ORIGINAL PAPER

Physiotherapy Quarterly (ISSN 2544-4395)
2026, 34(4), 48–55
© Wroclaw University of Health and Sport Sciences

Responsiveness of the Myanmar versions of the Oswestry Disability Questionnaire and the Roland–Morris Disability Questionnaire in individuals with subacute and chronic low back pain

DOI: https://doi.org/10.5114/pq/221420

Phyu Sin Oo[1], Maria Justine[2], Akkradate Siriphorn[1], Praneet Pensri[1]
[1] Department of Physical Therapy, Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand
[2] Centre for Physiotherapy Studies, Faculty of Health Sciences, Universiti Teknologi MARA, Selangor, Malaysia

Abstract

Introduction. The ability of an outcome measure to detect clinically meaningful changes is essential for both clinical decision-making and research. The Myanmar versions of the Oswestry Disability Questionnaire (M-ODQ) and the Roland–Morris Disability Questionnaire (M-RMDQ) have recently been validated; however, their responsiveness has not yet been investigated. This study aimed to determine the responsiveness of the M-ODQ and the M-RMDQ in individuals with subacute and chronic nonspecific low back pain (LBP) in the Myanmar population.

Methods. The responsiveness of M-ODQ and M-RMDQ was assessed in 102 individuals with subacute and chronic nonspecific LBP after a 4-week intervention period. Responsiveness of both questionnaires was evaluated by determining the effect size (*ES*), standardised response mean (*SRM*), area under the receiver operating characteristic curve (*AUC*), and correlation analysis with a 7-point global perceived effect (GPE) scale, visual analogue scale (VAS), Stark Quality of Life (QoL) questionnaire, and back performance scale (BPS).

Results. In participants who reported improvement, the *ES* and *SRM* were 0.73 and 0.66 for M-ODQ and 0.85 and 0.78 for M-RMDQ, respectively. The *AUC* values of the M-ODQ and M-RMDQ were 0.724 and 0.718, indicating that the outcome measures had acceptable responsiveness to detect clinical change. Correlations of the M-ODQ and M-RMDQ with the other external responsiveness measures were fair to moderate, with the rho values ranging from –0.341 to 0.521 for all the measures.

Conclusions. The M-ODQ and M-RMDQ demonstrated satisfactory responsiveness, which indicated their usefulness as outcome measures to detect clinically meaningful changes in both clinical and research settings in the Myanmar population with subacute and chronic nonspecific LBP.

Key words: nonspecific low back pain, responsiveness, Oswestry Disability Index Questionnaire, Roland–Morris Low Back Pain and Disability Questionnaire

Introduction

Low back pain (LBP) is a common musculoskeletal condition characterised by pain, muscle tension, or stiffness in the lumbar region, with or without radiation to the lower limbs, and is associated with disability and reduced quality of life [1]. The increasing burden of musculoskeletal conditions in both developed and developing countries indicates that LBP constitutes a significant public health challenge associated with substantial healthcare costs [2]. Worldwide, its prevalence in the general population ranges from 12% to 33%, with an annual prevalence between 10.3% and 65%, as well as a lifetime prevalence of 11% to 75% [3]. The annual incidence rate ranges from 1.5% to 36% [4]. LBP has been identified as the leading cause of disability globally and represents a major contributor to the worldwide socioeconomic burden, accounting for 10% of all years lived with disability [5, 6].

LBP adversely affects individuals' work capacity and their quality of life (QoL), often necessitating physiotherapy intervention [7, 8]. The disability rate from LBP has increased by 54% between 1990 and 2015 [9]. Consequently, reducing disability while maintaining or restoring functional status and supporting a productive lifestyle has become an important goal of management, with enhanced QoL as the ultimate outcome [10]. Evidence suggests that daily physical activity plays a preventive role in reducing the risk of LBP, underscoring the importance of interventions that promote mobility and functional capacity [6]. In line with these priorities, the use of valid outcome measures to assess disability levels is essential for both academic research and clinical practice [7].

