



LUNDS
UNIVERSITET

Department of Health Sciences
Division of Physiotherapy

Physiotherapy programme
180 ECTS

Bachelor Thesis 15 ECTS
Spring 2020

**Physiotherapist students' views of chronic pain and its treatments
- an international comparison**

Author

Emma Nilsson
Physiotherapy programme
Lund University
tys14eni@student.lu.se

Author

Rebecka Forsström
Physiotherapy programme
Lund University
re3380fo-s@student.lu.se

Examiner

Eva Ekvall Hansson
Associate Professor Physiotherapy
Lund University
Margaretavägen 1B, 222 40 Lund
eva.ekvall_hansson@med.lu.se

Author

Maria Råsmar
Physiotherapy programme
Lund University
ma1325ra-s@student.lu.se

Supervisor

Caroline Larsson
Physiotherapist PhD
Lund University
Margaretavägen 1B, 222 40 Lund
caroline.larsson@med.lu.se

Sammanfattning

Bakgrund:

Enligt International Association for the Study of Pain (IASP) lider cirka 20 procent av den vuxna befolkningen av långvarig smärta globalt. Otillräcklig behandling av tillståndet kan leda till negativa konsekvenser på människors hälsa och livskvalitet. Komorbiditeten mellan psykiskt mående och långvarig smärta är hög så väl som kostnaden för både samhället och individen. För ungefär en fjärdedel av personerna med långvarig smärta leder tillståndet till nedsatt arbetsförmåga och ökat vårdbehov.

IASP har konstaterat att vården av långvarig smärta är bristande i större delen av världen. För behandling av långvarig smärta finns det olika behandlingsmetoder med varierande och i många fall otillräcklig evidens. Studier visar brist på kunskap bland hälso- och sjukvårdspersonal avseende behandling av långvarig smärta samt otillräcklig utbildning inom området smärta på fysioterapiprogrammen.

Syfte:

Syftet med studien var att undersöka och jämföra fysioterapeutstudenters inställning till långvarig smärta och dess behandlingsmetoder, samt studenternas självupplevda beredskap att behandla långvarig smärta, i Sverige och Nya Zeeland.

Metod:

Enkät-baserad kvantitativ tvärsnittsstudie.

Resultat:

Resultatet visade att studenterna i Sverige och Nya Zeeland svarade relativt lika. I några fall fanns det en signifikant skillnad i svaren, till exempel vad gäller elevernas tro på om deras utbildning har gett dem tillräcklig kunskap om långvarig smärta och dess behandlingsmetoder, där eleverna i Nya Zeeland var mer positiva jämfört med studenterna i Sverige. Resultaten var generellt sätt mer spridda bland de svenska studenterna jämfört med studenter i Nya Zeeland.

Slutsats:

Resultaten kan indikera att studenterna i Nya Zeeland känner sig mer förberedda att möta patienter med långvarig smärta än de svenska studenterna. Dock kan inga ytterligare slutsatser dras gällande utbildningen kvalitet, då studien bara undersöker elevernas självupplevda kunskap. Följaktligen behövs ytterligare forskning.

Nyckelord: långvarig smärta, fysioterapi, internationell jämförelse, fysioterapeutstudent, utbildning

Abstract

Background:

According to The International Association for the Study of Pain (IASP), about 20 percent of adults suffer from chronic pain globally. Insufficient treatment of chronic pain can lead to negative effects on health and quality of life. The cost of chronic pain is high both for society and individuals. For approximately a quarter of the people with chronic pain, the condition results in reduced working ability and increased health care needs.

IASP has found that pain management is inadequate in most of the world. There are different options with a variety of evidence for the treatment of chronic pain, for many treatment methods the evidence is insufficient. Studies show a lack of knowledge of the treatments of chronic pain among health care professionals as well as the lack of adequate education in the area of pain in the physiotherapy programs.

Purpose:

The purpose of the study was to examine and compare physiotherapist senior students' beliefs about chronic pain, its treatment and the students' perceived preparedness to treat chronic pain, in Sweden and New Zealand.

Method:

Survey-based quantitative research method, with a cross-sectional design.

Result:

The result showed that answers from students in Sweden and New Zealand were fairly similar. Although, significant differences were found for some statements. For example, regarding the students' beliefs about whether their education has given them sufficient knowledge about chronic pain and its treatments, where the students in New Zealand were more positive compared to the students in Sweden. Moreover, the results were in general more scattered among the Swedish students compared to students in New Zealand.

Conclusion:

The results may indicate that the students in New Zealand feel more prepared than Swedish students. However, further conclusions can not be made regarding adequate education as the study only examines the students' self-perceived knowledge. Consequently, further research is needed.

Keywords: chronic pain, physiotherapy, international comparison, physiotherapy student, education

Contents

1. BACKGROUND	4
1.1 DEFINITION AND PHYSIOLOGY OF PAIN	4
<i>1.1.1 Acute pain</i>	4
<i>1.1.2 Chronic pain</i>	5
1.2 TREATMENTS OF CHRONIC PAIN	5
1.3 THE PATIENTS' RIGHT TO ADEQUATE PAIN TREATMENT	6
1.4 PAIN EDUCATION FOR HEALTH PROFESSIONALS	6
2. PURPOSE	8
2.1 SPECIFIC RESEARCH QUESTIONS	8
3. METHOD	8
3.1 DESIGN	8
3.2 STUDY PARTICIPANTS	8
3.3 SETTINGS	9
3.4 PROCEDURE	9
3.5 QUESTIONNAIRE	9
3.6 VALIDITY AND RELIABILITY	10
3.7 DATA ANALYSIS	10
3.8 ETHICS	10
4. RESULT	11
4.1 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY SAMPLE	11
4.2 STUDENTS BELIEFS ABOUT THE CAUSE AND MAINTENANCE OF CHRONIC PAIN	11
4.3 TO WHAT EXTENT DID THE STUDENTS CONSIDER THAT THERE WAS A DIFFERENCE BETWEEN ACUTE AND CHRONIC PAIN?	13
4.4 TREATMENTS OF CHRONIC PAIN CONSIDERED AS APPROPRIATE BY THE STUDENTS	13
4.5 PROFESSIONALS	14
4.6 TO WHAT EXTENT DID PHYSIOTHERAPIST SENIOR STUDENTS CONSIDERED THEMSELVES WELL PREPARED TO TREAT CHRONIC PAIN?	15
4.7 VARIATION IN ANSWER RANGE	16
5. DISCUSSION	17
5.1. RESULT DISCUSSION	17
<i>5.1.1. Beliefs about chronic pain among the students in Sweden and New Zealand</i>	17
<i>5.1.2 Self-reported preparedness of treating chronic pain</i>	19
<i>5.1.3 Response distribution</i>	20
5.2 METHOD DISCUSSION	20
<i>5.2.1 Study design</i>	20
<i>5.2.2 Study participants</i>	20
<i>5.2.3 Data collection</i>	20
5.3 RECOMMENDATIONS AND IMPLICATIONS FOR RESEARCH	21
6. RELEVANCE	21
7. CONCLUSION	22
8. ACKNOWLEDGMENT	22
9. REFERENCES	23
10. APPENDICES	27
10.1 APPENDIX 1	27
10.2 APPENDIX 2	31

1. Background

Chronic pain is a significant problem around the world (1-4), with a prevalence ranging from 10 to 55 percent, depending on the population sampled, the methods used to collect data, pain location and the criteria used to define chronic pain (1-4). According to The International Association for the Study of Pain (IASP), about 20 percent of adults suffer from chronic pain globally (5). The New Zealand National Health Survey 2018/19 estimates 19,4 percent of adults experienced chronic pain, defined as pain lasted more than six months and is present every day (6). In a recent European population study, chronic pain of moderate to severe intensity occurred in 19 percent of the adults and very few were managed by pain specialists and nearly half received inadequate pain management (3).

Chronic pain is a complex condition and includes interaction between biological and psychological aspects (7). The comorbidity between mood disorders and chronic pain is high (7). There are several psychological factors that are associated with adjustment to chronic pain (8). For example, there is strong evidence that pain-related anxiety and fear are related to a poor adjustment of chronic pain (8). While, high self-efficacy and adaptive pain coping are related to improved ability to cope with pain (8). For patients suffering from chronic pain, depression is associated with more complaints, higher pain intensity and a greater likelihood of longer duration of pain and non-recovery (7). Patients with chronic pain also experience a multitude of negative attitudes and distrust from healthcare providers, colleagues and families (9).

Insufficient treatment of chronic pain can lead to negative effects on health and quality of life (10). For approximately a quarter of the people with chronic pain, the condition results in reduced working ability and increased health care needs (9). The cost of chronic pain is high both for society and the individuals. Chronic pain is estimated to cost the Swedish community SEK 7.5 billion in direct health care costs each year (11). If the indirect costs of sick leave and loss of production are added, the amount rises to SEK 80 billion each year (11). The high cost of chronic pain is identified in many countries around the world. A recent study from Austria showed that the annual societal costs were estimated to EUR 10 191 (12). In 2018 a Chilean study calculated the annual expected cost due to musculoskeletal chronic pain to USD 1387.2 million, 0.417% of the national GDP (13). According to a study from 2010 in the United States, the cost of chronic pain was ranged from USD 560 billion to USD 635 billion, which was higher than the cost of cancer or heart disease (14).

1.1 Definition and physiology of pain

1.1.1 Acute pain

IASP defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (15). There are different types of pain. Nociceptive pain is pain that arises from actual or threatening damage to non-neural tissue and is due to the activation of nociceptors. Pain caused by a lesion or disease of the somatosensory nervous system is called neuropathic pain. Nociplastic pain arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors, neither evidence for disease or lesion of the somatosensory system causing the pain (15).

