Research Report

A study on internal consistency, response set bias, and construct validity of the Modified Oswestry Disability Questionnaire in assessing patients with low back syndrome in Metro Manila

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ABSTRACT

Objective: A cross sectional study was undertaken to investigate the internal consistency, response set bias and construct validity of the Modified Oswestry Disability Questionnaire (MODQ) in patients with low back syndrome in Metro Manila. ***Methodology:*** One hundred four (104) patients medically diagnosed with low back syndrome were recruited from three (3) different hospitals in Metro Manila and were requested to answer one of the eight (8) versions of the MODQ. The data obtained from patients were utilized to examine the three psychometric properties of MODQ, namely, the internal consistency, response set bias and construct validity. The statistical tools used were multivariate analysis of variance, Cronbach Alpha, and correlation coefficients. ***Results:*** Results revealed that the MODQ does not possess a response set bias and can be re-administered without bias to previous answers. It was also shown to have high internal consistency (alpha=0.79). It was also found to be strongly correlated with the Roland Morris Questionnaire (r=0.75, p=0.01). ***Conclusion:*** The MODQ was shown to have stable psychometric properties and appears to be a valid and promising tool in the assessment and treatment of patients with low back syndrome in Metro Manila.

Keywords: *disability, low back pain, Modified Oswestry Disability Questionnaire (non-MeSH), Filipinos (non-MeSH)*

INTRODUCTION

Structured questionnaires are important tools in objectively measuring patients' functional restrictions secondary to impairments. In the Philippine setting, functional measures are slowly gaining popularity among practitioners. With the rising prevalence of musculoskeletal pain syndromes, a valid and reliable collection of findings pertinent to function needs to be standardized[1].

Developed in 1980, the Oswestry Disability Questionnaire (ODQ) consisted of items addressing different aspects of function[1]. The ODQ has ten sections which include pain, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and traveling. The ODQ is an ordinal rating scale assessing home, work and other basic functional disabilities resulting from low back syndrome. The tool consists of ten items with six statements (denoted by the letters A-F) per item. Each item denotes areas of disability; while each statement reflects the extent to which the patient may be affected by the impairment [2-3]. Fairbank in 1980 considered scores from 0-20% as "minimal disability, 20-40% as "moderate disability", 40-60% as "severe disability", 60 to 80% as "crippled" or "housebound" and 80-100% as "bedbound or exaggerating." [4]

Modified versions of the Oswestry Disability Questionnaire had been developed in the hope of upgrading its quality. In one version, "pain killers" and "tablets" were removed from the Pain and Sleeping sections. In another version, "Sex Life" section has been replaced by "Employment and Homemaking." A modified version called the chiropractic version replaced "Sex Life" with "Changing Degree of Pain." This has been criticized since this transitional rating is conceptually different from pain intensity and activity limitation[5]. Davidson and Keating (2002) replaced miles with kilometers in the "Walking" section. Fairbank and Pynsent (2000) recommended use of Version 2.0 of the

Oswestry. This version instructs patients to answer the questions in relation with how their back problem is affecting them "today" rather than the original instructions which do not specify a time frame[4].

There is no existing evidence that any particular modified version of ODQ is superior to another[4]. However, the existence of disordered thresholds for personal care, standing, sex life, and social life is evident that, at least for these items, the response options do not perform as intended[5]. In walking, persons in the 65-years and above age group, and who are at the same level of ability as the younger group, had higher worse scores than expected. Fear of falling and other sociodemographic variables could be associated with this finding other than the difficulty in walking[6]. With these concerns raised about the Modified Oswestry Disability Questionnaire and the lack of study with regard to its applicability in the Philippine local setting, this study aims to confirm the stability of the psychometric properties of the Modified Oswestry Low Back Pain Disability Questionnaire.

The Roland-Morris Low Back Pain and Disability Questionnaire is another functional assessment tool that assesses a patient's perception of the extent in limitation in their activities of daily living because of low back syndrome. It has been extensively tested for validity, reliability, and sensitivity to detect change over time. It has been reported to have acceptable face validity, and high levels of test-retest reliability. Like the Oswestry Disability Questionnaire, it is an activity of daily living questionnaire which is unidimensional and captures the physical dimension of low back syndrome[8]. In order to confirm the role of MODQ in measuring disability to activities of daily living, it is compared with the Roland-Morris Low Back Pain and Disability Questionnaire.

The aim of this study was to investigate the three psychometric properties, namely the internal consistency, response set bias and construct validity of the Modified Oswestry Disability Questionnaire in assessing patients with low back syndrome in tertiary hospitals in Metro Manila.

METHODOLOGY

Study design

This is a cross-sectional analytic study accomplished through the use of survey questionnaires.

Recruitment and Selection

Twenty (20) tertiary hospitals in Metro Manila with a physical therapy department were identified using the 2005 PLDT Metro Manila yellow pages. The name of each hospital was written on a piece of paper and was placed in a box. Ten hospitals were drawn to which letters of request were sent. Only 3 hospitals consented to take part in the study.

