



# Hope in the context of chronic musculoskeletal pain: relationships of hope to pain and psychological distress

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## Abstract

**Introduction:** The cognitive model of hope suggests that people with high levels of hope are able to think about the ways to goals (pathways) and motivated to pursue those pathways to reach their goals (agency). We hypothesized that higher levels of hope would be related to lower levels of pain and less psychological distress (ie, anxiety and depression) and better adjustment.

**Objectives:** This study aims to examine the relationship, if any, between cognition of hope and chronic musculoskeletal pain.

**Methods:** One hundred and six patients with chronic musculoskeletal pain were recruited by convenient sampling from 2 public hospitals in Hong Kong. We assessed the hope level, psychological distress, and health outcomes by psychometric inventories.

**Results:** Zero-order correlation results showed that hope was inversely associated with psychological distress (ie, anxiety and depression) and positively related to subjective self-efficacy. There was no significant relationship with severity of pain. Patients presented with longer duration of chronic musculoskeletal pain have higher hope level while pain developed after injury on duty have lower hope level.

**Conclusion:** The findings of this cross-sectional study highlight the potential importance of hope in understanding adjustment to chronic musculoskeletal pain. Future longitudinal research could help reveal how hope and adjustment interact over the treatment of chronic pain cases.

**Keywords:** Hope, Musculoskeletal pain, Psychological stress

## 1. Introduction

Chronic pain is a common condition that is both disabling and costly; yet, there are few treatment regimens or medical interventions that reliably eliminate chronic pain.<sup>27</sup> Individuals with chronic pain often experience both physiological and psychological impairment, which can interfere with their ability to function at work and in society.<sup>5</sup>

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Patients with chronic pain usually focus on pain and cure; they often experience a lot psychological stress, negative emotions, and pain behaviors. It has been suggested that best practice for the treatment of chronic pain is to combine psychological and pharmacological interventions.<sup>28</sup> A recent literature review demonstrates that hope is influenced by several patient factors and has positive impact on patients with chronic pain.<sup>8</sup> The cognitive model of hope, as conceptualized by Snyder et al., suggests that people with high levels of hope are able to think about the pathways to their goals (pathway) and feel confident that they can pursue those pathways to reach their goals (agency).<sup>22</sup> In other words, being hopeful means believing one can set meaningful multiple goals, figure out how to achieve them, and motivate one-self to accomplish them. The cognitive style of hope may be important in explaining the variability in how patients adjust to chronic musculoskeletal pain. As this theory identifies specific constructs that are linked to high levels of hope, it has led to interest in the development of the interventions to promote hope in people coping with challenging life circumstances as well as specific hope interventions to increase pain tolerance.<sup>5,21</sup>

Although there are already different questionnaires in assessing chronic pain patient's psychological outcomes, most of them look at negative indicators, which mainly guide the health care professionals to design treatment plan. Hope Scale is a questionnaire that examines patient's positive cognition and potential in maintaining their physical

and mental health when they are facing chronic illness and even chronic pain.<sup>21–23,25</sup> Hope is considered as an important therapeutic factor in health and illness.<sup>3</sup> It is a positive, easy understandable concept to be incorporated in patient's education and treatment program to enhance their positive psychological outcomes. It has been supported as a therapeutic intervention for many chronic diseases.<sup>8</sup>

Higher hope has been related to increase positive mood, better physical health, enhanced capacity to cope with illness, and higher pain tolerance.<sup>1,14,19,21,23,25</sup> This theory has been assessed in patients with cancer or some chronic illness but rarely applied in patients with chronic pain.<sup>5,6,21–23,25</sup> As musculoskeletal pain is one of the big groups of patients with chronic pain, this study aims to assess the hope level in patients with chronic musculoskeletal pain and evaluate the association between hope and their psychological profile and outcomes. We hypothesized that higher levels of hope, as measured by Snyder et al.'s Hope Scale,<sup>22</sup> are associated with a lower level of psychological stress, catastrophizing idea, and higher self-efficacy.

