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Development of the Italian Version of the Pain Vigilance and Awareness Questionnaire in Subjects with Chronic Low Back Pain: Cross-cultural Adaptation, Confirmatory Factor Analysis, Reliability and Validity

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Abstract
Background Growing attention is being given to cognitive-behavioural measures to improve interventions for spinal disorders. The Pain Vigilance and Awareness Questionnaire (PVAQ) has never been validated in Italian subjects with chronic low back pain (LBP).
Purpose The purpose of this study is translating, culturally adapting and validating the Italian version of PVAQ (PVAQ-I).
Methods A cross-sectional evaluation of the psychometric properties of the PVAQ-I on patients with chronic LBP was conducted. The questionnaire was culturally adapted in accordance with international standards. The psychometric testing included confirmatory factor analysis, reliability by internal consistency (Cronbach's alpha) and test–retest reliability (intra-class correlation coefficient, ICC); construct validity by comparing the PVAQ-I with the Pain Catastrophising Scale (PCS), the Tampa Scale of Kinesiophobia (TSK), the Hospital Anxiety and Depression Score (HADS), the Chronic Pain Acceptance Questionnaire (CPAQ), a Numerical Rating Scale of pain intensity (NRS) and the Oswestry Disability Questionnaire (ODI); and sensitivity to change by calculating the smallest detectable change.
Results The PVAQ-I was administered to 131 subjects with chronic LBP (77 females, mean age of 48±16 years, median symptoms duration of 12 months). Factor analysis confirmed a two-factor (passive awareness and active vigilance), 13-item solution, which led to an acceptable data-model fit. Internal consistency (α=0.91) and test–retest reliability (ICC=0.92) were good. As a priori hypothesized, construct validity showed moderate correlations between the PVAQ-I and PCS (r=0.60), TSK (r=0.44) and HADS-Anxiety (r=0.53) and low correlations with HADS-Depression (r=0.28), NRS (r=0.28), ODI (r=0.23) and CPAQ (r=−0.12). The smallest detectable change was 9.
Conclusion The PVAQ was successfully translated into Italian and proved to have satisfactory psychometric properties. Its use is recommended for clinical and research purposes.

Keywords Pain Vigilance and Awareness Questionnaire · Low back pain · Outcome measures · Confirmatory factor analysis · Psychometric properties

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Introduction

According to a cognitive-behavioural conceptualization of chronic pain, a person's degree of "*attention to pain*"

may have direct consequences for their daily functioning. People highly attentive to pain may become less influenced by other aspects of their environment, engage in fewer productive activities, fail to accrue the psychological and physical benefits of these activities and suffer more distress, anxiety, depression and disability [1].

Based on these premises, it appeared useful to quantify the range of behaviours that entail attention to pain. For this purpose, the Pain Vigilance and Awareness Questionnaire (PVAQ) was initially developed in 1997. It is a 16-item measure of attention to pain, which can be applied to various pain populations. The initial assessment on its psychometric properties conducted on subjects with chronic low back pain showed satisfactory internal consistency, test–retest reliability, criterion and construct validity [1]. Subsequent exploratory and confirmatory factorial analyses performed in American (healthy subjects), Dutch (fibromyalgia subjects) and Spanish (chronic back pain subjects) samples suggested a two-factor structure of the PVAQ [2–5]. Further, in the latest study conducted on a chronic pain sample in the USA, three items were excluded from scoring due to low item-total correlations; however, the 13-item set also showed good internal consistency [6]. By means of principal component analysis, two factors were extracted, active vigilance and passive awareness: the first interpreted as a category of attending behaviour, including acts as seeking, checking, watching, listening and observing both externally and interoceptively and the second as a process of contextual behavioural influence seen as the product of conditioning and verbal learning influences, essentially establishing a situation where pain interacts with and exerts a degree of control over ongoing behaviour within awareness [6]. A recent analysis conducted in Chinese subjects with chronic pain confirmed the 13-item form, showing satisfactory psychometric properties [7].

As an Italian version of the PVAQ has not been developed with full cross-cultural adaptation and psychometrically analysed, Italian researchers and clinicians are limited from studying the processes available from this instrument. The aim of this study was to develop a culturally adapted and validated Italian version of the PVAQ for use in subjects with chronic low back pain (LBP).