Acute nociceptive pain is caused by damage and inflammation. The damage makes nociceptors activated and causes depolarization of the nociceptors which is spread to the spinal cord by C- and A-fibers. The signal is modified through the spinal cord and transmitted to second-order neurons by neurotransmitters and passed to the brainstem by ascending pathways. Pain

perception is modified by descending pain pathways. These signals pass through the limbic system and midbrain structures down through the periaqueductal grey to the brainstem and are filtered before descending to the spinal cord to either facilitate or inhibit the upgoing pain signal (16).

1.1.2 Chronic pain

The definition of chronic pain varies but is generally seen as pain that lasts more than the expected healing time (17). In this study, chronic pain is defined by ICD-11 (2019) as pain that lasts or recurs for more than three months (5). There are two types of chronic pain - chronic primary pain and chronic secondary pain. Chronic primary pain represents chronic pain as a disease in itself. Chronic secondary pain is chronic pain where the pain is a symptom of an underlying condition (5).

The mechanisms of chronic pain are complex and multifactorial, and it has not been completely resolved (18). Nevertheless, some type of continuous nociceptive process provides the potency of chronic pain to develop. The transition from acute to chronic pain appears to occur in discrete pathophysiological and histopathological steps. In acute pain, harmful stimuli are reduced during the healing process until no pain is detected. Intense and persistent pain can activate secondary mechanisms both in the peripheral nervous system and within the central nervous system which can lead to chronic pain (18).

Peripheral sensitization is a phenomenon that may occur which reduces the threshold for activation and increases membrane excitability. When there has been damage to neurons, this inflammatory response may be accompanied by ectopic action potentials (without peripheral stimulus) (16). If transmission of pain signals from the periphery to the spinal cord remains, changes may happen in the central nervous system and produce central sensitization. This occurs as hypersensitivity, that may arise from a reduced threshold for activation of different receptors and gives an abnormal amplification of sensory signaling within the central nervous system. The central sensitization can over time develop into a permanent state. Allodynia, hyperalgesia and spontaneous pain may be produced by central sensitization. Also, secondary hyperalgesia, where increased sensitivity to pain in the undamaged tissue around the original injury and 'wind-up', where repeated identical stimuli become increasingly painful in spite of unchanged stimulus intensity, can be developed. Evidence also shows that defective descending inhibitory control could be present in various chronic pain syndromes and can by itself cause central sensitization (16).

1.2 Treatments of chronic pain

There are different options with a variety of evidence for the treatment of chronic pain (19). Choosing intervention, factors like pain type, other medical and psychological issues, personal preferences, side effects and treatment available must be considered (20). The knowledge of the long term effects of different methods for treating chronic pain is lacking (9).

According to the Swedish council on health technology assessments (SBU) systematic review, the evidence for multimodal rehabilitation differs from strong evidence to limited evidence strength, depending on the type of treatments used and combined as well as for different types of chronic pain conditions (9,11,21). The same applies to the evidence grade for analgesics and antidepressants. Evidence strength varies from strong to limited for different types of analgesics and antidepressants and between different types of chronic pain conditions among the patients

(9,21). The scientific evidence is not enough to draw conclusions about the effect of several chronic pain conditions and various medical treatment methods and their side effects (9,21).

Furthermore, there is strong evidence that patients with neck and back pain who received professionally led training experience greater pain relief than patients who only received general training advice (9,21). For patients with low back pain, exercise provides a better effect on the pain than physically passive treatments (9,21). Exercise in combination with some form of behavioral therapy provides further improvement for patients with low back pain (9,21).

Moreover, SBU's systematic review showed that cognitive-behavioral therapy (CBT) improves the social and physical function and about 25 percent improved ability to deal with the pain compared to other investigated behavioral therapies, drugs, physiotherapy and no treatment at all with moderate evidence strength (9, 21). Additionally, information about chronic pain to the patients has a small to moderate effect on pain and low evidence of small to moderate effect on disability immediately after the intervention according to a systematic review and meta-analysis from 2018 (22). Neurophysiological pain education has a small to moderate effect on pain and disability at three months follow-up in patients with chronic low back pain (22).

Limited evidence of treatment of chronic pain has been found in acupuncture combined with other treatments. Likewise, mud or mineral bath therapy as a treatment of chronic musculoskeletal pain has also shown limited evidence according to the review from SBU (9,21).

For many treatment methods the evidence is insufficient. Scientific evidence is lacking for treatment methods as TENS, massage, relaxation and cryotherapy, to mention some examples (9,21,23).

According to IASP Curriculum Outline on Pain for Physical Therapy (24), the physiotherapist's role in the multimodal team around the patient suffering from chronic pain is to provide evidence-based person-centered care that improves the patient's function. The physiotherapist should encourage active self-management through the use of physical, cognitive and behavioral approaches to help the patient reduce the impact of their pain and disability. The focus of the treatment should be on what the patients can do themselves rather than focusing on the use of passive interventions. In order to help the patient in an adequate way, physiotherapists have to understand the multidimensional nature of pain, acknowledging the complex factors that underlay each patient's experience of pain. Moreover, knowledge alone is insufficient and the physiotherapist also requires competes about pain diagnosis and evidence-based pain treatments and management (24).

1.3 The patients' right to adequate pain treatment

IASP has found that pain management is inadequate in most of the world. This because chronic pain with or without diagnosis is highly stigmatized and there is a lack of knowledge among health care professionals regarding the mechanisms and management of pain (25). The declaration of Montreal pronounces that access to pain management is a fundamental human right and that all people with pain have the right to appropriate assessment and treatment of the pain by adequately trained health care professionals (25).

1.4 Pain education for health professionals

IASP have developed a curriculum outline on pain for physiotherapists and encourages the use of this in education and research (24). The curriculum includes a biological basis, the

psychosocial and environmental components of pain and their impact on the pain experience across the lifespan. According to the curriculum, the physiotherapist students should be familiar with the theoretical models behind interventions of pain as well as the empirical evidence for the effectiveness of these interventions. The recommendation of IASP is that physiotherapeutic pain management should be taught independently in the curriculum (24).

Latimer et al. 2004 investigated whether physiotherapy students' attitudes and beliefs towards chronic low back pain changed following exposure to a teaching module on chronic back pain (26). The study concluded that students' attitudes and beliefs changed to become more like those of pain clinic healthcare providers after taking part in the teaching module (26). The short-term effects of pain education on physiotherapist students have been investigated in a randomized control trial (n=80) (27). With a single 70-minute session about pain, the physiotherapy students improved their knowledge about pain, their attitudes towards patients with chronic pain become better and the likelihood that they will make recommendations in line with clinical guidelines increased (27). According to a study from Queensland University, an integrated pain course developed according to the pain curriculum guidelines by IASP resulted in increased student knowledge about pain, regardless of the length of the program attended. Students who had received an integrated pain course had increased knowledge in five of the six tested subscales; physiological basis of pain, psychological factors of pain perception, assessment and measurement of pain, cognitive-behavioural methods of pain relief, and pharmacological management of pain were improved (28). A qualitative study examined physiotherapists' pain beliefs and its influence on the management of patients with chronic low back pain. The study revealed a theory that the physiotherapists' pain beliefs may influence their clinical processes and the information about chronic pain given to the patient (29).

Despite the shown effect and support from the IASP curriculum, a recent review (2018) demonstrated that there has been an increased number of published reports over recent years that identifies inadequate pain education for health professionals (30). The review presents evidence indicating that students' knowledge, skills, attitudes or beliefs about pain are mostly inadequate across the health professions. The problems with pain education consist of lack of attention in the curricula and pedagogical approaches do not necessarily facilitate the knowledge and skills that health professionals require to manage patients in pain (30). Minimal interprofessional learning and insufficient hours of pain education have been reported (31). Published curricula for pain education have been available for decades, yet rarely applied in education (31).

The lack of adequate education in the area of pain also occurs in physiotherapy programs. A Canadian study concluded that Canadian physiotherapy programs integrate less than 40 percent of the pain education content recommended by IASP. In addition, the authors of the article considered that there was a need for further content that could help students better manage complex forms of pain (32). Studies from Canada and Finland showed that the teaching of pain-related topics in medical schools is fragmented and specific curricula for chronic pain are uncommon (33,34). A survey from the United States about time and resources spent on teaching about pain in the physiotherapy schools showed that 49 percent of the schools believed that their students did not receive adequate education in pain management (35). Furthermore, less than 50 percent of the respondent schools were aware of the IASP's guidelines for physical therapy pain education (35).

A study from the United Kingdom made by Ali and Thomson 2009 aimed to investigate and compare the knowledge of chronic pain and its management between final year physiotherapy students (n=62) and final year medical students (n=126). The result showed that physiotherapist

students could learn more about drug management of chronic pain and that medical students had a lack of knowledge about patient empowerment (36).

In conclusion, the physiotherapist profession faces a major challenge in patients with chronic pain (1-4). However, studies show a lack of knowledge of its treatments among health care professionals (3,9,25,37) as well as lack of adequate education in the area of pain in the physiotherapy programs (32). Since pain is one of the most common reasons to seek medical care, these are worrying facts (38). A broader knowledge of this is important in the development of education and would give an insight into whether physiotherapy senior students' beliefs varies in different parts of the world. This study compared students' self-perceived knowledge about chronic pain in two developed countries with different healthcare systems (39,40) and dissimilar lengths of their undergraduate education in physiotherapy (41,42,43). The included universities have received high world rankings in the QS World University Rankings 2020 (44). In the QS World University Rankings by Subject 2019, Lund University and University of Otago also were ranked top 100 in the area of anatomy and physiology (45)

2. Purpose

The purpose of the study was to examine and compare physiotherapist senior students' beliefs about chronic pain, its treatment and the students' perceived preparedness to treat chronic pain, in Sweden and New Zealand.

