Clinical Pain Research

Hanna Ljungvall*, Lisa Ekselius and Pernilla Åsenlöf

Reliability, construct validity, and factorial structure of a Swedish version of the medical outcomes study social support survey (MOS-SSS) in patients with chronic pain

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Abstract

Objectives: This study aimed to examine the psychometric properties of a Swedish version of the Medical Outcomes Study Social Support Survey (MOS-SSS).
Methods: Standard forward-backward translation was used. A cross-sectional survey was conducted among treatment seeking individuals with chronic pain included in a clinical cohort. Internal consistency was measured with Cronbach's α, test-retest reliability was examined with intraclass correlation, confirmatory factor analyses was used for examining factor structure, and correlations between the MOS-SSS and selected health validity measures were used for testing concurrent validity hypotheses.
Results: 182 participants were included in the study. Internal consistency measured with Cronbach's alpha was acceptable for all subscales and for the total support index of the MOS-SSS. Test-retest reliability was moderate – good for the different subscales, and was good for the overall support index. The original four factor model of the MOS-SSS was confirmed, and the concurrent validity hypotheses were also confirmed; however, the associations were weaker than expected.
Conclusions: The Swedish version of the MOS-SSS was found psychometrically sound and offers a systematic assessment of social support in specialized pain care.

Keywords: chronic pain; psychometric properties; social support

***Corresponding author: Hanna Ljungvall**, Department of Women's and children's health, Uppsala University, Uppsala, Sweden; and Department of Social Work, Uppsala University, Box 624, 751 26, Uppsala, Sweden, E-mail: hanna.ljungvall@uu.se
Lisa Ekselius and Pernilla Åsenlöf, Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

Introduction

Social support is the concept of how interpersonal relationships contributes to an individual's wellbeing. The functional components of social support are often thought to include: emotional support, i.e., caring, love and empathy, instrumental or tangible support, i.e., concrete ways people provide different kinds of assistance, social companionship, and appraisal [1]. Social support has been considered as a relevant factor in the prevention of physical and mental diseases, and chronic health conditions [2, 3]. Therefore, social support should be a part of chronic pain management when applying a biopsychosocial approach [4].

The impact of social support on chronic pain has been described as both beneficial and deleterious in the literature [5]. The contradictory findings regarding the effect of social support on chronic pain, and especially pain related behaviors, may relate to the inconsistent and various definitions of social support. One particular pain-specific construct of social support is solicitousness. Solicitousness can be described as another person's, often the pain sufferer's partner or parent, attentiveness to pain behaviors. For instance, it may concern taking over chores, indulging passive behaviors such as rest, and offering assistance in different situations [6]. It is hypothesized, in line with operant behavioral principles, that solicitousness reinforces pain-related behaviors, e.g., catastrophizing, thus increasing pain disability. These association has been demonstrated in several studies [7–9]. However, for a behavior to be solicitous, it needs to reinforce pain behavior, which can make it problematic to define certain behaviors as solicitous without considering how they actually affect the pain sufferer [6, 10]. Perceived global social support, i.e., non-pain-specific social support, contrary to solicitousness, is associated with decreased depression and pain for individuals with pain conditions, and a lack of perceived social support is associated with passive coping strategies that may in turn increase depression and pain severity [9, 11]. Another expression of

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social support and social acceptance is pain validation. Validation can be described as an acknowledgement of another person's experience and a recognition of it as significant in a non-judgmental and empathetic way. It is thought that pain validation may alleviate social stress associated with chronic pain, and validation is also important to establish a therapeutic alliance between healthcare provider and patient [12]. Hence, there are several different concepts of "social support," that can be perceived as contradictory. Therefore, defining and understanding the relationship between different kinds of social support and chronic pain is important when treating a patient [13].

