Original paper

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Validation of the West Haven-Yale Multidimensional Pain Inventory (WHYMPI/MPI) in a sample of Sinhala speaking population in Sri Lanka

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Abstract

Objectives

Pain is an unpleasant physical and emotional sensation due to actual or potential tissue damage. Acute pain is a symptom of an underlying disease. However, when it becomes chronic and persists for more than three months, it becomes a disease by itself. The purpose of this study is to validate the West Haven-Yale Multidimensional Pain Inventory among the Sinhalese speaking population in Sri Lanka.

Methodology

150 adult patients were recruited from the pain clinic at CNTH as per inclusion and exclusion criteria. Each patient has undergone a medical examination by a pain medicine specialist, as well as a psychiatric/psychological evaluation by a psychiatrist. Patients who have given written consent were asked to fill out the questionnaires with the assistance of a researcher.

Results

Of the 150 patients studied, 86 were female and the average age was 56. 49 years. Cronbach's alpha equal to 0.745 suggested that WHYMPI – S has overall acceptable reliability.

Conclusion

WHYMPI – S has acceptable reliability and validity as a self-reported measure for the evaluation of handicap induced by chronic pain.

Keywords: Chronic pain, Sinhala version of West Haven-Yale Multidimensional Pain Inventory (WHYMPI – S), Validation, Sri Lanka

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Introduction

Pain is an unpleasant physical and emotional sensation due to actual or potential tissue damage. Acute pain is a symptom of an underlying disease (1). However, if it is prolonged for more than three months, it is known as a chronic condition, and eventually it becomes a disease by itself (2). Most acute pains are nociceptive due to some form of tissue damage. Whereas most chronic pains are secondarily neuropathic due to certain reversible and irreversible changes in the nervous system, which are collectively called sensitization (2).

Chronic pain is one of the commonest conditions worldwide. Approximately 100 million adults in the United States are affected by chronic pain at any given time, with chronic low back pain and headaches being the most commonly diagnosed conditions (3). Meta-analysis on the prevalence of chronic pain in the UK concluded that chronic pain affects between one-third and one-half of the population of the UK (ranging from 35.0% to 51.3% with a pooled estimate of 43.5%, 95% CIs 38.4% to 48.6%), corresponding to 28 million British adults (4). An Australian study reported the prevalence of chronic pain to be 17.1% in males and 20.0% in females among a randomly selected community sample of 17,543 people (5).

Further, it has been more recently hypothesized that chronic pains and other non-communicable diseases (NCD) are closely linked through a pathological process called metaflammation which in turn has been linked to the occurrence of atherosclerotic diseases, chronic obstructive pulmonary disease, Alzheimer's disease, inflammatory bowel disease and some neuropathic pains which are interlinked (2,6). Chronic pain is closely linked with poverty and mental illness too (6).

Although the exact prevalence of chronic pain is not known in Sri Lanka, it is believed to be a common

condition. With the rise of other NCDs in Sri Lanka, its relevance is even more important (7,8).

The total healthcare costs for chronic pain treatment are estimated to range between $560 to 635 billion per year in the United States, eclipsing the annual costs of heart disease, diabetes, and cancer (3). Chronic pain influences the patient's daily activities and quality of life, as well as its repercussions in the workplace, and in the family and social environment (2). Often comprehensive assessment of these aspects is lacking. Management of chronic pain is challenging and difficulty in evaluating the effectiveness of the therapy objectively adds to the challenge (9).

Therefore, an objective, reliable, and valid tool to comprehensively assess the multi-dimensional aspects including interference with social and family life will be very important in the management of chronic pain.

The West Haven-Yale Multidimensional Pain Inventory (WHYMPI) is designed to provide a brief, psychometrically sound, and comprehensive assessment of the important components of the chronic pain experience (10). The instrument is recommended for use as part of behavioral and psychological assessment strategies in the evaluation of chronic pain patients in a clinical or research setting.