## 2. Methods

### 2.1. Patient selection

Participants in this study were patients with diagnosis of chronic musculoskeletal pain including joint pain, muscle pain, and neck pain/back pain for more than 3 months who had received treatment at 2 public hospitals in Hong Kong between October 2015 and December 2016 for pain management. To be considered for inclusion in this study, patients must (1) be at least 18 years of age; (2) have Chinese as a first language; (3) have musculoskeletal pain for 3 months or longer that was not due to a terminal condition, such as cancer, or to an acute condition, such as a fracture; and (4) have no obvious cognitive deficits that would preclude completion of study measures. Exclusion criteria included the inability to read because of visual impairment, inability to comprehend instructions, and lack of consent for study participation. All participants completed a set of questionnaires to measure hope, pain condition, anxiety and depression, catastrophizing idea, and self-efficacy. Patients' demographic, medical, and pain data were also collected.

### 2.2. Sample size calculation

The sample size was estimated based on recommendations by Nunnally of a ratio of 10 cases for each item to be factor analyzed. The Hope Scale comprised 8 items. Further sample size considerations were based on previous reports of the correlation between the Hope Scale and other psychometric measures psychological distress ( $F = 5.94, P = 0.001$ ).<sup>3</sup> Using sample size tables by Machin et al.,<sup>13</sup> 100 subjects were required if  $\alpha = 0.05$  and power = 0.9.

### 2.3. Informed consent

The study was approved by the Kowloon Central Cluster and New Territories East Cluster Clinical Research Ethic Committee under Hong Kong Hospital Authority. Written informed consent was obtained from all patients before their recruitment into the study. All participants were informed that they have the right to withdraw from the study at any time and that their nonparticipation will not affect their clinical care.

## 2.4. Measures tools

### 2.4.1. Hope

Hope was measured by the Adult Dispositional Hope Scale (AHS).<sup>22</sup> The scale consists of 8 items that measure 2 constructs: agency (determination to accomplish goals) and pathways (planning

strategies to accomplish goals). The 8-item AHS is rated on the basis of an 8-point Likert scale (1 = definitely false to 8 = definitely true) used to measure hope according to model of Snyder et al.<sup>5,6,22</sup> A Hope Total score was obtained by aggregating the scores for the 8 items. AHS Pathway (Hope Pathway) and AHS Agency (Hope Agency) scores were obtained by summing to scores of the relevant items (4 items per subscale). Hope Total scores ranged from 8 to 64, with higher scores indicating higher level of hope. Internal consistency for this sample will be determined for this sample by Cronbach's alpha. Internal consistency for this sample was good (Cronbach's alpha of AHS Total = 0.999, alpha of AHS agency subscale = 0.998, and alpha of AHS pathway subscale = 1.0). The Chinese version of the Hope Scale has previously been translated and validated by Ho et al.<sup>7</sup> and have applied on the psychological and clinical outcomes of patients with colorectal cancer.

### 2.4.2. Depression and anxiety

The 14-item Chinese version of the Hospital Anxiety and Depression Scale (HADS) was used to indicate the negative emotions of anxiety and depression. The Chinese version had been previously validated locally.<sup>9</sup> Two scores—HADS—Anxiety (HADS-A) and HADS—Depression (HADS-D)—were derived from the questionnaire. Severity of symptoms was rated according to a 4-point Likert scale (0, 1, 2, and 3). Higher scores corresponded to more symptoms of anxiety and depression. Internal reliability alphas according to this sample were HADS-A = 0.866 and HADS-D = 0.848.

### 2.4.3. Catastrophizing idea

Pain catastrophizing is the tendency to describe a pain experience in more exaggerated terms than the average person. The Pain Catastrophizing Scale (PCS) is a 5-point measure assessing the degree to which one experience each of 13 thoughts or feeling during past painful experience.<sup>26</sup> The questionnaire is categorized into 3 subscales—magnification, rumination, and helplessness. Pain Catastrophizing Scale scores have been associated with depression, anxiety, negative affect, and fear of pain. A Hong Kong Chinese version of this measure had been previously validated and was used in the current study.<sup>29</sup> Internal consistency for this sample was good (Cronbach's alpha = 0.944).

### 2.4.4. Self-efficacy and health status

Patient self-efficacy questionnaire (PSEQ) is a 6-point measure assessing patient's belief on their ability in performing activities despite the pain in 10 items.<sup>2</sup> The higher the score corresponded to the higher efficacy in daily activities. A Hong Kong Chinese version of this measure had been previously validated and was used in this study.<sup>10</sup> Internal reliability alpha according to this sample was 0.938.