The Medical Outcomes Study Social Support Survey (MOS-SSS) is one of the most widely used scales for the assessment of the functional components of perceived global social support [1]. The MOS-SSS is recognized as an instrument that is easy to apply and can be used in many contexts. Although items from the MOS-SSS have been used in Swedish research [14, 15] there are no studies that have validated a Swedish version where standard translation procedures have been followed in a chronic pain population. Therefore, we translated the RAND version of the MOS-SSS to Swedish and tested its psychometric properties on a sample of chronic pain patients seeking specialized pain care.

Here, our aim was to examine the reliability and construct validity of a Swedish version of the MOS-SSS in a sample of treatment-seeking individuals with chronic pain.

Methods

Participants and data collection

A cross sectional study was conducted in a multidisciplinary pain center at a university hospital in Sweden. The Pain Center is a specialized secondary and tertiary care unit that treats patients from all over Sweden, offering multidisciplinary in- and out-patient pain consultations and treatment.

The participants were consecutively recruited among treatment seeking individuals with chronic pain, i.e., pain >3 months, included in a clinical cohort, the U-PAIN cohort. The aim of the cohort is to identify patients who benefit from long-term opioid therapy or are at risk for problematic opioid use [16].

Eligible participants were ≥18 years, with chronic pain, competent in Swedish, and able to provide informed consent, i.e. no severe cognitive impairment or psychiatric condition.

For this study, we aimed to consecutively include the first 200 participants recruited to the clinical cohort described above. This was predicted to be adequate to investigate reliability and construct validity, according to the COSMIN guidelines [17].

Prior to the participants' clinical consultations or inpatient programs, they filled out an online questionnaire comprising questions regarding demographic and 12 computerized patient reported outcome measures (PROMs) including the MOS-SSS, accessed through a secure personal log in on the Swedish Healthcare Guide's digital platform. The PROMs were used for clinical purposes and as research data for those who consented study participation. Patients who did not use the Swedish Healthcare Guide's digital platform were offered paper and pencil versions of the PROMs. In conjunction with the clinical appointment the participants were scheduled for a research visit where informed consent was provided. During the research visit the participants completed research specific forms and 64 participants were enrolled in a feasibility study where they also completed a re-test of the MOS-SSS. The test re-test could be no-more than six weeks apart and the participants were blinded to their previous answers when completing the re-test.

Measures

Demographics: A study specific questionnaire was used to collect information on gender, age, ethnicity, pain duration, highest completed education, and main occupation.

The MOS social support survey (MOS-SSS): The MOS social support survey (MOS-SSS) measures perceived social support. It contains 19 items and constitutes four subscales: emotional or informational support, tangible support, affectionate support, and positive social interaction. Emotional and informational support comprises eight items assessing how interpersonal relationships provide guidance, positive affect, and empathetic understanding. Tangible support comprises four items measuring material support aid, and reliable alliance. Affectionate support comprises three items that assess expressions of love and affection. Positive social interaction comprises four items that pertain to the concept of social interaction, or social companionship. Questions are answered on a five-point scale ranging from "none of the time" [1] to "all of the time" [5]. Scale scores are then transformed to a 0–100 scale, with higher values indicating more support [1, 15].

The MOS-SSS was translated to Swedish using a standard forward-backward process following the specifications provided by RAND Health [16]. A professional interpreter translated the English version of the MOS-SSS to Swedish, and then the Swedish version was back-translated to English by another independent professional interpreter. Finally, the translated and back-translated versions were compared item by item by the authors and revised until agreement was reached. Then, five individuals completed the form and were asked to give feedback regarding the wording and interpretation of the different questions. No changes were made based on the feedback from the pilot version.

For this study, three additional items were added for the purpose of examining the acceptability of the Swedish version of MOS-SSS. Participants were asked whether it was easy to understand the MOS-SSS items, to fill out the form, and whether the items were relevant. Response alternatives were yes, no, and no opinion.

