Psychometric assessment of the Swedish version of the Injustice Experience Questionnaire among patients with chronic pain

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SAMMANFATTNING

Syfte: Undersöka psykometriska egenskaper för den svenska versionen av Injustice Experience Questionnaire (IEQ-S) bland patienter med långvarig smärta refererade till specialistvård i Sverige.

Metod: Denna studie var del av en genomförbarhetsstudie för en kohortstudie vilken undersöker patienter med långvarig, icke-malign smärta. Sextiofem deltagare, remitterade till Smärtcentrum vid Akademiska universitetssjukhuset i Uppsala, med en smärtduration över tre månader vid remittering, rekryterades konsekutivt. Studiedeltagarna besvarade IEQ-S som förberedelse inför klinikbesöket, samt igen inom sex veckor i syfte att undersöka stabilitetsreliabilitet. Work Ability Index (WAI) besvarades för beräkning av samtidig kriterievaliditet.

Resultat: Korrelationskoefficienten mellan IEQ-S och WAI (n = 57) var $r_S = -0.47$, p = <0,01. Den interna konsistensreliabiliteten för IEQ-S fullversion var Cronbach’s alpha = 0,94 (n = 64). Stabilitetsreliabiliteten beräknad genom Intraclass Correlation Coefficient = 0,80 (n = 55), med ett 95 % konfidensintervall mellan 0,69–0,88. Medianen för IEQ-S totalpoäng = 27,0 (n = 64), 25e percentilen = 15,3, 75e percentilen = 37,8, variationsvidd 3–48 poäng. Medelvärdet = 26,2 med standarddeviation 13,3. Trettio av 65 deltagare (46,9 %) hade en totalpoäng>30.

Konklusion: Denna studie har bidragit med ny information om IEQ-S psykometriska egenskaper, för patienter med långvarig smärta remitterade till specialistvård i Sverige. Den interna konsistensen för IEQ-S var hög (1), och stabilitetsreliabiliteten god (2). Ett måttligt, negativt, signifikant samband mellan IEQ-S och WAI påvisades, höga nivåer av upplevd orättvisa associerades med låga nivåer av arbetsförmåga. Resultaten stödjer användandet av IEQ-S som ett komplement i bedömningen av patienter med långvarig smärta remitterade till specialistvård i Sverige, dock är vidare forskning önskvärd. Denna studie har även givit en inblick om hur orättvisa upplevs bland patienter med långvarig smärta, men detta bör undersökas i ett större urval.

Key words: Injustice, validity, reliability, chronic pain, work ability
ABSTRACT

Aim: Study the psychometric properties of the Swedish version of the Injustice Experience Questionnaire (IEQ-S) among patients with chronic pain referred to Swedish specialist care.

Method: This study was part of a feasibility study for a cohort exploring patients with chronic, non-malignant pain. Sixty-five participants, referred to Pain Center at Uppsala University hospital, with a pain duration over three months at the time of referral, were consecutively sampled. The participants completed the IEQ-S to prepare for their clinical visit and again within six weeks to examine the stability reliability. The Work Ability Index was completed for a concurrent criterion validity analysis.

Results: The correlation coefficient between the IEQ-S and WAI (n = 57) was $r_S = -0.47$, $p < 0.01$. The internal consistency reliability for the full IEQ-S was Cronbach’s alpha = 0.94 (n = 64). The stability reliability was calculated using an Intraclass Correlation Coefficient = 0.80 (n = 55), with a 95% confidence interval ranging between 0.69-0.88. The median total score for IEQ-S measured at admission = 27.0 (n = 64), 25th percentile = 15.3, 75th percentile = 37.8, range = 3-48 points. The mean = 26.2, standard deviation = 13.3. Thirty out of 64 participants (46.9 %) had a total score > 30.

Conclusion: This study has contributed with new information about the psychometric properties of the IEQ-S, for patients with chronic pain referred to specialist care in Sweden. The internal consistency of the IEQ-S was high (1), and the stability reliability satisfactory (3). There was a moderate (4), negative, significant relationship between IEQ-S and WAI, high levels of perceived injustice were associated with low work ability in this study. The results support the use of the IEQ-S as an adjunct tool to assess patients with chronic pain referred to specialist care in Sweden, however further research is desirable. This study has also given an insight into how injustice is perceived among patients with chronic pain, however this should be studied in a larger sample.

Key words: Injustice, validity, reliability, chronic pain, work ability
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INTRODUCTION

Chronic pain can be devastating for the one experiencing it. It is also one of the most intractable problems challenging health care professionals, including physiotherapists, today (5). Physiotherapy should aim to improve health and decrease suffering, with individuals with chronic pain being an important patient group (6). In Sweden, musculoskeletal pain disorders, together with mental illness, are the most common diagnoses responsible for work disability and sick leave (7). Patients with chronic pain may have alterations in their behavioral or psychological responses to pain which can have major clinical significance (5). Because of the complex nature of chronic pain, behavioral and psychological factors need to be taken into consideration when assessing chronic pain (8). Perceptions of injustice have a significant negative impact on outcomes related to pain (9). Sullivan et al. (10) developed the Injustice Experience Questionnaire (IEQ) to measure perceived injustice associated with musculoskeletal injury (10). A thorough assessment of biopsychosocial factors, where perceived injustice is an important emotion to recognize, have been recommended prior to physiotherapy treatment (11). Valid and reliable measures are essential both to conduct research on chronic pain (12), but also to determine aspects of pain and direct, as well as evaluate, treatment (13). Research has supported the construct validity as well as the test-retest reliability of the IEQ and has shown that this measure might be a useful complement to psychosocial assessment of individuals with chronic pain. High scores on the IEQ have been suggested to predict failure to return to work (10). The original English language version of the IEQ has been translated into several other languages (14–16). A Swedish language version, the IEQ-S, was developed in 2015 (17). The psychometric properties of the Swedish version had previous to this study not been evaluated.

Psychometric assessment

When evaluating quantitative measures, validity and reliability are the two most important criteria. By documenting a measure’s validity and reliability, also known as a psychometric assessment, the quality of the measure is determined (3). To determine a measure’s validity and reliability is also a way of exploring possible measurement errors in a study (18). The reliability of a measure is necessary for the measure to be valid. However, a measure can have good reliability without being valid (3,18).
Validity

A measure’s validity explains to what extent the instrument measures what it is supposed to measure. The validity of a measure can be described in different aspects. One aspect is face validity, which refers to the subjective opinion of whether the measure looks like it is measuring the construct of interest. When exploring the face validity of a measure, the opinions of the people who will be completing the measure are of special interest. Content validity, construct validity and criterion-related validity are three other aspects of a measure’s validity that are of greater importance than the face validity (3).

Content validity refers to whether a measure has an appropriate sample of items to measure the construct of interest and how well it covers the whole construct. The content validity is an important aspect when it comes to measures of psychosocial properties. When developing a new instrument, researchers should therefore do a thorough conceptualization of the construct of interest to make sure the measure covers the full spectra of the construct. The content validity can never be measured completely objectively, since it is based on judgement. However, a content validity index can be calculated, indicating the degree of agreement among a panel of experts’ evaluation of the content validity (3).

Construct validity describes how well the measure actually measures the construct of interest. When assessing the quality of a study, construct validity is often thought to be a key criterion. However, the more abstract the construct of interest is, the more difficult is it to establish construct validity. When exploring construct validity, for which there are different approaches, researchers make predictions of how the construct of interest will function in relation to other abstract constructs. Logical analyses are made to test the predictions, which are made on the basis of already grounded conceptualizations (3).

Criterion-related validity is an aspect that describes the relationship between scores of the measure with an external criterion. A valid measure results in scores that strongly correlate with scores of the external criterion. The criterion validity is evaluated by calculating a validity coefficient, explaining how well the scores of the measure correlates with the scores of the external criterion. The validity coefficient ranges between -1.00 and 1.00 with -1.00 (negative relationship) and 1.00 (positive relationship) indicating the highest possible correlations and perfect criterion-related validity. It is desirable for a measure to have a criterion-related validity of 0.70 or higher (3). Criterion-related validity can be divided into concurrent and predictive validity. What differs these two is the timing of when the measurements are being obtained. When evaluating the concurrent validity, the scores of the measure of interest and the scores of the external criterion are obtained at the same time. On
the other hand, predictive validity evaluates the correlation between the scores of the measure of interest at one point in time, with the scores of the external criterion at another point in time, thus predicting people’s future performances or behaviors (3).