2.1 Specific research questions

To what extent was there a difference between the physiotherapist senior students responding answers in Sweden and New Zealand, regarding the following questions;

- What beliefs did the physiotherapist senior students have to the cause and maintenance of chronic pain?
- To what extent did physiotherapist senior students consider that there was a difference between acute and chronic pain?
- Which treatments of chronic pain did physiotherapist senior students considered as appropriate?
- Which professionals did physiotherapist senior students considered as appropriate to treat chronic pain?
- To what extent did physiotherapist senior students considered themselves well prepared to treat chronic pain?

3. Method

3.1 Design

Survey-based quantitative research methods were used, with a cross-sectional design.

3.2 Study participants

The study included 160 physiotherapists senior students at Lund University, University of Gothenburg and University of Otago.

Inclusions: Physiotherapist senior students at Lund University, University of Gothenburg or the University of Otago.

Exclusions: If the inclusions were met, there were no further exclusions.

3.3 Settings

In Sweden, the study took place at two different universities with various curriculums: Lund University and the University of Gothenburg. In New Zealand data was collected from three different campuses of the University of Otago, located in Wellington, Christchurch and Dunedin, all with the same curriculum. The bachelor program in Sweden runs over three years while in New Zealand it runs over four years. The Swedish students included in the study were at the beginning of their sixth semester out of six. In New Zealand the included students were in the first half of their eighth semester out of eight.

3.4 Procedure

The research students visited all included universities and campuses in both Sweden and New Zealand. Study participants were given the questionnaires personally by the research students during their respective lectures. Instructions and the purpose of this study were explained both oral and written by the research students. Consent was given through participation in the study. Participation was voluntary, and confidentiality was guaranteed. Possible refuse to participate was free for everyone and had no influence on their education. Answering the questionnaire was time-limited to 30 minutes. The students were requested to answer individually. The students were not allowed to take the questionnaire away. When the students had answered the questionnaire, or after the time-limit, the forms were collected by the research students.

3.5 Questionnaire

The questionnaire (Appendix 1) included 25 questions in total; divided in “Demographic data”, “Section 1” and “Section 2”. The questionnaire was developed mainly based on the questionnaire used in the study by Ali and Thomson (36), as presented in Appendix 2. The response options of the graded scales were modified to a five graded Likert scale (with the options strongly disagree, disagree, neither agree or disagree, agree and strongly agree), which is frequently used in questionnaires investigating attitudes and beliefs (46).

Additional questions were created for the purpose of this study, as presented in Appendix 2. These questions were created to design a questionnaire that fit the purpose of the study and to illustrate a broader picture of the students’ views of chronic pain. (Appendix 2).

The first three questions collected demographic data regarding age, gender and country of study. Section one included questions about areas of physiology, pathology, psychology and sociology of chronic pain, including two questions that were made for this study. The two questions “There is a physiological difference between acute pain and chronic pain” and “Chronic pain results in changes in the peripheral nervous system” were added to get a broader picture of the students’ views of chronic pain and its mechanisms. Section two included questions about the management of chronic pain, received education about chronic pain and the student’s interest in chronic pain. The first two questions were based on the general recommendations for physical activity in both Sweden and New Zealand (47,48). These questions highlighted if the student thought that patients with chronic pain should be as active as the general, healthy population.

“Through my education I have got sufficient knowledge of chronic pain” and “Through my education I have got sufficient knowledge of treatment of chronic pain” enabled a comparison of the students' experience of their education in the subject chronic pain. Moreover, the question “I feel prepared to treat patients with chronic pain” was added with the same purpose. Through the question “I am interested in working with chronic pain as a specialty” it was possible to chart if there was any difference between the countries regarding the interest of working with chronic

pain. The question “A free-standing pain mechanisms/management course is included in the curriculum of our education” was created from the questionnaire used by Hoeger Bement and Sluka (35) and showed the students’ experienced education about chronic pain.

The question “What treatments are appropriate to treat chronic pain?” aimed to get an overview of students’ beliefs about different treatments of chronic pain. The selection of treatment methods was made to obtain a range of different interventions with a varied level of evidence, performed by different professionals. The last question “What professionals/persons should be involved in the management of chronic pain?” was also retrieved from the questionnaire by Ali and Thomsons (37), even though the option “Family and Friends” was removed since this study was focused on the students’ beliefs towards different professionals. Through this question it was possible to examine students’ views of the multimodal collaboration in the management of chronic pain.

3.6 Validity and reliability

To control the face validity of the questionnaire, clearness of the instructions, the ambiguity of the questionnaire and to adjust the time needed to complete the questionnaire, the questionnaire was piloted on 17 physiotherapists senior students at Lund University, not involved in the study. No changes were made after the pilot study. The reliability and validity of the questionnaire were not further tested.

3.7 Data analysis

Data was analyzed and presented mainly as descriptive statistics in the form of percentages (%). Mean, frequency and standard deviations (SD) were used for continuous demographic data.

To enable comparison between groups, responds of most questions (in section 1 and 2) was dichotomized into “agree” (“strongly agree” or “agree”) and “not agree” (“strongly disagree”, “disagree” and “neither agree or disagree”). In some cases, data was presented in five categories to highlight the distribution of the answers within the groups in more detail.

The computer programs Excel and Word were used to process the collected data and to create charts and tables for the presentation of the questionnaire responses. Statistical analysis was made with the statistical program SPSS for group comparisons. Power/Sample size calculation has not been done due to limited time. The null-hypothesis of the study was that no difference between the groups would be found. The chi-squared test was used to compare categorical data. Statistical significance was set at $p < 0.05$.

3.8 Ethics

The study was approved by VEN, the regional ethical review board of Lund University. Ethical approval was made according to the ethical rules of the universities based on the recommendations of the ethical rules by VEN. Participation was voluntary, and confidentiality was guaranteed. Based on the validation by VEN, the study got approved by the program directors of Lund University, University of Gothenburg and the University of Otago.

Informed consent was given to the participants both written attached to the questionnaire and oral by the research students. Possible refuse to participate was free for everyone and had no influence on education. The consent could have been withdrawn by the participant before, during or after answering the questionnaire at any time.

Collected data were only handled by the research students and the supervisor of the study and were stored locked, in paper form and on a USB-stick. The material was destroyed after the results were compiled and presented at Lund University.

To ensure the responders' confidentiality, the information on the country of study, age and gender were coded. Names, university or identification number of the participants was not collected to avoid the risk of identifying individuals. Data was only presented at group level and was not given about individuals. In this way, confidentiality was guaranteed in the compiled material.

4. Result

4.1 Demographic characteristics of the study sample

Out of 160 physiotherapist senior students approached, a total of 159 were included in the study, the response rate for the total sample was 99.4% (Table 1). Of the study participants, 62% (n=98) were students in New Zealand and 38% (n=61) were students in Sweden (Table 1). There was more female student in both countries, the differences were greater in New Zealand than in Sweden (Table 1). The mean age was 24 and ranged between 21 and 47 years. Final year physiotherapy students in New Zealand (mean age 23 years) were relatively younger than final year physiotherapy students in Sweden (mean age 26 years) (Table 1).

Table 1. Demographics data, presented for total sample, Sweden and New Zealand

Variable	Total sample	Sweden	New Zealand
N, (%)	160	62 (38)	98 (62)
Response rate n, (%)	159 (99.4)	61 (98)	98 (100)
Men/women n,(%)	61/97 (38/62)	27/34 (44/56)	34/63 (35/65)*
Mean age, (years)	24 (SD 4.7)	26 (SD 4.4)	23 (SD 4,5)**

* One participant did not state gender.

**One participant did not state age.

4.2 Students beliefs about the cause and maintenance of chronic pain

Significant differences ($p < 0.05$) between the countries were found regarding the statements "Chronic pain is closely related to tissue damage" and "Psychological factors play a major role in the development of chronic pain", "Psychological factors play a major role in the maintenance of chronic pain", "Chronic pain is an interaction of physical, psychological and social factors" and "Cultural and social backgrounds have an effect on pain perception" (Table 2).

Of the students, 11.5% in Sweden and only 1.0% in New Zealand agreed to the statement that chronic pain is related to tissue damage (Table 2). Few students, 11.5% in Sweden and 4.1% in New Zealand considered a pathology as often identifiable in case of chronic pain (Table 2). Considering the physiology of chronic pain, 96.7% of the Swedish students and 92.9% of the students in New Zealand agreed to the statement that chronic pain results in changes in the Central Nervous System (Table 2). In Sweden, 73.3 % and in New Zealand 58.2% of the students agreed that chronic pain results in changes in the Peripheral Nervous System (Table 2).

There was a collected picture of chronic pain as an interaction of physical, psychological and social factors which 100 % of the students in New Zealand and 93.4 % of the students in Sweden agreed to (Table 2). Moreover, 99.0 % of the students in New Zealand and 91.8 % of the students in Sweden considered that cultural and social backgrounds have an effect on pain perception (Table 2). The students' view of psychological factors as a major contributor to the development of chronic pain differed significantly ($p = 0.001$) between the groups. In New Zealand, 94.9 % of

the students agreed, whereas the Swedish result for the same question was 77.0% (Table 2). The answers were more consistent about psychological factors as a major contributor for the maintenance of chronic pain, which 96.9% of the students in New Zealand and 85.2% of the students in Sweden agreed to (Table 2).

