

ORIGINAL ARTICLE

Reliability and Validity of Malay Version of Revised Oswestry Low Back Pain Disability Questionnaire

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Abstract:

The purpose of this study was to describe the process used to translate the Malay version of the ODQ and to test The Malay version in terms of test-retest reliability and validity among Malay low back pain (LBP) volunteers. The questionnaire was translated and back-translated following WHO recommendation. The Malay version was tested for 60 patients with low back pain. Test-retest with a two-day interval was performed. Internal consistency was assessed by Cronbach's alpha. Construct validity was assessed with correlation between the ODQ and the SF-36. Test-retest with a two-day interval was performed. Internal consistency and reliability of the Malay version of the ODQ was assessed by Cronbach's alpha and reached 0.821. Intraclass correlation coefficient was 0.821. Test-retest correlation reliability was 0.803. The ODQ was inversely correlated with the physical functioning scale of SF-36 and with mental scales of the SF-36. The reliability and construct validity of the Malay version of the Oswestry Disability Questionnaire were acceptable for assessing functional status of Malay speaking patients with low back pain.

Keywords: Low Back Pain, Malay Version, Oswestry Low Back Pain Disability Questionnaire (ODQ), Reliability, Validity

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1. INTRODUCTION

Low back pain (LBP) is a major health problem worldwide. It affects over 80% of persons at some point in their life and from 4-33% of a population at any one time [1]. In Malaysia, the prevalence of low back pain ranging from 41.3-79.4% which involves various occupations [2-4]. About 37% of LBP was known affecting the employment or activities and was estimated to cause more than 800 [thousands disability-adjusted life years lost annually [5]. In view of the fact that back pain commonly results in functional disability in daily routine, thus level of disability in patients with LBP is significant to be assessed in both clinical and research settings.

Assessment of the functional tasks has been used for quite sometimes and has become an important component for back pain evaluation. The clinicians and researchers have been using the various types of assessment tools either general or specific to back pain patient. One of the most commonly applied self-reported questionnaires is the Oswestry Disability Questionnaire (ODQ) [6]. The English version of ODQ is a valid test and has good reliability with reliability coefficient of $r = 0.89$ and ICC value 0.84 (95% CI = .73 - .91) [7-8]. This test measures the ability of low back pain

patients to manage their everyday activities that affected with their conditions.

ODQ has been used worldwide in different studies and settings. It has been translated into several non-English languages such as Norwegian [9], German [10], Italian [11], Japan [12], Greek [13], Korean [14-15], Chinese [16], Tamil [17] and Danish versions [18]. A number of studies have been carried out to inspect the psychometric properties of the tool, in particular when validating a variety of non-English versions, but most of these studies have been concerned with the reliability and validity [9-13]. A Good reliability and validity are requirements of any outcome measures, especially when it is to be applied to differentiate between subjects or predict prognosis [19-20]. A well validated questionnaire in diverse languages will allow the exchange of information in global studies [16]. In addition, it would be competent for comparison of different research discovery internationally.

In Malaysia, the health care practitioners still using the English Version of ODQ as their screening test for disability. However, this test seems not suitable for patients in this country due to some language barriers. In most cases, the examiner will either skip the question or directly translate the questionnaires. Skipping the question will affect the total score, which later will impact the outcome. In addition, the

direct translation from examiner may inaccurate. In fact, the Malay translated version of ODQ has never been found reported earlier. Therefore, the objectives of this paper were to (1) describe the process used to translate the proposed version of the ODQ and (2) to test this Malay version in terms of test-retest reliability and validity among Malay low back pain volunteers.

2. METHODOLOGY

The study was carried out in two phases. First phase was the translation of Revised ODQ into the Malay version. Secondly the test-retest measurement was applied to the LBP volunteers.

2.1 Questionnaires

The Revised Oswestry Low Back Pain Disability Questionnaire Hudson-Cook et al. [21] is a self-reported questionnaire based on the 10 sections of pain and daily activities. They include pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling and changing degree of pain. Each section is scored on a 6-point scale (0-5), with 0 representing no limitation and 5 representing maximal limitation. The total score is based on the summation of all subscales which is 50. The higher the score means the greater the disability. In cases where patients did not answer all 10 sections, the sum score of the answered sections were divided by the number of completed sections.