**Reliability**

The reliability of a measure explains with what consistency a measure measures the aspect of interest (3), in other words, the measure’s ability to produce the same results under the same conditions (18). A measure should produce as little variation as possible in repeated measures to have high reliability. The measure also needs good accuracy to have high reliability. Equivalence, stability and internal consistency are three important aspects of reliability in quantitative research (3).

The equivalence refers to the degree of agreement of a measure’s scoring between two or more independent observers. If the level of agreement is high, it can be assumed that the measurement errors are small. The equivalence can be evaluated through so-called interrater reliability procedures, where two or more observers make independent observations simultaneously. The data from the two observations are used to calculate an index of equivalence. If the scores are similar, they are likely reliable (3).

A measure’s stability refers to its ability to obtain similar results on two separate occasions. The stability is evaluated by doing a test-retest, meaning that the same measure is administered to the same sample on two occasions. The scores on the different occasions are compared and a reliability coefficient is computed (3). The reliability coefficient should reflect the degree of correlation and agreement between measurements, for which the Intraclass correlation coefficient (ICC) is widely used. For test-retest studies, the 2-way mixed effects model, with absolute agreement definition, of the ICC should be used, according to Koo and Lee (2) in their guideline for selecting ICC in reliability research. The reliability coefficient is an index ranging from 0.00 to 1.00 that objectively determines the size of the difference between the measures. The higher the value, the better is the measure’s stability. A reliability coefficient greater than 0.70 is considered satisfactory (3). An ICC value less than 0.5 indicates poor reliability, a value between 0.50-0.75 indicates moderate reliability, a value between 0.75-0.9 indicates good reliability and a value greater than 0.9 indicates excellent reliability (2). A problem with the test-retest approach is that many variables tend to naturally change over time, which can result in a falsely low reliability coefficient (3). Researchers tend to base the test-retest interval on assumptions of the variable’s stability (19). A short interval between measures, around one week, can decrease
the risk that the trait has changed. At the same time, this can increase the risk that the respondents remember their initial answers which might affect their second answer (19). With an increased interval between measures, the test-retest reliability also tends to decline naturally, even when examining more stable traits (3).

Internal consistency refers to if a measure’s different items measure the same trait. A scale should consist of items that all measure the one same trait. The internal consistency is normally established by calculating a so-called coefficient alpha, or Cronbach’s alpha, ranging from 0.00 to 1.00. The higher the coefficient, the more internally consistent is the measure (3). However, an alpha too high might suggest that the items are too similar (1). A Cronbach’s alpha of around 0.80 is considered a good value (18) and a maximum of 0.90 has been recommended (1). Correlations between each item and the total score of a measure, labelled Corrected Item-Total Correlation, should be larger than 0.30 for a reliable measure. The Cronbach’s Alpha if Item is Deleted is a calculation of what the overall alpha would be if any of the items were deleted. The value for each individual item should not be higher than the overall alpha, since this would mean that the deletion of that item would result in higher reliability (18).

**Chronic pain**

The International Association for the Study of 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” (20). Chronic pain is usually described as pain that has lasted longer than three months. However, chronic pain often aims to describe pain that persisted longer, or is stronger, than expected. Chronic pain is more complex than acute pain and also more difficult to treat. The maintenance of chronic pain can often be explained by other factors than the ones that triggered the pain in the first place, such as changes in pain modulation and behavior (21). Patients in Western medicalized social systems often construct pain as a symptom of an objectively identifiable disease or disorder (22). However, in reality the disease or disorder behind the pain isn’t always clear which can pose challenges and stigma (22). Chronic pain isn’t the product of only the sensory dimension, but also the emotional and cognitive dimensions, with the interpretation of pain based on previous experiences playing an important role (5). Pain perception is highly influenced by emotional and cognitive factors unrelated to the pain stimulus itself. Emotions have been confirmed to alter the activity of afferent and descending pain pathways in imaging studies (23). Negative emotions increase pain, and a positive state of mind and distraction can decrease pain (24). At
the same time, acute pain has been shown to induce depressed mood (25). Negative expectations can reverse the effect of analgesia (26), and positive expectations can produce pain relief by a placebo (27). Furthermore, when pain becomes chronic, an individual’s ability to regulate pain may be diminished due to structural changes in multiple brain regions involved in the emotional aspects of pain modulation (23). In summary, an individual’s pain perception and emotions affect each other simultaneously. Negative emotions can both increase the perception of pain but also diminish an individual’s ability to regulate pain. To understand the process of chronic pain and provide successful physiotherapy treatment of patients with chronic pain, a thorough assessment of biopsychosocial factors is required (11).

**Injustice and the Injustice Experience Questionnaire**

Etymologically, pain is closely intertwined with the social concept of punishment. Therefore, it’s not surprising that a discussion of pain often produce thoughts of justice (22). To define justice, one is dependent on individual contexts. Just or fair behavior usually defines justice in a social context (22). The term justice is often used interchangeably with the term fairness. Fairness can be described as when distributions are the same within a situation. Unfairness might then be experiences of when outcomes of another surpasses one’s own outcomes. The pursuit of justice has been stated to be a fundamental aspect of social life (22).

Perceived injustice has shown to have a negative impact on physical and psychological health in the context of chronic pain (22). Research has shown that perceived injustice might be a risk factor for poor outcomes among patients with chronic pain (10). Pain duration of over 12 months has been shown to increase levels of perceived injustice (15). High levels of perceived injustice have been shown to correlate with current unemployment (16). Perceived injustice among work disabled patients with musculoskeletal conditions has been shown to correlate with pain severity, catastrophizing, fear of movement, perceived disability and depression (10). High levels of perceived injustice have also demonstrated a lower probability of return to work at 12-months follow-up (10). Also among children and adolescents, high levels of perceived injustice have been shown to correlate with high levels of pain intensity, catastrophizing and functional disability as well as poorer emotional, social and school functioning (28). A pilot study investigated levels of perceived injustice among patients with fibromyalgia and rheumatoid arthritis. The study presented that patients with fibromyalgia reported higher levels of perceived injustice than the patients with rheumatoid arthritis before, but not after, controlling for other variables such as pain severity, age, gender, anxiety and depression. The authors of the study suggested that perceived injustice isn’t
etiologic but a surrogate expression of severe pain. Levels of perceived injustice might not depend on diagnosis but other variables such as pain levels, depression and anxiety (14).

The Canadian researchers Sullivan et al. (10) developed the original version of the IEQ with the aim of developing a valid and reliable measure of perceived injustice associated with musculoskeletal injury. The IEQ item content was derived partly by a research team and their clinical practice in the treatment of the target population, partly by focus group discussions with psychologists providing intervention studies for the target population. Several focus group meetings with 44 psychologists specialized in the treatment of persistent pain disorders were held as part of the development of the IEQ. The impact of perceived injustice on the recovery process was discussed. Perceived injustice was conceptualized as “an appraisal cognition or set of cognitions comprising elements of blame, magnitude of loss and irreparability of loss”. The research team provided clinicians with item examples. When developing the scale, they aimed for the items of the scale to be as close to actual verbalization of clients as possible. The clinicians were through discussion asked to recall phrases expressed by their clients that covered the different elements of perceived injustice. The development resulted in a twelve-item self-report measure addressing the degree to which individuals perceive their life after injury to be characterized by injustice (10). The original version of the IEQ is presented in appendix 1.

The IEQ was translated into Swedish in 2015 by Charlotte de Belder Tesséus (17). The Swedish version was accepted by Michel JL Sullivan, the author of the original IEQ. The IEQ-S has the same configuration as the original version. The validity and reliability of the IEQ-S had previous to this study not been evaluated. The IEQ-S is presented in appendix 2.

**Work (dis)ability and sick leave**

In Western industrialized countries, work disability is a major public health problem (29). In Sweden, musculoskeletal pain disorders, together with mental illness, are the most common diagnosis responsible for work disability and sick leave (7). By resulting in major work disability, pain disorders contribute to vast economic consequences in several countries around the world (30). In Sweden, chronic pain results in adverse social and economic consequences related to work disability and the importance of increasing efforts to keep chronic ill people in the labor market has been stressed (31). Long-term sick leave has also been associated with individual consequences such as reduced quality of life (32). People with disability, including pain disorders, have a 40% reduced employment rate (33). To be
employed contributes to having economic security and a valuable role in society, making work disability a potential threat to individual finance and social identity (34). In summary, it is beneficial both for individuals and society to improve work ability and return to work.

