Factor Structure, Psychometric Properties, And Correlates Of Revised Chinese Version Of Chronic Pain Coping Inventory Among Chronic Pain Patients In Hong Kong

S Cheng, C Cheung, V Ng, H Lim, K Leung, A Chan, G Hui

Abstract

The present study was to examine the factor structure, psychometric properties, and correlates of the revised Chinese version of Chronic Pain Coping Inventory (RC-CPCI) among Chinese patients with chronic pain in Hong Kong. One hundred seventy patients (95 women, 56%), aged from 18 to 84 years, (Mean=48.21, SD=13.89) with an average 4.63 years (SD=7.07) of chronic pain participated in the study. In the RC-CPCI, 6 factors, namely the Positive Coping, Negative Coping, Social Coping, Exercise/Stretch, Task Persistence, and Activity Pacing were found. The factors were shown to have adequate internal consistency, and to correlate with different pain belief and outcome measures. Limitations of the study were discussed.

INTRODUCTION

The prevalence of chronic pain is 10.8% in Hong Kong (1). Coping may be defined as the use of behavioral and cognitive techniques to manage stressful demands. Chronic pain and associated functional, vocational, and psychosocial disability can be viewed as stressors that may mobilize the use of coping strategies by patients. Evidence from a number of sources suggests that differences in the use of pain coping strategies may play a significant role in adjustment to chronic pain (2). And considerable amount of interest have been aroused to develop measures of pain-related coping and examine how coping is related to functioning among persons with chronic pain (3, 4).

One such measure is the Vanderbilt Pain Management Inventory (VMPI, 4), which consists of the Active Coping and Passive Coping. The Passive Coping has been found to relate with worse adjustment (5). Though VMPI has been widely used in the pain population, there is a need to identify specific coping strategies for clinical application and intervention. The Chronic Pain Coping Inventory (CPCI), which consists of 8 coping factors, has been shown as a useful assessment tool in reliably explaining variances of pain intensity, disability and depressive symptoms for English speaking patients with chronic pain (4, 6, 7).

Though Wong and colleagues have replicated some evidence for partial factorial structure of the Chinese version of the CPCI with the confirmatory factor analysis (CFA), 2 of the 8 factors have unsatisfactory goodness of fit in the CFA (8). One empirical question left unanswered is whether the original factorial structure is culturally applicable to the Chinese population.

After the development of the initial CPCI, Nielsen and colleagues (9) have proposed to add a subscale, the Activity Pacing Scale, into the CPCI. However, there is no examination whether this subscale is factorially distinctive from other factors in the CPCI. Another purpose of the present study was to re-examine the factorial structure of this revised version after incorporating this additional subscale in the inventory. Besides, we would like to document the correlates of this revised Chinese version of CPCI with other measures of pain and outcomes such as anxiety, depression, physical functioning.

Therefore, the present study was to examine the factor structure, psychometric properties, and correlates of the revised Chinese version of Chronic Pain Coping Inventory (CPCI) among chronic pain patients in a Chinese Hong Kong population.
Kong sample.

METHOD

Subjects

After the ethics approval from hospital review board was obtained, consecutive patients with chronic pain in their first attendance to 3 pain clinics in Hong Kong were invited into the study. The inclusion criteria of the participants were (a) having persistent pain for over 3 months, (b) literate and able to complete the questionnaires, (c) aged 18 or above. The exclusion criteria were (a) having the cancer-related pain and (b) refusing to give the written consent. From 2011 to 2013, a total of 170 patients (95 woman, 56%), aged from 18 to 84 years, (Mean=48.21, SD=13.89) with an average 4.63 years (SD=7.07) of chronic pain participated into the studies. The reported locations of the pain included the head (41.8%), shoulder (8.2%), limb (28.2%), chest (4.7%), back (11.2%), abdomen (2.4%), and others (3.5%).