Disability cannot be assessed directly through physiological evaluation; thus, self-reported questionnaires that evaluate pain and functional status are critical for quantifying functional limitations associated with LBP [11]. Among the various LBP-specific self-reported measures, the Oswestry Disability Questionnaire (ODQ) and the Roland–Morris Disability Questionnaire (RMDQ) are the most frequently utilised tools for assessing disability resulting from LBP [12]. The ODQ includes 10 items assessing pain-related disability in physical activities, whereas the RMDQ comprises 24 items addressing LBP-related activity limitations LBP [13]. Both questionnaires were originally developed in the English language, and have since been translated and cross-culturally adapted into several languages, with satisfactory psychometric properties [11, 14]. The Myanmar versions of both questionnaires have been validated and have demonstrated good psychometric properties; however, their responsiveness has yet to be examined [11, 15].

To be clinically meaningful in both practice and research, an outcome measure must be easy to administer, demonstrate psychometric soundness (validity and reliability), and, most importantly, exhibit responsiveness [16]. Responsive-

Correspondence address: Praneet Pensri, Department of Physical Therapy, Faculty of Allied Health Sciences, Chulalongkorn University, 154 Soi Chula 12, Rama I Rd., Wang Mai Subdistrict, Pathumwan District, Bangkok, Thailand, 10330, e-mail: Praneet.P@chula.ac.th; https://orcid.org/0000-0003-1801-8930

Received: 31.10.2025
Accepted: 04.05.2026

Citation: Oo PS, Justine M, Siriphorn A, Pensri P. Responsiveness of the Myanmar versions of the Oswestry Disability Questionnaire and the Roland–Morris Disability Questionnaire in individuals with subacute and chronic low back pain. Physiother Quart. 2026;34(4):48–55; doi: https://doi.org/10.5114/pq/221420.

ness describes the extent to which a measurement tool can detect important clinical changes occurring over time, which is crucial for guiding clinical judgements, conducting research, and selecting appropriate outcomes to detect changes between treatment groups [12, 17]. Responsiveness encompasses two concepts: "sensitivity to change", which refers to an outcome measure's ability to detect true changes rather than variations due to measurement error, and "external longitudinal construct validity", which indicates the extent to which the change score of an outcome correlates with changes in other measures assessing the same theoretical construct. According to the literature review and researchers' suggestions, the responsiveness of an outcome measure is generally evaluated using two principal approaches: distribution-based and anchor-based methods [18].

The responsiveness of the Myanmar versions of ODQ (M-ODQ) and RMDQ (M-RMDQ) has not yet been determined, which may limit their use for research and clinical purposes. This study aimed to determine the responsiveness of the M-ODQ and M-RMDQ in individuals with subacute and chronic nonspecific LBP using distribution-based and anchor-based methods.

Subjects and methods

Study design and setting

This prospective cohort study was conducted from May 2022 to April 2023 with a 4-week follow-up period at the Physical Therapy Clinic, Department of Physical Therapy, Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand.

Sample size calculation

The sample size was determined using MedCalc Software (version 23.2.1, MedCalc Software Ltd, Ostend, Belgium). An expected *AUC* of 0.8, a statistical power of 80% ($\beta = 0.10$), and a significance level (α) of 0.05 were used to estimate the required number of participants. To accommodate possible participant dropouts, the final sample size was set at 102 participants.

Participants

This research project was publicly announced on social media at the beginning of the study. Participants with subacute or chronic nonspecific LBP, who were literate in the Myanmar language and residing in Bangkok, Thailand, and who expressed interest in the study were invited. Eligible participants were both men and women aged 18–55 years. The area of pain was required to be located between the margins of the lower rib margins and the inferior gluteal folds [19]. Participants with a pain duration between 6 weeks and 3 months were classified as having subacute LBP, while those with pain lasting more than 3 months were classified as having chronic LBP [20]. Participants who were pregnant or who had mental problems, such as insomnia, anxiety, and depression, were excluded from this study. Demographic data of each participant, including body mass, height, gender, age, and duration of LBP, were also collected.