Changes in societies and increasing demands of work life has made the importance of work ability a growing issue. An individual’s possibility of a better and longer working life is strongly dependent on his or her work ability (35). The construct work ability was defined in 1981 as “How good is the worker at present, in the near future, and how able is he or she to do his or her work with respect to the work demands, health and mental resources?” in a follow-up study of aging employees in Finland (36). Work ability is a complex construct including human resources, work characteristics and factors outside working life (36). Work ability is dependent on a complex interaction of biological, physical, behavioral and social phenomena (30). Important work characteristics that influence an individual’s work ability are factors such as their supervisors and ergonomics (37).

Individuals with pain disorders who themselves expect a long time period before being able to return to work have longer periods of work absence (30). Having motivation to return to work have been shown to increase the chances of actually returning to work, or increasing employability, among people in sick leave due to pain syndrome (38). Workplace interventions have been shown to not only reduce time to return to work but also reduce pain and improve functional status among workers with musculoskeletal pain disorders (29).

The Work Ability Index (WAI) was developed in the early 1980s at the Finish Institute of Occupational Health (39) and has been widely used in the last decades in research and occupational health to measure work ability (36).

**Pain Center at Uppsala University Hospital**

In Uppsala, Sweden, patients with complex chronic pain can be referred from primary care to Pain Center at Uppsala University Hospital for specialist care. Pain Center also accepts patients from other parts of Sweden, as well as other countries. At Pain Center, several health professions work together to do case management for patients with severe chronic pain. Pain Center consider itself the most complete unit for pain treatment in Sweden (40). At Pain Center, research is widely conducted. The research includes several parts of case management for patients with chronic pain, including the understanding of psychological factors. The goal is to develop better knowledge that can lead to better treatment for the patients. One of Pain Center’s profile areas in research is characterization of patients with complex pain. Within the project U-PAIN, patients with chronic, non-malignant pain will be characterized by an
extensive biopsychosocial mapping, including variables such as work ability and injustice. A part of the project will also explore the effect of physiotherapy in relation to return to work for patients with opioid treatment (41).

**Rationale for the study**

Chronic pain causes a lot of suffering and challenges health professionals, including physiotherapists, vastly (5). Physiotherapy should aim to improve health and decrease suffering (6). By motivating patients to achieve goals, physiotherapists can take a first step in the treatment of patients with chronic pain. A thorough biopsychosocial assessment is required to understand the process of chronic pain and provide successful individualized, patient-centered physiotherapy treatment (11). The use of the IEQ as an additional tool to assess psychological risk for problematic outcomes after suffering a musculoskeletal injury has been supported in research (10). There’s a dearth of literature on perceived injustice in patients with chronic pain. Research suggests that it is of interest to examine whether perceptions of injustice impact health conditions not directly linked with injury (10). Previous to this study, perceived injustice hadn’t, to the knowledge of the author, been examined in a Swedish population. The original version of the IEQ was translated into Swedish in 2015 (17). However, the psychometric properties of the Swedish language version of the IEQ had previous to this study not yet been examined. Pain disorders are one of the leading causes of work disability in Sweden (7). Research has shown a connection between high levels of perceived injustice and work absence (10,16) but this had previously not been evaluated in a Swedish population.

**Aim**

The aim of this study was to investigate the psychometric properties of the IEQ-S among patients with chronic pain referred to Swedish specialist care. Levels of perceived injustice, measured with the IEQ-S, among the sample were also studied.

**Research questions**

1. What was the concurrent criterion validity between perceived injustice, measured with the IEQ-S, and work ability, measured with the Swedish WAI, for patients with chronic pain referred to Pain Center at Uppsala University Hospital at their admission?
2. What was the internal consistency reliability of the IEQ-S for patients with chronic pain referred to Pain Center at Uppsala University Hospital, measured at their admission?
3. What was the stability reliability of the IEQ-S, measured by test-retest over a maximum 6-week interval, for patients with chronic pain referred to Pain Center at Uppsala University Hospital?

4. How did patients with chronic pain referred to Pain Center at Uppsala University Hospital experience perceived injustice measured with the IEQ-S at their admission?

**METHOD**

**Design**

The design of this study was descriptive and correlational (3). This study was part of a feasibility study for a large cohort study exploring patients with chronic, non-malignant pain. The aim of the cohort study is to identify which patients benefit and which suffer from long-term treatment with opioids. A multidisciplinary research group will follow over 1000 patients over the course of five years with yearly follow-ups to build a knowledge base regarding risks and benefits with long-term opioid treatment. The patients will be characterized with an extensive biopsychosocial mapping, including variables such as perceived injustice and work ability. The study was approved by the regional ethic board in Uppsala (EPN Uppsala D-No 2016-376).

**Sample**

The target population for this study was patients with chronic pain referred to specialist care in Sweden. The sample consisted of patients with chronic pain referred to specialist care at Pain Center at Uppsala University Hospital. The sample size was set to 65 for this feasibility study. The sampling was consecutive, all patients from the accessible population who met the inclusion criteria were eligible for recruitment until the specified sample size was reached (3). Inclusion criteria were an age of 18 years or older, first visit of their current referral to Pain Center, and a pain duration of more than three months at the time of referral. An informed consent was also required for inclusion. Patients who were given acute care related to active cancer treatment and patients in palliative care were excluded, as were patients who had cognitive impairment or were illiterate in the Swedish language.

**Data collection – measures**

For the cohort study, numerous measures were used, including the IEQ-S and WAI. The full list of variables collected in the cohort is presented upon request.
Demographics
The participants were asked to submit demographic information (appendix 3) to present sample characteristics. The demographic variables used in this study were gender, age, pain duration, highest completed education, main occupation and perceived conjunction with onset of pain. Pain levels according to the Swedish Brief Pain Inventory – Short form (BPI-SF) (appendix 4), items 3-6, were also used to describe the sample. In BPI-SF item 3-6, pain levels are estimated through a Visual Analog Scale (VAS) with 0 representing no pain and 10 representing pain as bad as you can imagine. The original BPI (42) has shown to have good reliability ($r = 0.8$) and high internal consistency ($0.81 < \alpha > 0.95$) for pain intensity assessing cancer pain (43). The WAI was also used to describe the sample with respect to their work ability.

Injustice Experience Questionnaire
The IEQ-S was used to measure perceived injustice in this study. The IEQ-S, as well as the original IEQ, is a twelve-item self-report measure addressing the degree to which individuals perceive their life after injury to be characterized by injustice (10). Respondents to the IEQ are asked to indicate on a five-point scale to what degree they experience each of the twelve items described as thoughts and feelings, the endpoints of the five-point scale being 0 – not at all, and 4 – all the time (10). The total score is calculated by adding the scores of the twelve items. It has been indicated that a total score of 30 on the IEQ represents clinically relevant levels of perceived injustice (44). The structure of the IEQ has in research shown to yield a two-component solution, the first labeled severity/irreparability of loss and the second blame/unfairness (10).

Sullivan et al. (10) examined the construct validity of the IEQ by examining conceptually related variables (catastrophizing, fear of movement/re-injury, depression, self-reported disability, pain severity and follow-up and return to work). The study supported the construct validity of the IEQ, with the measure significantly correlating with measures of pain, depression, catastrophizing, fear of movement/re-injury and self-reported disability. The correlation between the IEQ and catastrophizing, measured with The Pain Catastrophizing Scale (PCS) was high ($r = 0.75$), questioning whether they are different constructs. However, a regression analysis revealed that the IEQ and the PCS each contributed to unique variance in the prediction of pain severity supporting the discriminant validity of the IEQ. A logistic regression also supported the discriminant validity, suggesting that high IEQ-scores predict failure to return to work.
Sullivan et al. (10) also examined the stability reliability (by test-retest the first week of rehabilitation and four weeks later) of the IEQ and its sensitivity to change through the course of treatment. The results showed the IEQ to be very stable across four weeks. The IEQ scores also showed little change through the course of treatment.

The above described results are suggested to support the use of the IEQ as an additional tool to assess psychological risk for problematic outcomes after suffering a musculoskeletal injury (10). The validity and reliability of the IEQ-S had previous to this study not been evaluated.