To the statement “Chronic pain leads to disability”, 77.0 % of the students in Sweden and 65.3 % of the students in New Zealand agreed (Table 2). Furthermore, 63.3% of the students in Sweden and 68.4% of the students in New Zealand agreed to the statement “Chronic pain can be cured” (Table 2).

Table 2. Students beliefs about the cause and maintenance of chronic pain (n=159)

Variable	SWE (n=61)	NZ (n=98)	P-value*
Chronic pain is closely related to tissue damage, (%)			0.003
- Agree	11.5	1.0	
- Not agree	88.5	99.0	
In case of chronic pain, pathology is often identifiable, (%)		**	0.077
- Agree	11.5	4.1	
- Not agree	88.5	95.9	
Chronic pain results in changes in Central Nervous System, (%)			0.305
- Agree	96.7	92.9	
- Not agree	3.3	7.1	
Chronic pain results in changes in Peripheral Nervous System, (%)	**		0.054
- Agree	73.3	58.2	
- Not agree	26.7	41.8	
Chronic pain is an interaction of physical, psychological and social factors, (%)			0.010
- Agree	93.4	100	
- Not agree	6.6	0.0	
Cultural and social backgrounds have an effect on pain perception, (%)			0.021
- Agree	91.8	99.0	
- Not agree	8.2	1.0	
Psychological factors play a major role in the development of chronic pain, (%)			0.001
- Agree	77.0	94.9	
- Not agree	23.0	15.1	
Psychological factors play a major role in maintenance of chronic pain, (%)			0.007
- Agree	85.2	96.9	
- Not agree	14.8	3.1	
Chronic pain leads to disability, (%)			0.117
- Agree	77.0	65.3	
- Not agree	23.0	34.7	
Chronic pain can be cured, (%)			0.432
- Agree	63.3	68.4	
- Not agree	37.7	31.6	
There is a physiological difference between acute pain and chronic pain, (%)		**	0.141
- Agree	91.8	83.7	
- Not agree	8.2	16.3	

* Chi 2 test

** One participant did not answer this question

4.3 To what extent did the students consider that there was a difference between acute and chronic pain?

Most of the participants agreed that it was a difference between acute and chronic pain; 91.8% of the students in Sweden agreed compared to the corresponding value of 83.7% among students in New Zealand (Table 2).

4.4 Treatments of chronic pain considered as appropriate by the students

Significant differences between the countries were found regarding the treatments “Relaxation”, “Acupuncture” and “TENS” (Figure 1) and the statement “Patients should be encouraged to avoid pain-inducing activities” (Table 3). The difference between the students in Sweden and New Zealand regarding the question “What treatments are appropriate to treat chronic pain?” is described in Figure 1. The treatment method that the students agreed on the most where “physical activity”.

The students in Sweden ranked the treatment methods as follows; 100% of the students thought that “physical activity” was an appropriate treatment. This was followed by “information about chronic pain” (96.7%), “psychotherapy” (90.1%), “relaxation” (80.3%), “TENS” (72.1%), “acupuncture” (68.9%) and massage” (55.7%). Fewer students thought that the treatment methods “analgesics” (44.3%), “anxiolytics/anti-depression medicine” (37.7%) and “ice bath” (24.6%) were appropriate for chronic pain. Only 6.6 % of the students in Sweden though that “mud bath” was a suitable treatment method (Figure 1).

The students in New Zealand ranked the treatment methods slightly different. The treatment methods that 99.0% of the students in New Zealand thought were appropriate to use on chronic pain were “physical activity”, “relaxation” and “information about chronic pain”. These methods were followed by “psychotherapy” (86.7%) and “massage” (61.2%). The treatment methods “TENS” (45.9%), “analgesics” (42.9%), “anxiolytics/anti-depression medicine” (42.9%) “acupuncture” (39.8%), “ice bath” (17.3%) and “mud bath” (13.3%), fewer than half of the students in New Zealand thought were appropriate (Figure 1).



Figure 1. What treatment are appropriate to treat chronic pain?

* P-value, Chi 2 test

** Statically significant

The belief that the general recommendations of physical activity in Sweden and New Zealand (82, 83) should be applied to patients with chronic pain was investigated (Table 3). The students mostly agreed that the general recommendations for aerobic activity should be applied, 83.6% of the students in Sweden and 79.6% of the students in New Zealand agreed to this (Table 3). The result was similar regarding applying the recommendations for muscle-strengthening activities (Sweden 78.7%, New Zealand 73.5%) (Table 3). There was a significant difference between the countries regarding the statement that patients should be encouraged to avoid pain inducing activities. Of the students in Sweden, 18.0% agreed compared to 4.1% in New Zealand (Table 3).

Table 3. Treatments of chronic pain (n=159)

Variable	SWE (n=61)	NZ (n=98)	P-value*
Patients with chronic pain should be physical active at least 150 minutes moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity throughout the week, (%)			0.529
- Agree	83.6	79.6	
- Not agree	16.4	20.4	
Patients with chronic pain should train muscle-strengthening activities at least 2 days each week, (%)			0.457
- Agree	78.7	73.5	
- Not agree	21.3	26.5	
Patients should be encouraged to avoid pain-inducing activities, (%)			0.003
- Agree	18.0	4.1	
- Not agree	82.0	95.9	

* *Chi 2 test*

4.5 Professionals

A significant difference between the countries was found in results for the professional “Psychologist” (Sweden 92.0%, New Zealand 100%), while the results for the other professions were similar to each other (Figure 2). The three professions doctor, physiotherapist and psychologist, most students regardless of the country considered as appropriate to treat chronic pain. For occupational therapist and nurse the results were slightly lower (Figure 2).

Of the participants, 93.4% of the students in Sweden and 93.9% of the students in New Zealand thought that doctors should be involved in the treatment of chronic pain. Furthermore, 98.4% of the students in Sweden and 100% of the students in New Zealand considered physiotherapists as an appropriate professional to treat chronic pain. For psychologists, 92.0% of the students in Sweden and 100% of the students in New Zealand thought that the profession should be included in the treatment of chronic pain. Neither students in Sweden nor in New Zealand considered that occupational therapists or nurses should be included in the treatment of chronic pain to the same extent as the previously mentioned professions. The result for occupational therapists among the students in Sweden were 70.5% and for the students in New Zealand 73.5% (Figure 2).

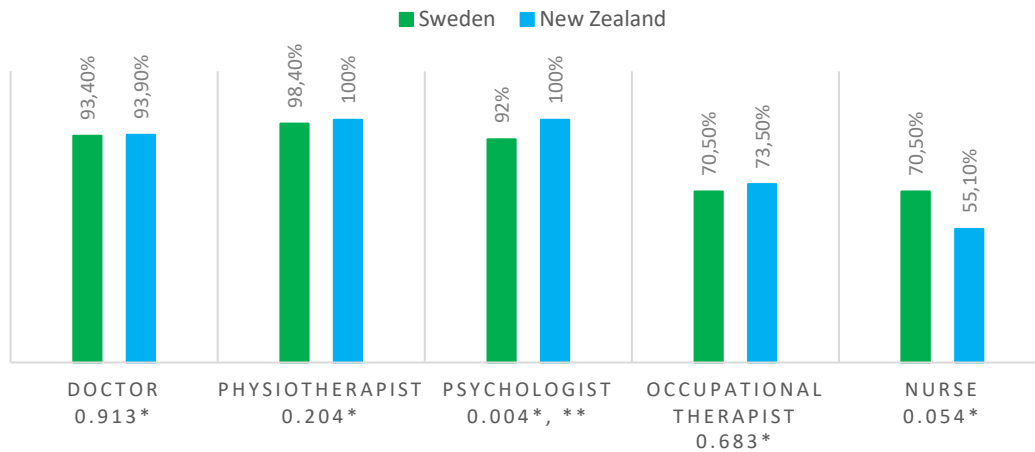


Figure 2. What professionals should be involved in the management of chronic pain?

* *P-value, Chi 2 test*

** *Statically significant*

4.6 To what extent did physiotherapist senior students considered themselves well prepared to treat chronic pain?

A significant difference between the countries was found regarding the statement “Through my education I have got sufficient knowledge of treatment of chronic pain” (Tabel 4).

Only 23.0% of the students in Sweden agreed that they felt prepared to treat chronic pain and the corresponding number among the students in New Zealand was 34.7% (Table 4). Furthermore, 45.0% of the students in Sweden and 60.2% of the students in New Zealand agreed that they have got sufficient knowledge of chronic pain through their education (Table 4). Of the students, 24.6% in Sweden and 48.0% in New Zealand agreed that they have got sufficient knowledge of the treatment of chronic pain through their education (Table 4).

Moreover, the students’ interest in the area of chronic pain was investigated. The result showed that among the students in Sweden, 67.2% agreed on being interested in the area of chronic pain. The same was for the students in New Zealand, where 62.2% agreed on being interested in the subject (Table 4). The students’ interest in working with chronic pain as a specialty was lower, where 34.4% of the students in Sweden and 27.6% of the students in New Zealand agreed on the statement (Table 4).

Of the students in Sweden, 32.8 % agreed with the question “A free-standing pain mechanisms/management course is included in the curriculum of our education” compared to 36.7%, of the students in New Zealand (Table 4).