EQ5D-5L: Health-related quality of life was measured with the EQ5D-5L, developed by the EuroQoL Group. The EQ-5D-5L is a brief self-reported measure of generic health that consists of five dimensions (mobility, self-care, usual activities, pain or discomfort, and anxiety or depression), each with five levels of functioning: "no problems," "slight problems," "moderate problems," "severe problems," and "unable to" or "extreme problems" for all dimensions that describe unique health states. The health states can be converted into index scores derived from population-based valuation studies that range from states worse than dead (0) to 1 (full health), anchoring dead at 0. In addition, EQ5D includes

a visual analog scale where health is rated on a scale from 0 (worst imaginable health) to 100 (best imaginable health) [17]. There is support for the validity and reliability of the EQ-5D's descriptive system and the index values in many conditions and populations [18, 19].

Patient health questionnaire 9-item depression module (PHQ9): The Swedish PHQ-9 was used to measure self-reported symptoms of depression. The self-administered form comprises nine items on how often, during the last two weeks, the patient has been bothered by different depressive symptoms. The response options range from "not at all" (0) to "nearly every day" [3], with a total score of 27 (1–4=minimal, 5–9=mild, 10–14=moderate, and 20–27=severe levels of depression). The Swedish PHQ-9 is a reliable measure with high internal consistency and a stable factor structure [20, 21].

Generalized anxiety disorder 7-item scale (GAD-7): The GAD-7 is a seven-item, self-administered questionnaire used to measure generalized anxiety. Patients are asked how often, during the last two weeks, they have been bothered by different symptoms. The response options range from not at all (0) to nearly every day [3], with a total score of 21 (0–4=minimal, 5–9=mild, 10–14=moderate, and 15–21=severe levels of anxiety). The GAD-7 has been shown to be a valid and reliable screening tool for assessing generalized anxiety disorder (GAD) in research and clinical practice [22]. Psychometric studies of the Swedish version of GAD-7 are lacking.

The Brief Pain Inventory Short Form (BPI-SF): Pain severity and pain interference were assessed with the Brief Pain Inventory Short Form (BPI-SF), a commonly used scale that assesses the localization and severity of pain during the last 24 h and activity interference in individuals with pain. Four items comprise questions on the severity of pain at its "worst," "least," "on average," and "now." The response options range from 0 as "no pain" to 10 as "pain as bad as you can imagine." To obtain a total pain severity score, the mean of the four severity items is computed. The interference subscale of the BPI-SF captures the patients' perception of how pain impacts seven constructs: "mood," "enjoyment of life," "relationship with others," "sleep," "general activity," "walking ability," and "work." The response options range from 0 as "does not interfere" to 10 as "completely interferes." The BPI-SF has been found to be a valid and reliable tool for assessing pain severity and interference in different populations [23, 24]. Validation studies of the Swedish version of the BPI-SF are lacking, but it has shown good psychometric properties when used in research settings [25].

Data analyses

Descriptive statistics were used to characterize the sample regarding age, gender, socioeconomic status, pain, depression, anxiety, and HRQoL. Reliability was assessed by examining internal consistency, evaluated by using Cronbach's α. The α coefficient was considered acceptable above 0.70 [18]. Test-retest reliability was assessed by using test-retest testing and computing the intraclass correlation coefficient (ICC), single measures, and absolute agreement. The ICC was considered poor if lower than 0.5, moderate between 0.5–0.75, good between 0.75–0.89, and excellent ≥0.9 [19, 20].

Construct validity was investigated by examining structural validity and computing a confirmatory factor analyses (CFA) based on MOS-SSS' four different subscales. Parameters in the CFA were estimated with the maximum-likelihood procedure, as model fit indices comparative fit index (CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). CFI close to 0.95 or higher, SRMR close to 0.08 or smaller, and RMSEA close to 0.06 or smaller indicate good fit [21]. Previous studies have demonstrated acceptable fit indices for the four-factor structure similar to the four subscales [1, 22, 23].

We also wanted to test concurrent validity hypotheses by exploring associations among the social support scales and the health measures described above. We examined if the strength of the associations were consistent with plausible hypotheses based on previous validation studies on MOS-SSS[1, 24]. We expected the relationship between perceived social support and the health measures to be weak (0.1–0.3) to moderate (r=0.3–0.60) [25]. Mental health (i.e. depression and anxiety) was expected to have the strongest association to social support, followed by that between social support and measures that contain aspects of both physical and mental health functioning, i.e., HRQoL. The lowest correlations were expected between social support and measures of pain severity and pain interference.