Based on a behavioural approach to attention, greater vigilance and awareness to pain ought to constitute greater engagement of behavioural influence, that is, larger effects on thinking, feeling, talking about and doing actions determined by pain [1, 6, 8]. Hence, the construct validity of the Italian version of PVAQ was expected to be supported through significant positive correlations with pain-related distress, avoidance, pain severity and disability. Further, acceptance of pain was also included for construct validity purposes. Here, as vigilance and awareness are parts of a pattern of increasing behavioural coordination by pain, it was expected that it would significantly negatively correlate with pain acceptance, as this variable reflects a reduction of behavioural coordination by pain in favour of greater coordination by goals and values [8]. Incidentally, each of these predictions is also theoretically consistent with current fear-avoidance models where distressed thoughts and feelings, hypervigilance, avoidance and pain perception feed into each other [9, 10].

Methods

This cross-sectional study was approved by our Institutional Review Board and conducted in accordance with ethical and humane principles of research.

Subjects

The study involved outpatients attending the Rehabilitation Unit at the Scientific Institute of Lissone (Monza Brianza, Italy), Salvatore Maugeri Foundation and the outpatients private practice of Physical Therapy at Sesto S. Giovanni (Milan, Italy) between June 2012 and December 2013. The inclusion criteria were chronic non-specific LBP, an age of >18 years and fluency in Italian. The exclusion criteria were acute and subacute LBP, specific causes of low back pain (disc herniation, lumbar stenosis, spinal deformity, fracture and spondylolisthesis) with or without peripheral neurologic signs, non-mechanical causes of low back pain (systemic illness, such as tumour and rheumatologic diseases) and mental health/psychiatric deficits (mini-mental state examination scale of <24).

Outpatients visiting the two involved centres during the study period were evaluated by two physiatrists, one for each centre, coordinated by the principal investigator. Those satisfying the inclusion criteria were asked to sign a written informed consent. Once the patients had given their approval to participate to the study, their demographic and clinical characteristics were recorded by research assistants.

Cross-cultural Adaptation

Adaptation of the PVAQ was done in accordance with the protocol issued by the American Association of Orthopaedic Surgeon Outcomes Committee [11]. Further, principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures based on the report of the ISPOR task force were taken into account [12].

Step 1: Translation into Italian The items taken from the original 13-items PVAQ [6] were translated into Italian, with the aim of retaining the concepts of the original while using culturally and clinically fitting expressions. Two translations were made independently by 2 Italian professional translators experienced in the PRO field. The translators were given a clear explanation of the concepts in the PVAQ, in order to capture the conceptual meaning of the items. Keeping the language colloquial and compatible with a reading age of 12 years, discrepancies between the translators were resolved by means of reconciliation between them; step 1 ended when a common adaptation was agreed.

Step 2: Back-translation into English Two bilingual translators whose mother tongue was English independently back-translated the initial translation. The principal investigator (MM) reviewed these translations and, with the help of the back-translators, made sure that the Italian version reflected the same item content as the original version and was conceptually equivalent.

Step 3: Expert Committee In order to achieve the harmonization of the adaptation process, the translations were submitted to a bilingual committee of clinicians, methodologists and the translators chaired by the principal investigator. To identify any discrepancies or mistakes, the committee explored the semantic, idiomatic and conceptual equivalence of the items and answers. This phase ended when a prefinal version was agreed.

Step 4: Test of the Prefinal Version A test of the prefinal version was performed in order to assess the level of comprehensibility and cognitive equivalence of the translation, to highlight any items that may be inappropriate at a conceptual level and to identify any other issues that cause confusion. Cognitive interviews were therefore conducted by a trained psychologist (BR) by administering the PVAQ to 20 patients with chronic LBP. The principal investigator and the Expert Committee reviewed the results from cognitive debriefing with the aim of identifying any modification necessary for improvement of the Italian form.

Sample Size

Sample size was based on the "rule of 10" patients per item [13].

Scale Properties

Feasibility The time needed to answer the questionnaire was recorded. The patients were asked about any problems they encountered and the data were checked for missing or multiple responses.

Factor Analysis Confirmatory factor analysis was used, with each item being specified to load on its subscale as latest found [6]. Model fit was assessed using the ratio between the χ^2 test and degrees of freedom (χ^2/df), the comparative fit index (CFI), the normed fit index (NFI) and the root-mean square error of approximation (RMSEA) and its 90 % confidence intervals [14]. The following thresholds were considered as representing a good fit: χ^2/df <3, CFI ≥0.90, NFI ≥0.90 and RMSEA ≤0.08 [15].