Table 4. Self-reported preparedness of treating chronic pain (n=159)

Variable	SWE (n=61)	NZ (n=98)	P-value*
I feel prepared to treat patients with chronic pain, (%)			0.117
- Agree	23.0	34.7	
- Not agree	77.00	65.3	
Through my education I have got sufficient knowledge of chronic pain, (%)			0.063
- Agree	45.0	60.2	
- Not agree	55.0	39.8	
Through my education I have got sufficient knowledge of treatment of chronic pain, (%)			0.003
- Agree	24.6	48.0	
- Not agree	75.4	52.0	
I am interested in the area of chronic pain, (%)			0.525
- Agree	67.2	62.2	
- Not agree	32.8	37.8	
I am interested in working with chronic pain as a specialty, (%)			0.358
- Agree	34.4	27.6	
- Not agree	65.6	72.4	
A free-standing pain mechanisms/management course is included in the curriculum of our education, (%)			0.612
- Agree	32.8	36.7	
- Not agree	67.2	63.3	

* Chi 2 test

** One participant did not answer this question

4.7 Variation in answer range

The answers among the students in Sweden were more scattered than the answers among students in New Zealand. This was especially evident in the questions “Through my education, I have got sufficient knowledge of treatment of chronic pain” and “I feel prepared to treat patients with chronic pain” (Figure 3, 4)

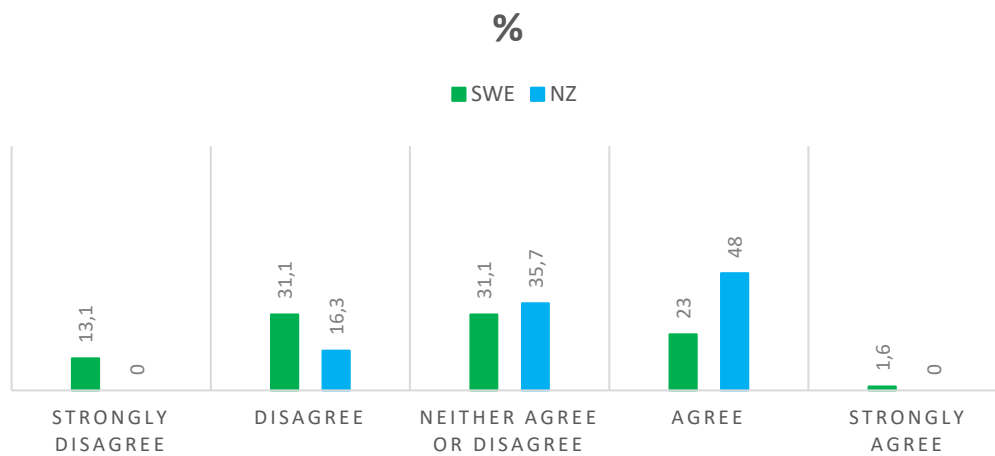


Figure 3. Through my education I have got sufficient knowledge of treatment of chronic pain

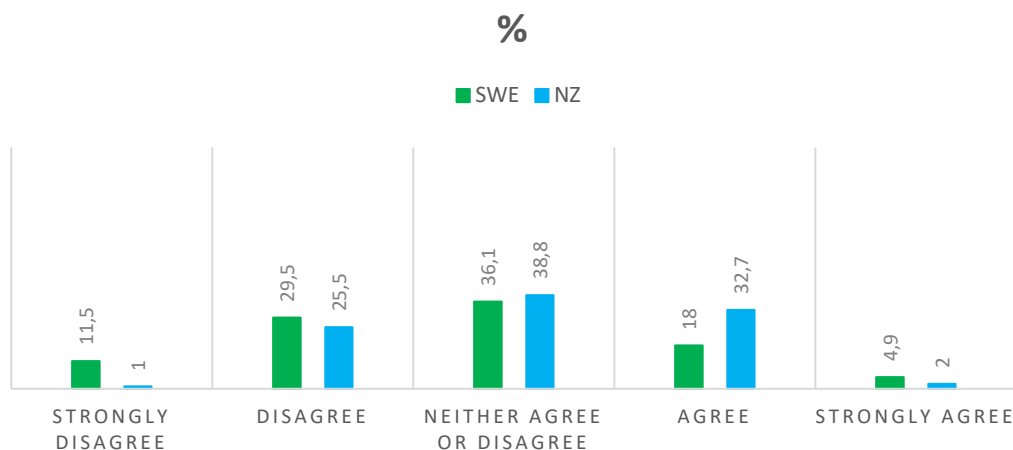


Figure 4. I feel prepared to treat patients with chronic pain

5. Discussion

5.1 Result discussion

This study examined physiotherapist senior students' beliefs about chronic pain, its treatment and the students' perceived level of education in chronic pain. The study compared students' answers in Sweden and New Zealand. In general, the answers did not differ remarkably between the countries. The results showed that students' beliefs about chronic pain were overall consistent with the literature which highlights the difference between chronic and acute pain as well as that chronic pain is a complex condition which is affected by several factors in the patient's life (5,7,8,15,18). An evident difference in the result was that the students in New Zealand through their education felt better prepared to meet and treat patients with chronic pain, compared to the Swedish students. Furthermore, although the responses between the countries most often followed each other, it was noticeable that the students in New Zealand responded more collectively compared to the students in Sweden whose answers were more scattered.

5.1.1 Beliefs about chronic pain among the students in Sweden and New Zealand

The results of the study showed that the beliefs about chronic pain among students in Sweden and New Zealand did not differ remarkably. For instance, the consideration of a physiological differences between acute and chronic pain was answered positively in both groups. Most of the participants agreed that it was a difference between acute and chronic pain. This in line with the literature that for example highlight the differences in the physiology of acute and chronic pain (16,18). According to recent studies, nearly half of the patients with chronic pain of moderate to severe intensity received inadequate pain management (3) and the patients with chronic pain also experience a multitude of negative attitudes and distrust from healthcare providers (9). Therefore, it is important that the physiotherapy students know the difference between various types of pain to be able to give the patient right guidance and treatment. In case of lack of knowledge and understanding, insufficient treatment is a risk which can lead to negative effects on health and quality of life for patients suffering from chronic pain (10).

Additionally, the beliefs among the students were similar in several other questions. For example; most of the students, both in Sweden and New Zealand, agreed or strongly agreed to that chronic pain results in changes in the Central Nervous System, that chronic pain is an interaction of

physical, psychological and social factors and nearly all of the students considered cultural and social backgrounds to have an effect on pain perception. However, about a third of the students were not sure or disagreed whether chronic pain results in changes in the Peripheral Nervous System (16,18). Likewise, nearly a third of the students did not agree or were uncertain about the statement that chronic pain leads to disability, even though the condition leads to reduced working ability and increased health care needs for a quarter of the people with chronic pain (9). This may indicate that beliefs about chronic pain differ in some fields and that all students may not feel fully confident in the area. This strengthens previous studies that have identified insufficient pain education for health professions such as physiotherapists (30,32).

Even though the answers were principally similar between the countries, there were questions where the result did not follow each other. The result for the question “Psychological factors play a major role in the development of chronic pain” was one of the questions where the students in Sweden did not agree in the same extent as the students in New Zealand. This somewhat surprising, as the answers between the countries were similar regarding the question “Psychological factors play a major role in the maintenance of chronic pain”. According to current research, psychological factors affect both the development and the maintenance of chronic pain (7,8). A similar trend was seen in the results for the questions about whether chronic pain results in changes in Central Nervous System and Peripheral Nervous System, where the students in New Zealand did not agree on the statement that it results in changes in the Peripheral Nervous System in the same extent as for changes in the Central Nervous System. What may have affected the students' answers regarding these questions is difficult to say, but the result may indicate uncertainty among the students regarding certain areas of the subject chronic pain.

Over a third of the students in both countries were uncertain or did not believe that chronic pain could be cured. This could be a result of the variety of evidence for the different treatment methods (9) as well as that chronic pain is a broad diagnosis spectrum where treatment methods are different successful depending on individual (9,19,20). The students in both countries considered physical activity as an appropriate treatment method in the management of chronic pain. Also, the students mostly agreed or strongly agreed that the general recommendations for aerobic activity and muscle-strengthening activities in Sweden and New Zealand should be applied to patients with chronic pain. The widespread belief in physical activity confirms a common image of the physiotherapist's role in the team around the patient which is consistent with the available evidence and general recommendations for physical activity in Sweden and New Zealand (47,48).

Since scientific evidence is limited for many treatment methods of chronic pain, this lack of united knowledge could be an affecting factor to the scattered results (9,21,23). The greatest contrasts in the results for the different treatment methods were found for three physiotherapeutic interventions; TENS, relaxation and acupuncture, where the students in Sweden and New Zealand responded dissimilar on the methods relevance. Acupuncture was the treatment method where the results differed the most between the countries, which can be a consequence of the limited evidence for it in the management of chronic pain (9,21). The students in Sweden thought that TENS was an appropriate way to treat chronic pain to a greater extent than the students in New Zealand. The scientific evidence for TENS is insufficient, but pain relief has been shown after using TENS (21). TENS is for example widely used in Sweden where about 17 percent of the patients with chronic pain has been exposed to the treatment (21). On the contrary, the New Zealand students showed a higher support for relaxation than the Swedish students. Of the students in New Zealand, almost everyone thought that relaxation is an appropriate treating method which differs from the lower Swedish result. There are some supporting evidence for

relaxation as a treatment for chronic pain, although the improvements do not maintain over time (50).

The different view on treatment methods between countries methods can be a consequence of the content included in the students' education but may also depend on the evidence for the treatment methods as well as cultural differences and general attitudes towards the treatment methods in the countries.