Work Ability Index

The Swedish version of the WAI was used to measure work ability in this study. The WAI is a self-report questionnaire for measuring work ability with questions taking into account physical and mental demands of work, and the individual’s health status and resources. The full WAI consists of seven domains which have single or multiple questions. The different domain questions are all scored differently. The scores are weighted and summed into an index ranging from 7 to 49 (39). The index results have been categorized into poor (7-27 points), moderate (28-36 points), good (37-43 points) and excellent (44-49 points) work ability (39).

The WAI has been widely used in research and occupational health services since the 1990s (36). It has been translated into 25 languages (45) and has been available in Swedish for over two decades (46). A random sample of the Swedish working population was evaluated (using a slightly modified version) of the WAI in 2005. The results showed higher scores for men than women and that the WAI-scores decreased with age. It was concluded that the Swedish version of the WAI was a useful questionnaire for workers of all ages with good internal consistency reliability (46). In 2017, a Swedish study on the general population concluded that the full WAI is superior to its individual items and has acceptable predictive criterion-related validity for long term sickness absence (47).

Psychometric assessments of the WAI have been conducted for several other language versions and different populations (48–57). For example, a study of Dutch construction workers showed that the WAI had an acceptable stability reliability through test-retest over a four-week interval (55). A Polish study from 2005 evaluated the psychometric properties of the WAI in nursing profession using large, international data. The internal consistency reliability was analyzed and showed to have a Cronbach’s alpha for the total
study sample of 0.72, which was considered satisfactory. The study revealed the WAI to have high levels of cross-national stability (57).

The Swedish version of the WAI from 2013 was used to measure work ability in this study. An additional instruction was added to the WAI to measure work ability among individuals with no current employment, asking them to answer the questions based on the profession and main work tasks of a previous employment (appendix 5).

Procedure
The participants received a written invitation letter to Pain Center in which they were asked to fill in the questionnaires to prepare for their clinical visit. They were instructed to do so through 1177.se, the Swedish Healthcare Guide online, using mobile BankID. In the invitation letter, they also received written information about the study. Research staff called the participants before their clinical visit to offer help with the above described procedure and asked permission to give more information about the cohort and feasibility study during the clinical visit. The patients accepting to participate filled in a written consent. The first 65 patients who met the inclusion criteria and accepted to be part of the feasibility study were included in this study. This sampling was made between January and June of 2019. The participants were then asked to fill in the questionnaires once more at their clinical visit. This was mainly done through the web-based platform Webropol. These data were used for the retest and had to have be done within six weeks after the first test to be included in the analysis.

Data management
The data were collected between January and June of 2019 and administered to a research data base by the research staff. The author did not take part in the data collection but was provided data from the data base and begun the analysis in February of 2020. This took place at Pain Center at Uppsala University Hospital where all the data were handled. A few participants had answered the questionnaires manually on paper. These data were collected from a paper folder stored in a locked cabinet at the Pain Center.

Data analysis
The original data were interpreted and coded. For the purpose of this study, the author translated the questions and answers to English. The analyses were made using Statistical Package for the Social Sciences (SPSS version 26).
Sample characteristics
The demographic variables for all 65 participants were summarized. For the variable pain duration, the participants had given written answers which were converted and calculated by research staff. This resulted in a discovery that one of the included participants had a pain duration of less than three months, whereby this participant was excluded from the analyses. Subsequently, 64 participants were included in the analyses. The Work Ability Index was also calculated to describe the sample (n = 57). Frequency, central tendency and variability were calculated depending of the different levels of measurement and distribution of data.

Research question 1 - Concurrent criterion validity
Fifty-six participants had given full answers to the WAI. Five participants had not answered at all (complete/unit nonresponse) and three had given incomplete answers (partial/item nonresponse). Of the incomplete answers, one had failed to answer one sub question (3A). However, the answer of this sub question did not affect the index, no matter the answer. For this reason, the author did a deductive imputation (58) of this answer in consultation with the supervisor. The remaining two incomplete answers were excluded from the analysis because the majority of the answers were missing or the missing answer was too difficult to impute. The 57 participants with full or imputed answers were included in the analysis. The WAI-indexes were calculated using an electronic calculator (59). The total scores of the IEQ-S at admission were calculated by Excel for the 57 participants who were included. The concurrent criterion validity was evaluated by calculating a correlation coefficient, explaining how well the scores of the measure IEQ-S test 1 correlated with the scores of the external criterion WAI (3). The WAI and IEQ-S, being questionnaires, produced ordinal data, demanding the use of a non-parametric test. The Spearman’s correlation coefficient, \( r_s \) is a non-parametric statistic that was used in this study (18).

Research question 2 – Internal consistency reliability
The total scores of the IEQ-S at admission for all 64 participants were calculated by Excel. The internal consistency was established by calculating the Cronbach’s alpha (3), including the Corrected Item-Total Correlation and Cronbach’s Alpha if Item is deleted (18).

Research question 3 – Stability reliability
Three participants had not answered the IEQ-S test 2 (retest). Of the 61 participants who had answered the retest, six had not answered within the decided interval (six weeks or less). The
remaining 55 participants who had answered both the test and retest within the right interval were included for analysis. The total scores of the IEQ-S test 1 and IEQ-S test 2 were calculated by Excel. The scores at the different test occasions were compared and a reliability coefficient (3) was computed. A 2-way mixed effects model, with absolute agreement definition, ICC (2) was used as the reliability coefficient, comparing pared data on the same measure (18). The IEQ-S total scores for the two different occasions were also analyzed by calculating their central tendency and variability. Lastly, the interval between the test and retest was analyzed calculating the central tendency and variability of the number of days in between the two tests. A histogram as well as a boxplot was made to visually decide if the data was symmetric, which it was not.

Research question 4– Perceived injustice
A descriptive analysis was made in SPSS calculating the median and the mean score as well as the variability for the total scores of the IEQ-S at administration. Number of participants who had a score of 30 or more, which is suggested to be clinically relevant levels of perceived injustice (44), was also calculated.

Ethical consideration
At admission, the patients in this study were not treated differently than the other patients administered to Pain Center at Uppsala University Hospital. A second data collection with the IEQ-S was not thought to cause any ethical risks. The questions in the questionnaires might have been perceived as personal but are often used in routine healthcare. The participation in this study was completely voluntary and the data were pseudonymized and protected. The participants were offered to take part of the result of this study. They were also informed that they had the possibility to take part of their personal information handled in the study.

RESULT
Sample characteristics
42.2 % (n = 27) of the participants were men and 56.3 % (n = 36) were women. One participant was unsure about sex property. Their age was ranging from 19-85 years old with a mean of 50.3 (n = 64) and a standard deviation (SD) of 14.5. The other demographic variables are summarized in Table I.
Table 1: Sample characteristics

| Demographic variable                        | Median | Mean (SD) | 25\textsuperscript{th} percentile | 75\textsuperscript{th} percentile | Range       |
|--------------------------------------------|--------|-----------|------------------------------------|------------------------------------|-------------|
| Pain duration (years) n = 64               | 8.0    | 13.7 (14.1)| 3.0                                | 21.75                              | 0.4-53.0    |
| Brief Pain Inventory (SF) n = 64           |        |           |                                    |                                    |             |
| Item 3: Worst pain in last 24 hours        | 8.0*   | 7.0*      | 9.0*                               | 2.0-10.0*                          |             |
| Item 4: Least pain in last 24 hours        | 5.0*   | 3.0*      | 7.0*                               | 0.0-10.0*                          |             |
| Item 5: Pain on average                    | 7.0*   | 5.0*      | 8.0*                               | 2.0-10.0*                          |             |
| Item 6: Pain right now                     | 7.0*   | 5.3**     | 8.0*                               | 0.0-10.0*                          |             |
| Work Ability Index total score n = 57      | 15.0** | 11.0**    | 25.0**                             | 7.0-40.0**                         |             |

| Frequency | %          |
|-----------|------------|
| What is your highest completed education?  |           |
| Have not completed elementary school, junior secondary school or similar | 1 | 1.6 |
| Elementary school, junior secondary school or similar | 15 | 23.4 |
| 2 years of high school education or vocational school | 16 | 25.0 |
| 3 or 4 years of high school education | 12 | 18.8 |
| University or collage education less than 3 years | 9 | 14.1 |
| University or collage education 3 years or longer | 11 | 17.2 |

| What is your main occupation right now?   |        |
|------------------------------------------|--------|
| Work as an employee                      | 15     | 23.4 |
| Entrepreneur                             | 1      | 1.6  |
| Student                                  | 1      | 1.6  |
| Pensioner (age pensioner, on disability pensioner, early retirement pensioner) | 19 | 29.7 |
| On long-term sick leave (more than 3 months) | 19 | 29.7 |
| Job-seeker or in a labour market policy measure | 5 | 7.8  |
| Other                                    | 4      | 6.3  |

| The pains started in conjunction with     |        |
|------------------------------------------|--------|
| Disease                                  | 6      | 9.4  |
| Accident                                 | 2      | 3.1  |
| Surgery                                  | 7      | 10.9 |
| Stress/strain                            | 4      | 6.3  |
| Other                                    | 2      | 3.1  |
| Do not know                              | 18     | 28.1 |
| Several of the options above             | 25     | 39.1 |

*0 = no pain, 10 = pain as bad as you can imagine
**index range = 7-49; 7-27 = poor; 28-36 = moderate; 37-43 = good; 44-49 = excellent work ability
Concurrent criterion validity
The correlation coefficient between the IEQ-S and WAI (n = 57) was $r_S = -0.47$, $p = < 0.01$, meaning that there was a negative, significant relationship between the two variables for this sample. High levels of perceived injustice were associated with low work ability.