The WHYMPI is a 52-item, 12-scale inventory that is divided into three parts. Part I includes five scales designed to measure important dimensions of the chronic pain experience including 1) perceived interference of pain in vocational, social/recreational, and family/marital functioning, 2) support or concern from a spouse or significant other, 3) pain severity, 4) perceived life control, and 5) affective distress. Part II assesses patients' perceptions of the degree to which spouses or significant others display solicitous, distracting, or negative responses to their pain behaviors and complaints. Part III assesses patients' reports of the frequency with which they engage in four categories of common everyday activities: household chores, outdoor work, activities away from home, and social activities. In addition to the individual scale scores, a General Activity scale score, obtained from the combination of all four activity scale scores, has been recommended for some purposes. Patients' responses to WHYMPI items are made on a 7-point scale.

Materials and methods

Ethical Consideration

Written permission was obtained from the original author of MPI via electronic mail, to validate MPI in Sri Lanka. Ethics approval for the study was granted by the Ethics Review Committee of the Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka. Further, permission was obtained from the director of CNTH and Dr. Nilmini Wijesooriya (clinical lead of the pain clinic) to conduct the study.

Translation of the West Haven-Yale Multidimensional Pain Inventory (WHYMPI) into Sinhalese

The WHYMPI translated independently into the Sinhala language by three native speakers of Sinhalese, bilingual in English after obtaining permission from the author. The three translators made a pooled version from the translations and a linguist undertook the version to ensure the linguistic quality. An individual professional translator back translated the English material into Sinhala. The original questionnaire and the back translation were compared for coherence and the initial Sinhalese version of the instrument was prepared for patient testing.

The patient testing panel was attended, 20 students of the University of Kelaniya (10 male, 10 female) who speak Sinhala as their native language. Every item of the Sinhalese version of the questionnaire was read aloud and at the same time, participants were asked to follow the texts of the printed copies of the instrument. This was followed by a group discussion and invited to answer two questions on the coherence of the questionnaire: what did this statement mean to you? Is there any better way to formulate the statement to express the meaning? The comments of the student panel considered making further changes. These comments were further assisted by the researchers and made the final version of the questionnaire.

The final version of Sinhalese version of WHYMPI was given to 10 selected patients with chronic pain and questions were asked about the clarity of the items and further modifications of WHYMPI-S.

Participants

The final Sinhala version of the questionnaire was administered to 150 patients over the age of 18 years. The participants were recruited from an outpatient pain clinic at the Colombo North Teaching Hospital with complaints of chronic pain lasting for at least 3 months before the date of examination. Informed written consent was obtained from each participant before the recruitment. Further, after administering the final version of the WHYMPI-S, the same questions on the coherence of the questionnaire were asked from 10 selected participants: what did this statement mean to you? Is there any better way to formulate the statement to express the meaning? The comments were considered and finalized in the WHYMPI Sinhala version.

Questionnaire

Questionnaires were distributed among the participating patients following obtaining informed consent. Questionnaires were collected on the same day. We have used four questionnaires along with WHYMPI-S for this study.

West Haven-Yale Multidimensional Pain Inventory

The West Haven-Yale Multidimensional Pain Inventory (WHYMPI) is designed to provide a brief, psychometrically sound, and comprehensive assessment of the important components of the chronic pain experience (10). The instrument is recommended for use as part of behavioral and psychological assessment strategies in the evaluation of chronic pain patients in a clinical or research setting.

Beck Depression Inventory II

BDI II proposes to measure the presence and severity of depression in psychiatrically diagnosed patients and in normal populations of both adolescents and adults. It consisted of 21 questions about how the individual has been feeling in the last week. Each question has four possible answer choices, ranging in intensity, so higher scores would indicate more severe depressive symptomatology. BDI II was validated to use in Sri Lanka by Rodrigo et al (11). Sinhala version of BDI-II has good psychometric properties, high internal consistency, good test-retest reliability, and good construct and concurrent validity and discriminant validity, in clinical and non-clinical samples (11).

