Factors that influence the impact of Chronic Non-Cancer Pain on daily life. A Partial Least Squares modelling approach

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Funding sources	State sources of funding and the role of funders in the conduct of the research or include a statement 'no external funding' **at the end of the paper**.	✓
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Section and Topic	Item No.		Reported on page No.
TITLE/ABSTRACT/ KEYWORDS	1	Identify the article as a study of diagnostic accuracy (recommend MeSH heading 'sensitivity and specificity').	1-2
INTRODUCTION	2	State the research questions or study aims, such as estimating diagnostic accuracy or comparing accuracy between tests or across participant groups.	4-9
METHODS			
Participants	3	The study population: The inclusion and exclusion criteria, setting and locations where data were collected.	9-10
	4	Participant recruitment: Was recruitment based on presenting symptoms, results from previous tests, or the fact that the participants had received the index tests or the reference standard?	9-10
	5	Participant sampling: Was the study population a consecutive series of participants defined by the selection criteria in item 3 and 4? If not, specify how participants were further selected.	9
	6	Data collection: Was data collection planned before the index test and reference standard were performed (prospective study) or after (retrospective study)?	10
Test methods	7	The reference standard and its rationale.	N/A
	8	Technical specifications of material and methods involved including how and when measurements were taken, and/or cite references for index tests and reference standard.	11
	9	Definition of and rationale for the units, cut-offs and/or categories of the results of the index tests and the reference standard.	10
	10	The number, training and expertise of the persons executing and reading the index tests and the reference standard.	8
	11	Whether or not the readers of the index tests and reference standard were blind (masked) to the results of the other test and describe any other clinical information available to the readers.	N/A
Statistical methods	12	Methods for calculating or comparing measures of diagnostic accuracy, and the statistical methods used to quantify uncertainty (e.g. 95% confidence intervals).	9-10
	13	Methods for calculating test reproducibility, if done.	11-12
RESULTS			
Participants	14	When study was performed, including beginning and end dates of recruitment.	12-13
	15	Clinical and demographic characteristics of the study population (at least information on age, gender, spectrum of presenting symptoms).	12-13
	16	The number of participants satisfying the criteria for inclusion who did or did not undergo the index tests and/or the reference standard; describe why participants failed to undergo either test (a flow diagram is strongly recommended).	12-13
Test results	17	Time-interval between the index tests and the reference standard, and any treatment administered in between.	N/A
	18	Distribution of severity of disease (define criteria) in those with the target	N/A

		condition; other diagnoses in participants without the target condition.	
	19	A cross tabulation of the results of the index tests (including indeterminate and missing results) by the results of the reference standard; for continuous results, the distribution of the test results by the results of the reference standard.	11-16
	20	Any adverse events from performing the index tests or the reference standard.	N/A
Estimates	21	Estimates of diagnostic accuracy and measures of statistical uncertainty (e.g. 95% confidence intervals).	12-14
	22	How indeterminate results, missing data and outliers of the index tests were handled.	N/A
	23	Estimates of variability of diagnostic accuracy between subgroups of participants, readers or centers, if done.	N/A
	24	Estimates of test reproducibility, if done.	N/A
DISCUSSION	25	Discuss the clinical applicability of the study findings.	14-19

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Abstract

Background: Chronic Non-Cancer Pain is pain of more than three months' duration and is not associated with an oncological condition. There is ample literature that recognises that Chronic Non-Cancer Pain impacts numerous areas of the life of the person who suffers from it. This impact is difficult to determine and quantify because Chronic Pain is a subjective experience.

Objective: The objective of this study was to test a recursive model of hypothesised factors that comprise the concept of Chronic Non-Cancer Pain Impact on daily life using Partial Least Squares-Structural Equation Modelling.

Design: A cross-sectional study was carried out. The sample size was calculated using G*Power V.3.1.9.4 with five parameters (two-tailed, large effect size (f^2=0.35), power of 0.95, statistical significance of 95% (α=0.05) and 36 predictors). The minimum number of subjects was considered to be 137.

Methods: A recursive model was built based on data from a sample of 395 people over 18 years of age with Chronic Non-Cancer Pain. Data collection was conducted between January and March 2020 at Pain Units and Primary Healthcare Centres belonging to the Spanish Public Health System in the province of Seville (Spain). Analyses were based on Partial Least Squares-Structural Equation Modelling. The internal consistency, convergent validity and discriminant validity of the internal measurement model were assessed. For the external measurement model, global model adjustment and structural validity were assessed. The predictive capacity of the final model was also evaluated. All analyses were performed using SmartPLS version 3.3.2 in consistent mode.

Results: Findings showed an adequate validity of the proposed model, which comprised nine factors: pain catastrophising, hopelessness due to pain, support network, proactivity, treatment compliance, self-care, mobility, resilience, and sleep. The internal validity of the model (Cronbach's alpha and rho_A>0.70; Average Variance Extracted>0.50; standardised outer loadings>0.60; Heterotrait-Monotrait-Ratio<0.85), goodness of fit (Standardised Root Mean Square Residuals<0.08; Geodesic and Euclidean distance *p*-value<0.05) and predictive power with out-of-sample values (Stone-

Geisser test>0.5) were adequate. The hypothesised structure of the instrument has also been confirmed (path coefficients>0.3; R^2>0.1; f^2>0.2).

Conclusions: The results have shown an adequate internal consistency, convergent validity and discriminant validity of the model. Likewise, the model has shown an adequate goodness of fit, and the validity of its structure and the hypothesis have been confirmed. However, more research is needed in this regard as the possible interaction between the different factors evaluated in the model with the confounding or moderating variables that may exist.

Keywords

Assessment, daily life impact, pain, partial least squares, validation studies

What is already known

- Chronic Non-Cancer Pain Impact is difficult to determine and quantify because it is a subjective experience, even though people's experiences of it are the main indicators for predicting the impairment it causes.
- The National Pain Strategy of the United States proposed defining High-Impact Chronic Pain as "Chronic Pain that limits daily life activities on most days for at least six months".
- The PAIN_Integral Scale©, designed to assess the recursive hypothesised model Impact of Chronic Non-Cancer Pain in daily life, showed good results for reliability and internal consistency in the preliminarily validation study, using Covariance-based Partial Least Squares.

What this paper adds

- The recursive hypothesised model has shown good results in terms of internal consistency, convergent validity, discriminant validity, goodness of fit and structural validity and the hypotheses that were formulated have also been confirmed.
- The recursive hypothesised model could serve nurses as a conceptual framework for assessing the Impact of Chronic Non-Cancer Pain in daily life, helping to establish specific interventions for each person.