Spearman's rho correlation was used for assessing correlations between MOS-SSS and the health measures because of the skewed distribution of the MOS-SSS items.

The EQ-5D-5L Index Value Calculator developed by the EuroQoL Group, using the U.K. value set, was used for calculations of EQ5D-index scores [26].

The packages lavaan and semPlot in R version 4.0.3 were used for the confirmatory factor analysis. IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. was used for other analyses. Throughout, statistical tests were one-tailed and treated as statistically significant at the level of $p \leq 0.05$.

Results

Participant characteristics

Finally, 182 participants were included in the study. Two were excluded because they did not fulfill the inclusion criteria and 16 participants were excluded because of incomplete or missing data. Participants demographic and characteristics are described in Table 1 and MOS-SSS scores in Table 2.

Internal consistency and test-retest reliability

Internal consistency measured with Cronbach's alpha was acceptable for all subscales and for the total support index with alpha coefficients ≥0.94, described in Table 2. As depicted in Table 3, the test-retest reliability was good for the overall support index, good for the affectionate support subscale, and moderate for the emotional/informational and tangible support scales.

Table 1: Social demographics and pain characteristics (n=182).

Measures	Mean, SD	n, %
Gender		182 (100)
Female		114 (62.6)
Male		67 (36.8)
Unsure		1 (0.5)
Family situation		182 (100)
Single		75 (41.2)
Married/cohabitant		101 (55.5)
Live-apart partner		6 (3.3)
Age, yrs	51.2 (15.8)	182 (100)
Nation of birth		182 (100)
Sweden		159 (87.4)
Other European country		16 (8.8)
Non-European country		7 (3.8)
Education		182 (100)
<Elementary school		4 (2.2)
Elementary school		44 (24.2)
High school		84 (46.1)
University or collage		50 (27.4)
Main occupation		181 (99.5)
Employment		46 (25.3)
Self-employed		5 (2.7)
Student		2 (1.1)
Retired[a]		61 (33.5)
On long-term sick leave[b]		52 (28.6)
Unemployed		8 (4.4)
Other		7 (3.8)
Pain duration,		180 (98.9)
3 months–1 year		6 (3.3)
>1 year–3 years		32 (17.6)
>3–10 years		49 (26.9)
>10 years		93 (51.1)
Pain classification[c]		182 (100)
Primary chronic pain		95 (52.2)
Chronic cancer-related pain		3 (1.6)
Chronic postsurgical or posttraumatic pain		51 (28.0)
Chronic neuropathic pain		40 (22.0)
Chronic secondary headache or orofacial pain		5 (2.7)
Chronic secondary visceral pain		9 (4.9)
Chronic secondary musculoskeletal pain		49 (26.9)

[a]By age, disability or early retirement. [b]More than 3 months. [c]According to the IASP classification of chronic pain for the International Classification of Diseases (ICD-11). Based on data from medical records. Participants can have more than one pain condition per participant.

Construct validity

The confirmatory factor analyses suggested that the original four factor model had a good fit (RMSEA=0.08, CFI=0.96, SRMR=0.04). The four factors' covariance ranged from 0.60 to 0.85 and the standardized factor loadings ranged from 0.71 to 0.94, depicted in Figure 1.

Table 3 presents the correlation between the health measures and the different social support scales and the overall social support index. The concurrent validity hypotheses were confirmed; however, the associations were weaker than expected and there were no associations between the social support measures, except for tangible support, and pain interference.

Acceptability

A majority of the participants reported that they agreed with, or were neutral to, the statements that the MOS-SSS was; easy to understand (87 %, n=180), easy to fill out (83 %, n=180), and that the questions were relevant (92 %, n=176).