Floor/Ceiling Effects Descriptive statistics were calculated to identify floor/ceiling effects, which were considered to be present when >15 % of the subjects obtained the lowest or highest possible scores [13].

Reliability Internal consistency (Cronbach's alpha, with values of >0.70 being considered acceptable) and test–retest reliability (intraclass correlation coefficient: ICC 2,1, with good and excellent reliability respectively indicated by values of 0.70–0.85 and >0.85) [13] were investigated. The test–retest interval was ten days. In addition to the ICC, a paired *t* test was used to compare the test–retest sessions in order to ensure the absence of any systematic error.

Content Validity For purposes of content validation, patients' were asked to report their perceptions of the aim of the measurement (Question: "Do you think the aim of this questionnaire is pain vigilance and awareness?"), the target population ("Do you think the items described here may be related to your pain?"), relevance ("Do you think these items are relevant to evaluating your pain vigilance and awareness?") and completeness

("Do you think that the items comprehensively reflect your pain vigilance and awareness?"). The hypotheses were considered acceptable if the percentage of affirmative answers was >90 % [13].

Construct Validity For construct validation [13], it was hypothesized a priori that the PVAQ and its subscales would achieve significant correlations with: (a) catastrophising, the Italian version of the Pain Catastrophising Scale (PCS) [16] and kinesiophobia, the Italian version of the Tampa Scale of Kinesiophobia (TSK) [17]; (b) anxiety and depression, the Italian version of the Hospital Anxiety and Depression Score (HADS) [18]; (c) pain acceptance, the Italian version of the Chronic Pain Acceptance Questionnaire (CPAQ) [19]; (d) pain intensity, the 0–10 Numerical Rating Scale (NRS) [20] and disability, the Italian version of the Oswestry Disability Questionnaire (ODI) [21]. The correlation with acceptance was expected to be negative in direction, and all other correlations were expected to be positive. Based on previous analyses [1, 3–5, 7], the correlations with catastrophizing, kinesiophobia and anxiety were expected to be moderate and the correlations with depression, acceptance and pain were expected to be low. Pearson's correlations were interpreted as follows: $r<0.30$ as low, $0.30<r<0.60$ as moderate, $r>0.60$ as high. Construct validity was considered good if >75 % of the hypotheses was confirmed.

Sensitivity to Change It was estimated by means of the minimum detectable change (MDC) calculated by multiplying the standard error of the measurements (SEM) by the z-score associated with the desired level of confidence (95 % in our case) and the square root of 2, which reflects the additional uncertainty introduced by using difference scores based on measurements made at two time points (in our case on days 1 and 10). The SEM was estimated using the formula: $SEM=SD[(1-R)^{1/2}]$, where SD is the baseline standard deviation of the measurements, and R the test–retest reliability coefficient [13].

Measures

PVAQ In its latest version, the questionnaire includes producing scores from 13 of 16 available items [6] and subjects are asked to consider their behaviour over the last 2 weeks and to indicate how frequently, on a six-point scale from 0 (never) to 5 (always), each item is a true description of their behaviour. The responses to the items are added and total score ranges from 0 to 65, with higher scores indicating greater endorsement of the behaviour. The PVAQ includes two underlying factors, named "Passive awareness" (items no. 1, 3, 4, 5, 7, 9, 11) and "Pain vigilance" (item nos. 6, 10, 12, 13, 14, 15); the responses to the items belonging to each subscale are added and sub-scores range from 0 to 35 and from 0 to 30, respectively. The internal consistency reliability of the passive awareness scale was 0.83 and for the active vigilance scale was 0.84; construct validity showed low correlations with pain ($r=0.25$ and 0.17, respectively) and disability ($r=0.22$ and 0.25, respectively) and low to moderate correlations with anxiety ($r=0.36$ and 0.51, respectively) and depression ($r=0.08$ and 0.32, respectively).

PCS This self-reported 13-item questionnaire assesses catastrophising in subjects with musculoskeletal complaints and in other populations. Each item is scored using a five-point scale ranging from 0 (never) to 4 (always). The total score is calculated by adding the scores of the individual items (range, 0–52). We used the Italian version which showed an internal consistence of 0.92, a test–retest reliability of 0.84 and moderate correlations with pain ($r=0.44$), kinesiophobia ($r=0.59$), disability ($r=0.45$), anxiety ($r=0.57$) and depression ($r=0.46$) [16].

