Psychometric Properties of the Pain Self-Efficacy Questionnaire Using Nigerian University Students with Chronic Pain

Christian S. Ugwuanyi[1], Chinedu I.O. Okeke[2]

[1]*Postdoctoral fellow, [2]Host, Professor and Head, School of Education Studies, Faculty of Education, University of the Free State, Bloemfontein, 9300, South Africa*

Abstract

This study was set to determine the psychometric properties of the pain self-efficacy questionnaire among Nigerian university students with chronic pain. A sample size of 256 Nigerian university students with chronic pains was used. The construct validation of the PSEQ was done using exploratory factor analysis while the internal consistency and stability reliability indices were estimated using Cronbach Alpha method. The study found that the items of the PSEQ correlated positively with each other (r = 0.72) and PSEQ is a unidimensional instrument with good internal consistency reliability. By implication, the Nigerian version of PSEQ demonstrated good psychometric properties as already indicated in English language, Portuguese and Dutch versions. Thus, usage of the PSEQ on Nigerian university students with chronic pain will help then to find out the level of adjust in their academic pursuit.

Keywords: *Psychometric, Properties, Pain, Self-efficacy, Chronic, Validation.*

Introduction

Pain, also known as a musculoskeletal disorder, is common among undergraduate students, particularly those with chronic cases and has remained a major concern of public health professionals and researchers worldwide.[1-3] Pain can restrict daily activities, decrease appetite, impair sleep and lead to depression, anxiety[4]. Pain is a common and major public health problem which impact an individual's quality of life from different aspects including physical, psychological and social negatively.[5-8] The ability of a patient to manage the painful condition is usually based on his/her pain self-efficacy level. As a psychological construct, pain self-efficacy is seen as one's confidence regarding his/ her ability to function effectively while in pain.[9] Available research has shown that pain self-efficacy is linked to positive pain-related outcomes in children with chronic pain.[1]

Corresponding author:
Dr. Christian S. Ugwuanyi
Email:ugwuanyics@ufs.ac.za

Self-efficacy beliefs are defined as convictions that one can successfully execute behaviours that are required to produce outcomes[10]. According to a previous study[11], efficacy beliefs determine whether coping behaviour will be initiated, how much effort will be expended, and how long this behaviour will be sustained in the face of obstacles and aversive experiences. Bandura proposed that efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences. This concept has been applied to chronic pain patients and several reviews[12] have concluded that self-efficacy beliefs, along with other psychological constructs, are related to adjustment to chronic pain. Self-efficacy beliefs have been found to explain a range of behaviours and aspects of pain experience in chronic pain situation.

Self-efficacy beliefs play an important role in functioning and coping with chronic pain.[12, 13] Converging lines of evidence support the importance of self-efficacy beliefs in adopting coping strategies[14], reducing avoidance behaviour[15], and predicting pain-induced fear.[16] Moreover, self-efficacy belief is a more

important determinant of disability than pain intensity, pain duration and anxiety.[17] Studies show that increases in functional self-efficacy are strongly related to positive treatment outcome.[18, 19] Self-efficacy beliefs are therefore important psychosocial determinants of pain behaviour and treatment outcomes. Several questionnaires have been employed to measure self-efficacy in chronic pain patients.[20-22]

Despite the prevailing/continuous pain experiences in many patients, only two questionnaires validated using English language speaking countries, Portuguese and Dutch patients had specifically investigated patients' confidence in performing general or more specific tasks in the presence of pain.[2,21] Thus, the study determined the psychometric properties of PSEQ using Nigerian university students with chronic pain.

Methodology

Participants

Chronic pain patients in different medical centres in Southeast universities in Nigeria were purposively selected for the study. A sample of 256 University students with chronic pain patients of different age cohorts were selected from 72 hospitals in the South-Eastern part of Nigeria. 43 of the participants are of ages within 15-25 years; 167 of the participants are of ages within 26-45 years, while 46 participants are of ages within 46-70 years.

Instrument

Pain Self-efficacy Questionnaire (PSEQ).[2] The PSEQ consists of 10 items. Each item is scored on a 7-point scale ranging from 0 "not at all confident" to 6 "completely confident". Higher scores on the PSEQ imply stronger self-efficacy beliefs while lower scores imply weaker SEB.