2.2 Translation

The English version of revised ODQ was translated and edited into Malay by the researchers, whose first language is Malay. The questionnaire was then back translated into English by the independent English language lecturer, whose first language is English. Later, the original version and the backward translated version were compared to ensure the accuracy of the translations as well as the meaning and contents remain. There were very minor differences found in grammatical that did not interfere with the meaning of the English version of revised ODQ. The Malay version was then used for study. The translation process of the study followed the procedure described by Hasanah [22] as proposed by World Health Organisation (WHO).

2.3 Subjects

The study was carried out in the Universiti Teknologi MARA Selangor. The subjects were recruited among the students and the staff of the campus who sustained low back pain. They were asked to volunteer to participate in the study. All participants gave their informed consent after receiving oral and written information about the study. This study was approved by the Research Ethical Committee, University Teknologi MARA.

2.4 Procedure and measurements

The ODQ were administered to all participants as part of the questionnaire used in the study. The comprehensive questionnaire consisted of demographic data and SF-36. The demographic data questionnaire consists of 2 parts which are part A consists of 14 personal details questions and part B consists of 10 health history questions.

The SF-36 consists of 36 questions on the general health status of the subjects, and provides 8 specific categories of physical and emotional scores: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health [23]. The SF-36 is widely used as a standard measurement in various validation studies. In this study the Malay version SF-36 translated and validated by [24] was used. Two sets of similar questionnaires were distributed to all participants. They were required to answer set 1 immediately and returned it back to the researcher. The second set was asked to be completed after 2 days interval and returned it back to the researcher.

2.4.1 Reliability

For the test-retest analyses, 60 participants had completed the questionnaires after 2 days and returned it back to the researcher.

2.4.2 Validity

For the reason that these questionnaires aim to measure disability in terms of restrictions in daily activities, it was supposed that the disability assessed by ODQ would be significantly correlated with limitations in physical activities according to the SF-36. Moreover, these questionnaires would provide information about a concept that was different from psychosocial concern. Thus, another hypothesis was that the sum scores of ODQ would show minimal correlations with mental and physical health scores of SF-36.

2.5 Data analysis

The Statistical Package of Social Science (SPSS), version 17.0 was used to analyse the data.

2.5.1 Reliability

Homogeneity (Internal consistency): Internal consistency was assessed by Cronbach's α coefficients, corrected item-total correlations, and Cronbach's α if the item was deleted [25]. The closer the value of α is to 1.00, the greater the internal consistency of items in the instrument being assessed [26] Cronbach's α greater than 0.7 is acceptable [27].

Reproducibility (Test-retest reliability): Intraclass correlation coefficients (ICCs) were used to quantify the reproducibility of test and retest. The ICC (1, 1) was calculated as the ratio of the variance between subjects and the total variance.

2.5.2 Validity

Content validity: Content validity was assessed during the questionnaire development stage (stage1: translation) by incorporating researchers and expert opinion.

Construct validity: Convergent validity of the ODQ was examined by calculating the correlations between ODQ and SF-36 using the Pearson’s r correlation coefficient. The ODQ was expected to be moderately to highly correlation with the SF-36 physical function and mental health subscales. A Pearson’s r correlation coefficient over 0.6 indicates high correlation [28].

3. RESULT AND DISCUSSION

There were 150 sets of questionnaires distributed for both test and re-test measurements. However, there were only 60 subjects had returned both sets of questionnaires and included for the study. Generally, the participants were able to fill in the questionnaire independently without assistance.

3.1 Demographic data

The demographic data of the subjects are presented in Table 1. Almost all participants were students with the mean age 20.4 years old who experienced low back pain. Out of all 81.7% were female. Majority of respondents reported having low back pain in less than one month and only 4 reported low back pain more than a year. Table 2 demonstrated the descriptive data and score distribution of the revised ODQ and SF-36. The mean score of ODQ of subjects for the test and retest measurements were 8.30 and 8.97 respectively. For the mean score of SF-36, subjects score 50.39 in the mental health subscale and 46.89 for physical health subscale.