The majority of the students agreed to that all professionals, mentioned in the survey, should be involved in the management of chronic pain. This was in line with SBU's systematic review (9,11). Students in both Sweden and New Zealand agreed on that doctors, physiotherapists and psychologists should be included in the team around the patient with chronic pain. Fewer thought that the professions occupational therapist and nurse should be included in the team. Why the results differed between the different professions could not be explained through this study, but considering that coordinated, intensive and activating rehabilitation with the help of interdisciplinary contribution gives better results than single treatments (9), students must understand the relevance of the multimodal cooperation. However, the interprofessional learning is minimal according to previous study (31).

5.1.2 Self-reported preparedness of treating chronic pain

Less than half of the students in both Sweden and New Zealand agreed with the statements "Through my education, I have got sufficient knowledge of chronic pain" and "Through my education, I have got sufficient knowledge of treatment of chronic pain". The result of these questions correlated to previous study results about students' knowledge, skills, attitudes or beliefs about pain, presented in a review from 2018. The review concluded that there has been an increased number of published reports over recent years that identifies inadequate pain education for health professionals (30).

Moreover, the students in New Zealand experienced their education about chronic pain and its treatments more efficient and they also felt more prepared to treat patients with chronic pain, compared to the students in Sweden. The difference in received knowledge could originate in the different lengths of the physiotherapy program in Sweden and New Zealand. In New Zealand, education extends over four years, whereas in Sweden the education extends over three years.

Furthermore, the curriculums of the universities are important to consider when analyzing these results. The curriculum of all the included physiotherapy programs includes descriptions about a professional approach and knowledge of relevant areas, such as patient-focused interventions, to be able to treat the patient in their individual situation. IASP recommends that physiotherapeutic pain management should be taught independently in the curriculum (24). However, direct mention of "pain" or "chronic pain" could only be found in the curriculum of the University of Otago (51-53). Overall, the curriculum for the University of Otago was more focused on chronic pain compared to the curriculum for the Swedish universities. Consequently, this could be a possible contributing factor to their perception that they had received sufficient education in chronic pain and its treatments.

According to the study by Latimer et al., it is possible to change students' attitudes and beliefs about chronic pain with just a short teaching module (26). By adding more targeted teaching towards chronic pain and its treatment, student's self-reported preparedness of treating chronic pain could increase. The result of this study may support this as the curriculum of the University of Otago points out chronic pain throughout education (51-53). Considering this, an increase of

the students' feeling in being prepared to treat patients with chronic pain could be reached through developing their education.

5.1.3 Response distribution

The students in New Zealand responded more collectively than the students in Sweden, whose results were scattered. An underlying cause may be because the students in New Zealand studied at the same university with the same curricula, while the students in Sweden represented two different universities with the various curriculums (51-53). The content of the curriculum regarding chronic pain could also be an affecting factor, such as the length of the education, as mentioned above. By adding more targeted teaching about chronic pain in education, as Latimer et, al suggests in their study (26), the answers among the students would get more collective, which in the future could lead to a more united attitude to the condition chronic pain among the profession.

5.2. Method- and material discussion

5.2.1. Study design

A survey-based quantitative research method with a cross-sectional design was used in this study as the time and budget were restricted. The method design was relevant to use to the investigation of the students' beliefs about chronic pain, its treatments and the perceived level of education in the subject. Moreover, a survey-based design made it possible to investigate a large number of participants to identify statistical similarities and differences between the countries.

5.2.2 Study participants

The sampling method as described in "3.2 Study participants" was used without modification. A limitation of the study was that the questionnaire only was made at two out of eight physiotherapy programs in Sweden and one out of three physiotherapy programs in New Zealand. The result may also have been influenced by the differences in duration of the Bachelor of physiotherapy degree in Sweden (three years) and New Zealand (four years) and their different curriculums. However, this is not seen as a source of error but as a part of the comparison between the countries.

Since the study included more participants who studied in New Zealand than in Sweden, the results of the questionnaire were reported in percent instead of the response rate. Age and gender, which could be seen as possible confounding factors, were represented similar between the groups. Out of the limited collection of demographic data made in this study, analysis of further confounding factors was not possible.

5.2.3 Data collection

The low dropout rate (0.6 %) was possibly contributed by the authors' visit to the universities. In Sweden, data collection was made at the end of scheduled lectures and in New Zealand during compulsory lectures. This probably also contributed to the high level of participation. Due to the authors' visit, the student may have felt forced to participate in the survey. However, the participation was completely voluntary, and the student had been informed by the responsible lecturer before the lecture, as well as by the authors, both oral and written, during the lecture. A web-based questionnaire could have been made to reach out to a greater study population, however, this could have increased the dropout rate.

The questionnaire was piloted on 17 physiotherapists senior students at Lund University, not involved in the study. This made it possible to correct any uncertainties with the questionnaire

and increase the reliability and validity of the study. The students were not allowed to take the questionnaire away, because the answers could have been compromised, which would have been a confounding factor in the study. The questionnaire was made in English which may limit the generalizability of the results according to the students' level of language. However, in the pilot study made on Swedish students, no difficulties in understanding the language were showed. Also the participants were allowed to ask questions to the researchers about the questionnaire, both in the pilot study and in the study, in case of any uncertainties.

Previous studies that formed the basis of the questionnaire, have considered reliability and validity (35,36). In the article by Ali and Thomson the face validity, content validity, construct validity and criterion-related validity were all addressed according to Portney and Watkins, 2000 (36). Questions that originated from the questionnaire by Hoeger Bement and Sluka were developed in cooperation with pain experts in the respective national organizations. The development of the Hoeger Bement and Sluka questionnaire (35) was made considering the recommendations by Murinson et al., a study where the purpose was to establish important benchmark values regarding pain education of future physicians during primary professional training (35,49).

However, the purpose of the study by Ali and Thomson was to investigate the knowledge of chronic pain and its management between final year physiotherapy and medical students (36). Additionally, the purpose of the study by Hoeger Bement and Sluka was to determine the extent of pain education in current Doctorate of Physical Therapy schools in the United States, including how pain is incorporated into the curriculum, the amount of time spent teaching about pain, and the resources used to teach about pain (35). Considering the purpose of this study, questions were modified and added by the authors to form a suitable questionnaire.

The reliability and validity of the questions which were modified or added by the authors were not further tested which may have limited the quality of the study. The validity and reliability of the questionnaire would have been increased by using a previously developed questionnaire straight through without adding or changing questions. Since this study highlighted the physiotherapist students' beliefs about chronic pain, as well as what professions and treatments they considered suitable, the use of a new modified questionnaire was necessary considering that these factors have not been found combined in previous questionnaires.

5.3 Recommendations and implications for research

The study only examined the students' self-perceived knowledge and their beliefs about chronic pain. Further studies on how education differs in content regarding chronic pain are needed to get a greater picture of the subject. Additionally, a follow-up study of the participants' knowledge as working physiotherapists could be of interest. Further research could also be made comparing other countries to get a broader picture of the international differences. Moreover, other health-care professions could be included to receive more extensive results of the multimodal spectrum.

6. Relevance

Physiotherapists faces a major challenge in patients with chronic pain and studies show a lack of knowledge of its treatments (3,9,25,37,54). This study showed an international comparison between Sweden and New Zealand and it also highlighted possible differences between countries and their educations, as well as the students' beliefs towards chronic pain. This is important to consider since previous studies show a lack of knowledge of its treatments among students and professionals (3,9,25,37,54).

7. Conclusion

The result showed that answers from students in Sweden and New Zealand were fairly similar. Although, significant differences were found for some statements. For example, regarding the students' beliefs about whether their education has given them sufficient knowledge about chronic pain and its treatments, where the students in New Zealand were more positive compared to the students in Sweden. Moreover, the results were in general more scattered among the Swedish students compared to students in New Zealand.

The results may indicate that the students in New Zealand feel more prepared than Swedish students. However, further conclusions can not be made regarding adequate education as the study only examines the students' self-perceived knowledge. Consequently, further research is needed.

8. Acknowledgment

The authors would like to give a special thanks to the study participants and the coordinators at Lund University, University of Gothenburg and the University of Otago for helping out with the project. Finally, a great thanks to our supervisor Caroline Larsson, Ph.D. and Susanne Brokop RPt, Sen Lecturer for their professional guidance and valuable support throughout the project.

9. References

1. Jakobsson U. The epidemiology of chronic pain in a general population: results of a survey in southern Sweden. *Scand J Rheumatol*. 2010;39(5):421-429.
2. Fayaz A, Croft P, Langford RM, Donaldson LJ, Jones GT. Prevalence of chronic pain in the UK: a systematic review and meta-analysis of population studies. *BMJ Open*. 2016;6(6):e010364.
3. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *Eur J Pain*. 2006;10(4):287-333.
4. C Harstall, M Ospina. How Prevalent Is Chronic Pain?. *IASP*. 2003;11(2):1-4.
5. IASP. Chronic Pain has arrived in the ICD-11. [Internet] Washington DC: IASP; 2019 [updated 2019-01-17; cited 2019-08-29]. Available from: <https://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=8340&navItemNumber=643>)
6. Ministry of health. New Zealand Health Survey. [Internet]. Wellington: Ministry of health; 2019 [cited; 2019-09-12]. Available from: https://minhealthnz.shinyapps.io/nz-health-survey-2018-19-annual-data-explorer/w_01229fa9#!/explore-topics
7. Bair MJ, Robinson RL, Katon W, Kroenke K. Depression and pain comorbidity: a literature review. *Arch Intern Med*. 2003;163(20):2433-45.
8. Keefe FJ, Rumble ME, Scipio CD, Giordano LA, Perri LM. Psychological aspects of persistent pain: current state of the science. *J Pain*. 2004;5(4):195-211.
9. SBU. Rehabilitation of patients with chronic pain conditions: A systematic review. [Internet]. Stockholm: Swedish Council on Health Technology Assessment (SBU); 2010. SBU Yellow Report; 198. [cited 2019-08-29]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK447966/>
10. Roditi D, Robinson M. The role of psychological interventions in the management of patients with chronic pain. *Psychol Res Behav Manag*. 2011;4:41-9.
11. SBU. Samordnad behandling bäst vid långvarig smärta. [Internet]. Stockholm: Statens beredning för medicinsk utvärdering (SBU); 2019 [updated 2019-04-30; cited; 2019-09-05]. Available from: <https://www.sbu.se/sv/pressmeddelanden/tidigare-pressmeddelanden/pressmeddelanden/samordnad-behandling-bast-vid-langvarig-smarta/>.
12. Mayer S, Spickschen J, Stein KV, Crevenna R, Dorner TE, Simon J. The societal costs of chronic pain and its determinants: The case of Austria. *PLoS One*. 2019;14(3):e0213889.
13. Vargas C, Bilbeny N, Balmaceda C, Rodriguez MF, Zitko P, Rojas R, et al. Costs and consequences of chronic pain due to musculoskeletal disorders from a health system perspective in Chile. *Pain Rep*. 2018;3(5):e656.
14. Gaskin DJ, Richard P. The economic costs of pain in the United States. *J Pain*. 2012;13(8):715-24.