Procedure

At the first instance, copies of the informed consent letter were sent to 324 undergraduate students in the 5 medical centres in Southeast universities but 256 of them with chronic pain responded positively to the request. After that, copies of the PSEQ were administered to the chronic pain patients who responded positively to the request.

Construct Validation

The instrument was construct validated by subjecting it to confirmatory factor analysis using the principal component matrix. This was done after the completion of the questionnaire items by the chronic pain patients. After that, the data collected were coded and factor analysis was done. A criterion factor loading of 0.50 was used in the selection of pure items. That was based on the recommendation[23] that any item that loads 0.5 or above in only one of the factors should be considered a pure item.

Table 1:Correlation matrix of the items of PSEQ

	item1	item2	item3	item4	item5	item6	item7	item8	item9	item10
item1	1.000									
item2	.577	1.000								
item3	.360	.493	1.000							
item4	.104	.194	.328	1.000						
item5	.273	.168	.113	.385	1.000					
item6	.157	.285	.340	.289	.546	1.000				
item7	.026	.153	.214	.263	.346	.525	1.000			
item8	.093	.209	.277	.369	.261	.487	.720	1.000		
item9	.109	.112	.152	.115	.166	.264	.434	.396	1.000	
item10	.098	.190	.100	-.066	.130	.194	.312	.192	.471	1.000
a. Determinant = .034										

Table 1 shows that the items of the PSEQ correlated very positively with each other. This means that the items are related to a particular construct.

Table 2: KMO and Bartlett's Test for the Adequacy of the sample for the factor analysis of PSEQ

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.693**
Bartlett's Test of Sphericity	Approx. Chi-Square	845.141
	Df	45
	Sig.	.000

Table 2 shows that the KMO measure is 0.693 which shows that the sample for the factor analysis of the PSEQ was very adequate. From the same Table 2, the **Bartlett's test** of sphericity is significant. That is, its associated probability (0.000) is less than 0.05, and is small enough to reject the null hypothesis. This means that the correlation matrix for the PSEQ is not an identity matrix

Table 3: Communality values for the items of PSEQ

Item Statement		Initial	Extraction
1.	I can enjoy things	1.000	.696
2.	I can do most of the household chores	1.000	.751
3.	I can socialise with my friends or family members as often as I used to do	1.000	.537
4.	I can cope with my pain in most situations	1.000	.585
5.	I can do some form of work	1.000	.470
6.	I can still do many things I enjoy doing	1.000	.608
7.	I can cope with my pain without medication	1.000	.450
8.	I can accomplish most of my goals in life	1.000	.662
9.	I can live a normal lifestyle	1.000	.646
10.	I can gradually become more active	1.000	.773

Table of communalities (Table 3) shows how much of the variance in the variables have been accounted for by the extracted factors. It shows that item 1 which says "I can enjoy things" had communality value of 0.696 meaning that over 69% of the variance in *I can enjoy things* is accounted for. Also, item 2 with communality value of 0.75 means that 75% of the variance in *I can do most of the household chores* is accounted for. This follows of other items in Table 3. However, item 7 had the smallest communality value of 0.45 meaning that 45% of the variance in *I can cope with my pain without medication* is accounted for while the highest in communality value is 10 with communality value of 0.77 meaning that 77% of the variance in *I can gradually*

become more active is accounted for.

Table 4: Component Matrix for the items of PSEQ

Item Statement	Component 1	Component 2	Component 3
I can enjoy things		.682	
I can do most of the household chores	.535	.634	
I can socialise with my friends or family members as often as I used to do	.558		
I can cope with my pain in most situations	.513		
I can do some form of work	.588		
I can still do many things I enjoy doing	.743	.657	
I can cope with my pain without medication	.739	.567	
I can accomplish most of my goals in life	.739		
I can live a normal lifestyle	.543		
I can gradually become more active			.682

Extraction Method: Principal Component Analysis.
a. 3 components extracted.

Table 4 above shows the loadings of the ten variables on the three factors extracted. The higher the absolute value of the loading, the more the factor contributes to the variable. The gap on the table represents loadings that are less than 0.5. In order words, the benchmark for the selection of the items was 0.5 and we suppressed all loadings less than 0.5. Table 4 also shows that items 2, 3, 4, 5, 6, 7, 8 and 9 loaded more than 0.5 on factor 1, items 1, 2, 6, 7 loaded more than 0.5 on factor 2 while only item 10 loaded more than 0.5 on factor 3. This implies that items 2, 3, 4, 5, 6, 7, 8 and 9 are more related to factor 1, item 1 is more related to factor 2 while item 10 is more related to factor 3. This result shows that items 1, 3, 4, 5, 8, 9 and 10 are factorially pure items out of the items of PSEQ because they loaded above 0.5 in only one factor. Items 2, 6 and 7 are factorially complex items because they loaded above 0.5 in more than one factor. Thus, 7 out of the 10 items of PSEQ were found to be pure items after the confirmatory factor analysis.

