documented to be of high quality.

To integrate behavioral medicine content and competencies effectively into the curriculum, it was important to present a coherent structure and process that would allow the requisite core content to be taught, theoretically and practically, within a 3-year timeframe. Consequently, a multi-step structure was identified in the area of cognitive behavioral therapy (Turk, 2003; Turk and Okifuji, 1993), adapted to physiotherapy practice through a process model (Åsenlöf, 2005; Johansson, 1999; Sandborgh, 2008; Söderlund, 2001). This structured process model allowed for teaching requisite competencies in patient/client examination/assessment, analysis, intervention, and evaluation was evidence based and relevant to the primary areas of physiotherapist practice (Denison and Åsenlöf, 2012). The steps in the process model included: problem formulation; collection of biopsychosocial data relevant to the presenting problem (s); functional behavior analysis and shared goal setting as well as the development; generalization and maintenance of behavioral skills (i.e. physical, psychological and organizational skills); and the achievement of behavioral goals (Denison and Åsenlöf, 2012; Turk, 2003). A systematic process model for integrating behavioral medicine into physiotherapist practice was outlined, which described the final integration of germane behavioral medicine content and competencies within physiotherapist practice.

To ensure that students learn and practice behavioral examination/assessment and treatment methods, two clinical competency portfolios were developed, one for examination/assessment methods, and one for treatment methods. The two portfolios were developed through partnership with experienced practicing physiotherapists. Each portfolio contains a manual and checklists, which are structured and coded according to the ICF. The manual gives a short description of each method, with references. As students apply their basic skills during clinical placements, these are recorded and signed by the clinical educators in the checklist parts of the clinical competency portfolios. Excerpts from the examination/assessment and treatment portfolio appear in Tables 4 and 5.

Theories of learning and health psychology are taught and integrated with biomedical theories and models from the beginning of the program and reinforced throughout to facilitate an understanding of health behavior and the integration of health behavior

Table 4. Examples from the portfolio which is used to monitor students’ clinical competencies. The portfolio consists of a manual with brief explanations of the assessment methods and a checklist to be signed by the clinical supervisor.

Excerpt from Portfolio 1: Manual for Assessment Methods:				
Psychological functions (ICF, b1: Mental functions) Energy and drive functions b130				
You should be able to explain and carry out assessments of patients: Self-efficacy for the activity/-ies that is/are problematic; Readiness for change; Outcome expectations; Fear and avoidance behavior for the activity/-ies that is/are problematic; and Perceived barriers for performing the chosen activity or activities				
Excerpt from Portfolio 1: Checklist for Assessment Methods				
	Has observed	Has practiced with peer student	Has carried out with patient	Has correctly performed as observed by clinical supervisor Signature and date by clinical supervisor below
Assessment of self-efficacy for the activity/-ies that is/are problematic				

Table 5. Examples from the portfolio which is used to monitor students’ clinical competencies. The portfolio consists of a manual with brief explanations of the treatment method and a checklist to be signed by the clinical supervisor.

Excerpt from Portfolio 2: Manual for Treatment Methods:				
Walking d450 (ICF, d4: Mobility) Gait pattern functions b770				
You should be able to explain and carry out treatment for: Weight bearing; Step length; Step frequency; and Walking speed				
Excerpt from Portfolio 2: Checklist for Treatment methods				
	Has observed	Has practiced with peer student	Has carried out with patient	Has correctly performed as observed by clinical supervisor Signature and date by clinical supervisor below
Correction of weight bearing in walking				

changes (Michie et al., 2009, 2013). Given multiple theories and models of health behavior change (Davis et al., 2015), program topics focus on respondent and operant psychology theory, the Transtheoretical Model/ Stages of Readiness for behavior change, Social Cognitive Theory, the Health Belief Model, ecological models, Diffusion of Innovation and the PRECED-PROCEED model. In the context of clinical reasoning, Elvén, Hochwalder, Dean, and Soderlund (2015) described how these theories and models can be translated into clinical capabilities and competencies. These competencies are applicable to supporting changes in various behaviors and achieving behavioral change goals, such as increasing patients’/clients’ physical activity.