Background

Chronic Non-Cancer Pain is pain of more than three months' duration (Raja et al., 2020) and is not associated with an oncological condition (Cunha, Pinto-Fiamengui, Sampaio & Conti, 2016). Chronic Non-Cancer Pain is considered a public health problem throughout the world due to its high prevalence. It is estimated to affect the world population in a range of between 12% and 42% (Costa-Cabral, Botelho-Bracher, Prescatan-Depintor & Eluf-Neto, 2014; Kennedy, Roll, Schraudner, Murphy & McPherson, 2014). In Europe, Chronic Non-Cancer Pain affects 19% of the population (Breivik, Eisenberg & O´Brien, 2013) and 17% of the Spanish population (Cabrera-León, Rueda & Cantero-Braojos, 2017).

In addition, Chronic Non-Cancer Pain has significant economic repercussions (Torralba, Miquel & Darba, 2014). The annual cost associated with this health condition in Europe is around 300 billion euros (Bushnell, Ceko & Low, 2013) and this figure is 16 billion euros in Spain (Torralba, Miquel & Darba, 2014).

There is ample literature that recognises that Chronic Non-Cancer Pain impacts numerous areas of the life of those who suffer from it, such as sleep quality (Haack et al., 2020), pain catastrophising (Akbari et al., 2017) and/or resilience (Hemington et al., 2018), among others. This impact is difficult to determine and quantify because Chronic Pain is a subjective experience based on individual characteristics (Ferrer-Peña, Gil-Martínez & Pardo-Montero, 2016), the values of each culture (Torres-Cueco, 2018) and the learning process that takes place throughout the individual's life (Ferrrer-Peña, Gil-Martínez & Pardo-Montero, 2016).

The concept of Chronic Non-Cancer Pain Impact is such a complex one that there is no exact definition, even though it is one of the main indicators to predict the impairment caused by the pain (Fine, 2011). In a study carried out in 2016 based on the secondary analysis of the National Health Survey of the United States, researchers found that High-Impact Chronic Pain generates four times more limitations in daily life than serious health problems such as a cerebral vascular accident, renal insufficiency, cancer, diabetes or cardiac failure (Pitcher et al., 2019).

The National Pain Strategy of the United States proposes defining High-Impact Chronic Pain as “chronic pain that limits daily life activities on most days for at least six months” (Dalhamer et al., 2018). This definition is based only on the assessment of three interrelated areas: 1) perception of pain intensity, 2) limitation in the activity related to pain and 3) restriction of the participation in social activities due to Chronic Pain (National Pain Strategy, 2020). Nevertheless, we considered that there are other aspects related to the impact of pain, that these are important to understand the individual circumstances of each person experiencing pain, and that they should be assessed (Cáceres-Matos & Gil-García, et al., 2021).

This is the conception of the Impact of Chronic Non-Cancer Pain that the PAIN_Integral Scale© instrument is integrated, designed, and preliminarily validated using the technique Covariance-based Structural Equation Model (Cáceres-Matos & Gil-García et al., 2021). It includes the key aspects suggested by the National Pain Strategy (2020) as well as factors such as pain catastrophising, hopelessness due to pain, proactivity, treatment compliance, among others.

However, when studying health conditions with a subjective component (Liu, Hsu, Hung, Wu & Pai, 2019; Roche, Duffield & White, 2011; Zhao, Ahmed & Faraz, 2020) as important as the Impact that Chronic Non-Cancer Pain has on daily life, there are authors who recommend the use of techniques such as Partial Least Squares-Structural Equation Modelling. This is an emerging second-generation statistical method based on analysis of variance that is mainly used to develop theories in exploratory research (Williams, Vandenberg & Edwards, 2009). This methodology is specifically useful in research on social and healthcare sciences where the constructs are not directly observable except through the observation of the indicators or items (Chin, 1998). Therefore, it allowed us to analyse the proposed model comprising the relationships between the constructs and the relationships between constructs and their indicators (Dijkstra & Henseler, 2015; Marcoulides, 2016).

Thus, the objective of this study was to test a recursive model of hypothesised factors that comprise the instrument PAIN_Integral Scale©, which assesses the concept of Chronic Non-Cancer Pain Impact on daily life using Partial Least Squares-Structural Equation Modelling.

Modelling

To define the recursive hypothesised model, this study started from the conceptualisation that the extent to which Chronic Non-Cancer Pain affects each person depends on biological, psychological and social factors and the interaction between them (Amaya-Ropero & Carrillo-González, 2015; Breivik, Eisenberg & O'Brien, 2013; Ferrer-Peña, Gil-Martínez & Pardo-Montero, 2016; Norrefalk, 2011; Registered Nurses´ Association of Ontario, 2013; Torralba, Miquel & Darba, 2014; Wranker, Rennemark, Berglund & Elmståhl, 2014). Other authors insist that the multidimensional nature of Chronic Pain is not adequately reflected and that it is necessary to assess the Impact of Chronic Non-Cancer Pain on daily living in a comprehensive way (Pitcher, Von Korff, Bushnell & Porter, 2019).

Based on this conceptualisation, our study established the following hypotheses that are supported by the literature to assess the model proposed:

Hypothesis 1: Pain catastrophising will be positively associated with hopelessness due to pain and inversely associated with support network.

Pain catastrophising is an exacerbated negative process characterised by a lack of control over the response to Chronic Non-Cancer Pain (Hülsebusch, Hasenbring & Rusu, 2016; Rusu, Gajsar, Schüter & Bremer, 2019). People who catastrophise about their pain tend to magnify the threat of painful stimuli and this is considered to be a maladaptive response to pain (Rusu, Gajsar, Schüter & Bremer, 2019). Therefore, imagination can play a crucial role in anticipating negative outcomes when living with pain (Darnall, 2015).

Studies reveal that pain catastrophising could influence hopelessness due to pain (Hülsebusch, Hasenbring & Rusu, 2016; Klasen, Brüggert & Hasenbring, 2006) and this relationship seems to be direct. This means that people who are more likely to catastrophise about their pain could be associated with greater feelings of hopelessness (Hülsebusch, Hasenbring & Rusu, 2016). Several studies have reported that the feeling of being helpless caused by pain catastrophising makes the person feel hopelessness (Craig et al., 2022; pp. 301-328; Velly et al., 2011).

On the other hand, pain catastrophising may cause maladaptive changes in a person's support network that helps to reduce the pain (Cano, 2004; Shim et

al., 2017). Several studies have reported that positive responses from people in the person's inner circle could be a mediating factor in the relationship between catastrophising and anxiety/depression (Inoue et al., 2015) or even be considered as a coping strategy (Terol-Cantero, Bernabé, Martín Aragón, Vázquez & Buunk, 2021).

Hypothesis 2: Proactivity will be positively associated with treatment compliance, self-care and mobility.

Proactivity is the ability of a person to lead his or her own life and face changes. It is a type of coping which is characterised by a behaviour that allows potentially stressful situations to be anticipated and to improve the reaction to them, minimising their impact (Parker & Wang, 2015). Studies indicate that, when a person plays an active role in the management of their condition, this directly influences compliance with the prescribed pharmacological treatment (Broekmans, Dobbels, Milisen, Morlion, & Vanderschueren, 2009). Treatment compliance is understood as “the extent to which a person’s behaviour (in terms of taking medication, following diets or implementing lifestyle changes) coincides with medical or health advice” (World Health Organization, 2013).