Internal consistency reliability
The Cronbach’s alpha for the overall IEQ-S (n = 64) was 0.941. The Corrected Item-Total Correlation ranged between 0.619-0.894 and the Cronbach’s Alpha if Item Deleted varied between 0.929-0.940 for the twelve items as is shown in Table II.

Table II: IEQ-S test 1 (admission) Item-Total Statistics

| IEQ-S item                                                                 | Corrected Item-Total Correlation* | Cronbach’s Alpha if Item Deleted** |
|----------------------------------------------------------------------------|-----------------------------------|-----------------------------------|
| Item 1: Det är inte många som förstår hur allvarliga mina besvär är.       | 0.625                             | 0.939                             |
| Item 2: Mitt liv blir aldrig som förut.                                   | 0.746                             | 0.935                             |
| Item 3: Jag får lida för att någon annan slarvat.                         | 0.633                             | 0.939                             |
| Item 4: Ingen skulle behöva leva så här.                                  | 0.695                             | 0.937                             |
| Item 5: Jag vill bara få tillbaka mitt liv som det var förut.             | 0.639                             | 0.939                             |
| Item 6: Jag känner att det här har påverkat mig för alltid.               | 0.733                             | 0.936                             |
| Item 7: Alltihop käns så orättvist.                                      | 0.894                             | 0.929                             |
| Item 8: Jag är orolig för att mina besvär inte tas på allvar.             | 0.619                             | 0.940                             |
| Item 9: Ingen kan någonsin gottgöra mig för allt jag gått igenom.         | 0.777                             | 0.934                             |
| Item 10: Det känns som om jag blivit bestulen på något värdefullt.        | 0.819                             | 0.933                             |
| Item 11: Jag oroar mig för att jag kanske aldrig kan förverkliga mina drömmar. | 0.826                             | 0.932                             |
| Item 12: Jag kan inte tro att det här har hänt mig.                       | 0.754                             | 0.935                             |

*should be larger than 0.30
**should not be larger than the overall Cronbach’s alpha = 0.941

Stability reliability
The ICC, single measure, 2-way mixed effects model, with absolute agreement definition, was 0.80 (n = 55). Its 95% confidence interval ranged between 0.69-0.88. Table III shows the central tendency and variability of the total scores for IEQ-S on the two different occasions. The number of days between the test (IEQ-S test 1) and retest (IEQ-S test 2) varied between 3-42 days with a median of 22 days.
**Table III: Total score for IEQ-S at the two different occasions**

|                | Median | 25th percentile | 75th percentile | Minimum score | Maximum score |
|----------------|--------|-----------------|-----------------|---------------|---------------|
| IEQ-S test 1** | 29.0** | 16.0**          | 38.0**          | 3.0**         | 48.0**        |
| IEQ-S test 2** | 26.0** | 17.0**          | 36.0**          | 4.0**         | 48.0**        |

* n = 55

** IEQ total score = sum of responses to all 12 items, total score range = 0-48, total score > 30 = clinically relevant level of perceived injustice

**Perceived injustice – total IEQ-S scores**

The median total score for IEQ-S measured at admission was 27.0 (n = 64), 25th percentile = 15.3, 75th percentile = 37.8, with a range between 3-48 points. The mean was 26.2 with a standard deviation of 13.3. Thirty out of 64 participants (46.9 %) had a total score of 30 or more.

**DISCUSSION**

**Result summary**

High levels of perceived injustice were associated with low work ability in this study. There was a moderate (4), negative, significant relationship between the IEQ-S and the WAI. The internal consistency of the IEQ-S was high (1), and the stability reliability good (2). This study showed that close to half of the sample had clinically relevant levels of perceived injustice (44). The median work ability was poor among the sample.

**Result discussion**

**Concurrent criterion validity**

High levels of perceived injustice were associated with low work ability in this study. There was a moderate (4), negative, significant relationship between the IEQ-S and the WAI, calculated by the Spearman’s correlation coefficient. To the knowledge of the author, no other study has examined the concurrent criterion validity between the IEQ and the WAI. However, the IEQ has been studied with respect to its concurrent criterion validity against other variables. The concurrent validity of the Japanese IEQ has been evaluated against the subscales of the Brief Pain Inventory (BPI) and the Pain Catastrophizing Scale (PCS). The correlational coefficient of the Japanese IEQ and the subscales of the BPI was calculated by Pearson’s correlation coefficient (r) and ranged from r = 0.38 to r = 0.68 (p < 0.01) (15).
correlational coefficients of the Japanese IEQ and the PCS was 0.73 (p < 0.01). The concurrent validity of the Spanish IEQ also examined the criterion validity, calculating the Pearson’s correlation coefficient between IEQ and the Pain Visual Analogue Scale (PVAS), Fibromyalgia Impact Questionnaire (FIQ), Hospital Anxiety and Depression Scale (HADS), Pain Catastrophizing Scale (PCS) and Chronic Pain Acceptance Questionnaire. All the questionnaires were significantly associated with the total IEQ-score (60).

The result in this study might have been affected by a difficulty in answering the questions of the WAI for the large percentage of participants who did not have a current employment. It would be interesting to compare the scores of the IEQ-S and WAI, as well as the concurrent criterion validity among the two, for the participants with, respectively without, a current employment. The validation of the Danish IEQ showed a significant correlation between high levels of perceived injustice and current unemployment ($r_S = 0.15$, $p < 0.1$, 2-tailed) (16). Future research should also examine the concurrent criterion validity between the IEQ-S and other external criteria.

**Internal consistency reliability**

The internal consistency reliability of the IEQ-S was high in this study, with an overall Cronbach’s alpha of 0.94. A Cronbach’s alpha > 0.9 might suggest that the different items of the IEQ-S are too similar (1). However, an item-total analysis showed that all of the IEQ-S items correlated with the total score, with values over 0.3 for all measures. Furthermore, the deletion of any of the twelve items did not result in a higher Cronbach’s alpha than the overall value. The result is similar to the validation study of the Danish IEQ, were the Cronbach’s alpha was 0.91. Their item-total analysis inspection also showed that no item behaved in a statistically unexpected manner. A round off of the alpha was made to 0.9 and the Danish version was considered validated (16). The Japanese version of the IEQ also had a Cronbach’s alpha of 0.9 (15). The original IEQ had a coefficient alpha of 0.92 (10). The IEQ analyzed in a pediatric sample, had a Cronbach’s alpha of 0.93 (28). The Spanish IEQ had slightly lower internal consistency, with a Cronbach’s alpha of 0.89. The alpha value decreased when each one of the items were eliminated, which supported the use of a one-dimension scale (60).

**Stability reliability**

The ICC in this study was 0.80 ($n = 55$), with a 95% confidence interval ranging between 0.69-0.88. A reliability coefficient higher than 0.70 is considered satisfactory (3), and an ICC
value between 0.75 and 0.90 indicate good reliability (2). The original IEQ was very stable across four weeks ($r = 0.9$) and showed little change through the course of treatment (10). However, the analytic method used was test-retest correlations, and not an ICC-calculation, making the comparison difficult. Reliability estimates vary according to the method used to obtain them (3). According to Koo and Li (2), the ICC is a more ideal measure of reliability. The stability of the Japanese version of the IEQ was also tested through test-retest with a retest done within 1-4 weeks of the baseline measure. The ICC of the total score was 0.93 (15). The ICC for the Spanish IEQ was calculated for 1- to 2-week follow up interval with an ICC score of 0.98 (60). The ICC-score in this study might be slightly lower, since the interval in many cases was longer and reliability declines as the interval increases (19). Since the IEQ has shown to yield a two-component solution in principal components analysis (10), it might have been interesting to assess the stability reliability of the two subscales (3). However, an analysis of the structure of the Swedish version of the IEQ should first be made.