The progression in the curriculum follows three trajectories: 1) from individual health to societal and global health; 2) from analyzing patients’/clients’ behaviors in activities of importance for participation to choosing and applying suitable treatment and behavior change methods and evaluating outcomes; and 3) progressing students’ competences so that they are more aligned with the revised Bloom’s taxonomy of learning objectives (Anderson et al., 2001), that is, remembering,

understanding, applying, analyzing, evaluating, and creating. An overview of the curriculum is presented in the Appendix. The first year of the program includes foundation courses on anatomy, functional anatomy, physiology, pathology, and psychology while reinforcing the integration of behavioral medicine content. For example, students complete reports on their analyses of individuals’ behavior limitations in daily activities from the viewpoint of psychological factors and the physical and social contexts as well as functional anatomic, physiologic and pathologic perspectives. As a learning strategy, students also monitor their own personal physical activity and related biopsychosocial factors. Then, quantitative and qualitative analyses are applied to the data that the students collect. During clinical placements that are introduced in the second year, students complete case reports based on a behavioral medicine perspective. These case reports are critically reviewed by and discussed with peers and tutors in seminars. Seminars are focused on patient/client-centred communication, examination/assessment of biopsychosocial factors resulting in a functional behavior analysis, jointly established behavioral goal setting and proposed management plans, with a behavioral

change and maintenance perspective. During the third year, the clinical education seminars emphasize professional communication, interpretation and implications of functional behavior analyses and evidence-based behavioral interventions, including those for health protection and promotion for individuals and groups as well as on a societal level (Michie et al., 2013). In the third year, students also complete their faculty-supervised theses, which require the students to demonstrate their theoretical and empirical knowledge of behavioral medicine as an integral component of physiotherapist practice. The theses call for a demonstration of in-depth knowledge and understanding of theoretical frameworks incorporating behavioral medicine into practice as well as the extension of these frameworks to the formulation of research questions, methods, and interpretations of the findings.

Consistent with the program's behavioral medicine orientation, our curriculum differs from most other Swedish physiotherapist curricula because it is not organized according to biomedical conditions and diagnoses. Teaching and learning are focused on students' clinical competencies to address the movement and functional behaviors of each patient/client, with various presenting problems/complaints and/or diagnoses, rather than targeting management *per se* to these problems/complaints or diagnoses. Thus, the first year of the program focusses on foundational knowledge in behavioral medicine; the second year on assessment/examination of patients/clients and behavior analysis; and the third year on treatment and evaluation (Appendix).

Challenges

Several challenges have been encountered while integrating behavioral medicine content and competencies into the new curriculum. First, we needed to address how the new content could be integrated into a standard curriculum that was already viewed as overcrowded. To accommodate evidence-based behavioral content, areas lacking sufficient clinical evidence (e.g. treatment with various electrotherapy modalities) were not included. The program is continuously revised to ensure that it adheres to up-to-date evidence and thoroughly integrates physiotherapy and behavioral medicine without sacrificing essential biomedical knowledge and skills. This process is particularly challenging, as the evidence is continuously changing and some content needs to be sacrificed (Foster and Delitto, 2011).

An important objective of the new program was to support students' understanding of how behaviors related to movement, function, lifestyle, and health

are learned, shaped, and modified. Factors to consider are illness behavior, healthcare-seeking behavior, lifestyle-related behaviors, congruence with goals, and recommendations jointly established by the patient/client and physiotherapist and the patient's/client's attitudes toward and beliefs about health, healthcare, and health professionals. Accordingly, various factors need to be considered to serve as an effective basis for management/treatment regimens. Supporting students' abilities to analyze and address behavioral problems constitutes an educational challenge; particularly, the progression in their understanding of the interaction of biopsychosocial factors and health and illness and recovery outcomes. Our premise was that addressing behavioral issues, such as fear of movement and low self-efficacy for engaging in physical activity or lack of social support, are as fundamental to core physiotherapist practice as addressing standard pathophysiologic/biomechanical issues. Furthermore, students need to be competent in evaluating all factors impacting levels of the ICF and their interactions, including physical, psychological, social, and environmental factors, to fully explain the patients'/clients' problems and select appropriate interventions.