Outcomes measures

A screening questionnaire was used to identify the participants who were eligible for this study. It comprised four questions addressing the location and duration of LBP, any history of hospitalisation or medication for mental health problems, and literacy in the Myanmar language. Demographic data including gender, age, height, and body mass were collected using a demographic questionnaire.

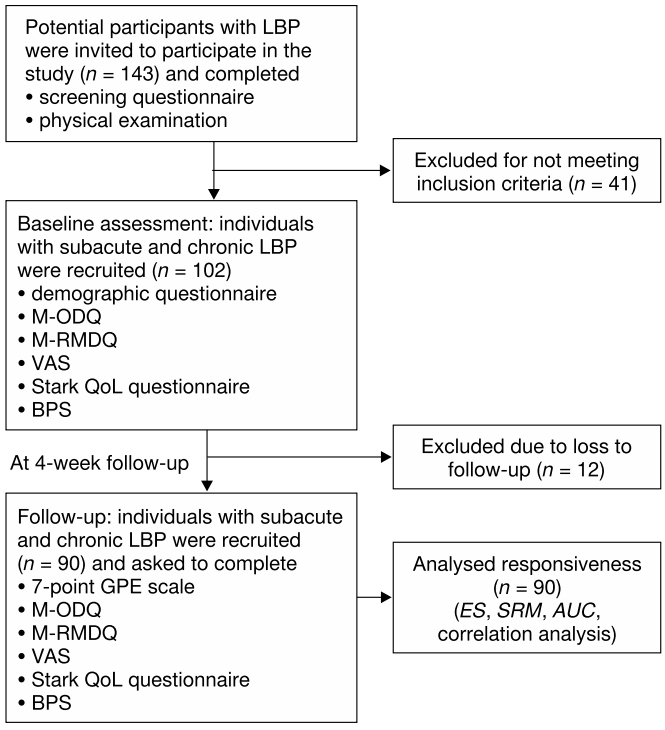
The M-ODQ and M-RMDQ were used to assess back-specific disability levels before and after the 4-week intervention period. The M-ODQ comprises 10 items that assess the pain intensity and the effect of LBP on routine activities. The total score varies from 0, indicating no disability, to 50, representing the highest level of disability, and is expressed as a percentage [21]. The M-RMDQ includes 24 items that measure how LBP affects various aspects of daily functioning, including personal care, mobility, work, and sleep. The total score ranges from 0, indicating no disability, to 24, indicating the most severe disability [11].

The visual analogue scale (VAS) was used to evaluate pain intensity on a 100-mm line, where 0 mm denotes no pain and 100 mm the worst pain [22]. Health-related QoL was evaluated with the Stark QoL questionnaire, which comprises two main components: mental and physical. The mental component includes three subscales: mood, energy, and social contact, while the physical component consists of six items that evaluate performance in routine physical tasks, such as lifting a heavy box, sweeping rubbish, taking a glass, tying shoes, moving a table, and shopping. Responses for each item are rated on a scale from 0 (very poor performance) to 100 (very good performance) [23]. Disability associated with LBP was objectively evaluated using the back performance scale (BPS), which consists of five physical performance tests: lift test, fingertip-to-floor test, pick-up test, roll-up test, and the sock test. Each test is rated on a scale from 0 to 3 based on difficulty, producing a total score ranging from 0 (no disability) to 15 (maximum disability), which reflects the functional disability level related to LBP [24].