Each hospital was assigned a set of forty (40) Modified Oswestry Low Back Pain Disability Questionnaire, consisting of five (5) copies of each of the eight (8) versions. Each set was then shuffled five (5) times by one of the researchers and distributed to patients based on the order of their arrival.

The inclusion criteria were: a) male or female of at least 18 years of age b) Filipino citizen c) medically diagnosed with low back syndrome d) sufficient capability to answer the questionnaire independently, and e) ability to read and write in English. Patients were excluded if they had concomitant diagnoses other than that of the low back.

No criteria were made as to the intensity, duration, frequency, cause and/or prior treatment of pain to maximize the range and diversity of patients with low back syndrome.

Procedure

The potential participants were oriented as to the nature and purpose of the study. An explanatory statement was distributed to facilitate understanding of the study. Upon agreement to participate, an informed consent, also requiring demographic data from participants, was signed. One of the eight versions of the Modified Oswestry Disability Questionnaire (MODQ) was administered to the patient. The patient chose one of the six statements that best described their situation. The worst possible situation was graded 5. The normal, pain free, unrestricted condition was graded 0. The sum of the section scores was transformed to a percentage score, adjusted for missed section. The total possible score ranged from 0 to 100. Higher scores indicated worse function.

Each of the 8 versions of the MODQ differed from the original in one respect. A description of each version is discussed below.

Version 1 consisted of 10 MODQ items. Each item has 6 responses arranged in order of increasing disability. This is considered as the original MODQ, from which all altered versions were based.

In Version 2, the arrangement of the items was reversed, but the order of the responses was retained in increasing disability.

In Version 3, the arrangement of the original items was the same as Version 1, but the order of the responses was arranged in decreasing disability.

In Version 4, both the arrangement of the items and the order of the responses were reversed compared to Version 1.

In Version 5, responses for the odd items were ordered in increasing disability, while even items were ordered in decreasing disability.

In Version 6, responses for the odd items were arranged in decreasing disability, while responses for the even times were arrayed in increasing disability.

In Versions 7 and 8, the order of the items was reversed from that of Version 1. The responses followed the pattern of Versions 5 and 6, respectively[3].

The data collected from these were utilized to measure the response set bias of the questionnaire. The patients were requested to answer the Roland-Morris Low Back Pain and Disability Questionnaire, together with the assigned MODQ version, for the measurement of construct validity.

The first part of the procedure is summarized in Figure 1.

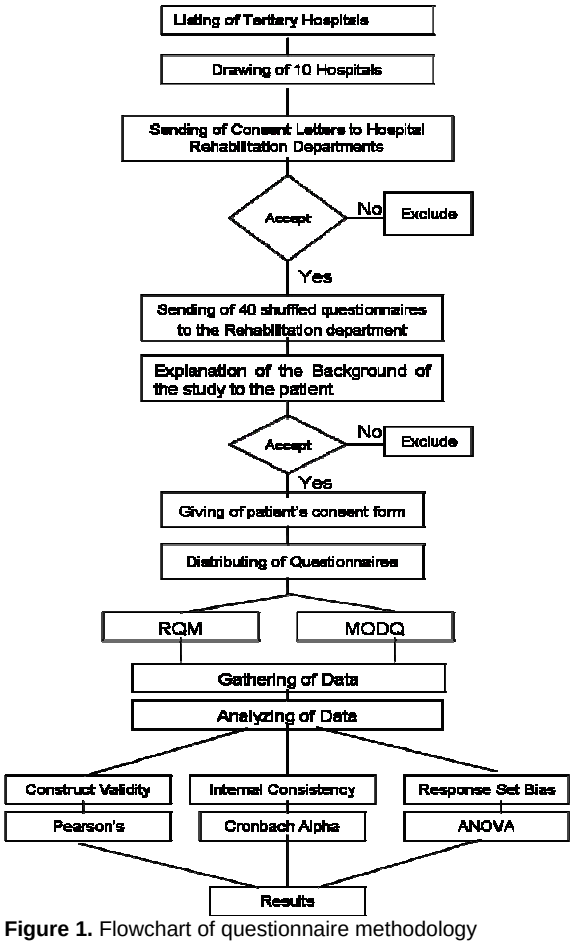

Figure 1. Flowchart of questionnaire methodology

RESULTS

Demographic Characteristics

The study was completed after 3 months. The sample consisted of 104 participants with a wide range of medical diagnoses of low back syndrome. The participants' age ranged from 18-86 years, with a mean of 41.02 years and a standard deviation of 14.35 years. There were more females (56%) than males (44%). The sample was a representative of various occupations, which consisted of 59.62% professionals, 12.50% manual laborers, 20.19% homemakers, 4.81% students, and 2.88% retirees.