Another challenge was related to clinical education and clinical reasoning. Clinical reasoning involves analyzing and synthesizing findings from the examination/assessment, tailoring management/treatment and evaluating its effectiveness from a behavioral medicine as well as a standard physiotherapy approach (Elvén, Hochwälder, Dean, and Söderlund, 2015). Various authorities have emphasized the importance of clinical education and the interaction between clinical educators and students in forming students' clinical skills and professional identities (Ernstzen, Bitzer, and Grimmer-Somers, 2009; Shepard, Hack, and Jensen, 1999). Clinical educators provide essential formative feedback on students' clinical reasoning and practice, and serve as role models for students. The clinical educators' ability to implement behavioral medicine competencies in their clinical practices and teaching is crucial for effective clinical education. To facilitate this implementation and ensure high-quality clinical education, the university offers two postgraduate courses in behavioral medicine. Further, regular meetings and seminars are organized for the clinical educators, and attended by a majority of them. The need for guidance and support from the university in teaching and evaluating students' clinical performance has been acknowledged by clinical supervisors, as reported in a faculty project report on clinical education in physiotherapy (Fritz, Elvén, and Moberg, 2015). In response to this demand, several of our faculty members are involved in guiding and

supporting clinical supervisors during clinical placement periods to further the implementation of behavioral medicine in clinical courses.

Program review

To date, we have five levels of program review, including findings from a survey of alumni and four theses. In 2009, 5 years after the program was instituted, we undertook a survey of graduates (Johansson, 2009). The survey was distributed to the 104 students who had graduated in 2007, 2008, and 2009. The response rate was 65%, and thus generalizations of the results to the total cohort of graduated students during this period should be made with caution. The survey was based on an alumni survey used in other programs at the university. Ten specific questions were added regarding behavioral medicine integration in the Physiotherapy program. The format for the responses consisted of Likert rating scales and essays. It was investigated to what degree these former students believed their professional education had prepared them for practice, the value of behavioral medicine knowledge in their practices including what content they believed was missing or insufficient and what postgraduate courses would address this issue. The respondents reported that the program had provided them with the competencies they needed in their practices as new graduates, with median ratings of 3 on a 4-point scale. In response to open-ended questions, they reported that knowledge in behavioral medicine was important to their practices. The value of integrating behavior change theories in physiotherapy was highly rated, with a median score of 8 on an 11-point scale. Conversely, the respondents from our first cohort of graduates called for more manual skills training in the program.

The students' agreement with a clinical reasoning model in physiotherapy that focuses on patients'/clients' behavior change was later confirmed in a focus group study by Elvén, Hochwälder, Dean, and Söderlund (2015). More specifically, students in the focus groups considered that such a clinical reasoning model reflects theoretical knowledge and practical experience in behavioral medicine oriented physiotherapy. It was pointed out, however, that the impact of biomedical factors on behavior needs to be clarified in this clinical reasoning model.

The four faculty-supervised theses evaluated the program from various perspectives and included a range of methodologies. Every attempt was made to ensure arm's length data collection in the interest of reducing socially desirable responses. One thesis compared two student groups, one from Mälardalen University ($n = 33$) and

one from another Swedish university ($n = 31$), with regard to the students' attitudes toward a biopsychosocial versus a biomedical model for explaining non-specific persistent low back pain and pain related to decreased activity (Svantesson and Söderberg, 2016). The instruments that were used included the Physiotherapist Attitude and Beliefs scale (PABST-PT) (Ostelo et al., 2003) and Health Care Provider – Pain and Impairment Relationship Scale (HC-Pairs) (Rainville et al., 2000). The PABS-PT consists of two factors, one assessing the biopsychosocial treatment orientation and, the other, assessing the biomedical treatment orientation. Not unexpectedly, compared with students from the other university, those from Mälardalen University demonstrated a stronger treatment orientation toward the biopsychosocial model and a weaker treatment orientation toward the biomedical model with respect to the examination/assessment and management of low back pain. Moreover, the study showed that students from Mälardalen University had less strong beliefs regarding the degree to which disability and limitation of activities are impacted by pain. All differences were statistically significant.