Perceived injustice
This study showed that almost half of the participants in this sample had clinically relevant levels of perceived injustice, which corresponds to the 75th percentile of the distribution of IEQ scores in the IEQ User Manual (44). The result is similar to a psychometric study of the Spanish IEQ, with a sample of fibromyalgia participants (60).

The mean total score of the IEQ-S in this study was higher than what is described in the study of the original IEQ (10) as well as the IEQ User Manual (44). The psychometric study of the Japanese version of the IEQ (15) also resulted in a slightly lower mean total score than the IEQ-S. The sample for these studies consisted of participants who had injury-related pain. A minority of the participants in this study stated that their pains started in conjunction with an accident solely. The validation of the Danish IEQ had a more similar sample to this study, with participants with chronic benign pain, not necessarily sustained by an injury (16). The mean total score of the Danish IEQ was also very similar to the IEQ-S. The psychometric testing of the Spanish IEQ was done with a sample of fibromyalgia patients (60) and showed even higher mean levels of perceived injustice. These results suggest that chronic pain, not necessarily sustained from injury is associated with higher levels of perceived injustice. However, this is contradicted by the results of Ferrari and Science Russel (14), who compared levels of perceived injustice in patients with rheumatoid arthritis and fibromyalgia. The participants with rheumatoid arthritis had much lower levels of perceived injustice than in all the other studies. A psychometric study of the English version on an Australian population
showed slightly higher levels of perceived injustice compared to this, as well as the Danish, but not the Spanish, study. The sample consisted of participants who had work-related musculoskeletal disorders (61), however it is unclear to the author if these disorders were a result of a specific injury or not. The IEQ has also been psychometrically evaluated on a sample of children and adolescents with chronic pain (28). The mean level of perceived injustice was lower than in this study but slightly higher than in the study of the original IEQ (10).

Previous research has shown that the pain origin affects the levels of perceived injustice. Sullivan et al showed that individuals with musculoskeletal conditions who had been injured in a motor vehicle accident showed higher levels of perceived injustice than individuals who had been injured in a work accident for example (10). Other studies have shown that injury victims might experience injustice particularly in situations where injury has occurred as a result of someone else’s error or negligence (62). Future research should study the IEQ-S total score in association with the demographic variables, as has been done in several international studies. A comparison of the total score depending on how the pains started would have made the comparison to other studies interesting. Future research should also study perceived injustice in a larger sample.

Method discussion
The sample for this study was recruited consecutively. A consecutive sample is often considered the best choice for a rolling enrollment. However, the risk of potential bias could have been smaller if the sample had been determined by a specific time period instead of a specific sample size. A long sampling period has been suggested to decrease bias due to “seasonal or other time-related fluctuations” (3). Sampling as many as 65 patients, the author hoped to get a representative sample, meaning that the main characteristics of the sample closely approximated those of the population, however, this cannot be ensured (3). There’s a lack of scientifically sound recommendations for sample size determination for psychometric studies (63,64). However, the more homogeneous the sample, the smaller sample size is required (3). The sample in this study can be considered heterogenous with respect to many of the demographic variables presented, which may motivate that a larger sample size would have been desirable. At the same time, all participants had chronic pain and were suitable for Swedish specialist care, which reflect an aspect of homogeneity, which could warrant the sample size chosen for this study.
Preferably, the data considering pain duration would have been collected differently. In this study, the participants were able to answer the question about pain duration in their own words, making the data very difficult to summarize and present. This also resulted in the exclusion of one participant for the analyses. It would have been of interest to know more about the pain genesis/origin of the participants. However, the nature of chronic pain is often complex and multidimensional, which makes it very difficult to assess (13).

The original IEQ was designed to measure perceived injustice associated with musculoskeletal injury (10). However, in this study, the participants gave different answers to when or why their pain started. No inclusion or exclusion criteria was set to control this. However, this study was part of a large cohort study where this aspect was not a main aspect of interest. Recently, a new version of the IEQ was developed which was adapted for relevance to a noninjury context, the Trait Injustice Experience Questionnaire (T-IEQ) (65). In future research, it would be interesting to investigate if this new version would suit the sample of this study, as well as the cohort study, better.

One could argue if the WAI was the right measure to use when examining the concurrent validity. There seem to be a lack of psychometric studies of the Swedish WAI, and to the knowledge of the author, no such analyses have been made for the specific sample in this study. However, it is widely used in research and has shown good internal consistency reliability (46) and acceptable predictive criterion-related validity for long term sickness absence (47) in Swedish general working populations.

The WAI used in this study did also have an additional instruction, added to measure work ability among individuals with no current employment, asking them to answer the questions based on the profession and main work tasks of a previous employment (appendix 3). This version has not been psychometrically analyzed.

Self-report measures create measurement errors since other factors than the ones we aim to measure intervene how individuals answer (3). Since the participants answered so many questionnaires, the author suspects a risk of respondent fatigue (66), which could explain why some participants failed to answer the Work Ability Index completely.

Many variables tend to change over time, which can affect the test-retest and reliability coefficient (3). In this study, the test-retest interval was not decided in consideration to the specific questionnaire (IEQ-S) or variable (injustice) analyzed since it was a part of a large cohort study, investigating many other variables. Therefore, the interval was not based on assumptions of the specific trait’s stability, which researchers usually tend to do (19). In this study, the interval ranged from three to 42 days. There is a risk that
participants who had short intervals remembered their initial answers which might have affected their second answer. At the same, the risk that the trait had changed decreased (19). With the longer intervals, there is a risk that the test-retest reliability had naturally declined, which it tends to do even with more stable traits (3).

The concurrent criterion validity in this study was moderate. Polit and Beck (3) describes that the more abstract the concept, the less suitable it is to rely on criterion-related validity. If injustice is interpreted as an abstract concept or trait, the concurrent criterion validity might not have been the best suitable measure of validity.

Clinical implication and social benefits
To conduct research on chronic pain, valid and reliable measures are essential (12). The results of this study can provide valuable information about data quality in future research with similar sample characteristics. However, a psychometric analysis only examines an application of a measure, and ideally, new psychometric testing should be made for new samples (3). Valid and reliable measures are also essential in clinical settings to determine aspects of pain, as well as direct treatment and evaluate effectiveness of interventions (13). Traditional, biomedical approaches of assessing pain should be accompanied by an assessment of other factors such as social, emotional and behavioral ones (8). The results of this study can add to the quality of pain assessment in clinical settings.

The results of this study suggest that the IEQ-S may be an adjunct tool for physiotherapists to assess patients with chronic pain referred to specialist care in Sweden. The use of the IEQ as part of a biopsychosocial assessment has previously been recommended for physiotherapy assessment to precede treatment for patients with chronic pain (11).

With the consequences work disability have, as have been described in this study, it is of great importance for both individuals and society to improve work ability. The results of this study have contributed with knowledge about the relationship between chronic pain, perceived injustice and work ability.

The benefits of this study are thought to outweigh the potential risk for the participants, which have been minimized as described earlier. This is motivated by the fact that this study contributed to new knowledge and that the method used successfully answered the research questions (67).
Future research
Future studies should examine other psychometric aspects of the IEQ-S. The new version of the IEQ, the T-IEQ, should be studied and potentially translated to Swedish to perhaps better suit research where the sample hasn’t sustained their pain directly from injury. It would also be interesting to compare perceived injustice, measured with the IEQ-S, among patients who have suffered a traumatic injury with those who haven’t. To get more insight into how injustice is perceived among patients with chronic pain, a larger sample should be studied. Future research should also examine possible intervention approaches to reduce perceptions of injustice.