The attitudes and concerns of the person towards the medication are considered as a risk factor for non-compliance. Proactive pain management and the search for information on treatment could be related to better adherence to treatment (Timmerman, Stellema, Stronks, Groeneweg & Huygen, 2014). In addition, it is known that people with Chronic Non-Cancer Pain are more likely to report more problems with self-care activities (Evangelista & Shinninck, 2008) such as grooming, dressing, bathing and using the toilet (Mlinac & Feng, 2016). Self-care refers to the full range of specific behaviours that the person performs aimed at improving health, preventing disease or adverse sequelae from the disease and maintaining their well-being (Evangelista & Shinninck, 2008; Kralik, Price & Telford, 2010), including medical, behavioural and emotional aspects (Lorig & Holman, 2003). Being a proactive person positively influences one’s ability to take care of oneself (Broekmans, Dobbels, Milisen, Morlion, & Vanderschueren, 2009). Studies indicate that being proactive in the face of initiatives whose objective is to increase the person's confidence make these people have greater control over

the actions and decisions related to their health, that is, their self-care. Therefore, these people would go from having a passive role to having an active role in their self-care (European Network on Patient Empowerment, 2012; Nuño-Solinis et al., 2013; World Health Organization, 1998).

Hypothesis 3: Resilience will be positively associated with proactivity and negatively associated with pain catastrophising and hopelessness due to pain.
Resilience is a positive psychological construct that encompasses positive environmental and emotional characteristics that allow a person to endure adversity (Kralik, Price & Telford, 2010). Several studies have reported that resilience resources may decrease sensitivity to pain, and that it is associated with greater well-being (Davydov, Steward, Ritchie & Chaudieu, 2010; Ramírez-Maestre, Esteve & López, 2012).

Higher resilience may cause reductions in pain catastrophising among Chronic Non-Cancer Pain sufferers over time. Furthermore, another study found that individuals with Chronic Non-Cancer Pain who had higher levels of resilience experienced greater positive emotions and subsequent improvements in daily reports of pain catastrophising (Palit, Fillingim, & Bartley, 2020). In this sense, several studies have confirmed that catastrophising is a predictor of pain severity (Hülsebusch, Hasenbring & Rusu, 2016). On the other hand, those who are more resilient to Chronic Non-Cancer Pain may present higher levels of proactivity (Elliot et al., 2019; Sturgeon & Zautra, 2010). Resilient people carry out proactive behaviour, try to achieve the objectives that are proposed and have a greater capacity for facing stressful circumstances with which they have to deal (Elliot et al., 2019).

Hypothesis 4: Support network will be positively associated with self-care, resilience, proactivity, mobility and sleep.
Chronic Non-Cancer Pain is associated with a reduced support network and isolation is one of the most common consequences of this condition (Finlay, Peacock & Elander, 2018). This concept was proposed by Cobb (1976) as follows: “Support network is information leading the subject to believe that he or she is cared for and loved, esteemed, and a member of a network of mutual obligation” (Cobb, 1976; Fernández-Peña, Molina & Valero, 2018). Improving

one's support network is related to psychological and physical benefits and it is considered to be a crucial part of a person's therapeutic intervention (Ibrahim et al., 2015). Studies link a greater support network with a greater capacity for self-care (Hand, Law, McColl, Hanna & Elliott, 2014; Finlay, Peacock & Elander, 2018) and proactivity (Cowan, 2013).

Another factor that is influenced by the support network is resilience, since it seems to be a key factor in determining who is resilient and who is not (Elliot et al., 2019; Sturgeon & Zautra, 2010; Zang, Zhao, Cao & Ren, 2017).

In addition, according to Gosling et al., (2014), support network reduces sleep disturbances and higher levels of support network could lead to lower levels of mobility impairment (Gosling, Batterham, Glozier & Christensen, 2014; Goubert & Trompetter, 2017).

Methods

Study design

The sample size to be used was calculated using G*Power V.3.1.9.4. The five input parameters were two-tailed, a large effect size (f^2=0.35), a power of 0.95, a statistical significance of 95% (α=0.05) and a total of 36 predictors (Cohen, 1988; Faul, Erdfelder, Lang & Buchner, 2007; Green, 1991)**.** The minimum number of subjects was considered to be 137 but the sample size of our study was larger with a total of 395 subjects.

Recruitment procedures

This study was conducted at Pain Units and Primary Healthcare Centres belonging to the Spanish Public Health System in the province of Seville (Spain).

As inclusion criteria, people aged over 18 years with any Chronic Non-Cancer Pain condition were eligible for the study. Our exclusion criteria covered people who suffered from cancer pain, neurodegenerative diseases, cognitive impairment or difficulties with oral communication in Spanish.

Data collection

Data were collected between January and March 2020 by a member of the research team, trained in the use of the PAIN_Integral Scale© instrument. The researcher asked the participants all the questions to avoid nonresponse bias, so there were no missing items. Data were recorded in paper format and subsequently, the same researcher entered the data electronically through a google form document.

The questionnaire was divided into two sections. In the first section, questions were asked to obtain sociodemographic data such as type of residential area, marital status, level of education and employment status, among others. This allowed us to contextualise the characteristics of the sample. In the second section, questions were asked to collect clinical data as well as the pharmacological treatment and Chronic Non-Cancer Pain characteristics.

PAIN_Integral Scale©

The PAIN_Integral Scale© was chosen to assess the Impact of Chronic Non-Cancer Pain in the hypothesised model because it is an instrument that evaluates the nine dimensions that encompass this concept: pain catastrophising (3 items), hopelessness due to pain (3 items), support network (8 items), proactivity (3 items), treatment compliance (5 items), self-care (3 items), mobility (3 items), resilience (5 items), sleep (3 items). This instrument was preliminarily validated in Seville (southern Spain) and consists of 36 items graded on a Likert-type scale from one to five and scores on the scale range from 36 to 180 points, and two cut-off points are identified (36-130: Severe impact; 131-135: Moderate impact; 136-180: Mild impact). The items included were selected by a group made up of researchers with clinical and academic profiles from different disciplines and who have experience in the study, assessment and treatment of people with Chronic Non-Cancer Pain. The PAIN_Integral Scale© showed adequate internal consistency through the calculation of Cronbach's Alpha coefficient (α=0.72). The Exploratory Factor Analysis indicated that it is structured into nine dimensions (71.02% of the explained variance), which were subsequently confirmed by Confirmatory Factor Analysis in a different sample (Goodness of Fit Index=0.90; Standardised Root Mean Square Residual=0.04; Root Mean Square Error of

Approximation=0.05). The nine dimensions are pain catastrophising (3 items), hopelessness due to pain (3 items), support network (8 items), proactivity (3 items), treatment compliance (5 items), self-care (3 items), mobility (3 items), resilience (5 items), sleep (3 items) (Cáceres-Matos & Gil-García, Rivera-Sequeiros & López-Millán, 2021).