### 2.4.5. Demographic and medical information

Participants' demographics (age, sex, marital status, family status, education level, and employment status) and medical data (history of injury, duration of pain, and site and intensity of pain) were retrieved from medical records of the hospital.

### 2.4.6. Ethical concern

Patients were invited to fill up a set of pain intake questionnaires including their demographics, pain conditions, questionnaires as

above (HADS, PCS, and PSEQ), and an additional questionnaire of Adult Dispositional Hope Scale, which may take 5 more minutes. We had obtained patient's consent before joining the study. Participation in this study did not affect their clinical treatment subsequently. All the information was kept confidential. To protect the participant privacy, all research data were handled in line with hospital authority and hospital policy in handling, storage, and destruction of patients' medical records. They were locked in cabinets where our department keeps patients' confidential information. Electronic data were saved in secured computer of the hospital with restricted access.

#### 2.4.7. Data analysis

Descriptive statistics were calculated for demographic variables (ie, age, sex, education, marital status, family status, and employment status), medical variables (ie, history of injury on duty, severity of pain and duration of pain), and self-report measures (ie, hope, pain, anxiety and depression, pain catastrophizing idea, and self-efficacy).

Pearson's correlations and point-biserial correlations were conducted to identify significant bivariate relationships between continuous demographic and medical variables and other study variables. *t* test and analysis of variance were performed to identify significant bivariate relationships between other categorical demographic and medical variables. General linear regression analyses were performed to examine the unique association of hope with the outcome variables (ie, anxiety and depression, pain catastrophizing idea, and self-efficacy) after controlling for demographic and medical variables significantly associated with the outcome based on bivariate analyses.

### 3. Results

#### 3.1. Patient characteristics

Patient characteristics are presented in **Table 1**. About 34% of the patients were men, and the average age of the patients was 51 years (SD = 14.8 years). More than half (53.8%) of the patients were between 41 and 60 years old, and nearly one-fourth (23.6%) of them were older than 60 years. For education history, more than half (51.9%) of the patients reported their highest education as secondary school, and about 20% of the patients had postsecondary level or above education.

#### 3.2. Pain history background characteristics

The medical characteristics of the sample are presented in **Table 1**. About 40.6% of the patients report injury on duty (IOD)-related pain condition. For the duration of pain, 23.6% of the patients complained of pain less than 1 year, 41.5% of the patients complained of pain for 1 to 5 years, and 34.0% of patient had pain for more than 5 years. About 1.9% of the patients complained of mild pain with numerical rating pain score (NRS) 0 to 3, 36.8% of the patients complained of moderate pain with NRS 4 to 6, and 55.7% complained of severe pain with NRS  $\geq$  7.

#### 3.3. Associations between demographic and pain status variables with hope level

Pearson's product-moment correlations showed that duration of pain was positively and weakly associated with Total Hope ( $r = 0.205$ ,  $P = 0.036$ ) and Hope Pathway ( $r = 0.207$ ,  $P = 0.034$ ). Furthermore, patients with history of IOD had lower hope scores

than those without IOD (**Table 2**). No significant relationships were found between hope and other demographic and clinical variables including age, sex, education level, and pain intensity.

#### 3.4. Relationship of hope with outcome variables

Pearson's correlations were conducted to identify significant relationships between Hope Scale and other psychological outcome variables (**Table 3**). Hope was significantly and negatively correlated to anxiety ( $r = -0.371$ ,  $P = 0.00$ ) and depression ( $r = -0.472$ ,  $P = 0.00$ ). Hope was also significantly and positively correlated to the patient self-efficacy ( $r = 0.420$ ,  $P = 0.00$ ) which was one of the chronic pain adjustment index. Although hope was shown to be inversely related to the PCS, it is not statistically significant.