Conclusion
This study has contributed with new information about the psychometric properties of the IEQ-S, for patients with chronic pain referred to specialist care in Sweden. The internal consistency of the IEQ-S was high (1), and the stability reliability good (2). There was a moderate (4), negative, significant relationship between the IEQ-S and the WAI, showing that high levels of perceived injustice were associated with low work ability in this study. The results support the use of the IEQ-S as an adjunct tool for physiotherapists, as well as other health care professionals, to assess patients with chronic pain referred to specialist care in Sweden, however further research is desirable. This study has also given an insight into how injustice is perceived among patients with chronic pain, however this should be studied in a larger sample.
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When injuries happen, they can have profound effects on our lives. This scale was designed to assess how your injury has affected your life.

Listed below are twelve statements describing different thoughts and feelings that you may experience when you think about your injury. Using the following scale, please indicate how frequently you experience these thoughts and feelings when you think about your injury.

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| never | rarely | sometimes | often | all the time |

1. Most people don’t understand how severe my condition is.
2. My life will never be the same.
3. I am suffering because of someone else’s negligence.
4. No one should have to live this way.
5. I just want to have my life back.
6. I feel that this has affected me in a permanent way.
7. It all seems so unfair.
8. I worry that my condition is not being taken seriously.
9. Nothing will ever make up for all that I have gone through.
10. I feel as if I have been robbed of something very precious.
11. I am troubled by fears that I may never achieve my dreams.
12. I can’t believe this has happened to me.

...Total
Namn: ____________________________ Ålder: ________ Känd: ________ Datum: __________

Skador som inträffar kan få allvarliga konsekvenser för våra liv. Följande skala har tagits fram för bedömning av hur din skada påverkat ditt liv.

Nedan finns tolv påståenden som beskriver olika tankar och känslor som du kan ha när du tänker på din skada. Vi ber att du använder skalan och anger hur ofta dessa påståenden förekommer i dina tankar och känslor när du tänker på din skada.

0 – aldrig  1 – sällan  2 – ibland  3 – ofta  4 – hela tiden

☐ Det är inte många som förstår hur allvarliga mina besvär är.
☐ Mitt liv blir aldrig som förut.
☐ Jag får lida för att någon annan slarvat.
☐ Ingen skulle behöva leva så här.
☐ Jag vill bara få tillbaka mitt liv som det var förut.
☐ Jag känner att det här har påverkat mig för alltid.
☐ Alltihop känns så orättvist.
☐ Jag är orolig för att mina besvär inte tas på allvar.
☐ Ingenting kan någonsin gottgöra mig för allt jag gått igenom.
☐ Det känns som om jag blivit bestulen på något väldigt värdefullt.
☐ Jag oroar mig för att jag kanske aldrig kan förverkliga mina drömmar.
☐ Jag kan inte tro att det här har hänt mig.

…Summa

Skala är efter tillstånd av Dr. Sullivan översatt och omarbetad av Charlotte de Belden Tesséus, Uppsala Universitet, Institutionen för neurovetenskap, Sjukgymnasprogrammet. BMC Box 593, 751 24 Uppsala, Sweden.
APPENDIX 3: Demographic variables
Smärtanalys

Bakgrundsinformation

1. Hur lång är du? __________
2. Vad väger du? _________kg
3. Var bor du?
   □ Storstad >100 000 invånare
   □ Mellanstor stad
   □ Landsort < 10 000 invånare

4. Vilket land är du född i? __________
5. Vilket land är din föräldrar födda i?
   Mamma: _____________
   Pappa: _____________

6. Är du ensamstående eller gift/sambo?
   □ Ensamstående
   □ Gift/sambo

5a. Har du/ni några barn som bor hemma?
   Räkna med de barn som bor minst halva tiden hos dig.
   □ Ja
   □ Nej → Gå till fråga 6!

5b Om ja: Hur många?
   Fyll i antal i rutan.
   □ 0-5 år
   □ 6-12 år
   □ 13-19 år
   □ 20 år eller äldre

6. Hur många personer ingår i ditt hushåll? _________ st

7. Vilken är din högsta genomförda utbildning?
   Obs! Ange endast ett alternativ.
   □ Grundskola, folkskola, realskola eller liknande
   □ 2-årig gymnasieutbildning eller fackskola
   □ 3- eller 4-årig gymnasieutbildning
   □ Universitets- eller högskoleutbildning kortare än 3 år
   □ Universitets- eller högskoleutbildning 3 år eller längre
8. Vilken är din huvudsakliga sysselsättning just nu?
☐ Arbetar som anställd
☐ Egen företagare
☐ Studerande
☐ Pensionär (ålders-, avtals-, sjuk- och förtidspensionär)
☐ Långtidsjukkriven (mer än 3 månader) ☐ Heltid ☐ Deltid _____%
☐ Tjänstledig eller föräldraledig
☐ Arbetssökande eller i arbetsmarknadspolitisk åtgärd
☐ Hemarbetande, sköter hushållet
☐ Annat____________________________________

9. Till vilket yrke vill du räkna ditt arbete? ______________________________________
Obs! Om du inte arbetar nu, ange yrke och arbetsuppgifter som du huvudsakligen hade i ditt tidigare arbete.

10. Vilken typ av arbetsgivare har du?
Obs! Ange endast ett alternativ.
☐Privat
☐Kommunal
☐Landsting/region
☐Staten
☐Annan
☐Har ingen arbetsgivare

11. Om du plötsligt skulle hamna i en oförutsedd situation, där du på en vecka måste skaffa fram 15000 kr, skulle du klara det?
☐Ja
☐Nej

12. Har du under de senaste 12 månaderna hänt att du har haft svårigheter att klara de löpande utgifterna för mat, hyra, räkningar, m.m.?
☐Nej
☐Ja, vid ett tillfälle
☐Ja
Din smärta

1. Beskriv med egna ord dina smärtor/besvär i dagsläget:

2. När började smärtorna som du nu söker för?
   År___________  Månad___________  Ev dag______________

3. Sedan när är smärtorna som de är nu?
   År___________  Månad___________  Ev dag______________

4. Började smärtorna i samband med:
   □ Sjukdom   □ Olycka   □ Operation   □ Stress/påfrestning
   □ Annat? ________________

5. Har du varit utsatt för psykiskt eller fysiskt våld eller övergrepp?
   □ Nej
   □ Ja

6. Hur ofta har du smärtor?
   □ Ständigt, oberoende av vad jag gör
   □ Ständigt men med attacker av svårare smärta emellanåt
   □ Nästan hela tiden, men kan vara smärtfri några timmar
   □ Nästan varje dag, men kan vara helt smärtfri vissa dagar
   □ Annat? ____________________________
7. Känns smärtorna på djupet eller mer som ytliga?
   - [ ] Djupa
   - [ ] Ytliga
   - [ ] Både djupa och ytliga

8. Beskriv med egna ord vad som vanligen lindrar smärtan:

9. Beskriv med egna ord vad som vanligen förvärrar smärtan:

10. Vilka mediciner använder du regelbundet? Ange alla dina mediciner. Fyll i tabellen enligt exemplet nedan.

| Läkemedlets namn | Styrka | Antal/dag | Sedan när? |
|------------------|--------|-----------|------------|
| Ex. Alvedon      | 500 mg | 2 tabl 4ggr/dag | Aug 2012 |

11. Hur upplever du effekten av eventuella smärtmediciner?
   - [ ] Ingen
   - [ ] Måttlig
   - [ ] God
12. Vilka mediciner mot smärta har du provat tidigare, hur upplevde du effekten?

| Läkemedlets namn: | Effekt: Ingen | Måttlig | God | Biverkningar |
|-------------------|----------------|---------|-----|--------------|
|                    |                |         |     |              |
|                    |                |         |     |              |
|                    |                |         |     |              |
|                    |                |         |     |              |
|                    |                |         |     |              |

13. Har du fått någon annan behandling än mediciner mot din smärta och med vilket resultat? (T ex TNS, akupunktur, sjukgymnastik, smärtskola, beteendeterapi)

Övriga sjukdomar

Har du haft någon av följande sjukdomar/besvär?

|                          | Ja | Nej |
|--------------------------|----|-----|
| Ärftlig sjukdom i familjen |    |     |
| Hjärtsjukdom              |    |     |
| Högt blodtryck            |    |     |
| Astma                     |    |     |
| Magsår/magkatarr          |    |     |
| Njursjukdom               |    |     |
| Leversjukdom              |    |     |
| Diabetes                  |    |     |
| Struma                    |    |     |
| Ögonsjukdom               |    |     |
| Psykisk sjukdom           |    |     |
| Förstoppning              |    |     |
| Annat? Vad?              |    |     |
APPENDIX 4: BPI-SF

SMÄRTFORMULÄR *BPI-SF, svensk version

Namn: ___________________________ Personnummer: ______________________

Datum: ____________________________

1. De flesta människor har någon gång upplevt smärta, exempelvis huvudvärk, värk från en stukad led eller tandvärk. Har du senaste veckan upplevt någon annan smärta än dessa smärttyper?
   □ Ja □ Nej
   Om du har upplevt smärta – fortsätt med formuläret.