The 7-point global perceived effect (GPE) scale was used as an anchor-based measure to capture participants' subjective perception of overall change in their low back pain condition following the intervention. Conceptually, the GPE reflects the patient's holistic judgement of improvement or deterioration, integrating pain intensity, functional ability, and QoL into a single global impression rather than focusing on isolated symptoms. This makes it a suitable external criterion for responsiveness analyses, as it provides a patient-centred benchmark against which questionnaire change scores can be compared. In this study, responses of "very much improved", "much improved", "much deterioration", and "very much deterioration" were classified as clinically meaningful improvement, while "slight improvement", "no change", and "slight deterioration" were categorised as non-improvement [25]. This dichotomisation has been widely adopted in previous responsiveness studies and enhances the interpretability of ROC curve analyses by distinguishing between participants who experienced substantial change and those who did not [26, 27].

Study procedure

A total of 143 individuals were screened, of whom 102 LBP participants met the eligibility criteria and were enrolled in the study, while 41 participants who did not meet the criteria were excluded (Figure 1). The study procedures were thoroughly explained to each participant, and their written informed consent was obtained. Subsequently, all participants completed the M-ODQ, M-RMDQ, VAS, and Stark QoL questionnaire at baseline and after the 4-week intervention



LBP – low back pain, M-ODQ – Myanmar version of Oswestry Disability Questionnaire, M-RMDQ – Myanmar version of Roland-Morris Disability Questionnaire, GPE – global perceived effect, VAS – visual analog scale, QoL – quality of life, BPS – back performance scale

Figure 1. The study flow chart

period. The researcher evaluated the BPS at both baseline and the 4-week follow-up. During the initial visit, each participant received a home self-management programme for low back pain (LBP). This programme included lumbar stabilisation exercises (see Supplementary materials) and guidance on applying hot packs (*e.g.*, water bottles, sand packs, or gel packs heated with hot water or in the microwave) to the painful lumbar region for 15 min. The use of hot packs was recommended 1–2 times *per* day to enhance local blood flow, reduce muscle spasm, and promote pain relief. Participants were instructed to apply adequate insulation (*e.g.*, towel layers) to ensure safe use and prevent potential thermal injury [28–30]. Among the 102 participants, 12 did not complete the follow-up assessment for the following reasons: four participants moved to live abroad, six were unable to attend the scheduled appointment due to work commitments, and two could not be contacted after changing their contact details. These participants were therefore considered dropouts. Consequently, 90 participants with subacute and chronic non-specific LBP completed both assessments (baseline and 4-week follow-up) and were included in the analysis. At the follow-up, each participant completed the 7-point GPE, which was used to categorise them into either the improved or non-improved group. All measurements were carried out by the same assessor for all individuals to reduce measurement variability.

Statistical analysis

Data were analysed using SPSS (version 22 for Windows; IBM Corp., Armonk, NY, USA), with the significance level set up at $p < 0.05$. The Shapiro–Wilk's test was applied to examine the normality of the data distribution, while descriptive statistics were used to summarise participants' demographic characteristics [11].

The responsiveness of the M-ODQ and M-RMDQ was evaluated using distribution-based and anchor-based approaches. In the distribution-based method, responsiveness was estimated using the effect size (*ES*) and standardised response mean (*SRM*). Specifically, the *ES* was calculated as the difference between the mean baseline and follow-up scores divided by the standard deviation (*SD*) of the baseline, whereas the *SRM* was defined as the ratio of the mean change score to the *SD* of those changes. *ES* and *SRM* values of ≤ 0.20 indicate small changes, those around 0.50 indicate moderate changes, and values exceeding 0.80 indicate large changes [12].

The anchor-based approach comprised correlation analysis and a receiver operating characteristic (*ROC*) curve analysis. The M-ODQ and M-RMDQ change scores from baseline to the end of the 4th week were correlated with the 7-point GPE scale, VAS, Stark QoL questionnaire, and the BPS at the follow-up by calculating Spearman's or Pearson's correlation coefficients, as appropriate. A higher correlation coefficient indicates that the questionnaire is more responsive to changes perceived by the patient. Correlation coefficient values were interpreted according to the following criteria: < 0.25 (little or no relationship), 0.25–0.50 (fair), > 0.50–0.75 (moderate), and > 0.75 (excellent) [31]. Evaluating the responsiveness of the M-ODQ and M-RMDQ involved generating the *ROC* curves and then calculating the corresponding *AUC* values, which were used to distinguish between improved and non-improved participants. Theoretically, an *AUC* of 0.5 indicates no discriminating ability, whereas a value of 1.0 reflects perfect accuracy. *AUC* values between 0.7 and 0.8 are generally considered as acceptable, while those between 0.8 and 0.9 indicate excellent discrimination [32]. Finally, *ROC* curves of the M-ODQ and M-RMDQ were compared using the method proposed by DeLong *et al.* [33].