#### 3.5. Hope Agency and Hope Pathway in predicting anxiety and depression

Injury on duty and duration of pain were observed to be positively and significantly correlated with hope. To further examine and compare the independent effects of Hope Agency and Hope Pathway in predicting anxiety and depression respectively, 2 hierarchical multiple regression analyses were conducted. Hospital Anxiety and Depression Scale—Anxiety and HADS-D were the dependent variables in each of the regression equation. Injury on duty and duration of pain were entered in step 1. Patient self-efficacy questionnaire, Hope Agency, and Hope Pathway were entered simultaneously in step 2. The final step 2 results of these regression analyses are shown in **Table 4**.

Regarding anxiety, injured on duty, and duration of onset could predict HADS-A significantly in step 1,  $R^2 = 0.199$ ,  $F(3, 98) =$

**Table 1**  
Patients and pain history background characteristics.

Descriptive statistics of study variables (N = 106)			
Variables	N	%	Mean (SD)
Sex			
Male	36	34	
Female	70	66	
Age			51 (14.8)
Below 25	4	3.8	
26–40	20	18.9	
41–60	57	53.8	
Above 60	25	23.6	
Education level			
No formal education	6	5.7	
Primary	22	20.8	
Junior secondary	27	25.5	
Senior secondary	28	26.4	
Postsecondary	12	11.3	
University degree or above	9	8.5	
Injury on duty			
Yes	43	40.6	
No	63	59.4	
Duration of pain			
Below 1 y	25	23.6	
1–5 y	44	41.5	
Above 5 y	36	34	
Average pain score			6.6 (1.5)
Mild (0–3)	2	1.9	
Moderate (4–6)	39	36.8	
Severe ( $\geq$ 7)	59	55.7	

**Table 2**  
Mean and SD of variables by injury on duty.

	Total mean (SD)	Injury on duty		t-value
		Yes Mean (SD)	No Mean (SD)	
HADS-A	10.81 (4.85)	12.48 (4.506)	9.62 (4.838)	3.024*
HADS-D	10.50 (4.88)	12.55 (4.753)	9.07 (4.549)	3.748†
PCS	36.69 (12.48)	38.07 (11.379)	35.77 (13.038)	0.926
PSEQ	23.96 (12.91)	18.9 (12.317)	27.5 (12.247)	-3.509†
Hope Total	39.85 (13.65)	35.93 (13.53)	42.18 (13.11)	2.353*
Hope Agency	19.49 (6.98)	17.71 (6.256)	20.52 (7.882)	2.054*
Hope Pathway	20.36 (7.25)	18.21 (7.882)	21.66 (6.443)	2.444*

\* Finding is significant at the 0.05 level (2-tailed).

† Finding is significant at the 0.01 level (2-tailed).

HADS-A, Hospital Anxiety and Depression Scale—Anxiety; HADS-D, Hospital Anxiety and Depression Scale—Depression; PCS, Pain Catastrophizing Scale; PSEQ, patient self-efficacy questionnaire; Hope Total, Adult Dispositional Hope Scale Total score; Hope Agency, Adult Dispositional Hope Scale Agency score; Hope Pathway, Adult Dispositional Hope Scale Pathway score.

8.100,  $P < 0.01$ . Adding PSEQ, Hope Agency and Hope Pathway could not increase the predictive power of the equation significantly,  $\Delta R^2 = 0.048$ ,  $P = 0.053$ . The final equation involving the 5 independent variables was significant,  $R^2 = 0.246$ ,  $F(5, 96) = 6.273$ ,  $P < 0.01$ . The PSEQ remained as the only individual predictor in the final equation ( $\beta = -0.244$ ). Lower self-efficacy predicted higher anxiety. Both Hope Agency and Hope Pathway were not significant predictors after the effect of self-efficacy was taken into account.

For depression, step 1 with injury on duty and duration of onset as predictors was significant,  $R^2 = 0.234$ ,  $F(3, 98) = 9.971$ ,  $P < 0.01$ . Adding PSEQ, Hope Agency and Hope Pathway in step 2 could significantly increase the predictive power,  $\Delta R^2 = 0.107$ ,  $P < 0.01$ . The final equation was significant,  $R^2 = 0.341$ ,  $F(5, 96) = 9.936$ ,  $P < 0.01$ . Both IOD ( $\beta = 0.275$ ) and Hope Agency ( $\beta = -2.577$ ) were both significant individual predictors in the final equation. Patients who was injured on duty and had lower hope agency would exhibit more depressive symptoms.