Discussion

The aim of the study was to examine reliability and construct validity of a Swedish version of the MOS-SSS in a population of individuals with chronic pain seeking treatment in specialized pain care. The results of our study suggest that our translated version of the MOS-SSS is a reliable and valid instrument for assessing perceived social support in patients with chronic pain treated in specialized pain care. These findings are consistent with previous studies in other populations [1, 22, 24, 27, 28].

The MOS-SSS' scores for the overall social support and the social support subscales were similar to those reported in the original study [1]. The full range of all scores was observed for all items, even though data for all scales was skewed towards higher scores. This indicates that the instrument may be sensitive to a lack of social support but might be less sensitive to detecting improvement on a group level given the risk of ceiling effects, similar to what has been previously reported [29].

The correlations between the different support scales and the health validity measures were in line with our hypotheses, although weaker than expected [1].

However, our results, i.e., no correlations between any of the social support scales and pain interference, but weak to moderate correlations between all the social support subscales and depression, and weak correlations between pain severity and the tangible, affectionate, and positive interactions subscales, are in line with previous research on chronic pain populations [11, 30]. Similar to our findings, Jensen et al. [9] have shown that social support is associated with depressed mood and pain intensity, but not to functional disability in a sample of patients with chronic pain.

Our study had some limitations that should be mentioned. First, we had some missing data. Nevertheless, the number of subjects used for the analyses was considered

Table 2: Descriptive statistics for the social support measures presented as mean, median. Internal consistency as measured with Cronbach's α and retest stability measured with intraclass coefficient (n=182).

Meassure	n	K[a]	Mean, SD	Median (IQR)	Range	Cronbach's α	ICC[b], n
Emotional/info support[a]	182	8	66.6 (27.6)	71.9 (40.6)	0–100	0.95	0.73 (60)
1. Someone you can count on to listen to you when you need to talk			4.0 (1.2)	4.0 (2.0)	1–5		
2. Someone to give you information to help you understand a situation			3.2 (1.2)	3.0 (2.0)	1–5		
3. Someone to give you good advice about a crisis			3.9 (1.3)	4.0 (2.0)	1–5		
4. Someone to confide in or talk to about yourself or your problems			3.9 (1.3)	4.0 (2.0)	1–5		
5. Someone whose advice you really want			3.5 (1.3)	4.0 (2.0)	1–5		
6. Someone to share your most private worries and fears with			3.8 (1.4)	4 0.0 (2.0)	1–5		
7. Someone to turn to for suggestions about how to deal with a personal problem			3.8 (1.3)	4.0 (2.0)	1–5		
8. Someone who understands your problems			3.6 (1.2)	4.0 (2.0)	1–5		
Tangible support[a]	182	4	71.8 (27.6)	75.0 (50.0)	0–100	0.95	0.71 (58)
9. Someone to help if you were confined in bed			3.8 (1.2)	4.0 (2.0)	1–5		
10. Someone to take you to the doctor if you needed it			4.1 (1.2)	4.0 (1.25)	1–5		
11. Someone to prepare your meals if you were unable to do it yourself			3.8 (1.4)	4.0 (2.0)	1–5		
12. Someone to help with daily chores if you were sick			3.8 (1.3)	4.0 (2.0)	1–5		
Affectionate support[c]	182	3	74.5 (24.8)	75.0 (41.7)	0–100	0.95	0.74 (60)
13. Someone who shows you love and affection			4.1 (1.2)	5.0 (1.0)	1–5		
14. Someone who love you and makes you feel wanted			4.0 (1.3)	5 (2.0)	1–5		
15. Someone who hugs you			3.9 (1.3)	4.0 (2.0)	1–5		
Positive interaction[a]	182	3	75.1 (30.2)	91.7 (41.7)	0–100	0.94	0.71 (60)
16. Someone to have a good time with			3.9 (1.1)	4.0 (2.0)	1–5		
17. Someone to get together with for relaxation			4.1 (1.0)	4.0 (2.0)	1–5		
18. Someone to do something enjoyable with			4.0 (1.1)	4.0 (2.0)	1–5		
Additionell item	182	1					0.58 (60)
19. Someone to do things with to help you get your mind off things			3.7 (1.1)	4 (2.0)	1–5		
Overall support index	182	19	70.3 (24.2)	75.0 (35.9)	0–100	0.97	0.84 (58)

[a]Number of items in the scale, [b]Intraclass correlation coefficient estimating test-retest stability no more than six weeks apart. [c]The subscales' overall score is transformed to a 0–100 scale, where a higher score indicates more support. The individual items range from 1–5 and a higher score indicates more support.