Measures

1. The principal measure in this study was the Revised Chinese version of CPCI (RC-CPCI), which was consisted of the original 42 items with 8 subscales (respectively Guarding, Resting, Asking for Assistance, Relaxation, Task Persistence, Exercise/Stretch, Seeking Social Support, and Coping Self-Statement) and the additional Activity Pacing Scale (6 items) (9). Each item would be from 0 to 7 days of practice of the coping in a week. The mean could be obtained by dividing the aggregate score with the total number of items in each factor. The internal consistency of the factors in the original scale was satisfactory (alpha >0.7). Different factors correlated well with different outcome measures (4). The present Chinese version was translated by the first author and then refined by two experienced Clinical Psychologists in doctorate level (KK Leung and S Chang), who were proficient in Chinese and English, and worked with chronic pain patients (Appendix 1: RC-CPCI was attached).

2. Other measures of pain and outcome used in this study included the Chinese version of VPMI (10), HK-Pain Self-Efficacy Pain Questionnaire (11), HK-Pain Catastrophizing Scale (12), SF-36 (13), Hospital Anxiety and Depression Scale (14), which all had been well validated with satisfactory psychometric properties for Chinese patients.

RESULT

As the initial multivariate analyses of variance indicated no sex differences on all measures, male and female data were combined in all subsequent statistical tests.

Factor Analyses of the RC-CPCI

A principal component analysis was initially performed. Twelve factors with eigenvalues exceeding unity emerged, and together they accounted for 66.4% of the total variance. To avoid overfactoring, the scree test was employed (15). It showed that 6 factors could be appropriately and meaningfully extracted. The 6-factor solution, which could be considered as an adequate representation of the data, was rotated to a Varimax criterion for interpretation (16). The factors and their loadings are presented in Table 1. We used salient loadings .36 for the purpose of interpreting the meaning of each component. To simplify the interpretation of findings, we decided to delete any item loading .36 on more than one factor.

In the present results of factor analyses, each of the first 3 factors was consisted of 2 factors as derived in the original model. The first factor, named Positive Coping (9 items), was the combination of the factors “Relaxation” (5 items) and “Coping Self-Statement” (4 items) in the original CPCI. The second factor, named Negative Coping (10 items), was comprised of the factors “Guarding” (7 items) and “Resting” (5 items). The third factor, labelled as Social Coping (9 items), was formed by the exact items in the factors “Asking for Assistance” (4 items) and “Seeking Social Support” (5 items). The remaining 3 factors, respectively the Task Persistence (6 items), Exercise/Stretch (5 items), and Activity Pacing (6 items), had replicated the same items in the 3 factors in the original study. As 2 items had factor loading less than .36 (items 7 and 42) and 1 item (number 25) had loadings greater .36 onto two factors, these 3 items were being removed from the RC-CPCI. The total number of the items in the present RC-CPCI was reduced from 48 to 45.

In Table 1, we presented a summary of the factor structure, and the mean, SD, and alpha of each factor. In Table 2, we also presented a summary of the percentile rank for each factor score.
other pain coping and belief, correlational analyses were conducted with results shown in Table 3. Several salient findings were summarized in the followings. First, Positive Coping did not have significant association with pain belief such as pain catastrophizing or pain self-efficacy, but it had significant correlation with Active Coping in the VMPI and other factors in the RC-CPCI. Second, Negative Coping and Task Persistence had relatively stronger associations with other coping and belief scales, as compared to other factors in the RC-CPCI. Third, the remaining factors such as the Social Coping, Exercise/Stretch, and Activity Pacing had different degree of associations with different pain coping and belief.

### Table 3
Correlation between RC-CPCI factors with pain measures

To evaluate the relationship between the RC-CPCI with outcome measures, we conducted the correlational analyses between the RC-CPCI factors with pain intensity, emotional distress, and physical health functioning. The findings were presented in Table 4. Some key points were highlighted below. First, only the factor Activity Pacing was significantly associated with pain intensity, whereas none of any other factors were. Second, Negative Coping, Task Persistence, and Activity Pacing had significant associations with emotional distress in the expected directions. Third, Positive Coping did not associate with any outcome measures, whereas Negative Coping and Task Persistence had strong association with most of the physical functioning subscales. Finally, the Social Coping, Exercise/Stretch, and Activity Pacing had different degree of associations with different aspects of physical functioning.