The distribution of the eight versions of the Modified Oswestry Low Back Pain Disability Questionnaire was as follows: 15 participants answered Version 1; 15 answered Version 2; 15 answered Version 3; 12 answered Version 4; 13 answered Version 5; 14 answered Version 6; 11 answered Version 7; and 10 answered Version 8.

The severity of disability of the sample with reference to the MODQ scores was widely distributed, with a mean of 34.81% and a standard deviation of 15.80%. Seventeen (17) participants fell under minimally disabled (16.25%), 47 under moderately disabled (45.19%), 37 under severely disabled (35.58%), 2 under crippled (1.92%) and 1 under bed ridden (0.96%).

The answers on the Roland Morris Disability Questionnaire ranged from 1-21 with a mean of 8.85 and a standard deviation of 4.63. This shows more widely distributed responses than the previous study done by TIbbles, et al[3].

Response Set Bias

Each answered item from Versions 2-8 was first converted to its equivalent answer in Version 1, since the rearrangement of the items and responses in the questionnaires will yield different scores for different sets of versions. Each item was then replaced by its assigned score and was tabulated (Table 1).

The total scores of the participants in each version were summed and the mean for each version was computed (column 3 of Table 1). This now represents the total MODQ scores of each patient in a version. The scores were then compared with one another, taking eight variables and testing for any significant differences in their means by the use of Analysis of Variance (ANOVA) in SPSS. The results show that the mean of each version fell between the lower and upper boundaries of the 95% confidence interval for mean (column 6 of Table 1) of the original version (Version 1). The variation in-between and within versions is low and the F ratio is 0.681, which is not significant.

Version of MODQ	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	15	38	23	6	26	51	2	90
2	15	39	18	5	29	50	0	68
3	15	32	11	3	26	38	16	50
4	12	32	15	4	22	42	0	48
5	12	33	15	4	24	42	18	56
6	14	37	17	5	27	47	4	58
7	11	29	13	4	21	38	6	50
8	10	36	10	3	29	43	20	48
Total	104	35	16	2	32	38	0	90

Table 1. Analysis of variance of the eight Modified Oswestry Disability Questionnaire

Internal Consistency

The test for internal consistency was done using Cronbach Alpha in SPSS. In most social science applications, it must be noted that the reliability coefficient must be 0.80 or higher to be acceptable. The value of alpha obtained for this MODQ is 0.80, indicating adequate internal consistency.

Construct Validity

The participants that answered the MODQ also answered the Roland Morris questionnaire. The aim is to compare MODQ scores with the Roland Morris scores obtained by the participants. The scores were computed using percentile ranking and compared. A bivariate correlation using Pearson correlation coefficients was done using SPSS. The results showed that the MODQ has a very high correlation with the Roland Morris questionnaire, with a Pearson coefficient of 0.751.

DISCUSSION

Testing for the integrity of the content of a questionnaire is of dire importance before determining its applicability. Instability, in terms of psychometric properties, can lead to redundant questions, biased answers, and unreliable results.

Since the mean score of patients which answered each version of the MODQ fell between the lower and upper boundaries of the 95% confidence interval for the mean of the original version (Version 1), this signals that there is little fluctuation in the patients' responses. The F ratio, which is 0.681, indicates that there is no significant difference in the mean scores obtained with the different versions of the MODQ. Thus, re-arrangement of items in the MODQ did not affect the way participants responded. This finding further strengthens the value of MODQ in monitoring the patients' progress after a series of physical therapy regimen. The higher probability of gathering unbiased data may lead to MODQ's use in researches related to low back syndrome.

The study included participants with diverse levels of disability. This has not affected the way in which the participants responded. The Cronbach Alpha value of 0.7917 reflects high internal consistency of MODQ. A high level of internal consistency is appropriate for the MODQ because it measures a relatively narrow aspect of health, namely low back pain. Reliable internal structure allows confidence in the measurement of the current status of a patient's disability resulting from low back pain of the participants[3].

For construct validity, the results suggest that there is a high correlation between the MODQ and Roland-Morris scores. This re-affirms the role of MODQ in measuring the physical dimension of disability which restricts the activities of daily living in patients with low back syndrome. This also confirms the inherent construct validity of MODQ. The MODQ can reproduce valid and very reliable results in assessing the function level of participants.

CONCLUSION

The study confirms the stability of the psychometric properties of the Modified Oswestry Disability Questionnaire as to internal consistency, response set bias, and construct validity in assessing patients with low back syndrome in Metro Manila. It is a valid questionnaire which Filipino physical therapists may use in their comprehensive evaluation and treatment of patients with low back syndrome.

This study was employed in Metro Manila only. The data obtained herein can serve as baseline for a

future nationwide scale research on Modified Oswestry Disability Questionnaire. Inclusion of the views of Filipino physiotherapists regarding administration of MODQ can be included and scrutinized in further studies. Their expert opinion can be used in modifying the MODQ that may increase its applicability in the Filipino setting.

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