Table 3: Score values of the validity health measures and Spearman Rho's correlation coefficient between the validity health measures, the different social support scales, and the overall social support index.

Validity measures	n	Score values median (IQR)	Emotional/informational	Tangible	Affectionate	Positive interaction	Overall index
EQ5D index	147	0.44 (0.37)	0.13	0.14[a]	0.05	0.03	0.14[a]
PHQ 9	181	10.00 (9.00)	−0.22[b]	−0.24[b]	−0.35[b]	−0.25[b]	−0.30[b]
GAD 7	182	6.00 (10.00)	−0.16[a]	−0.19[b]	−0.23[b]	−0.17[b]	−0.21[b]
BPI-SF pain severity	180	6.50 (7.75)	−0.05	−0.17[a]	−0.13[a]	−0.14[a]	−0.10
BPI-SF pain interference	178	7.00 (2.89)	0.06	−0.11	−0.01	−0.03	0.00

[a]$p \leq 0.05$, [b]$p < 0.01$ (1-tailed significant).

sufficient, given the number of items in the MOS-SSS. Secondly, no gold standard social support measure was used to test concurrent validity because of the lack of validated Swedish instruments that measure social support. Therefore, we restricted our study to testing validity hypotheses regarding correlations with relevant health measures. However, other studies in other languages have shown support for concurrent validity between MOS-SSS and the Multidimensional Scale for Perceived Social Support (MSPSS) [27, 28]. Thirdly, the MOS-SSS was part of a larger questionnaire comprising many different PROMs. Therefore, the items regarding acceptability may have been influenced by the experience of completing the whole battery of PROMs and may not only reflect how the MOS-SSS was perceived regarding applicability and relevance. Lastly, the instrument was tested on a sample of patients with chronic pain seeking treatment in specialized pain care and may not be generalized to other populations. However, the original MOS-SSS was