Internal Consistency Reliability of PSEQ

Table 5: Reliability analysis of the PSEQ

Cronbach's Alpha	N of Items
.838	7

Table 5 shows the internal consistency reliability of the 7 items of PSEQ was estimated as 0.838 using Cronbach alpha method. This value confirmed that PSEQ is a reliable instrument for the management of pains by patients.

Stability Reliability of PSEQ

The stability of PSEQ was estimated through test re-test method. Pearson correlation between the first and second administration of PSEQ is 0.866, $p<.001$. This shows a high correlation of the first administration and second administration of PSEQ after two weeks interval. This indicates that PSEQ is stable
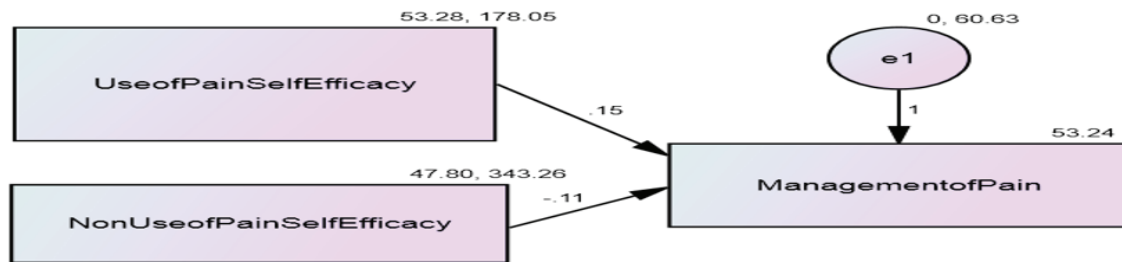
Figure 1: Path diagram of the use of PSEQ in the management of pains

The figure 1 represents the model diagram for the impact of the use of PSEQ in the management of pains. It reveals that the use of PSEQ has a positive impact on the management of pains among Nigerian university students. The model fit for the recursive model developed was tested using Chi-Square goodness of fit test and Root Mean Square Error of Approximation (RMSEA). The developed model had a Chi-square value of 28.34 with a probability value of 0.72. The Chi-square value of 28.34 and RMSEA value of 0.00 showed that the data used for the study fitted the model.

Discussion

This study has been able to establish the psychometric properties of PSEQ using Nigerian university students. The PSEQ had good psychometric properties in the sense that the items of the PSEQ correlated highly with each other and as well loaded above 0.50 majorly in one factor. This implies that the PSEQ is a unidimensional instrument with good internal consistency reliability as well as stability reliability for determining the self-efficacy of patients with chronic pain. These findings are similar to the findings.[2, 21, 11] Study[11] found that the exploratory factor analysis demonstrated that the Dutch version of the PSEQ is a unidimensional instrument with adequate internal consistency which is also in accordance with the original English language version[2] and the Portuguese version.[21] This by implication shows that the Nigerian version of PSEQ demonstrated good psychometric properties as already indicated in English language, Portuguese and Dutch versions.

However, the 10-item English version of PSEQ developed by Nicholas in 1989 was reduced to 7 items through the exploratory factor analysis. The variation in the number of items may have been because of the difference in the area of the study. Thus, further validation of the instrument is recommended for future research in Nigeria or any of the African countries.

In conclusion, the Nigerian version of the PSEQ is a unidimensional instrument with good internal consistency and stability reliabilities. This implies that the Nigerian version also demonstrated good psychometric properties just like those of the English language, Portuguese and Dutch versions. The implication of this finding lies in the fact that Nigerian university students with chronic pain can be diagnosed from time to time ascertain their level of management of their pains for optimal academic performance.

References

1. Nicholas, M.K. The Pain Self-Efficacy Questionnaire: Taking pain into account. European Journal of Pain 2007, 11(2), 153-163.