Statistical Analysis

Descriptive statistics were used to map and summarise the characteristics of the sample using R software (the R project, Auckland, New Zealand). Continuous variables were expressed by mean ($\bar{x}$) with the corresponding confidence interval (CI) and categorical variables were expressed as percentages (%) and CI. The comparison of the different groups' proportions was assessed using the χ^2 test for qualitative variables and the Student's t-test for quantitative variables. Significance was considered to be 5% in all analyses. The discriminant validity, internal consistency and convergent validity of the internal measurement model were calculated. The following criteria were considered:

- Regarding the discriminant validity, the two measurements used were the analysis of the cross-loadings and the Heterotrait-Monotrait Ratio. For the first measurement, the cross-loadings of an indicator on its construct were required to be higher than any of its loadings with the other constructs. For the Heterotrait-Monotrait Ratio, all the constructs were required to have a value lower than 0.85 and be within the confidence interval (Henseler, Ringle & Sarstedt, 2015).
- Cronbach's alpha and composite reliability were analysed for internal consistency, requiring values greater than 0.70 (Streiner, 2003). Composite reliability permits different degrees of precision and amounts of error for items measuring the same latent variable.
- To evaluate convergent validity, the cross-loadings of the indicators and the Average Variance Extracted were analysed. The cross-loadings must be equal to or greater than 0.70. In the case of values between 0.40 and 0.70, the impact that the elimination of the indicator would have on the internal consistency of the construct was analysed (Barclay, Higgings & Thompson,

1995). For the Average Variance Extracted, values higher than 0.50 were required (Fornell & Larcker, 1981).

The global model adjustment and structural validity of the external measurement model were assessed. The following criteria for the retention of the items were considered:

- For the global adjustment model, the Standardised Root Mean Residuals value was required to be less than 0.08 (Hu & Bentler, 1998) and the *p* value had to be greater than 0.05 for geodesic distance (d_G) and Euclidean distance (d_ULS) (Henseler, Hubona & Ray, 2016).
- Regarding the validity of the structural model, collinearity was assessed requiring Variance Inflation Factor values less than three; path coefficients (β), the coefficient of determination (R^2) and the effect size (f^2) were also considered, the values of which were to be greater than 0.3, 0.1 and 0.2 respectively (Hair et al., 2019).

The predictive capacity of the final model was also evaluated by calculating the Stone-Geisser test (Q^2) value using the blindfolding procedure for a D oversight distance (D=7), which had to be greater than 0.50 (Geisser, 1974; Shmueli, Ray, Velasquez-Estrada & Chatla, 2016; Stone, 1974).

All analyses for the validation of the recursive measurement model were performed using SmartPLS version 3.3.2 in consistent mode and, to assess predictive capacity, SmartPLS predict mode was used (Ringle, Wende & Becker, 2020). In addition, to analyse discriminant validity, global model adjustment, structural model validity and predictive capacity, a bootstrapping analysis with 10,000 subsamples was performed.

Ethical considerations

Everyone who met the inclusion criteria was informed about the study, but only participants who provided written or verbal informed consent were included and were able to leave the study when they considered it appropriate. The research committee of the Virgen Macarena-Virgen del Rocio University Hospital approved the study (1373-N-20).

Results

Sociodemographic characteristics

The study subjects comprised a total of 249 women (63%) and 146 men (37%). The average age of participants included was 56.47 (±14.89) years (women: 62.00±6.00 years vs. men: 56.2±8.00 years). Table 1 shows data on age, PAIN_Integral Scale© score, centre, marital status, employment situation, among others. The most prevalent type of pain was lower back pain in both women (58.9%) and men (72.77%); and the average pain evolution time was 120.10 (±143.85) months (women: 156.29±168.00 months vs. men: 72.77±89.98 months). The average pain intensity, measured by the Visual Analogue Scale, was 7.44 (±2.14) for women and 6.88 (±2.38) for men.

#Table 1#

Internal measurement model: internal consistency, convergent validity and discriminant validity

Cronbach's alpha, rho_A and composite reliability values for each of the constructs are greater than 0.70 and composite reliability values are all below the value calculated for the 95% confidence interval. Therefore, the estimated model has good reliability (Table 2).

Regarding the Average Variance Extracted, all the values obtained are greater than 0.50 (Table 2) and the confidence intervals are below the values calculated for a confidence level of 95%. For cross-loadings, all the values are greater than 0.70 (Table 3) except items TC3, TC5, SN2 and SN6, which were subsequently eliminated in order to verify whether their elimination would improve the Average Variance Extracted values. However, the results obtained did not improve the values and we decided to keep the four items. Given these results, there is convergent validity for each one of the constructs proposed, which means that the items that comprise the constructs are more likely to measure what they assess.

The Heterotrait-Monotrait Ratio values between the different pairs of constructs are all less than 0.85 (Table 4) and these values are below those calculated for a confidence level of 95%. Therefore, it can be said that there is discriminant validity in the estimated model.

#Table 2#

#Table 3#

#Table 4#

External measurement model: global model adjustment and structural validity

Firstly, the Standardised Root Mean Residuals value was 0.05, which is less than the maximum allowed of 0.08. The values for d_ULS and d_G were 1.95 and 0.63 respectively, which is lower than the values calculated for 95% (p<0.05) and 99% (p<0.01). These results show that there are differences between the estimated model and the population model, indicating an acceptable goodness of fit of the model.

All the path coefficients are greater than 0.3 and have a statistically significant effect (p<0.05) (Table 4).

The multicollinearity analysis between the elements (Table 3) provided values less than 3 for all items, showing that there is no collinearity between questionnaire items.

R^2 values obtained are all greater than 0.1 and they are below the values calculated for a confidence level of 95%. Regarding the values of the effect size of the relationship between constructs, all the f^2 values are higher than 0.2 and 0.35, which means effect sizes are moderate and strong, respectively (Table 4).

Taking into account all the results, it could be said that the structural model that we have proposed is reliable.

Figure 1 represents the nomogram of the validated model with the Cronbach's alpha values of each construct, the path coefficients and their *p*-values, and the cross-loadings of each item.

#Figure 1#

Predictive capacity of the model

Regarding the predictive capacity of the model, the values of Q^2 statistic for all the constructs are greater than 0, so it can be said that the model has predictive capacity (Table 2).

Discussion

The aim of this study was to test a model of hypothesised factors that comprise the concept of Chronic Non-Cancer Pain Impact on daily life using Partial Least Squares-Structural Equation Modelling.

The vision of Chronic Non-Cancer Pain that contextualises this study is the holistic view, as many international associations for the study of pain have claimed over the last two decades, that it should be considered a disease in itself (Breivik, Eisenberg & O'Brien, 2013; Ferrer-Peña, Gil-Martínez & Pardo-Montero, 2016; Norrefalk, 2011; Wranker, Rennemark, Berglund & Elmståhl, 2014).