Inherent in the ICF framework is the assumption that patients'/clients' behaviors and functional abilities cannot solely be explained by biomedical symptoms; the interplay between body structure and function, personal factors such as beliefs, the environment and the activity and participation of a person are also important. Thus, with respect to the students from Mälardalen University, their attitudes and perceptions of patients'/clients' symptoms and illness experiences as well as their biopsychosocial perspective on pain-related behavioral problems, are consistent with the ICF framework. Although extension studies are needed to follow patients/clients managed from the two perspectives, the study concluded that behavioral medicine content influences students' clinical perspectives and decision-making with respect to examination/assessment and intervention and evaluation of low back pain.

The second thesis was a qualitative interview study of five managers of primary healthcare centers regarding the degree to which they valued behavioral medicine content and competencies related to patient/client care in the entry-level physiotherapy education curriculum (Saviluoto and Windle, 2016). The informants reported that behavioral medicine knowledge was not only valuable for the individual client/patient intervention/treatment, but also important at an organizational level to maximize healthcare outcomes overall. Extension studies were indicated to establish whether behaviorally oriented physiotherapy reduces return patient/client visits and costs.

The third thesis was a qualitative interview study of graduates who were practicing in hospital settings (Önning and Sandmer, 2016). With the use of semi-structured interviews, the study investigated how well four graduates perceived they were applying behavioral medicine knowledge and skills in daily practice, with a focus on achieving maximal movement and functional behavioral changes in their patients/clients in a hospital setting. The participants reported that they were effectively applying behavioral medicine knowledge and skills in their practices to achieve behavioral change, although they were doing this in an unstructured manner. Systematically transferring behavioral medicine clinical reasoning to clinical settings, where the contact time with patients is brief and infrequent, may require system and policy changes.

The last of the theses related to the review of the characteristics and effectiveness of the new program was also a qualitative interview study of four clinical educators (Matthed and Selin, 2016). Based on social cognitive theory, the study's aim was to explore educators' perceptions of mentoring and their perceived ability to facilitate learning in students who were taught behavioral medicine competencies. Both individual and environmental factors were identified as influencing mentoring. The participants reported having varied knowledge in behavioral medicine. The clinical educators believed that the factors that facilitated student learning and reinforced behavioral medicine content in their clinical placements included a facilitating workplace and environment, supervisors' expertise in behavioral medicine and the time that could be allocated to this area of instruction. The findings reinforced and informed the need for behavioral medicine professional development for clinical educators.

These five levels of program review were preliminary; nonetheless, they have been useful in identifying deficiencies and strengths in the new curriculum and informing research related to both pedagogy and practitioner effectiveness. The biopsychosocial approach to movement behavior problems has been well received by the students as demonstrated in their attitudes and beliefs (Svantesson and Söderberg, 2016). The alumni survey (Johansson, 2009), along with the national quality review of the program (Swedish National Agency for Higher Education, 2007), highlights the need to support students in learning practical skills. Educational efforts should be directed toward a structured way of addressing patient's/client's behavioral changes within physiotherapists' regular practice (Önning and Sandmer, 2016). Further, clinical supervisors need continuing support from the university and their respective workplaces to guide students and evaluate clinical

competency, especially with regard to behavior change strategies (Fritz, Elvén, and Moberg, 2015; Matthed and Selin, 2016). The research enterprise, which is described next has been paramount to refining and further developing the entry-level physiotherapy program at Mälardalen University.

Program's research enterprise

For the faculty members, the mission of the research enterprise of Mälardalen University's physiotherapy academic program is to consistently publish high-quality inter-professional research in leading journals to advance practice and present their findings at high-level conferences. The primary goal is to inform the undergraduate physiotherapy curriculum as well as postgraduate courses and programs. Most faculty members are researchers, research project leaders, and supervisors of doctoral students. Also, most are involved in teaching at both the undergraduate and graduate levels. The integration of behavioral medicine and physiotherapy has been studied in several intervention studies, in various clinical settings and samples across age groups (Arkkukangas, 2017; Bring, 2012; Cederbom, 2014; Holm, 2014; Thunborg, 2015). Clinical research findings, including those regarding barriers to and facilitators for a behavioral medicine approach in primary care physiotherapy (Fritz, Söderbäck, Söderlund, and Sandborgh, *in press*), have been integrated into the program curriculum.