15. IASP. IASP Terminology: [Internet] Washington DC: IASP; 1994 [updated 2017-12-14; cited 2019-09-28]. Available from: <https://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698>.
16. Pergolizzi J, Ahlbeck K, Aldington D, Alon E, Coluzzi F, Dahan A, et al. The development of chronic pain: physiological CHANGE necessitates a multidisciplinary approach to treatment. *Curr Med Res Opin.* 2013;29(9):1127–1135.
17. Rostami K, Zadeh S H, Rakhshan M. Chronic pain: a concept analysis. *Electron J Gen Med* 2019;16(2):em130)
18. Voscopoulos C, Lema M. When does acute pain become chronic? *Br J Anaesth.* 2010;105 Suppl 1:i69-85.
19. Turk DC, Wilson HD, Cahana A. Treatment of chronic non-cancer pain. *Lancet.* 2011;377(9784):2226-35.
20. Fishman SM, Ballantyne J, Bonica JJ, Fishman S, Rathmell JP. *Bonica's Management of Pain*, 4th Edition. Lippincott Williams and Wilkins; 2010;40(2):315-319
21. SBU. Metoder för behandling av långvarig smärta - En systematisk litteraturöversikt. [Internet]. Stockholm: Statens beredning för medicinsk utvärdering (SBU); 2006 [cited 2019-08-20]. Available from: https://www.sbu.se/contentassets/81ea041f1bc2441aa09868a4f29d3f1a/smarta_fulltext.pdf
22. Tegner H, Frederiksen P, Esbensen BA, Juhl C. Neurophysiological Pain Education for Patients With Chronic Low Back Pain: A Systematic Review and Meta-Analysis. *Clin J Pain.* 2018;34(8):778-86.
23. Bettoni L, Bonomi FG, Zani V, Manisco L, Indelicato A, Lanteri P, et al. Effects of 15 consecutive cryotherapy sessions on the clinical output of fibromyalgic patients. *Clin Rheumatol.* 2013;32(9):1337-45.
24. IASP. IASP Curriculum Outline on Pain for Physical Therapy. [Internet] Washington DC: IASP; 2018 [cited 2019.09.07]. Available from: <https://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2055>.
25. Cousins MJ, Lynch ME. The Declaration Montreal: access to pain management is a fundamental human right. *Pain.* 2011;152(12):2673-4.
26. Latimer J, Maher C, Refshauge K. The attitudes and beliefs of physiotherapy students to chronic back pain. *Clin J Pain.* 2004;20(1):45-50.
27. Colleary G, O'Sullivan K, Griffin D, Ryan CG, Martin DJ. Effect of pain neurophysiology education on physiotherapy students' understanding of chronic pain, clinical recommendations and attitudes towards people with chronic pain: a randomised controlled trial. *Physiotherapy.* 2017;103(4):423-9.
28. Strong J, Meredith P, Darnell R, Chong M, Roche P. Does participation in a pain course based on the International Association for the Study of Pain's curricula guidelines change student knowledge about pain?. *Pain Res Manag.* 2003;8(3):137-42.
29. Daykin AR, Richardson B. Physiotherapists' pain beliefs and their influence on the management of patients with chronic low back pain. *Spine (Phila Pa 1976).* 2004;29(7):783-95.

30. Thompson K, Johnson MI, Milligan J, Briggs M. Twenty-five years of pain education research-what have we learned? Findings from a comprehensive scoping review of research into pre-registration pain education for health professionals. *Pain*. 2018;159(11):2146-58.
31. Briggs EV, Carr EC, Whittaker MS. Survey of undergraduate pain curricula for healthcare professionals in the United Kingdom. *Eur J Pain*. 2011;15(8):789-95.
32. Wideman TH, Miller J, Bostick G, Thomas A, Bussieres A, Wickens RH. The current state of pain education within Canadian physiotherapy programs: a national survey of pain educators. *Disabil Rehabil*. 2019:1-7.
33. Watt-Watson J, Hunter J, Pennefather P, Librach L, Raman-Wilms L, Schreiber M, et al. An integrated undergraduate pain curriculum, based on IASP curricula, for six health science faculties. *Pain*. 2004;110(1-2):140-8.
34. Poyhia R, Niemi-Murola L, Kalso E. The outcome of pain related undergraduate teaching in Finnish medical faculties. *Pain*. 2005;115(3):234-7.
35. Hoeger Bement MK, Sluka KA. The current state of physical therapy pain curricula in the United States: a faculty survey. *J Pain*. 2015;16(2):144-52.
36. Ali N, Thomson D. A comparison of the knowledge of chronic pain and its management between final year physiotherapy and medical students. *Eur J Pain*. 2009;13(1):38-50.
37. Tei R, Dreyer P, Nikolajsen L. Inadequate postoperative pain relief in chronic pain patients – A Qualitative Study. *Nordisk sygeplejeforskning*. 2012;2(1):3-14.
38. Heit HA. Addiction, physical dependence, and tolerance: precise definitions to help clinicians evaluate and treat chronic pain patients. *J Pain Palliat Care Pharmacother*. 2003;17(1):15-29.
39. MBIE. Healthcare. [Internet]. Wellington: Ministry of Business, Innovation and Employment (MBIE); 2019 [updated 2019-10-14;cited 2019-12-17]. Available from: <https://www.newzealandnow.govt.nz/living-in-nz/healthcare>
40. Vetenskapsrådet. Det svenska sjukvårdssystemet. [Internet]. Göteborg: Vetenskapsrådet; 2019 [updated 2019-12-19;cited 2019-12-17]. Available from: <https://www.kliniskastudier.se/forskningslandet-sverige/det-svenska-sjukvardssystemet.html>
41. University of Otago. Bachelor of Physiotherapy. [Internet]. Dunedin: University of Otago; 2019 [cited 2019-12-17]. Available from: <https://www.otago.ac.nz/courses/qualifications/bphty.html>,
42. Lunds universitet. Fysioterapeutprogrammet. [Internet]. Lund: Lunds universitet; 2019 [cited 2019-12-17]. Available from: <https://www.lu.se/lubas/i-uoh-lu-VGFYT>
43. Göteborgs universitet. Fysioterapeutprogrammet. [Internet]. Göteborg: Göteborgs universitet; 2018 [updated 2018-08-08;cited 2019-12-17]. Available from: <https://sahlgrenska.gu.se/utbildning/kurser-program/program/fysioterapeut>
44. QS. University Rankings [Internet]. London: QS Quacquarelli Symonds Limited; 2019 [cited date 2019-12-17]. Available from: <https://www.topuniversities.com/qs-world-university-rankings>

45. QS. University Rankings [Internet]. London: QS Quacquarelli Symonds Limited; 2019 [cited date 2019-12-17]. Available from: <https://www.topuniversities.com/university-rankings/university-subject-rankings/2019/anatomy-physiology>
46. Persson A. Frågor och svar: om frågekonstruktion i enkät- och intervjuundersökningar. [Internet]. Stockholm: Statistiska centralbyrån (SCB); 2016. [cited 2019.08.23]. Available from: https://www.scb.se/contentassets/c6dd18d66ab240e89d674ce728e4145f/ov9999_2016a01_br_x08br1601.pdf
47. FYSS. Rekommendationer om fysisk aktivitet. [Internet]. Stockholm: FYSS; 2011 [cited 2019.09.10]. Available from: <http://www.fyss.se/rekommendationer-for-fysisk-aktivitet/>.
48. Ministry of health. How much activity is recommended? [Internet]. Wellington: Ministry of health; 2017 [updated 2017-05-10; cited 2019-09-10] Available from: <https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep/physical-activity/how-much-activity-recommended>.
49. Mezei L, Murinson BB. Pain education in North American medical schools. *J Pain*. 2011;12(12):1199-208.
50. Dunford E, Thomson M. Relaxation and Mindfulness in Pain: A Review. *Rev Pain*. 2010;4(1): 18–22.
51. Lunds Universitet. Utbildningsplan fysioterapeutprogrammet [Internet]. Lund: Lunds Universitet, Medicinska fakulteten; 2018. cited 2019-09-23]. Available from: <https://www.student.med.lu.se/sites/student.med.lu.se/files/utbildningsplan-fysioterapeutprogrammet-rev-2017-06-07.pdf>.
52. Göteborgs Universitet. Utbildningsplan fysioterapeutprogrammet [Internet]. Göteborg: Göteborgs Universitet, Sahlgrenska akademien; 2018 [cited 2019-09-23]. Available from: https://neurophys.gu.se/digitalAssets/1707/1707091_utbildningsplan-fysioterapeutprogrammet-201806.pdf
53. University of Otago. Bachelor of Physiotherapy Bachelor of Physiotherapy (Hons) Curriculum. Dunedin: University of Otago, School of physiotherapy;2018.
54. Carr E, Brockbank K, Barrett R. Improving pain management through interprofessional education: evaluation of a pilot project. *Learning in Health and Social Care*. 2003;2(1):6-17.