This holistic view of Chronic Non-Cancer Pain is widespread among nurses, who are in continuous contact with sufferers (Lukewich et al., 2015). This conception is very similar to the total pain concept developed by Cicely Saunders in 1964, where she considered this as "a whole overwhelming experience, not only physical, but also emotional, social and spiritual (Wood, 2021)". However, this concept was developed for cancer pain, which has connotations that, in our opinion, differentiate it from Chronic Non-Cancer Pain, such as the severity of the underlying disease.

We believe that the results of this study may have direct implications for clinical practice. Starting from the statement of the American Nursing Association, they concluded that all nurses are pain management nurses and have the obligation to help people manage their pain to reduce its impact on daily life (American Nursing Association, 2018). In addition, the new definition of Chronic Non-Cancer pain proposed by the International Association for the Study of Pain (Raja et al., 2020) has reinforced the main role of nurses in its approach from a biopsychosocial perspective. The new definition of Chronic Non-Cancer Pain especially highlights the importance of the role of the nurse in the assessment stage, considering the different factors involved and the relationships between such factors. In this sense, nurses need a conceptual framework that identifies the key aspects impacted by Chronic Non-Cancer pain and how they are related to people. Therefore, we believe that the results obtained after testing the proposed hypothesised recursive model in this study may have more relevance, thus helping to understand which aspects should be evaluated to

provide quality care as well as how Chronic Non-Cancer impacts each person (Sonneborn & Williams, 2020).

To achieve this, a correct assessment needs to be carried out given that consultation time is limited, with the use of multidimensional instruments that evaluate the different areas on which pain has an impact (Breivik et al., 2008; International Affairs & Best Practice Guidelines, 2013). A set of instruments that individually evaluate each of the aspects that pain influences is necessary (Cáceres-Matos et al., 2020). Proof of the complexity that this entails is that only 10% of health professionals report having incorporated them into their daily clinical practice (Breivik et al., 2006; Breivik et al., 2008).

Although there are several multidimensional instruments for assessing Chronic Non-Cancer Pain, such as the Brief Pain Inventory (pain intensity, general activity, state of mind, ability to walk, normal work, relationships with other people, sleep and enjoyment of life; Cleeland & Ryan, 1994) or the Short-Form McGill Pain Questionnaire (sensory scale of pain through a set of adjectives, affective scale and intensity of pain; Melzack, 1975), these have limitations in their use.

The first limitation is that, despite being multidimensional instruments, each dimension is evaluated by a single item, which reduces the information obtained during the assessment (International Affairs & Best Practice Guidelines, 2013; Morrone & Weiner, 2013; Breivik et al., 2008; Turk & Melzack, 2011). This does not align with the recommendation of Beavers et al. to evaluate each dimension by a minimum of three or four items (Beavers et al., 2013). The second limitation is that the evaluation of each one of the items is based on the use of a Visual Analogue Scale, the implementation of which has shown weaknesses since it is based on retrospective measurements and subjects may tend to overestimate or underestimate the answers (Turk & Melzack, 2011).

In this sense, the PAIN_Integral Scale© instrument, on which the model proposed for testing in this study is based, has two strengths. The first is a methodological strongpoint, since it is below the maximum of 40 items recommended by Nunnally and each dimension is made up of three items or more. The second strength is conceptual, since it follows the proposal for the concept of high-impact Chronic Pain proposed by the National Pain Strategy (work, social and self-care activities) and, in addition, it evaluates more

dimensions and includes others not previously considered, such as treatment compliance, proactivity, resilience, hopelessness due to pain and pain catastrophising, which have not been covered by the aforementioned instruments (Cáceres-Matos, Gil-García, Barrientos-Trigo, Porcel-Gálvez & Cabrera -León, 2020; Cáceres-Matos & Gil-García et al., 2021).

Therefore, this instrument, once its external validation process has been completed, could streamline the assessment of the Chronic Non-Cancer Pain Impact on daily life in consultation, since it would combine all the necessary instruments into one, speeding up the validation process.

We found as a discrepancy that, in the model proposed in our study, employment situation was not included as one of the constructs, although this factor has been evaluated as a sociodemographic variable external to the model, obtaining rates of incapacity for work of 60.2% among women and 66.4% among men. These data are similar to those obtained in other previous studies carried out on the Spanish population in which they found that around 43% of people with severe pain had problems doing their work (Langley, Ruiz-Iban, Molina, De Andrés & Castellón, 2011) or even between 43% and 78% in the case of people suffering from fibromyalgia (Rivera & González, 2004; Sicras-Mainart et al., 2009).

It is necessary to point out that, despite the fact that the National Pain Strategy proposed a relatively recent approach to the concept of high-impact Chronic Pain, the use of this definition has not yet been extended to clinical practice and it is difficult to find scientific publications which address and/or analyse it (Dahlhmer et al., 2018; National Institute of Health, 2021; Zelaya et al., 2020). This issue also occurs with the Chronic Non-Cancer Impact concept, for which no definition is available. Therefore, the testing of the hypothesised model that we propose in this study is in an exploratory phase, which explains why the Partial Least Squares-Structural Equation Models technique has been used.

This technique is usually used for construct prediction or for the identification of key constructs when the structural model is complex. Opposed to this technique is the Covariance-based Structural Equation Model, which has traditionally been used to confirm a theory or to compare alternative theories (Hair et al., 2019; pp.148) and has previously been used in the validation of the PAIN_Integral Scale© (Cáceres-Matos & Gil-García, et al., 2021).

If the results obtained in the study using the Covariance-based Structural Equation Model technique and the present study are compared, it can be seen that the Cronbach's alpha values of each subscale are very similar for both techniques (pain catastrophising: Covariance-based: 0.88 vs. Partial Least Squares: 0.88; hopelessness due to pain: Covariance-based: 0.78 vs. Partial Least Squares: 0.78; support network: Covariance-based: 0.92 vs. Partial Least Squares: 0.91; proactivity: Covariance-based: 0.83 vs. Partial Least Squares: 0.76; treatment compliance: Covariance-based: 0.76 vs. Partial Least Squares: 0.74; self-care: Covariance-based: 0.94 vs. Partial Least Squares: 0.94; mobility: Covariance-based: 0.75 vs. Partial Least Squares: 0.74; resilience: Covariance-based: 0.78 vs. Partial Least Squares: 0.78; sleep: Covariance-based: 0.83 vs. Partial Least Squares: 0.83) (Cáceres-Matos & Gil-García, et al., 2021). Although different statistics were used, the adjustment measures yielded good results. Regarding the hypotheses put forward, it can be affirmed that all of them are confirmed, since all the path coefficients were greater than 0.3, obtaining statistical significance (p<0.05).