Several priorities have been identified for research directions related to practice. These include: maximizing the congruence of behavioral content and competencies within clinical practice and education (Fritz, Söderbäck, Söderlund, and Sandborgh, *in press*) with a view to develop models of clinical reasoning within the context of patient/client-centered care (Elvén, Hochwälder, Dean, and Söderlund, 2015, 2018); increasing inter-professional research related to digital health (Eklund, Elfström, Eriksson, and Söderlund, 2018); and further developing global and lifespan perspectives on health behavior and health behavior modification.

In the 2013–2014 academic year, a review of the research performance of the four schools at Mälardalen University (2015) was commissioned and reviewed by several panels including 45 internationally recognized scholars. The research output of the faculty members was compared with international standards as well as other academic programs within the university. For the division of physiotherapy, the productivity was rated as solid, with excellent potential for expansion including international collaboration. The formal systematic integration of behavioral medicine content and competencies

into physiotherapist practice was reported to be innovative and timely, and the link between research and advancement to the physiotherapy profession was apparent.

As a research-intensive university, Mälardalen University aspires to become a center of excellence in physiotherapy with a behavioral medicine orientation within Europe and potentially globally. It recruits gifted graduate students from Scandinavia and abroad. With a faculty that also conducts physiotherapy-related research within a behavioral medicine framework, graduate student enrolments have continued to increase. Between 2010 and 2017, the number of faculty members' publications (faculty number averaging approximately 12) in peer-reviewed journals has ranged from 10 to 22 annually.

Future directions

Although the integration of behavioral medicine content and competencies into the physiotherapy curriculum at Mälardalen University along with an associated research enterprise has become well established and accepted, there are areas, which continue to be strengthened. Compared with conventional physiotherapy interventions, behavioral content and competencies have been more challenging to define, prioritize, and operationalize. We continue to refine the behavioral content and objectives such that the content is reflected throughout the curriculum and integrated in problem-based and patient cases in both practical and clinical courses. As there currently are no universally accepted minimum standards for behavioral competencies within professional physiotherapist education (Dean and Söderlund, 2015; Dean et al., 2015b), we have constructed a clinical competency portfolio comparable to conventional physiotherapist clinical skills. In addition, we continue to work with peer clinical supervisors and provide continuing education in behavioral medicine theories and competencies. In this way, the content is more effectively reinforced by clinical supervisors and promotes a seamless educational experience for students. We are currently initiating master's and doctoral programs in physiotherapy, with a focus on behavioral medicine. These programs will be taught in English. Finally, consistent with the ICF and the WHO's definition of health, we endeavor to reflect behavioral medicine theory and practice in our on-going research wherever possible.

Summary and conclusions

Based on the extant literature, we constructed a novel new entry-level undergraduate physiotherapy program in Sweden, which integrates behavioral medicine content and competencies. The rationale for the new curriculum

was based on several premises. First, maximizing movement and functional capacity, and in turn health, is a goal based on the profession's established definition and values. Movement and function are conceptualized as behaviors, and as such they lend themselves to functional behavior analysis. Such analysis yields insights into the factors that support and reinforce optimal behavioral skills related to movement and function as well as those factors that serve as barriers. Further, behavioral analysis is useful for understanding how best to address behavioral factors in conjunction with standard examination/assessment findings, largely based on pathophysiology and biomechanics. Interventions can therefore be directed at the primary factors to support sustained behavioral change. Another premise is that lifestyle-related NCDs have been declared a priority not only by the WHO, but also by the WCPT. Thus, these should be addressed to some minimal standard, in every patient/client including children. Lifestyle change constitutes behavioral change. Today, many patients/clients are living with one or more chronic conditions and/or disabilities. Physiotherapists play a key role in enabling them to maximize their health and wellbeing and thrive, not merely survive with these conditions by exploiting largely non-pharmacological interventions and potentially behavioral interventions. Further, the risk factors for NCDs are largely those related to musculoskeletal conditions, the dominant area of contemporary physiotherapist practice. By addressing these factors in patients/clients with musculoskeletal conditions, physiotherapists could improve their standard outcomes and limit the recurrence of signs and symptoms. A final premise is that effective communication with patients/clients is the cornerstone of effective physiotherapist management and optimal outcomes in addition to supporting seamlessly interfaced care with the patient's/client's other health professionals.