#### 4. Discussion

To the best of the authors' knowledge, this is the first study to report the importance of hope and examine the interaction between 2 dimensions of hope (ie, Agency and Pathway) with psychological distress and adjustment in patients with chronic musculoskeletal pain. Patients with chronic musculoskeletal pain were common to develop high levels of anxiety and depression.<sup>12</sup> This group of patients provides a suitable platform to investigate this relationship and determine the direction for the future prospective studies. Hope was found to be negatively correlated with patient's level of anxiety and depression while positively correlated to patient's self-efficacy. Although hope was found negatively correlated with PCS, it was not statistically significant. Pain Catastrophizing Scale which is the most

consistent psychosocial factor predicting of adjustment to chronic pain and may contribute to the development and long-term maintenance of chronic pain.<sup>15</sup> This study also highlights the potential role that pain catastrophization may play in delaying recovery from chronic musculoskeletal pain. Depression, pain catastrophizing, and anxiety commonly co-occur with chronic pain and might adversely affect pain outcomes.<sup>20</sup> Treatment of these modifiable psychological factors is warranted to optimize the effectiveness of pain-specific therapies.

Our patients had high level of hope ( $M = 39.85 \pm 13.65$ ) compared with patients with cancer in the previous studies.<sup>18</sup> However, the SD is relatively large, showing the hope level has wide variation in the patients with chronic musculoskeletal pain. Chronic musculoskeletal pain is different from terminal illness; the initiating cause could be obvious like IOD or nonspecific. In our study, patients with history of IOD was showing lower hope level. Lower agency would exhibit more depressive symptoms. Return to work could be hypothesized as one of the meaningful goal for those patients. Higher hope helps them to figure out how to achieve and motivate one-self to accomplish the goal. A study showed that good health in terms of mental- and self-rated health, few pain sites, as well as good psychosocial working conditions seem to indicate a lower risk of work disability.<sup>11</sup>

In our study, we found that depression and patient self-efficacy accounted for a moderate proportion of hope (31.2%). This is in agreement with previous studies done in mixed cancer populations which found that higher levels of hope were associated with lower level of depression.<sup>17</sup> These findings lead us to believe that when trying to cope with depression, it will bring up a positive expectancies regarding one's action (hope) to successfully overcome the chronic pain. Higher perceived self-efficacy also reflect better coping to pain, feeling more confident that they can pursue those pathways to reach their goals. Regarding anxiety, it was found significantly correlated with hope but found to not significant predictor. It could be that hope has a weak association with anxiety.

Besides theoretical implications, this study brings forward the future direction for psychological assessment and psychotherapy intervention to patients with chronic pain. Previous studies have proven that hope<sup>4</sup> and other psychological stress<sup>20</sup> can be enhanced through psychosocial interventions. Pain is a multidimensional concept including affective, evaluative, and cognitive domains.<sup>16</sup> Staats and Stassen<sup>24</sup> also presented hope as a multidimensional construct focusing on wishes and expectations in specific desired circumstances. The current study could not show the potential differential effect of hope on different dimensions of pain. Future study should examine whether hope exhibits different effects on the 3 dimensions of pain and give a better understanding on patients' perception of both chronic pain and hope. Nevertheless, the findings support the development of hope intervention programs for patients with chronic musculoskeletal pain to reduce psychopathology. Patients with chronic pain are usually beneficial from functional rehabilitation and psychological coping as the chronic pain is not usually curable.

**Table 3**  
Correlation among hope, hospital anxiety and depression scale (HADS), pain catastrophizing scale (PCS), and patient self-efficacy questionnaire (PSEQ).

	Hope Agency	Hope Agency	HADS-A	HADS-D	PCS	PSEQ
Hope Scale—Total	0.958 ( $P = 0.000$ )	0.961 ( $P = 0.000$ )	-0.371 ( $P = 0.000$ )	-0.472 ( $P = 0.000$ )	-0.108 ( $P = 0.272$ )	0.420 ( $P = 0.000$ )
Hope Agency		0.843 ( $P = 0.000$ )	-0.370 ( $P = 0.000$ )	-0.481 ( $P = 0.000$ )	-0.168 ( $P = 0.087$ )	0.420 ( $P = 0.000$ )
Hope Pathway	0.843 ( $P = 0.000$ )		-0.341 ( $P = 0.000$ )	-0.425 ( $P = 0.000$ )	-0.042 ( $P = 0.674$ )	0.386 ( $P = 0.000$ )