TSK This self-reported 13-item version assesses fear-avoidance behaviours. Each item is scored using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree), and the total score is calculated by adding the scores of the individual items (range, 13–52). We used the Italian version which showed an internal consistence of 0.77, a test–retest reliability of 0.96 and low correlations with pain ($r=0.35$), disability ($r=0.34$), anxiety ($r=0.283$) and depression ($r=0.26$) [17].

HADS This assesses anxiety and depression disorders and consists of 14 items that create subscale scores for anxiety (7 items) and depression (7 items). The total score for each subscale is calculated by adding the scores of the individual items (0–3) and ranges from 0 (good) to 21 (poor). We used the Italian version which showed an internal consistency of 0.89 for anxiety and of 0.88 for depression, and a high discriminating power for all the psychiatric disorders investigated (AUC= 0.89) [18].

CPAQ We used the Italian self-administered 20-item version of to measure pain acceptance. The items are rated on a scale of 0 (never true) to 6 (always true) and the total score ranges from 0 to 120. Internal consistency was of 0.88 and test–retest reliability of 0.86; there were

moderate to high correlations with pain (r=−0.49), disability (r=−0.59), kinesiophobia (r=−0.60), anxiety (r=−0.61), depression (r=−0.66) and catastrophising (r=−0.66) [19].

NRS This is an 11-point rating scale ranging from 0 (no pain at all) to 10 (the worst imaginable pain) [20]. Test–retest reliability was of 0.61. Patients were asked to evaluate the pain they felt in the last week.

ODI We used the Italian self-reported 10-item version, which allows a comprehensive evaluation of back problems. The total score varies from 0 (no disability) to 100 (maximum disability). Internal consistency was of 0.86 and test–retest reliability of 0.96; high correlations were found with pain (r=0.73), and disability (r=0.82) [21].

The analyses were made using the Italian version of SPSS 22.0 software; CFA was performed using SPSS Amos.

Results

Subjects

A total of 152 patients agreed to participate and, of them, 131 satisfied the inclusion criteria; these were 77 females (58.8 %) and 54 males (41.2 %) with a mean age of 48±16 years (range 19–79). The median duration of LBP was 12 months (range 5–120). The mean body mass index was 23.74±3.53 Kg/m^2. Table 1 shows their general characteristics.

Table 1 General characteristics of the population (n=131)

Variable	No.	%
Marital status		
Unmarried	61	46.6
Married	70	53.5
Employment		
Student	19	14.5
Employee	65	49.6
Self-employed	17	13.0
Housewife	7	5.3
Pensioner	23	17.6
Education		
Elementary school	4	3.1
Middle school	22	16.8
Upper school	64	48.9
University	41	31.3
Smoking		
Yes	32	24.4
No	99	75.6
Use of drugs		
Antidepressants	5	3.8
Analgesics	61	46.6
Muscle relaxants	7	5.3
NSAIDs	48	36.6
None	10	7.6
Comorbidities (principal)		
Hypertension	37	28.2
Non-insulin dependent diabetes mellitus	18	13.7
Heart disease	11	8.4
Gastro-enteric disease	16	12.2
Respiratory disease	13	9.9
None	36	27.5

NSAIDs nonsteroidal anti-inflammatory drugs

Translation and Cross-cultural Adaptation

The translation procedure took 2 months to reach a culturally adapted version, and all of the items were easily forward and back-translated, and no difficulties were showed during the review of the back-translations. The correctness of the process, the content of the items and the concepts expressed were confirmed by the experts. The cognitive interviews confirmed the comprehensibility and the cognitive equivalence of the translation; no other issues causing confusion were pointed out. Finally, the principal investigator and the Expert Committee confirmed the work done.

The PVAQ-I is reproduced in Appendix.

Scale Properties

Acceptability All the questions were well accepted. The questionnaire was completed in 7.7±2.2 min. There were no missing responses or multiple answers.