If we continue to analyse the methodological aspects of this study, we can observe that the rule of 10 subjects per item traditionally used to calculate the sample size is in disuse (Marcoulides & Saunders, 2016). For this reason, the sample size in this study has been calculated taking into consideration a minimum power of 95%, an effect size of 0.35, a statistical significance of 95% and a total of 36 predictors, obtaining a minimum value of 137 subjects, widely exceeded in our sample (Green, 1991). In addition, the Partial Least Squares-Structural Equation Modelling allows the use of much smaller and much larger sample sizes (Henseler, 2018), even though Reinartz et al. suggest a sample size of at least 100 subjects (Reinartz, Haenlein & Henseler, 2009).

With respect to convergent validity, adequate Average Variance Extracted values (>0.50) were obtained for all constructs and outer loading values higher than 0.70 were obtained for all items, except TC3, TC5, SN2 and SN6, which were in the interval of 0.40-0.70. For these items, the recommendations of Hulland (Hulland, 1999) were followed, which recommends the recalculation of the value of the Average Variance Extracted once the items have been eliminated. In our study, the elimination of the items did not improve the Average Variance Extracted values, so we decided not to eliminate them. This

was done taking into account the recommendations of various authors, who consider that for scales that are in the initial stages of development, they can be more flexible, allowing values between 0.40 and 0.70 (Hulland, 1999; Hair, Ringle & Sarstedt, 2011).

In terms of prospective lines of research, we believe that it would be necessary to analyse the possible interaction between the different factors evaluated in the model with the confounding or moderating variables that may exist, such as sociodemographic characteristics. In addition, and not focusing specifically on the hypothesised model, but on the PAIN_Integral Scale© instrument that evaluates it, we consider it necessary to analyse the convergence of each subscale with specific validated instruments that assess the same constructs to determine the cut-off points.

Limitations

This study has several limitations. Firstly, we highlight that the Partial Least Squares-Structural Equation Modelling methodology does not yet allow for the study of bidirectional relationships between constructs, which are likely to exist in the proposed model due to the complexity of the impact that Chronic Non-Cancer Pain causes.

Secondly, test-retest could not be applied in order to obtain results on the stability of the measurement over time because it was carried out following a cross-sectional design, which makes it difficult to establish cause-effect relationships.

Finally, the mediating or moderating variables have not been taken into account because the model is at an initial stage of development. This consideration was based on studies carried out by authors such as Hair et al., (2019) who consider that it is necessary to have a strong theoretical or conceptual foundation before exploring significant mediation or moderation effects.

Conclusions

The results have shown an adequate validity of the measurement model, evaluated through internal consistency, convergent validity and discriminant validity. Likewise, it has shown an adequate goodness of fit, and the validity of

the structure of the model and the hypothesis have been confirmed. However, we believe that an evaluation of the model considering the possible mediation or moderation effects is necessary.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Figure(s) 1

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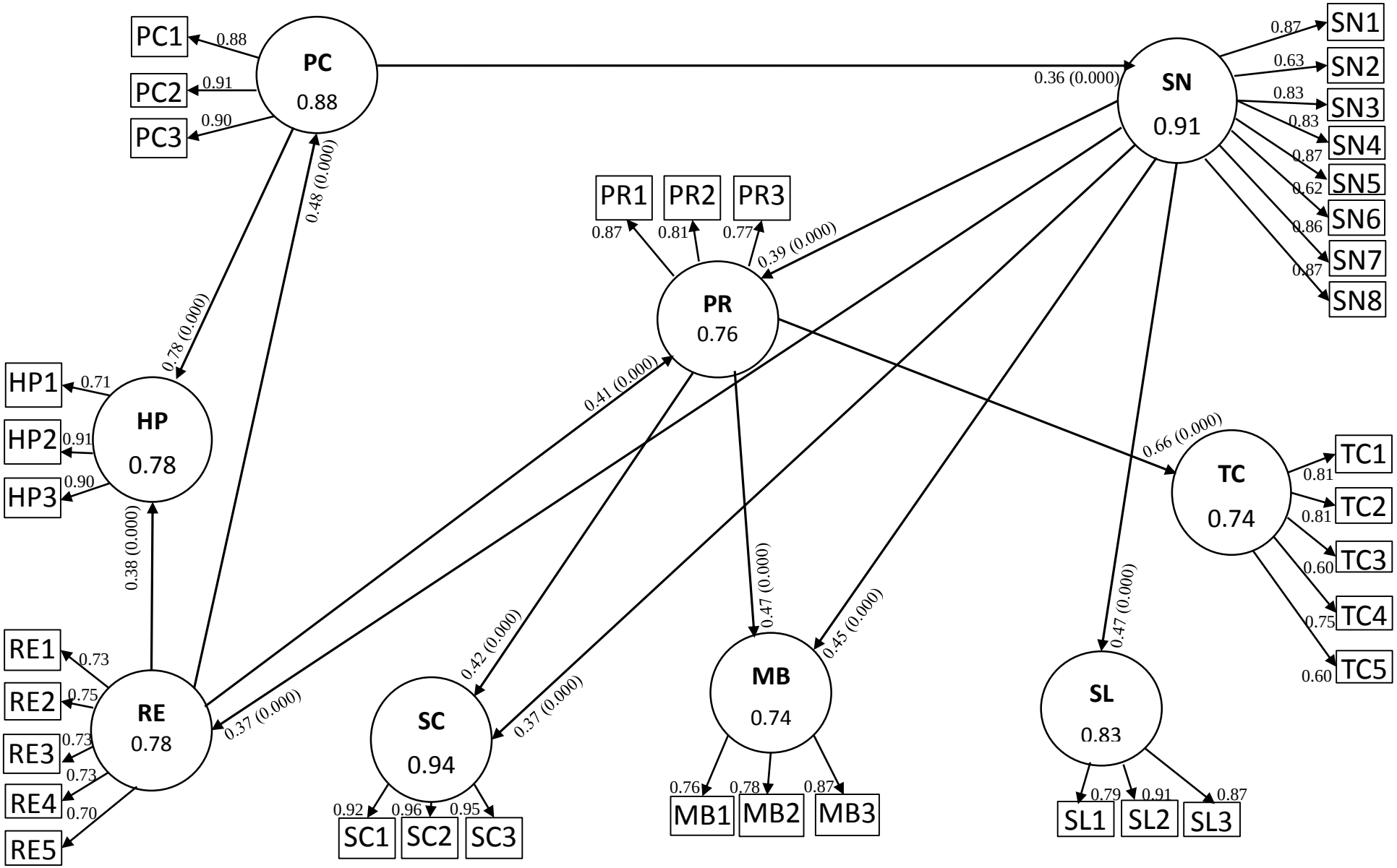