Pain catastrophizing scale

Pain Catastrophizing Scale (PCS) was developed in 1995 by Sullivan et al. to measure the degree of individual pain catastrophizing (12). PCS scores have been found to reliably predict certain variables, such as severe pain, disability, and emotional disturbances, which occur following trauma or tissue damage (2-6). This is a 13-item questionnaire answered on a likert scale. PCS is validated to use among the Sinhalese population by Pallegama et al and Sinhalese version is found to have good psychometric properties (13).

Revised Dyadic Adjustment Scale

The Revised Dyadic Adjustment Scale (RDAS) is a self-report questionnaire that assesses seven dimensions of couple relationships within three overarching categories including consensus in decision making, values and affection, satisfaction in the relationship with respect to stability and conflict regulation, and cohesion as seen through activities and discussion (14). The RDAS includes only 14 items, each of which asks the respondents to rate certain aspects of her/his relationship on a 5- or 6-point scale. Scores on the RDAS range from 0 to 69 with higher scores indicating greater relationship satisfaction and lower scores indicating greater relationship distress. RDAS has been used successfully in Sri Lankan studies before (15).

Visual analogue scale

The Visual Analogue Scale (VAS) consists of a straight line with the endpoints defining extreme limits such as 'no pain at all' (Number '0') and 'pain as bad as it could be' (Number '10'). The patient is asked to mark his pain level on the line between the two endpoints. The distance between 'no pain at all' and the mark then defines the subject's pain.

Statistical Analysis

Data were recorded in an electronic database and analyzed using the Statistical Package for the Social Sciences (SPSS) version 22. Data presented as mean ± standard deviation (SD). The frequency of item values, the mean and standard deviation of the item, and the item-total correlation were calculated to determine item characteristics. Scale mean, standard deviation, and mean of the item-item correlations were calculated to determine scale characteristics. Cronbach's alpha was calculated to evaluate the internal consistency and reliability of the WHYMPI-S. For testing the stability of the WHYMPI Sinhala version split-half reliability analysis was performed. Temporal stability and criterion validity were calculated by using Pearson's correlation coefficients. Confirmatory factor analysis was performed. Each one of the 3 sections was analyzed separately. Factors (latent variables) were defined on the basis of their corresponding items (observed variables), whereas the correlation coefficients between various factors, factor loading on the related latent variable, and the residual variances of the items were set as free parameters.

Results

In the total of 150 patients studied, the majority were females (86, 57.3%). The average age of participants was 56.49 years (SD ± 12.29, Range = 20 to 76 years). Almost nearly half of the participants (47.3%) were depressed. Majority of participants (n = 79, 52.66%) scored above cut off of visual analog scale suggesting severe chronic pain.

The Cronbach's alpha coefficient for the Sinhalese WHYMPI was 0.745 and the impact of chronic pain on patients' lives, the response of others to the patients' communication of pain, and the extent to which patients participate in common daily activities; subscales coefficients were 0.802, 0.519 and 0.827 respectively, indicating good internal consistency. The subscale III also known as 'C' showed a higher inter-item correlation

(0.203) of the items and are correlated to a greater extent and the items may be repetitive in measuring the intended construction. However, subscale I ('A') and subscale II (B) showed lower values (0.148, 0.069 respectively) which denotes that the items are not correlated well. The correlations ranged from -0.155 (6th item of subscale I) to 0.377 (10th item of subscale III). The means, standard deviations and corrected item-total correlations of the 52 items are presented in Table 1.

The overall reliability coefficient, Cronbach's alpha demonstrated that WHYMPI-S has very good internal consistency (0.745). In addition, the item-total statistics showed that removal of any item would result in a lower Cronbach's alpha except removal of item A5, A6, A11, A16, B8, B10, B11, B14, C1, C7 showed an increase of Cronbach's alpha.