Factor Analysis Table 2 shows the results of the two subscales of the PVAQ. The comparative fit index, the normed fit index and the root-mean square error of approximation value obtained using the two-factor correlated model did not meet the criteria for a good fit. Therefore, the model was adjusted on the basis of modification indices that suggested adding covariance

Table 2 Results of confirmatory factor analysis testing of factorial validity

Model	χ^2/df	CFI	NFI	RMSEA	90 % CI	Factor loadings
Two factors of the PVAQ-13	2.87	0.87	0.81	0.12	0.10–0.14	0.57–0.83
Two factors of the PVAQ-13 with covariate error[a]	2.31	0.91	0.90	0.10	0.08–0.12	0.58–0.87

χ^2/df indicates ratio between the χ^2 test and degrees of freedom

CFI comparative fit index, *NFI* normed fit index, *RMSEA* root mean square error of approximation and 90 % CI of RMSEA, *CI* confidence interval

[a] The model included specified covariance between error terms for items 1–9, 3–5, 4–9, 12–13

between error terms for item pairs 1–9, 3–5, 4–9 and 12–13, showing acceptable fitting criteria. Figure 1 shows the diagram of the adjusted model with standardized factor loadings, commonalities and correlation values specified.

Floor/Ceiling Effects No floor/ceiling effects were found (Table 3).

Reliability Cronbach's α was satisfying (0.87–0.91). Paired t test showed no significant difference between test–retest ses-

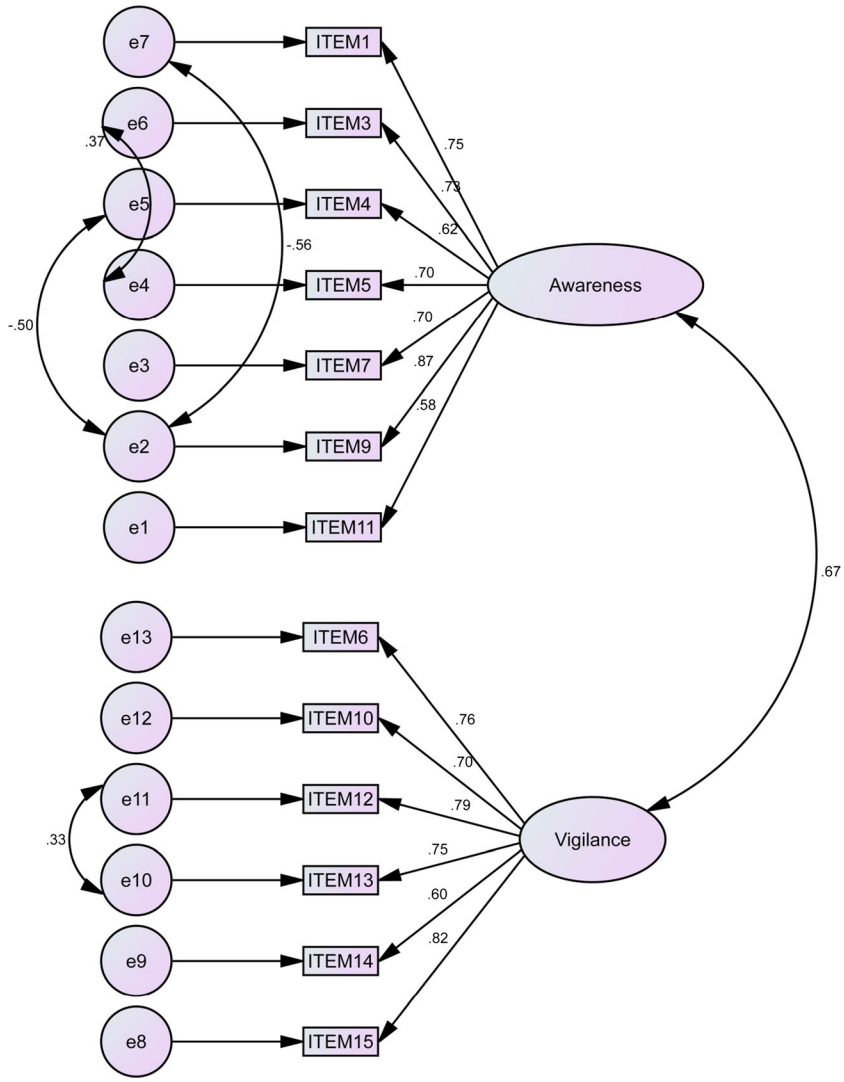

Fig. 1 Diagram of the 2-factor model with standardized factor loadings, commonalities specified, and correlation values specified