Table 1. Descriptive analysis. Sociodemographic characteristics of the sample

Variables (n=395)	Women (n=249)	Men (n=146)	p-value
Age	Mean (95% CI)	Mean (95% CI)	p<0.05*
	62.0 (56.0 to 68.0)	56.2 (48.2 to 64.2)	
	% (95% CI)	% (95% CI)	
16-44	10.6 (6.8 to 14.4)	17.8 (11.6 to 24.0)	p<0.05**
45-64	46.7 (40.5 to 43.5)	56.8 (32.3 to 81.3)	
65+	42.3 (36.2 to 48.4)	24.7 (17.8 to 31.6)	
Pain_Integral Scale©	Mean (95% CI)	Mean (95% CI)	p=0.11*
	121.47(15.58)	123.49(14.14)	
	% (95% CI)	% (95% CI)	
Severe impact (36-130)	68.7 (62.9 to 74.5)	67.2 (59.6 to 74.8)	p=0.82**
Moderate impact (131-135)	13.3 (9.1 to 17.5)	12.3 (7.0 to 17.6)	
Mild impact (136-180)	18.0 (13.2 to 22.8)	20.5 (14.0 to 27.0)	
Visual Analogue Scale (VAS)	Mean (95% CI)	Mean (95% CI)	<0.001*
	7.44(2.14)	6.88(2.38)	
Centre			
Virgen del Rocio University Hospital	77.5 (72.3 to 82.7)	74.0 (72.9 to 75.1)	p<0.05**
Virgen Macarena University Hospital	6.4 (4.8 to 8.0)	11.0 (5.9 to 16.1)	
Virgen de Valme University Hospital	3.2 (2.1 to 4.3)	7.5 (5.3 to 9.7)	
San Juan de Dios Aljarafe Hospital	2.4 (0.5 to 4.3)	2.1 (0.0 to 4.4)	
Primary Healthcare Centres	10.5 (6.7 to 14.3)	7.4 (3.2 to 11.6)	
Marital status			
Married	55.3 (48.8 to 61.5)	76.0 (69.1 to 83.0)	p<0.05**
Single	12.6 (8.5 to 16.7)	12.3 (7.0 to 17.6)	
Separated/Divorced	10.6 (6.8 to 14.4)	9.6 (4.8 to 14.4)	
Widowed	21.1 (16.0 to 26.2)	1.4 (0.0 to 3.3)	
Employment situation			
Employed	15.4 (10.9 to 19.9)	24.7 (17.8 to 31.6)	p<0.05**
Unemployed	4.9 (2.2 to 7.6)	6.8 (2.7 to 10.9)	
Retired/medical leave	60.2 (54.1 to 66.3)	66.4 (58.1 to 74.1)	
Homemaker	18.7 (13.9 to 23.5)	0.7 (0.0 to 2.1)	
Student	0.8 (0.0 to 1.9)	0.7 (0.0 to 2.1)	
Level of education			
Early childhood education	15.4 (10.9 to 19.9)	5.5 (1.8 to 9.2)	p<0.05**
Primary school	54.9 (48.7 to 61.1)	52.7 (44.6 to 60.8)	
Secondary school	17.1 (12.4 to 21.8)	29.5 (37.1 to 40.5)	
Higher education	12.6 (8.5 to 16.7)	11.0 (5.9 to 16.1)	
Type of locality			
Less than 10,000 inhabitants	17.7 (13.0 to 22.4)	20.5 (14.0 to 27.0)	p<0.05**
From 10,000 to 50,000 inhabitants	38.2 (32.2 to 44.2)	38.4 (30.5 to 46.3)	
More than 50,000 inhabitants	1.2 (0.0 to 2.6)	1.4 (0.0 to 3.3)	
Capitals	43.0 (36.9 to 49.1)	39.7 (31.8 to 47.6)	
Location of chronic non-cancer pain			
Cervical spine	23.2 (18.0 to 28.4)	16.4 (10.4 to 22.4)	p<0.05**
Thoracic spine	12.6 (8.5 to 16.7)	7.5 (3.2 to 11.8)	
Lumbar spine	54.9 (48.7 to 61.1)	61.6 (53.7 to 69.5)	
Sacral bone	25.1 (19.7 to 30.5)	26.6 (19.4 to 33.8)	
Shoulder	18.3 (13.5 to 23.1)	6.8 (2.7 to 10.9)	
Armpit/side/arm	15.9 (11.4 to 20.4)	11.0 (5.9 to 16.1)	
Elbow	7.3 (4.1 to 10.5)	2.7 (0.1 to 5.3)	
Wrist/hand	17.5 (12.8 to 22.2)	8.2 (3.8 to 12.7)	
Hips	15.4 (10.9 to 19.9)	10.3 (5.4 to 15.3)	

Legs	36.6 (30.6 to 42.6)	43.3 (35.3 to 51.4)	
Knee	19.5 (14.6 to 24.4)	15.8 (9.9 to 21.7)	
Ankle/foot	16.7 (12.1 to 21.3)	11.0 (5.9 to 16.1)	
Stomach	3.7 (1.4 to 6.0)	0.0 (0.0 to 0.0)	
Abdomen	6.1 (3.1 to 9.1)	4.8 (1.3 to 8.3)	
Facial	1.2 (0.0 to 2.6)	0.7 (0.0 to 2.1)	
Migraine/headache	10.2 (6.4 to 14.0)	7.5 (3.2 to 11.8)	
Fibromyalgia	27.6 (22.1 to 33.2)	6.2 (2.3 to 10.1)	
* T-Student test ** Chi-square test			

Table 4. Heterotrait-Monotrait Ratio, effect size (f^2) and path coefficients

	HTMT (95%CI)	f^2 (95%CI)	Path Coefficients*
PC-> SC	0.29 (0.19-0.38)		
PC -> HP	0.70 (0.61-0.78)	0.76 (0.47-0.98)	0.78
PC -> SN	0.21 (0.12-0.31)	0.36 (0.27-0.45)	0.36
SL -> SC	0.05 (0.03-0.14)		
SL -> PC	0.33 (0.22-0.44)		
HP -> SC	0.29 (0.20-0.38)		
HP -> SL	0.34 (0.21-0.45)		
PR -> SC	0.18 (0.07-0.30)	0.30 (0.18-0.42)	0.42
PR -> PC	0.18 (0.08-0.29)		
PR -> SL	0.09 (0.05-0.20)		
PR -> HP	0.11 (0.08-0.22)		
PR -> TC	0.07 (0.06-0.17)	0.24 (0.13-0.35)	0.66
PR -> MB	0.07 (0.06-0.18)	0.38 (0.31-0.45)	0.47
MB -> SC	0.46 (0.36-0.55)		
MB -> PC	0.28 (0.17-0.40)		
MB -> SL	0.18 (0.09-0.30)		
MB -> HP	0.25 (0.16-0.37)		
SN -> SC	0.12 (0.07-0.21)	0.25 (0.20-0.30)	0.37
SN -> RE	0.33 (0.23-0.45)	0.35 (0.20-0.40)	0.37
SN -> SL	0.11 (0.06-0.23)	0.39 (0.29-0.49)	0.47
SN -> HP	0.12 (0.07-0.23)		
SN -> PR	0.15 (0.10-0.26)	0.46 (0.30-0.62)	0.39
SN -> MB	0.22 (0.13-0.33)	0.35 (0.10-0.60)	0.45
RE -> SC	0.20 (0.10-0.33)		
RE -> PC	0.42 (0.31-0.51)	0.28 (0.13-0.43)	0.48
RE -> SL	0.17 (0.10-0.28)		
RE -> HP	0.37 (0.26-0.47)	0.22 (0.15-0.29)	0.38
RE -> PR	0.23 (0.13-0.35)	0.24 (0.13-0.35)	0.41
RE -> MB	0.30 (0.20-0.43)		
TC -> SC	0.06 (0.03-0.17)		
TC -> PC	0.08 (0.05-0.19)		
TC -> SL	0.07 (0.06-0.18)		
TC -> HP	0.08 (0.06-0.17)		
TC -> MB	0.15 (0.09-0.25)		
TC -> SN	0.05 (0.04-0.15)		
TC -> RE	0.07 (0.06-0.18)		