2. Yajie L & Mimi M. Y. T. Pain situations among working adults and the educational needs identified: an exploratory survey via WeChat. BMC Public Health 2019, 19:1149 https://doi.org/10.1186/s12889-019-7503-9

3. Hayes S, Hogan M, Dowd H, Doherty E, O'Higgins S, Nic Gabhainn S. Comparing the clinical-

effectiveness and cost-effectiveness of an internet-delivered acceptance and commitment therapy (ACT) intervention with a waiting list control among adults with chronic pain: study protocol for a randomised controlled trial. BMJ Open 2014. 4:e005092.

4. Berman RLH, Iris MA, Bode R, Drengenberg C. The effectiveness of an online mind-body intervention for older adults with chronic pain. J Pain 2009, 10: 68–79. https://doi.org/10.1016/j.jpain.2008.07.006.

5. Butow P, Sharpe L. The impact of communication on adherence in pain management. In: Pain2013.

6. Hanssen DJC, Naarding P, Collard RM, Comijs HC, Oude Voshaar RC. Physical, lifestyle, psychological, and social determinants of pain intensity, pain disability, and the number of pain locations in depressed older adults. Pain 2014, 155:2088.

7. Bandura, A. Self-efficacy - Toward a unifying theory of behavioural change. Psychological Review 1977, 84(2), 191-215.

8. Van der Maas, L.C.C., Vet, de, H.C.W., Köke, A., Bosscher, R.J. & Peters, M.L. Psychometric properties of the Pain Self-Efficacy Questionnaire (PSEQ): Validation, prediction, and discrimination quality of the Dutch version. European Journal of Psychological Assessment 2012, 28(1), 68-75.

9. Gatchel, R.J., et al. The biopsychosocial approach to chronic pain: scientific advances and future directions. Psychological Bulletin 2007, 133(4), 581-624.

10. Turk, D.C. &Okifuji, A. Psychological factors in chronic pain: evolution and revolution. Journal of Consulting and Clinical Psychology 2002, 70(3), 678-690.

11. Jensen, M.P., Turner, J.A. & Romano, J.M. Self-efficacy and outcome expectancies: relationship to chronic pain coping strategies and adjustment. Pain 1991, 44, 263-269.

12. Asghari, A. & Nicholas, M.K. Pain self-efficacy beliefs and pain behaviour. A prospective study. Pain 2001, 94, 85-100.

13. Karoly, P., et al. The impact of goal cognition and pain severity on disability and depression in adults with chronic pain: an examination of direct effects and mediated effects via pain-induced fear. Cognitive Therapy and Research 2008, 32,418-433.

14. Denison, E., Åsenlöf, P. &Linberg, P. Self-efficacy, fear-avoidance, and pain intensity as predictors of disability in subacute and chronic musculoskeletal pain patients in primary health care. Pain 2004, 111, 245-252.

15. Meredith, P., Strong, J & Feeney, J.A. Adult attachment, anxiety, and pain self-efficacy as predictors of pain and disability. Pain 2006, 123, 146-154.

16. Woby, S.R., et al. Outcome following a physiotherapist-led intervention for chronic low back pain: the important role of cognitive processes. Physiotherapy 2008, 94, 115-124.

17. Anderson, K.O., et al. Development and initial validation of a scale to measure self-efficacy beliefs in patients with chronic pain. Pain 1995, 63, 77-84.

18. Altmaier, E.M., et al. Role of self-efficacy in rehabilitation outcome among chronic low back pain patients. Journal of Counseling Psychology 1993, 40(3), 335-339.

19. Lackner, J.M., Carosella, A.M. & Feuerstein, M. Pain expectancies, pain, and functional self-efficacy expectancies as determinants of disability in patients with chronic low back disorders. Journal of Consulting and Clinical Psychology 1996, 64(1), 212-220.

20. Rudy, T.E., et al. Psychosocial predictors of physical performance in disabled individuals with chronic pain. The Clinical Journal of Pain 2003, 19, 18-30.

21. Sardà, J., et al. Pain-related self-efficacy beliefs in a Brazilian chronic pain patient sample: a psychometric analysis. Stress and Health 2007, **23,** 185-190.

22. Vong, S.K., et al. Measurement structure of the Pain Self-Efficacy Questionnaire in a sample of Chinese patients with chronic pain. Clinical Rehabilitation 2009, **23**(11), 1034-1043.

23. Field, A. Discovering Statistics using SPSS for Windows. London – Thousand Oaks – New Delhi: Sage publications 2007.