10. Appendices

10.1 Appendix 1

Physiotherapist students views of chronic pain and its treatments – *an international comparison*

Questionnaire

Emma Nilsson

*Student at the Physiotherapist
program at Lund University*

Email: tys14eni@student.lu.se

Phone: +46 70 917 16 18

Rebecka Forsström

*Student at the Physiotherapist
program at Lund University*

*Email: re3380fo-
s@student.lu.se*

Phone: +46 76 103 77 96

Maria Råsmar

*Student at the Physiotherapist
program at Lund University*

Email: ma1325ra-s@student.lu.se

Phone: +46 76 815 19 71

Supervisor

Caroline Larsson,

*Physiotherapist, PhD Lund
University*

Email:

caroline.larsson@med.lu.se

INFORMATION LETTER TO PARTICIPANTS

Physiotherapist students views of chronic pain and its treatments - an international comparison

You are asked to participate in the survey above.

About 20 percent of adults suffer from chronic pain globally and 10 percent are newly diagnosed with chronic pain each year. Physiotherapists have a central role in the team around the patient with chronic pain. There are several physiotherapeutic interventions with evidence that can help the patient.

The scientific literature shows a lack of knowledge of chronic pain and its mechanisms amongst health care professionals, including physiotherapists. Furthermore, studies reveal that expertise in chronic pain management is limited. Since chronic pain is one of the most common reasons to seek medical care, this is a worrying fact.

The purpose of the study is to examine the physiotherapy senior students' attitudes towards chronic pain and different treatments for chronic pain in Sweden and New Zealand.

The study will be made through a questionnaire. If you agree to participate, we ask you kindly to answer the questions in the attached form as completely as possible. You will be answering the questionnaire individually, no discussions with other students are allowed and you are not allowed to take the questionnaire away. Answering the questionnaire is time-limited to 30 minutes. When you are done answering the questionnaire, the form will be collected by one of the researching students.

Participation is completely voluntary, and confidentiality is guaranteed. If you do not want to participate you do not need to explain why and it does not influence your education. The data will be destroyed after the study is made.

The study is part of the thesis at the Physiotherapist program, Lund University.

For questions please contact us or our supervisor.

Best regards

Emma Nilsson

*Student at the Physiotherapist
program at Lund University
Email: tys14eni@student.lu.se
Phone: +46 70 917 16 18*

Maria Råsmar

*Student at the Physiotherapist
program at Lund University
Email: ma1325ra-s@student.lu.se
Phone: +46 76 815 19 71*

Rebecka Forsström

*Student at the Physiotherapist
program at Lund University
Email: re3380fo-s@student.lu.se
Phone: +46 76 103 77 96*

Supervisor

*Caroline Larsson,
Physiotherapist, PhD Lund
University
Email: caroline.larsson@med.lu.se*

Physiotherapist students views of chronic pain treatments – an international comparison

Age _____ years

Gender _____

Country of study Sweden New Zealand

The purpose of the study is to examine the physiotherapy senior students' knowledge about chronic pain and attitudes to different treatments of chronic pain in Sweden and New Zealand.

Section 1: Knowledge of chronic pain

*Make sure that you mark **one** answer to each statement.*

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Chronic pain is closely related to tissue damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In case of chronic pain, pathology is often identifiable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a physiological difference between acute pain and chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pain results in changes in Central Nervous System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pain results in changes in Peripheral Nervous System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pain can be cured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pain is an interaction of physical, psychological and social factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural and social backgrounds have an effect on pain perception	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic pain leads to disability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psychological factors play a major role in the development of chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psychological factors play a major role in maintenance of chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please turn page for Section 2

Section 2: Management of chronic pain

Make sure that you mark only **one** answer to each statement.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Patients with chronic pain should be physical active at least 150 minutes moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity throughout the week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patients with chronic pain should train muscle-strengthening activities at least 2 days each week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patients should be encouraged to avoid pain-inducting activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Through my education I have got sufficient knowledge of chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Through my education I have got sufficient knowledge of treatment of chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A free-standing pain mechanisms/management course is included in the curriculum of our education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel prepared to treat patients with chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am interested in working with chronic pain as a speciality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am interested in the area of chronic pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What treatments are appropriate to treat chronic pain?

Mark **all** alternatives you consider as right

Physical activity	<input type="checkbox"/>	Anxiolytics (anti-depression medicine)	<input type="checkbox"/>	Mud bath	<input type="checkbox"/>
Analgesics	<input type="checkbox"/>	Massage	<input type="checkbox"/>	Ice bath	<input type="checkbox"/>
Relaxation	<input type="checkbox"/>	Acupuncture	<input type="checkbox"/>	TENS	<input type="checkbox"/>
Psychotherapy	<input type="checkbox"/>	Information about chronic pain	<input type="checkbox"/>		

What professionals/persons should be involved in the management of chronic pain?

Doctor	<input type="checkbox"/>	Psychologist	<input type="checkbox"/>	Nurse	<input type="checkbox"/>
Physiotherapist	<input type="checkbox"/>	Occupational therapist	<input type="checkbox"/>		

Thank you for your participation!

10.2 Appendix 2

Section	Question	Origin	Response option	Modification from previous study
Demographic Data	Age	Ali and Thomson (36)	Open	
Demographic Data	Gender	Ali and Thomson (36)	Open	Open response option instead of Male / Female
Demographic Data	Country of study	Created for this study	Sweden / New Zealand	
Section 1: Knowledge of chronic pain	Chronic pain is closely related to tissue damage	Ali and Thomson (36)	Five grade Likert scale (Strongly disagree, disagree, neither agree or disagree, agree, strongly agree)	Changed response options from "True", "False" and "Don't know".
Section 1: Knowledge of chronic pain	In case of chronic pain, pathology is often identifiable	Ali and Thomson (36)	Five grade Likert scale	Added "In case of chronic pain" Changed response options from "True", "False" and "Don't know".
Section 1: Knowledge of chronic pain	There is a physiological difference between acute pain and chronic pain	Created for this study	Five grade Likert scale	
Section 1: Knowledge of chronic pain	Chronic pain results in changes in Central Nervous System	Ali and Thomson (36)	Five grade Likert scale	Replaced "It" with "Chronic pain" Changed response options from "True", "False" and "Don't know".
Section 1: Knowledge of chronic pain	Chronic pain results in changes in Peripheral Nervous System	Created for this study	Five grade Likert scale	
Section 1: Knowledge of chronic pain	Chronic pain can be cured	Ali and Thomson (36)	Five grade Likert scale	Changed response options from "True", "False" and "Don't know".
Section 1: Knowledge of chronic pain	Chronic pain is an interaction of physical, psychological and social factors	Ali and Thomson (36)	Five grade Likert scale	Replaced "It" with "Chronic pain".
Section 1: Knowledge of chronic pain	Cultural and social backgrounds have an effect on pain perception	Ali and Thomson (36)	Five grade Likert scale	

Section 1: Knowledge of chronic pain	Chronic pain leads to disability	Ali and Thomson (36)	Five grade Likert scale	Replaced “Prolonged” with “Chronic”.
Section 1: Knowledge of chronic pain	Psychological factors play a major role in the development of chronic pain	Ali and Thomson (36)	Five grade Likert scale	Replaced “its development” with “the development of chronic pain” Changed response options from “True”, “False” and “Don’t know”.
Section 1: Knowledge of chronic pain	Psychological factors play a major role in maintenance of chronic pain	Ali and Thomson (36)	Five grade Likert scale	Replaced “its development” with “the development of chronic pain” Changed response options from “True”, “False” and “Don’t know”.
Section 2: Management of chronic pain	Patients with chronic pain should be physical active at least 150 minutes moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity throughout the week	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	Patients with chronic pain should train muscle-strengthening activities at least 2 days each week	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	Patients should be encouraged to avoid pain-inducing activities	Ali and Thomson (36)	Five grade Likert scale	
Section 2: Management of chronic pain	Through my education I have got sufficient knowledge of chronic pain	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	Through my education I have got sufficient knowledge of treatment of chronic pain	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	A free-standing pain mechanisms/management course is included in the curriculum of our education	Hoeger Bemen and Sluka (35)	Five grade Likert scale	Developed form original question: “Do you have a free-standing pain mechanisms/management course?” (yes / no)

Section 2: Management of chronic pain	I feel prepared to treat patients with chronic pain	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	I am interested in working with chronic pain as a speciality	Created for this study	Five grade Likert scale	
Section 2: Management of chronic pain	I am interested in the area of chronic pain	Created for this study	Five grade likert scale	
Section 2: Management of chronic pain	What treatments are appropriate to treat chronic pain?	Created for this study Options collected from Ali and Thomson (36), SBU (11) and IASP (24)	Multiple choice	
Section 2: Management of chronic pain	What professionals/persons should be involved in the management of chronic pain?	Ali and Thomson (36)	Multiple choice	Added the option "Doctor". Removed the options "Physican" and "Family/Friends".