### Correlation of RC-CPCI factors with outcome measures

To examine the associations between the RC-CPCI with
DISCUSSION

The purposes of the present study are three-folded. First, it aimed to reexamine the factor structure of the RC-CPCI in the Chinese culture. Second, it documented the psychometric properties of the RC-CPCI in the present Chinese pain patients. Third, it demonstrated the associations of RC-CPCI with other pain constructs and outcome measures.

For the factorial structure, we have found a parsimonious and meaningful pain coping behaviors with the present clinical sample. The results replicated partial factorial structure resembling to the original one (such as the exact factor composites for Task Persistence, Exercise/Stretch, and Activity Pacing), but found different coping patterns such as the Positive Coping, Negative Coping and Social Coping in the Chinese patients. Interestingly, the Positive Coping and Negative Coping indeed were noted to be separately similar to the Active Coping and Passive Coping in the VMPI, as shown in their respective correlational coefficients. Thus, the model of Positive Coping (or Active Coping) and Negative Coping (or Passive Coping) may be empirically applicable to the Chinese culture. Besides, the present factor analyses lent support to the assertion that Activity Pacing was a separate and independent behavioral coping in pain patients. Our findings also show that the internal consistencies of each factor in the RC-CPCI are good. It appears that the RC-CPCI enjoyed satisfactory psychometric properties.

We documented the significant associations of RC-CPCI with various pain variables and outcome measures. These findings added to the literature that RC-CPCI has acceptable construct validity as reflected by its significant associations with respect to pain variables and outcome measures in anticipated directions. A few interesting findings that relate to the association with other pain and outcome variables deserve an attention. First, as a replication of the previous findings (17), our present work found that different coping strategies are associated with different outcome variables. For instance, Negative Coping, which is associated with resting and guarding, is found to be negatively correlated with pain self-efficacy but positively with pain catastrophizing. Conversely, Activity Pacing that is the skill related to pain activity tolerance is shown to be positively related to pain self-efficacy but negatively with pain catastrophizing. These findings signify the importance of matching the cognitive and behavioral intervention strategies for chronic pain patients in maximizing the therapeutic gains. Second, Positive Coping that consists of relaxation practice and coping statements are shown unrelated to any of the outcomes and other pain measures. However, it is significantly and strongly associated with other pain coping in particularly the Activity Pacing and Exercise/Stretch in the RC-CPCI and the Active Coping in the VMPI. This finding indicates that Positive Coping may affect outcome variables via an indirect path from other coping strategies such as Activity Pacing and Exercise/Stretch rather than a direct one. Future investigation may need to examine this speculation, which can have a vital treatment implication for adjustment to chronic pain.

However, several limitations should be noted in the present studies. The present study has adopted convenience sampling and we have no information regarding to those who refused to take part into the study, due to inability to obtain the consent. Thus one should be cautious in direct generalization of the present findings to other Chinese chronic pain patients. However, the present findings can be treated as the preliminary evidence for the factorial structure of RC-CPCI for the Chinese pain patients. Future studies should replicate and examine the structural validity of the RC-CPCI. Second, in this study, owing to limited resource, we have not shown the re-test reliabilities of the RC-CPCI that future investigation may report this psychometric property of the test. Finally, this present study is a correlational one, implying none of any causal relationship among coping strategies, pain belief, and outcome variables. The pain coping and adjustment model for Chinese chronic pain patients can be tested and examined in future randomized control trials.

### Table 4

<table>
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<tr>
<th>Factors</th>
<th>RC-CPCI</th>
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<td>.29*</td>
<td>.23</td>
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<td>.23</td>
<td>.15</td>
<td>.28</td>
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<td></td>
<td>Positive Coping</td>
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<td>.32</td>
<td>.20</td>
<td>.19</td>
<td>.19</td>
<td>.14</td>
<td>.20</td>
</tr>
</tbody>
</table>

Note: HADS = Hospital Anxiety & Depression Scale; SF36 = Physical functioning; SF36 = Role limitations due to physical health; SF36 = Role limitations due to emotional problems; SF36 = General health; SF36 = Energy/Fatigue; SP = General health; SF = Physical health; P = Psych.
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References

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