Table 1: Demographic data of age, gender, duration of low back pain (LBP) and occupation

Age (mean=20.40)	n= 60 (%)
18	5 (8.3)
19	19 (31.7)
20	12 (20.0)
21	7 (11.7)
22	12 (20.0)
23	2 (3.3)
24	2 (3.3)
28	1 (1.7)
Gender	
Male	11 (18.3)
Female	49 (81.7)
Duration of LBP	
<1 month	32 (53.3)
1-3 months	6 (10.0)
3-6 months	5 (8.3)
6-12 months	5 (8.3)
>12 months	4 (6.7)
Occupation	
Clerk	2 (3.3)
Student	58 (96.7)

Table 2: Descriptive data and score distribution of the revised ODQ and SF-36

	Mean±SD
ODQ T1	8.30±6.043

ODQ T2	8.97±6.123
SF-36 (PH)	50.39±6.024
SF-36 (MH)	46.89±7.493

3.2 Reliability properties

Table 3 summarizes the test-retest reliability between the first and second completion of ODQ showed by the ICC (0.821), 95% confidence interval (0.700, 0.893) and coefficient of variance (CV). Internal consistency by Cronbach’s alpha was 0.821. Table 4 and table 5 demonstrate the item-total score correlations of 10 sections of ODQ for the test and retest measurements.

Table 3: Intraclass Correlation (IC) Coefficient and 95% Confidence Interval (CI)

Intraclass Correlation ^a	Intraclass Correlation Coefficient			F Test			
	Lower	Upper	Value	df1	df2	Sig	
Single Measures	.696	.539	.807	5.589	59	59	.000
Average Measures	.821	.700	.893	5.589	59	59	.000

Table 4: Item-Total Score Correlations of each section of ODQ first measurement (test)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Pain intensity	7.10	26.973	.627	.545	.832
Personal care	7.12	27.529	.572	.367	.838
Lifting	7.43	31.097	.563	.492	.837
Walking	7.95	31.675	.568	.481	.838
Sitting	7.45	29.574	.612	.440	.832
Standing	7.43	31.267	.523	.471	.840
Sleeping	7.68	31.135	.528	.449	.839
Social life	7.73	31.318	.470	.348	.844
Travelling	7.55	31.675	.600	.440	.836
Changing degree of pain	7.25	28.462	.598	.442	.833

Table 5: Item-Total Score Correlations of each section of ODQ second measurement (retest)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Pain intensity	7.78	28.783	.662	.518	.830
Personal care	7.87	28.592	.630	.487	.834
Lifting	8.08	30.959	.637	.529	.835
Walking	8.47	32.558	.607	.446	.840
Sitting	7.93	29.826	.534	.451	.844
Standing	7.97	31.321	.615	.484	.837
Sleeping	8.25	31.987	.552	.339	.842
Social life	8.43	31.572	.511	.366	.844
Travelling	7.98	33.034	.357	.185	.857

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Sitting	7.93	29.826	.534	.451	.844
Standing	7.97	31.321	.615	.484	.837
Sleeping	8.25	31.987	.552	.339	.842
Social life	8.43	31.572	.511	.366	.844
Travelling	7.98	33.034	.357	.185	.857
Changing degree of pain	7.93	29.962	.566	.429	.840

3.3 Validity

Table 6 shows the associations between the summary scores of ODQ and SF-36 used to construct validity of the questionnaires. A fair correlation was found between the ODQ and physical health as well as the mental health of the SF-36. Both SF-36 subscales showed inversely correlated to ODQ. The result was calculated for only 46 participants who completed SF-36 questionnaires.

Table 6: Pearson's correlation coefficient of the ODQ and SF-36

		ODQ T1	ODQ T2	SF-36 PH	SF-36 MH
ODQ T1	Pearson Correlation	1	.643**	-.336*	-.084
	Sig. (2-tailed)		.000	.022	.580
	Covariance	37.859	22.841	-12.457	-3.857
ODQ T2	Pearson Correlation	.643**	1	-.321*	-.346*
	Sig.(2-tailed)	.000		.030	.018
	Covariance	22.841	33.331	-11.151	-14.973
SF-36 PH	Pearson Correlation	-.336*	-.321*	1	.023
	Sig. (2-tailed)	.022	.030		.881
	Covariance	-12.457	-11.151	36.288	1.021
SF-36 MH	Pearson Correlation	-.084	-.346*	.023	1
	Sig. (2-tailed)	.580	.018	.881	
	Covariance	-3.857	-14.973	1.021	56.143

**Correlation is significant at the 0.01 level (2-tailed).

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

3.4 Reliability and Validity of the Malay version of ODQ

This paper reports the translation process of ODQ which is the self-reported back-specific outcome measure questionnaire. This is the first study that translates the English version of ODQ into Malay language. The process of the translation was quite straightforward. This study followed the procedure recommended by WHO [22]. The

Malay version of ODQ appeared to be clearly understood and easily used by the participants in this study.