To date, indicators support that graduates from our behaviorally oriented physiotherapy curriculum have augmented competencies, compared with those from programs in which the behavioral medicine content is less integrated in the curricula. Based on stringent accreditation reviews, conventional competencies remain strong in our graduates. The program continues to be refined based on new evidence, including that from the research enterprise within the program.

We believe that the physiotherapy profession has a unique role in advancing healthcare by integrating minimum standards for behavioral content and competencies into conventional practice; in addition, the profession is strategically well positioned within the health professions globally to do so. We hope to stimulate dialogue within the international physiotherapist

community regarding the interface of behavioral and conventional biomedical competencies within entry-level curricula, with the intent of and establishing minimum standards for competencies in behavioral medicine within contemporary practice.

Declaration of Interest

The authors declare no conflicts of interest.

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Appendix. Overview of the program curriculum

Year 1	Year 2	Year 3
<p>Physiotherapy (PT): Profession and Scientific Methodology <i>Introduction to the profession, behavioral medicine, and basic scientific methodology. Also, psychological perspectives and public health are introduced.</i></p>	<p>Pathology in Neurology and Psychiatry <i>Evidence base for pathophysiological issues in PT, prevention, and epidemiology. Experiences of illness and palliative care.</i></p>	<p>PT: Methods for Treatment – Preclinical Studies <i>Treatment methods addressing physical, psychological, and contextual factors. Evaluation of outcomes. Behavioral change techniques. Clinical reasoning.</i></p>
<p>Physiology and Anatomy <i>Basic knowledge in physiology and anatomy regarding the impact of different organ systems on movement and activity.</i></p>	<p>PT: Methods for Assessment – Preclinical Course <i>Assessment, physical activity, and exercise from a biopsychosocial perspective. Psychometrics and evidence. Lifestyle and communication with clients for health-related behavior change.</i></p>	<p>PT: Methods for Treatment and Evaluation – Clinical Studies <i>Creation of treatment plans. Application of treatment methods, evaluation, and analyses of outcomes on individual, group, and societal levels. Clinical reasoning.</i></p>
<p>PT: Health and Development – for Children and Older People <i>Health promotion from individual, group and societal levels from a biopsychosocial perspective. Motor, cognitive, and social development from a life span perspective.</i></p>	<p>Health Psychology for physiotherapists <i>Theories for health psychology, health and illness. Application of health and problem solving models as well as learning and health psychology theories.</i></p>	<p>PT: Thesis with Specialization in Behavioral Medicine <i>Create, conduct, and describe a complete study, including background, objectives, data collection, data analyses and discussion of results, within an integrated behavioral medicine theoretical framework.</i></p>
<p>PT: Movement Science <i>Biomechanics, functional anatomy, and behavioral learning. Understanding movement from a behavioral medicine perspective.</i></p>	<p>PT: Methods for Assessment – Clinical Studies <i>Application of assessment methods and analysis of the patient's activity, participation, physical, and social environment. Functional behavior analysis. Clinical reasoning.</i></p>	<p>PT: Physiotherapy from an organizational perspective on health care <i>Health and behavioral change interventions on an organizational level. Analyses and creation of strategies for organizational change.</i></p>
<p>Pathology: Internal Medicine and Orthopedics <i>Epidemiology and public health. Respiratory, cardiac, geriatric, and pediatric diagnoses.</i></p>	<p>Project Description for Thesis in PT <i>Application of scientific methodology: research problem, aim, methodology, and research ethics for a planned thesis with a specialization in behavioral medicine.</i></p>	<p>Societal perspectives and global health for physiotherapists <i>Societal challenges for health nationally, internationally, and globally. Cultural challenges for interventions on a societal level. Interventions for NCDs. Theories for health literacy.</i> PT: Elective course: In-depth or broader studies in physiotherapy.</p>