HADS-A, Hospital Anxiety and Depression Scale—Anxiety; HADS-D, Hospital Anxiety and Depression Scale—Depression; PCS, Pain Catastrophizing Scale; PSEQ, patient self-efficacy questionnaire; Hope Total, Adult Dispositional Hope Scale Total score; Hope Agency, Adult Dispositional Hope Scale Agency score; Hope Pathway, Adult Dispositional Hope Scale Pathway score.



**Table 4**  
**Regression analysis.**

Variable	B	SE B	Beta	t
HADS—Anxiety as dependent variable				
Injury on duty (yes/no)	0.715	1.030	0.072	0.695
Duration of onset	-1.233	0.694	-0.173	-1.777
PSEQ	-0.093	0.040	-0.244	-2.322*
Hope Agency	-0.127	0.122	-0.180	-1.049
Hope Pathway	-0.052	0.166	-0.075	-0.499
HADS—Depression as dependent variable				
Injury on duty (yes/no)	2.723	0.965	0.275	2.822†
Duration of onset	0.712	0.650	0.100	1.095
PSEQ	-0.057	0.038	-0.149	-1.513
Hope Agency	-0.294	0.114	-0.413	-2.577*
Hope Pathway	0.037	0.109	0.054	0.342

\* Finding is significant at the 0.05 level (2-tailed).

† Finding is significant at the 0.01 level (2-tailed).

HADS, Hospital Anxiety and Depression Scale; Hope Agency, Adult Dispositional Hope Scale Agency Score; Hope Pathway, Adult Dispositional Hope Scale Pathway Score; PSEQ, patient self-efficacy questionnaire.

Different multidisciplinary pain coping programs were developed to improve patient's psychological stress and self-efficacy by education on goal setting, pacing, and problem-solving to reach the goal. These are also compatible to the concept of agency and pathway component of hope. However, hope do give patients a more positive goal in their coping journey. Future studies could develop hope-based intervention protocol for patients with chronic musculoskeletal pain and examine its efficacy.

Other limitations of this study have to be considered. The sample size of the study is rather limited. However, it has to be taken into consideration that the results obtained revealed significant association with anxiety and depression, self-efficacy, indicating that the sample size had adequate power.

## Disclosures

The authors have no conflict of interest to declare.

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## References

- Arnao RC, Rosen DH, Finch JF, Rhudy JL, Fortunato VJ. Longitudinal effects of hope on depression and anxiety: a latent variable analysis. *J Pers* 2006;75:43–64.
- Asghari A, Nicholas MK. Pain self-efficacy beliefs and pain behaviour. A prospective study. *PAIN* 2001;94:85–100.
- Berendes D, Keefe FJ, Somers TJ, Kothadia SM, Porter LS, Cheavens JS. Hope in the context of lung cancer: relationships of hope to symptoms and psychological stress. *J Pain Symptom Manage* 2010;40:174–82.
- Duggleby W, Wright K, Williams A, Degner L, Cammer A, Holtzlander L. Developing a living with hope program for caregivers of family members with advanced cancer. *J Palliat Care* 2007;23:24–31.
- Gitlin MC. Chronic non-cancer pain: an overview of assessment and contemporary management. *J La State Med Soc* 1999;151:93–8.