In this study, the reliability and validity of Malay version of ODQ were assessed in order to decide whether this instrument is reliable and valid to be used for Malay speaking population. Our results showed that the reliability of the questionnaire, as indicated by test-retest reproducibility and internal consistency, proved to be high. The results were similar with the Original, Spanish and Norwegian version of ODQ that found the high internal consistency with Cronbach α 0.93, 0.96 and 0.94 respectively [9,29].

The results of item-total score correlations also were all high for each item ranging from 0.47-0.62 for test and 0.35-0.66 for retest measurements, indicating that each item was well correlated to the ODQ score. These demonstrate that all items of the ODQ are homogeneous when evaluating the functional status of low back pain. The value of ICC (0.821) for test-retest reliability of the Malay version ODQ showed excellent test-retest agreement which was similar to the original (English version) of ODQ with good development processes [9]. The construct validity was fairly correlated based on strength of linear relationship with inverse correlation, probably because there was not enough dispersion in the change scores of all subjects on every scale [30].

Majority of the patients were having acute low back pain which probably due to non-specific sources. Besides, they were at the young age group which can tolerate better with the pain. Therefore, the reduction in functional activities was minimal and the level of disability also was not much affected. These was shown by the mean score of ODQ test and retest measurement in table 2. Moreover, younger age person has shown to have faster healing process rate than the older person. The chronological age and changes with aging impaired wound healing process in older people, thus slower the recovery process [31]. Therefore the ability to do functional activities is not much disabling among young age. As students, most of them were staying in the university residential apartment where they have to follow most of the student affairs activities and continue with active lifestyle as university students. Furthermore, with the university environment and lifestyles, they will participate in most activities and make themselves busy, and with times their pain disappeared. Peers influence also perhaps contributed to motivate and support.

Our study also demonstrates that a self-directed functional status questionnaire is reliable to be translated into Malay language with proper maintenance of its original (English) version properties. It is significant to translate the current existing questionnaires rather than to develop the new one. Global accepting of the translated and validated questionnaires is essential when to be used in different population especially with different culture and background. This view is supported by the good understanding of the

well-known SF-36 questionnaire which has been translated into numerous different languages. This will enhance the comparability of the research findings globally when the similar questionnaires are used in different population.

Generally, our results support previous findings of the Norwegian [9], German [10], Italian [11], Japan [12], Greek version [13], Korean [14-15], Chinese [16], Tamil [17] and Danish versions [18] of ODQ.

3.5 Limitation of the study

Several limitations of this study were noted. One of them was that this study had been conducted in a single-centered institution where majority of the populations were tertiary education students. Furthermore, most of them were studying in health education including Physiotherapy, Occupational Therapy, Nursing, Environmental Health, Medical Lab Technology, and others. Somehow, these students had ideas or experiences of how to cope with their pain in order to complete their daily activities and at the same time minimise the level of disability.

In the other hand, the subjects were in similar age group who are young and active. Thus, the likelihood of recovery from injury is greater than those who are older. Therefore, the level of disability is not too much affected compared to middle age or elderly group. Furthermore, the numbers of participant for the study were small and these might influence the outcome of the study.

3.6 Recommendation

In future, we would recommend multicentre studies to improve the generalization of the results. The study also could be conducted in cross-culturally with more groups of low back pain patients for comparison. Probably with variety and greater number of cases will reflect better outcome.

4. CONCLUSION

The Malay version of revised ODQ seems to be reliable and valid questionnaire for the assessment of functional status disability for the patients with LBP. Therefore, we recommend the use of Malay version of revised ODQ in future trials and for comparing different individuals or groups of patients who sustained LBP. The efficiency of the Malay version of revised ODQ in evaluating longitudinal change in an individual or a group seems to be promising and we believe should be the subject for further research.

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