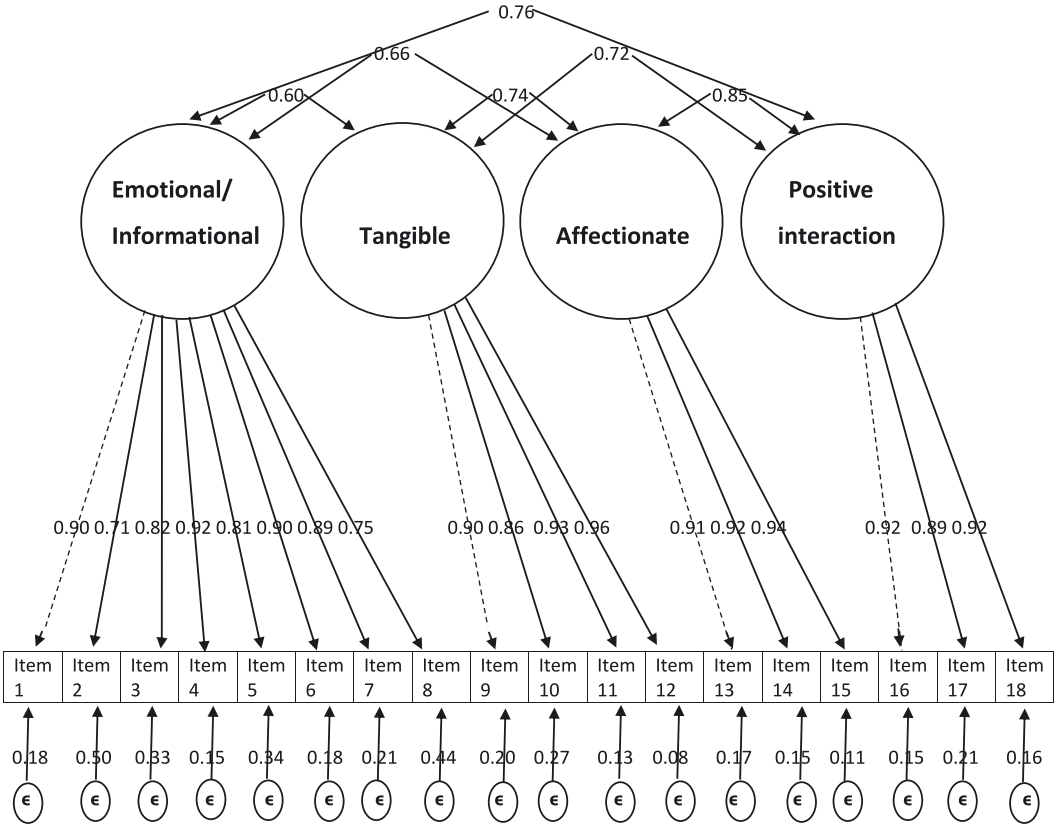

Figure 1: Confirmatory factor analysis with standardized factor loadings for the 18 items of the medical outcome study social support survey (MOS-SSS).

developed for patients with chronic conditions, and our results are consistent with previous findings [1].

Clinical implications

Systematic assessment of social support is often neglected both within pain research and in clinical settings, despite its known influence on health [31].

Given that sociocultural factors, e.g., educational levels, culture, and poor social support, are associated with chronic pain [32, 33] it is important to have psychometrically sound instruments to assess the need for social support interventions and to evaluate these interventions. The MOS-SSS enables the assessment of different concepts of perceived social support, allowing interventions to be matched to the individual patient's needs. This is of great importance since patients with chronic pain have reported different preferences regarding the type of support and who should be the provider of the support, e.g., family, friends, or healthcare providers [34, 35]. Also, MOS-SSS measures different functional components of social support, which may be useful given the sometimes contradictory understanding of social support and chronic pain, i.e., solicitousness vs. pain validation and emotional support. For instance, it can be hypothesized that a patient that scores highly on the emotional, affectionate, and positive interaction scales may receive adequate emotional support and pain validation, and a patient that reports lower scores on these scales but higher scores on the tangible support scale may be subjected to solicitous responses from their partner or caregiver. However, this needs to be further explored and has not been examined in our study. Furthermore, self-reported social support should always be interpreted with caution, especially regarding solicitousness, given that what might be considered solicitous behavior in a pre-defined construct may not have that effect on a particular individual or couple but could rather be an act of emotional validation depending on how and why the support is shown [6, 10, 36].

Systematic examination of social support in populations with chronic pain may help both clinicians and researchers better understand how social support, or lack thereof, affects patients and what interventions should be offered. Clinical social support interventions include tangible or instrumental support, e.g., transportation, housing, referral to social services or help to obtain health care insurance, and case management services [37]. Interventions targeting more emotional, informational, and affectionate aspects of

social support include peer support groups, educational groups for family members, couple therapy, individual counselling, or psychotherapy, all of which focus on communication skills to improve validation and social interaction [10, 36–38].

Conclusions

The Swedish version of the MOS-SSS was found to be a comprehensible, easily applied instrument to assess perceived social support in a population of patients with chronic pain. The findings demonstrated that the instrument was psychometrically sound, and the original four-factor model was confirmed.

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Competing interests: The authors report there are no competing interest to declare.
Ethical approval: The research complied with all relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration (as amended in 2013), and has been approved by the Regional Ethics Board in Uppsala (EPN Uppsala D-No 2016-376, 2020–05283).
Data availability statement: The data that support the findings of this study are available on request from the corresponding author, [HL]. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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