Table 3 Floor/ceiling effects and reliability of PVAQ-I and its subscales

Subscales	Test mean (SD)	Re-test Mean (SD)	*P* value	Internal consistency (α)	Test–retest (ICC and 95 % CI)	Floor/ceiling effects (%)
Passive awareness (7 items)	20.4 (6.3)	20.1 (5.8)	0.28	0.88	0.88 (0.84–0.91)	0/0
Active vigilance (6 item)	12.5 (6.3)	12.1 (6.1)	0.22	0.87	0.89 (0.85–0.92)	0/0.8
Total	32.8 (11.2)	32.2 (10.3)	0.11	0.91	0.92 (0.89–0.94)	0/0

SD standard deviation, *ICC* intraclass correlation coefficient, *CI* confidence interval, *P value* significance level of the paired *t* test between test–retest sessions

sions, excluding the presence of systematic error. Test–retest reliability was good (ICCs:0.88–0.92). Table 3 shows the full results.

Content Validity The percentage rate of patients' affirmative answers was always >90 %. The content of the items was considered adequate, appropriate for the target population, comprehensive and relevant for investigating pain vigilance and awareness in this population.

Construct Validity All of the a priori hypotheses were achieved. Table 4 summarises the correlations.

Sensitivity to Change The MDC of the PVAQ-I and of the Passive awareness and Pain vigilance subscales was 8.8, 6.1 and 5.8, respectively. Changes above these thresholds can be considered true changes in the construct being measured and not systematic or random errors in patient scores.

Discussion

This paper describes the adaptation and validation of the PVAQ in Italian subjects with chronic LBP. Analysing the psychometric properties of an outcome measure is a continuous process recommended in order to strengthen its properties and expand its applicability in specific contexts and countries [9].

The results of the adaptation process indicated that it was successfully developed following international guidelines. The experts played an important role during the re-evaluation of the process and confirmed the quality of the work done. The test of the prefinal version confirmed the comprehensibility of the items, leading to a valid measure of another culture's conception of health that allows data comparability and cross-national studies.

The questionnaire was acceptable to our population and required less than 10 min to be completed; it responded satisfactorily to the requirements of relevance and completeness and seemed to be fully applicable in everyday clinical practice. No floor/ceiling effects were found, which suggests that the questionnaire under investigation had enough discriminating power in subjects with chronic low back pain.

Our findings confirmed the originally proposed structure of the PVAQ, suggesting pain vigilance and awareness can be described as a process with two cognitive-behavioural components in subjects with chronic LBP [6]. This solution is also in accordance with the factorial structure found in a previous study conducted in Chinese subjects with chronic pain, suggesting similarities with our results, though direct examination on cross-cultural factorial invariance cannot be determined in this study [7]. Our findings are in contrast with previous findings concerning PVAQ factorial models, probably because of

Table 4 Construct validity. Pearson's correlations between the PVAQ-I (and its subscales) and the NRS, ODI, PCS, TSK, NRS, HADS-Anxiety, and HADS-Depression

Outcome measures	Mean (SD)	PVAQ-I	Passive awareness	Active vigilance
PCS (0–52)	22.4 (8.6)	0.60**	0.48**	0.58**
TSK (13–52)	26.1 (9.0)	0.44**	0.31**	0.48**
HADS-anxiety (0–21)	12.6 (3.5)	0.53**	0.53**	0.41**
HADS-depression (0–21)	7.5 (3.1)	0.28**	0.26**	0.24**
CPAQ (0–120)	61.9 (13.8)	−0.12	−0.16	−0.05
NRS (0–10)	4.3 (2.0)	0.28**	0.22*	0.29**
ODI (0–100)	14.5 (12.0)	0.23**	0.13	0.29**

**$p<0.01$; *$p<0.05$

the heterogeneity of the subjects enrolled in these previous studies, including non-clinical as well as fibromyalgia subjects [2–4].

Our analysis demonstrated that the PVAQ-I was internally consistent with similar estimates to the original findings achieved in the latest model (0.83–0.84) [6]. These were slightly higher than Chinese values found when the 13-item model was investigated (0.75–0.77) [7].

Test–retest reliability was satisfactory suggesting good repeatability over time in this population. This psychometric property was not investigated in other samples adopting the 13-item solution and therefore comparisons are not possible.