- Ho SM, Ho JW, Bonanno GA, Chu AT, Chan EM. Hopefulness predicts resilience after hereditary colorectal cancer genetic testing: a prospective outcome trajectories study. *BMC Cancer* 2010;10:279.
- Ho SMY, Ho JWC, Pau BKY, Hui BP-H, Wong RS-M, Chu AT-W. Hope-based intervention for individuals susceptible to colorectal cancer: a pilot study. *Fam Cancer* 2012;11:545–51.
- Katsimigios AM, O'Beirne S, Harmon D. Hope and chronic pain—a systematic review. *Ir J Med Sci* 2021;190:307–12.
- Leung CM, Wing YK, Kwong PK, Lo A, Shum K. Validation of the Chinese-Cantonese version of the hospital anxiety and depression scale and comparison with the Hamilton Rating Scale of Depression. *Acta Psychiatr Scand* 1999;100:456–61.
- Lim HS, Chen PP, Wong TCM, Gin T, Wong E, Chan ISF, Chu J. Validation of the Chinese version of pain self-efficacy questionnaire. *Anesth Analgesia* 2007;104:918–23.
- Mather L, Ropponen A, Mittendorfer-Rutz E, Narusyte J, Svedberg P. Health, work and demographic factors associated with a lower risk of work disability and unemployment in employees with lower back, neck and shoulder pain. *BMC Musculoskelet Disord* 2019;20:622.
- Sørensen L, Jensen MSA, Rathleff MS, Holden S. Comorbid insomnia, psychological symptoms and widespread pain among patients suffering from musculoskeletal pain in general practice: a cross-sectional study. *BMJ Open* 2019;9:e031971.
- Machin D, Campbell MJ, Fayers PM, Pinol APY. Chapter 18: the correlation coefficient. In: *Sample size tables for clinical studies*. Oxford: Blackwell Science, 1997. p. 168–73.
- Magaletta PR, Oliver JM. The hope construct, will, and ways: their relations with self-efficacy, optimism, and general well-being. *J Clin Psychol* 1999;55:539–51.
- Martinez-Calderson J, Jensen MP, Morales-Asencio JM, Luque-Suarez A. Pain catastrophizing and function in individuals with chronic musculoskeletal pain: a systematic review and meta-analysis. *Clin J Pain* 2019;35:279–93.
- Melzack R, Wall PD. *The challenge of pain*. Harmondsworth: Penguin Books, 1982.
- Nekolaichuk CL, Bruera E. Assessing hope at the end of life: validation of an experience of hope scale in advanced cancer patients. *Palliat Support Care* 2004;2:243–53.
- Rajandram RK, Ho SM, Samman N, Chan N, McGrath C, Zwahlen RA. Interaction of hope and optimism with anxiety and depression in a specific group of cancer survivors: a preliminary study. *BMC Res Notes* 2011;4:519.
- Rand KL. Hope and optimism: latent structures and influences of grade expectancy and academic performance. *J Pers* 2009;77:231–60.
- Scott EL, Kroenke K, Wu J, Yu Z. Beneficial effects of improvement in depression, pain catastrophizing, and anxiety on pain outcomes: a 12-month longitudinal analysis. *J Pain* 2016;17:215–22.
- Snyder CR, Berg C, Woodward JT, Gum A, Rand KL, Wroblewski KK, Brown J, Hackman A. Hope against the cold: individual differences in trait hope and acute pain tolerance on the cold pressor task. *J Pers* 2005;73:287–312.
- Snyder CR, Harris C, Anderson JR, Holleran SA, Irving LM, Sigmon ST, Yoshinobu L, Gibb J, Langelle C, Harney P. The will and the ways: development and validation of an individual-differences measure of hope. *J Pers Soc Psychol* 1991;60:570–85.
- Snyder CR, Simpson SC, Ybasco FC, Borders TF, Babyak MA, Higgins RL. Development and validation of the state hope scale. *J Pers Soc Psychol* 1996;70:321–35.
- Staats S, Stassen M. Hope: an affective cognition. *Soc Indic Res* 1985;17:235–42.
- Stanton AL, Danoff-Burg S, Cameron CL, Bishop M, Collins CA, Kirk SB, Sworowski LA, Twillman R. Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. *J Consult Clin Psychol* 2000;68:875–82.
- Sullivan MJ, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. *Psychol Assess* 1995;7:524–32.
- Turk DC. Clinical effectiveness and cost-effectiveness of treatments for patients with chronic pain. *Clin J Pain* 2002;18:355–65.
- Turk DC, Swanson KS, Tunk ER. Psychological approaches in treatment of chronic pain patients—when pills, scalpels, and needles are not enough. *Can J Psychiatr* 2008;53:213–23.
- Yap JC, Lau J, Chen PP, Gin T, Wong T, Chan I, Chu J, Wong E. Validation of the Chinese pain catastrophizing scale (HK-PCS) in patients with chronic pain. *Am Acad Pain Med* 2008;9:186–95.