Convergent validity was confirmed by Spearman's correlations for the total WHYMPI-S score of part III which assessed general activity and the scores of BDI (-0.152) and VAS (0.112) .

There was a statistically significant negative correlation between age and the total score (-0.170). However, there was no correlation between gender and the total WHYMPI-S score.

Table 1. Item Statistics

	Mean	Std. Deviation	N
MPI A1	3.63	1.892	150
MPI A2	3.68	2.401	150
MPI A3	3.81	2.446	150
MPI A4	2.74	2.726	150
MPI A5	5.09	1.571	150
MPI A6	3.65	2.180	150
MPI A7	3.41	1.987	150
MPI A8	2.64	2.800	150
MPI A9	2.36	2.678	150
MPI A10	2.49	2.290	150
MPI A11	4.59	1.994	150
MPI A12	3.22	2.672	150
MPI A13	.83	1.891	150
MPI A14	2.06	2.690	150
MPI A15	4.85	1.632	150
MPI A16	4.41	2.130	150
MPI A17	3.32	2.615	150
MPI A18	3.38	1.938	150
MPI A19	1.79	2.571	150
MPI A20	3.36	2.118	150
MPI B1	.81	1.878	150
MPI B2	5.05	1.974	150
MPI B3	3.05	2.787	150
MPI B4	1.22	2.091	150
MPI B5	4.77	2.247	150
MPI B6	3.41	2.764	150
MPI B7	1.07	2.142	150
MPI B8	4.85	2.175	150
MPI B9	3.04	2.694	150
MPI B10	1.15	2.154	150
MPI B11	4.10	2.582	150
MPI B12	3.05	2.802	150
MPI B13	5.74	1.155	150
MPI B14	4.72	2.262	150
MPI C1	4.17	2.602	150
MPI C2	3.19	2.777	150
MPI C3	1.00	1.932	150
MPI C4	.75	1.783	150
MPI C5	3.42	2.750	150
MPI C6	3.27	2.773	150
MPI C7	.77	1.589	150
MPI C8	1.93	2.340	150
MPI C9	4.28	2.341	150
MPI C10	3.06	2.838	150
MPI C11	2.07	2.333	150
MPI C12	2.79	2.322	150
MPI C13	3.41	2.807	150
MPI C14	1.37	2.407	150
MPI C15	.70	1.650	150
MPI C16	4.46	2.296	150
MPI C17	3.62	2.794	150
MPI C18	3.28	2.855	150

The data met the Kaiser-Meyer-Olkin criteria for sample adequacy (MSAs 0.607), as well as those for Bartlett's test of sphericity, (d.f.s 1326 P- 0.000).

Selected patients were interviewed regarding their experiences with WHYMPI-S. All the patients reported that all the items in WHYMPI-S were clear to them, and further modifications are not necessary.

Discussion

The findings of the current study showed that WHYMPI-S is a reliable and valid tool to evaluate chronic pain related handicap in regard to social and family life of each individual.

The validity of the WHYMPI has been supported by the results of confirmatory and exploratory factor analytic procedures. The procedures revealed that the WHYMPI scales were significantly correlated with several criterion measures of anxiety, depression, marital satisfaction, pain severity, and health locus of control.

The strengths of the WHYMPI are its brevity, ease of administration, demonstrated reliability and validity, face validity and patient acceptance, and demonstrated utility in multiple clinical and research investigations. One weakness of the WHYMPI is that the Life-Control subscale consists of only two items.

Therefore, validating WHYMPI to use in Sri Lanka will help in the assessment and management of chronic pain in Sri Lankan patients.

Conclusion

The results of this study suggested that the Sinhala version of WHYMPI is a reliable and valid measure to evaluate chronic pain experience related distress and handicap regarding the subscales of functional, emotional, and catastrophic.

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Author Contributions

- **Conceptualization:** Asiri Rodrigo, Chamara Wijesinghe, Nilmini Wijesinghe, Nisansala Liyanage, Thilini Abayabandara-Herath.
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