2. Fyll i smärtritningen och markera vilken typ av smärta du besväras av på de olika ställena på kroppen.

3. Gradera din smärta genom att ringa in den siffra som bäst beskriver smärtan när den varit som värst under senaste dygnet.
   
   ![Sfigra 1-10]
   
   Ingen smärta Värsta tänkbara smärta

4. Gradera din smärta genom att ringa in den siffra som bäst beskriver smärtan när den varit som minst under senaste dygnet.
   
   ![Sfigra 1-10]
   
   Ingen smärta Värsta tänkbara smärta

5. Gradera din smärta genom att ringa in den siffra som bäst beskriver smärtan i genomsnitt.
   
   ![Sfigra 1-10]
   
   Ingen smärta Värsta tänkbara smärta

6. Gradera din smärta genom att ringa in den siffra som bäst beskriver hur ont du har just nu.
   
   ![Sfigra 1-10]
   
   Ingen smärta Värsta tänkbara smärta

7. Vilken behandling eller vilka mediciner får Du för din smärta?
8. Hur mycket har behandlingen eller medicineringen **lindrat smärtan** under det senaste dygnet?

| 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Ingen lindring | Fullständig lindring |

9. Ringa in den siffra som bäst beskriver hur smärtan under det **senaste dygnet** inverkat på:

a) **dina allmänna aktiviteter**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

b) **din sinnessämning**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

c) **din gångförmåga**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

d) **ditt normala arbete (i och utanför hemmet)**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

e) **dina relationer till andra människor**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

f) **din sömn**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |

g) **din förmåga att njuta av livet**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Ingen inverkan | Mycket stor inverkan |
Frågeformulär Smärtercentrum

04. Arbetsförmåga (WAI)
Work Ability Index (WAI). Version 1.1, 2013-06-17

Fråga 0-2B
Om du inte arbetar nu, besvara frågorna utifrån det yrke och de arbetsuppgifter som du huvudsakligen hade i ditt tidigare arbete.

0. Vilka är de huvudsakliga kraven i ditt arbete? (obligatorisk fråga)

- Psykiskt krävande
- Fysiskt krävande
- Båda psykiskt och fysiskt krävande

1. Den nuvarande arbetsförmågan jämfört med när den var som bäst (obligatorisk fråga)
Vi antar att din arbetsförmåga, då den var som bäst, värderas med 10 poäng. Vilket poängtal skulle du ge din nuvarande arbetsförmåga?

10 - Min arbetsförmåga är som bäst

2A. Arbetsförmåga i relation till arbetets krav (obligatorisk fråga)
Hur bedömer du din nuvarande arbetsförmåga i relation till de fysiska krav ditt arbete ställer?

- Mycket bra
- Ganska bra
- Måttlig
- Ganska dålig
- Mycket dålig

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2B. Hur bedömer du din nuvarande arbetsförmåga i relation till de psykiska krav ditt arbete ställer? *(obligatorisk fråga)*

- Mycket bra
- Ganska bra
- Måttlig
- Ganska dålig
- Mycket dålig

3. Nuvarande sjukdomar
Skada/sjukdom

A. Skada till följd av olycka *(obligatorisk fråga)*
(t.ex. huvud/nackskada eller stor bränskskada)

- Ja, enligt min åsikt
  - Ja, enligt läkare
  - Nej

B. Muskuloskeletala sjukdomar i rygg, armar, ben eller annan del av kroppen *(obligatorisk fråga)*
(t.ex. långvarig led- eller muskelvärk, ledgångsreumatism, ischias)

- Ja, enligt min åsikt
  - Ja, enligt läkare
  - Nej

C. Hjärt/kärlsjukdomar *(obligatorisk fråga)*
(t.ex. högt blodtryck, kärlkramp, hjärtinfarkt)

- Ja, enligt min åsikt
- Ja, enligt läkare
Nej

D. Luftvägssjukdomar (obligatorisk fråga)
(t.ex. astma, svår luftrorskatarr, emfysem)
  Ja, enligt min åsikt
  Ja, enligt läkare
  Nej

E. Psykiska störningar (obligatorisk fråga)
(t.ex. nervösa besvär, depression, ångest, sömnstörning, utmattning)
  Ja, enligt min åsikt
  Ja, enligt läkare
  Nej

F. Sjukdom i nervsystemet eller öron, ögon (obligatorisk fråga)
(t.ex. hörselskada, ögonsjukdom, epilepsi)
  Ja, enligt min åsikt
  Ja, enligt läkare
  Nej

G. Sjukdom i mage eller matsmältningsorgan (obligatorisk fråga)
(t.ex. magkatarr, magsår, gallsten, lever- eller tarmstörning)
  Ja, enligt min åsikt
  Ja, enligt läkare
  Nej

H. Sjukdom i urinvägar eller könsorgan (obligatorisk fråga)
(t.ex. njursjukdom, inflammation i äggstockar eller prostata)

☐ Ja, enligt min åsikt
☐ Ja, enligt läkare

Nej

I. Hudsjukdom (obligatorisk fråga)
(t.ex. eksem, psoriasis)

☐ Ja, enligt min åsikt
☐ Ja, enligt läkare

Nej

J. Tumör eller cancer (obligatorisk fråga)

☐ Ja, enligt min åsikt
☐ Ja, enligt läkare

Nej

K. Ämnesomsättningssjukdom (obligatorisk fråga)
(t.ex. övervikt, diabetes, struma)

☐ Ja, enligt min åsikt
☐ Ja, enligt läkare

Nej

L. Blodsjukdom (obligatorisk fråga)
(t.ex. blodbrist/anemi)

☐ Ja, enligt min åsikt
☐ Ja, enligt läkare

Nej
M. Medfödd funktionsnedsättning (obligatorisk fråga)

☐ Ja, enligt min åsikt

☐ Ja, enligt läkare

Nej

N. Annan sjukdom eller funktionsnedsättning (obligatorisk fråga)

☐ Ja, enligt min åsikt

☐ Ja, enligt läkare

Nej

Fråga 4-6

4. Uppskattad arbetsoförmåga relatert till sjukdom eller skada (obligatorisk fråga)

Är din sjukdom eller skada ett hinder i ditt nuvarande arbete? Kryssa i mer än ett alternativ om du behöver.

Det finns inga hinder

☐ jag har inga sjukdomar eller skador

☐ jag klarar mitt arbete, men får symptom

☐ jag är ibland tvungen att minska arbetstakten eller ändra arbetssätt

☐ jag är ofta tvungen att minska arbetstakten eller ändra arbetssätt

☐ på grund av min sjukdom eller skada klarar jag endast att arbeta deltid

☐ enligt min egen åsikt är jag helt oförmögen att arbeta

5. Sjukskrivning under det senaste året (12 månader) (obligatorisk fråga)

Hur många dagar har du varit borta från arbetet p.g.a. sjukdom eller skada (vård, behandling eller undersökning) under det senaste året (12 månader)?

☐ Ingen dag

☐ 1-7 dagar

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6. Egen prognos av arbetsförmåga om två år från nu. (obligatorisk fråga)

Med tanke på din hälso - tror du att du kan arbeta i ditt nuvarande yrke om två år?

- Nej, det tror jag inte
- Jag är osäker på det
- Ja, det är ganska säkert

7. Psykiska resurser

7A. Har du under den senaste tiden kunnat uppskatta dina dagliga aktiviteter? (obligatorisk fråga)

- Ofta
- Ganska ofta
- Ibland
- Ganska sällan
- Aldrig

7B. Har du under den senaste tiden varit pigg och alert? (obligatorisk fråga)

- Ofta
- Ganska ofta
- Ibland
- Ganska sällan
- Aldrig

7C. Har du under den senaste tiden känt dig hoppfull inför framtiden? (obligatorisk fråga)

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Besvara

- Ofta
- Ganska ofta
- Ibland
- Ganska sällan
- Aldrig

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