Results

The baseline characteristics of the participants enrolled in this study are provided in Table 1. Based on the dichotomised 7-point GPE scale, 46 participants (51.1%) were classified as improved, while 44 participants (48.9%) were classified as non-improved.

Table 1. Demographic characteristics of the participants (*n* = 90)

Participants' characteristics	*n* (%)	Mean ± *SD*
Gender		
male	37 (41.1)	–
female	53 (58.9)	–
Age (years)	–	32.10 ± 8.63
Body mass (kg)	–	62.86 ± 14.38
Height (m)	–	1.63 ± 0.08
Body mass index (kg/m^2)	–	23.26 ± 5.18
Duration of LBP (months)	–	35.43 ± 41.45
subacute (6–12 weeks)	18 (20)	9.33 ± 2.37
chronic (> 12 weeks)	72 (80)	174.83 ± 170.01
7-point GPE scale		
improved group (1, 2, 6, 7)	46 (51.1)	–
non-improved group (3, 4, 5)	44 (48.9)	–

LBP – low back pain, GPE – perceived effect

Table 2. GPE categories, *ES*, and *SRM* of the M-ODQ and M-RMDQ (*n* = 90)

Variables	GPE categories	Baseline mean ± *SD*	Follow-up mean ± *SD*	Change scores mean ± *SD*	*ES*	*SRM*
M-ODQ	improved group	17.67 ± 9.70	10.58 ± 9.45	7.09 ± 8.27	0.73	0.85
	non-improved group	17.85 ± 7.59	16.43 ± 8.24	1.42 ± 5.80	0.18	0.24
	total	17.76 ± 8.68	13.44 ± 9.30	4.32 ± 7.67	0.49	0.56
M-RMDQ	improved group	4.37 ± 2.96	2.39 ± 2.16	1.98 ± 2.53	0.66	0.78
	non-improved group	3.91 ± 2.82	3.68 ± 2.51	0.23 ± 1.68	0.08	0.13
	total	4.14 ± 2.89	3.02 ± 2.41	1.12 ± 2.32	0.38	0.48

M-ODQ – Myanmar version of Oswestry Disability Questionnaire, M-RMDQ – Myanmar version of Roland–Morris Disability Questionnaire, GPE – global perceived effect

At the baseline, the M-ODQ and M-RMDQ had mean (± *SD*) scores of 17.76 ± 8.68 and 4.14 ± 2.89, respectively, while at the 4-week follow-up, the corresponding values were 13.44 ± 9.30 and 3.02 ± 2.41. The mean change scores of the M-ODQ and M-RMDQ from baseline to follow-up were 4.32 ± 7.67 and 1.12 ± 2.32, respectively.

Using the distribution-based method, the overall *ES* values were 0.49 for the M-ODQ and 0.38 for the M-RMDQ, indicating that both questionnaires demonstrated moderate responsiveness in detecting changes in LBP disability. In the improved group, the *ES* values were 0.73 for the M-ODQ and 0.66 for the M-RMDQ, whereas in the non-improved group, they were 0.18 and 0.08, respectively. These results demonstrate that the improved group had substantially higher *ES* values than the non-improved group, confirming the moderate responsiveness of both instruments to change. Similarly, the M-ODQ and M-RMDQ showed overall moderate responsiveness, with *SRM*s of 0.56 and 0.48, respectively. In the group analysis, the improved group exhibited large responsiveness for the M-ODQ (*SRM* = 0.85) and moderate responsiveness for the M-RMDQ (*SRM* = 0.78), whereas the non-improved group showed small responsiveness for the M-ODQ (*SRM* = 0.24) and M-RMDQ (*SRM* = 0.13). Overall, these results indicate that both outcomes have moderate to large sensitivity to change, particularly in individuals who reported improvement. Table 2 presents the GPE categories and the specific *ES* and *SRM* values of the M-ODQ and M-RMDQ in this study.