Consistent with a general behavioural approach to attention, the PVAQ-I was associated with related constructs such as catastrophising and fear of movement, supporting its construct validity and suggesting that subjects who persistently focus on pain are more influenced by it in their thoughts, feelings and actions, more avoidant and generally show and report more pain-related behaviour. Our findings are in accordance with previous studies which showed similar relationships with catastrophising (r=0.57–0.61) and fear of movement (r=0.32–0.48) [3–5, 7] and anxiety with estimates in line with previous researches (r=0.35–0.59) [4–7]. Based on the Fear-Anxiety-Avoidance model of pain, our findings might add evidence to the role of pain vigilance in constituting a part of the cognitive component of pain anxiety [22], although, unlike previous studies [6] the current study did not focus explicitly on aspects of cognitive interference or interruption. Lower correlations were achieved with depression, suggesting a reduced association between these measures and a minor role of active vigilance and awareness in influencing depressed moods. This result too is in line with previous studies (r=0.24–0.27) [6, 7].

Very low negative correlations were found between PVAQ-I and pain acceptance, suggesting that these variables are largely unique from each other and seem likely to contribute independently to processes of disability and treatment. The lack of significant relations here is somewhat theoretically inconsistent in that these ought to be related opposing processes, with hypervigilance feeding patterns of avoidance, for example, and acceptance reducing these. This unexpected finding deserved further study. In any case, as previously suggested, a model of pain that includes both pain vigilance and acceptance is likely to be more complete than one that only includes one or the other [6].

Low correlations were found with physical measures. Despite a role of pain vigilance and awareness in pain perception and physical functioning as proposed in the fear-avoidance model [23], our results suggest stronger relationships between PVAQ with scales more heavily targeted at cognitive-behavioural issues, as described previously. Our findings support previous studies concerning pain (0.17–0.25) [2, 6, 7] and disability (0.22–0.24) [6, 7].

PVAQ-I proved to be sensitive to change in this sample. Given the degree of repeatability, the SEM and MDC were reduced and ensured it could identify changes in the scores exceeding the threshold of instrument noise. At a 95 % confidence level, the MDC indicated that, if a subject shows a change after a given intervention of more than 9 points in the total score, it would not be a measurement error.

Our study has some limitations. Firstly, the relationships between pain vigilance and awareness and physical tests, e.g. evaluation of gait, reflexes, or flexion/relaxation response of back muscles, were not considered since only questionnaires were used. Secondly, our study was restricted to chronic LBP, and it is uncertain whether its findings can be extended to other patient- and disease-specific populations (e.g. neck or shoulder pain). Thirdly, content validity was based on questions that might have prevented neutral responses partially limiting the soundness of our results; the use of open questions in the future is therefore suggested. Finally, some of the internationally most established measures used to conduct validation studies like the Short Form Health Survey-36 were not used, but researchers are recommended to analyse them in future studies on the PVAQ-I in order to further investigate its properties.

Conclusions

The PVAQ-I administered in subjects with chronic LBP confirms the latest proposed two-factor structure and is reliable, valid and sensitive to change. This new measure is expected to help Italian clinicians and researchers in terms of diagnosis and therapy by identifying key behavioural processes related to distress, avoidance and disability in people with chronic pain.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Appendix

Pain Vigilance and Awareness Questionnaire – Versione italiana

Istruzioni: la preghiamo di rispondere alle domande del questionario, facendo una crocetta su una sola casella per ciascuna domanda, indicando la frequenza con cui prova queste esperienze.

0 = mai; 1 = raramente; 2 = qualche volta; 3 = spesso; 4 = quasi sempre; 5 = sempre

Item	Descrizione	Mai	Raramente	Qualche volta	Spesso	Quasi sempre	Sempre
1	Sono molto sensibile al dolore						
3	Noto rapidamente le variazioni di intensità del dolore						
4	Noto rapidamente gli effetti delle cure sul dolore						
5	Noto rapidamente le variazioni di localizzazione e di estensione del dolore						
6	Mi concentro sulle sensazioni dolorose						
7	Mi accorgo del dolore anche quando sono occupato con un'altra attività						
9	Capisco immediatamente quando il dolore comincia o aumenta						
10	Quando eseguo qualcosa che aumenta il dolore, la prima cosa che faccio è verificare quanto il dolore sia cresciuto						
11	Capisco immediatamente quando il dolore diminuisce						
12	Mi sembra di rendermi conto del dolore più degli altri						
13	Presto molta attenzione al mio dolore						
14	Sono consapevole del mio livello di dolore						
15	Sono preso dal pensiero del dolore						

Consapevolezza passiva (n. 1, 3, 4, 5, 7, 9, 11): …../35

Vigilanza attiva (n. 6, 10, 12, 13, 14, 15):…../30

Totale:…../65

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