HTMT: Heterotrait-Monotrait Ratio; f^2: effect size; SC: Self-care; MB: Mobility; SL: Sleep; TC: Treatment Compliance; PR: Proactivity; RE: Resilience; SN: Social network; HP: Hopelessness due to pain; PC: Pain Catastrophizing.

*p-values < 0.05

Table 2

Table 2. Internal consistency, construct validity statistics, coefficients of determination (R2) and Q^2 de Stone-Geisser (Q^2)

	α	Rho_A	CR (95% CI)	AVE (95% CI)	R^2 (95% CI)	Q^2	Correlation								
							1	2	3	4	5	6	7	8	9
1. Self-care	0.94	0.94	0.94 (0.91-0.96)	0.89 (0.84-0.94)	–	0.72	0.94								
2. Pain catastrophising	0.88	0.88	0.88 (0.85-0.90)	0.81 (0.75-0.87)	0.34 (0.26-0.45)	0.58	0.26	0.90							
3. Treatment compliance	0.74	0.80	0.84 (0.80-0.87)	0.56 (0.52-0.60)	–	0.41	0.14	0.03	0.87						
4. Sleep	0.83	0.90	0.80 (0.76-0.83)	0.74 (0.70-0.78)	–	0.48	0.00	0.29	0.09	0.86					
5. Hopelessness due to pain	0.78	0.83	0.75 (0.64-0.86)	0.70 (0.66-0.74)		0.41	0.26	0.60	0.05	0.27	0.84				
6. Proactivity	0.76	0.81	0.74 (0.69-0.79)	0.66 (0.57-0.75)	0.39 (0.31-0.47)	0.3	0.16	0.15	0.05	0.05	0.06	0.82			
7. Mobility	0.74	0.81	0.89 (0.81-0.92)	0.65 (0.58-0.72)	–	0.30	0.41	0.24	0.19	0.13	0.21	0.04	0.80		
8. Support Network	0.91	0.94	0.78 (0.73-0.82)	0.63 (0.57-0.75)	0.36 (0.29-0.43)	0.55	0.10	0.20	0.06	0.10	0.11	0.12	0.18	0.79	
9. Resilience	0.78	0.78	0.75 (0.63-0.87)	0.53 (0.33-0.75)	0.49 (0.39-0.61)	0.30	0.17	0.35	0.06	0.15	0.29	0.18	0.24	0.30	0.73

α: Cronbach´s alfa; CR: Composite Reliability; AVE: Average Variance Explained; R^2: Coefficient of determination; Q^2: Stone-Geisser.

Table 3. Cross-loadings and collinearity

	Factor Loadings	Mean	Standard deviation	T-Statistics	P-values	VIF
SC1←SC	0.92	0.92	0.05	16.09	<0.001	2.31
SC2←SC	0.96	0.96	0.03	14.39	<0.001	2.35
SC3←SC	0.95	0.94	0.03	26.74	<0.001	2.62
MB1←MB	0.76	0.76	0.07	7.74	<0.001	1.48
MB2←MB	0.78	0.77	0.06	9.94	<0.001	1.58
MB3←MB	0.87	0.87	0.06	14.39	<0.001	1.39
SL1←SL	0.79	0.79	0.08	8.64	<0.001	2.18
SL2←SL	0.91	0.90	0.06	14.76	<0.001	2.48
SL3←SL	0.87	0.87	0.08	10.21	<0.001	1.63
TC1←TC	0.81	0.80	0.03	16.35	<0.001	1.97
TC2←TC	0.81	0.81	0.04	9.91	<0.001	1.36
TC3←TC	0.60	0.60	0.01	8.31	<0.001	1.38
TC4←TC	0.75	0.74	0.03	11.72	<0.001	1.65
TC5←TC	0.60	0.60	0.04	6.67	<0.001	1.35
PR1←PR	0.87	0.87	0.06	12.72	<0.001	1.46
PR2←PR	0.81	0.81	0.04	9.23	<0.001	1.59
PR3←PR	0.77	0.77	0.07	7.50	<0.001	1.52
RE1←RE	0.73	0.72	0.07	8.46	<0.001	1.49
RE2←RE	0.75	0.74	0.07	9.76	<0.001	1.55
RE3←RE	0.73	0.72	0.07	8.88	<0.001	1.53
RE4←RE	0.73	0.73	0.08	8.35	<0.001	1.42
RE5←RE	0.70	0.70	0.07	8.88	<0.001	1.48
SN1←SN	0.87	0.85	0.09	10.40	<0.001	2.54
SN2←SN	0.63	0.62	0.07	9.51	<0.001	1.77
SN3←SN	0.83	0.81	0.09	9.35	<0.001	2.41
SN4←SN	0.83	0.80	0.09	11.50	<0.001	2.39
SN5←SN	0.87	0.87	0.07	6.33	<0.001	2.80
SN6←SN	0.62	0.85	0.09	8.68	<0.001	1.63
SN7←SN	0.86	0.87	0.10	6.92	<0.001	2.80
SN8←SN	0.87	0.85	0.06	8,63	<0.001	2.67
HP1←HP	0.71	0.71	0.06	9.75	<0.001	1.35
HP2←HP	0.89	0.88	0.04	22.26	<0.001	2.20
HP3←HP	0.90	0.89	0.04	23.60	<0.001	2.06
PC1←PC	0.88	0.87	0.04	21.98	<0.001	2.19
PC2←PC	0.91	0.90	0.03	33.71	<0.001	2.61
PC3←PC	0.90	0.90	0.03	25.99	<0.001	2.60

SC: Self-care; MB: Mobility; SL: Sleep; TC: Treatment Compliance; PR: Proactivity; RE: Resilience; SN: Social network; HP: Hopelessness due to pain; PC: Pain Catastrophizing; VIF: Variance Inflation Factor.

Conflict of interest: None

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Data availability

Data are confidential