Based on the anchor-based approach, *ROC* curves were generated from the change scores of the M-ODQ and M-RMDQ to distinguish participants who showed improvement from those who did not. As shown in Table 3, the *AUC* values were 0.724 for the M-ODQ and 0.718 for the M-RMDQ. The comparison of the two *ROC* curves is illustrated in Figure 2. Pairwise comparison using DeLong's method indicated no significant difference between the two areas (difference = 0.00568; *SE* = 0.0556; 95% *CI*: –0.103 to 0.115; *z* = 0.102; *p* = 0.918).

Correlations with the external criterion measures (GPE, BPS, VAS, and Stark QoL questionnaire) were examined by

Table 3. Overall *ES*, *SRM*, and *AUC* values of the M-ODQ and M-RMDQ (*n* = 90)

Variables	*ES*	*SRM*	*AUC*
M-ODQ	0.49	0.56	0.724
M-RMDQ	0.38	0.48	0.718

M-ODQ – Myanmar version of Oswestry Disability Questionnaire
M-RMDQ – Myanmar version of Roland–Morris Disability Questionnaire

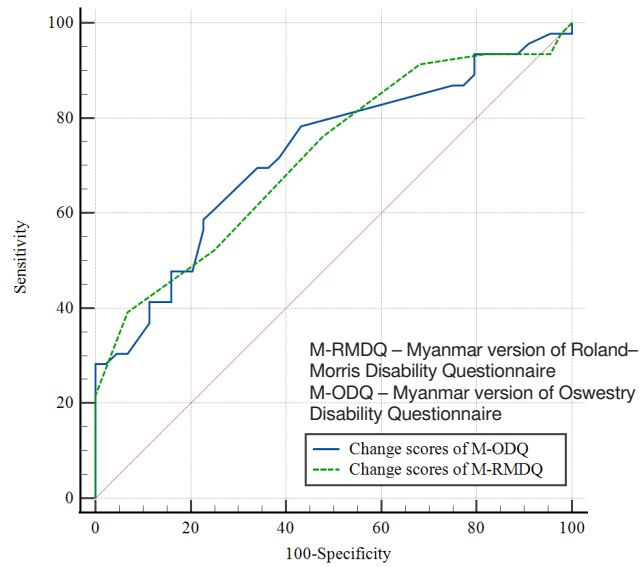


Figure 2. *ROC* curves for the change scores of M-ODQ and M-RMDQ

Table 4. Correlation analysis of the M-ODQ and M-RMDQ with the responsiveness criteria measures (*n* = 90)

Variables	Criteria measures	Correlation coefficient	Types of correlation
M-ODQ	M-RMDQ	0.521*	Spearman
	GPE	0.389*	Spearman
	VAS	0.514*	Pearson
	BPS	0.469*	Spearman
	Stark QoL questionnaire (mental component)	–0.341*	Spearman
	Stark QoL questionnaire (physical component)	–0.513*	Pearson
M-RMDQ	M-ODQ	0.521*	Spearman
	GPE	0.383*	Spearman
	VAS	0.527*	Spearman
	BPS	0.480*	Spearman
	Stark QoL questionnaire (mental component)	–0.505*	Spearman
	Stark QoL questionnaire (physical component)	–0.499*	Spearman

M-RMDQ – Myanmar version of Roland–Morris Disability Questionnaire, M-ODQ – Myanmar version of Oswestry Disability Questionnaire, GPE – global perceived effect, VAS – visual analogue scale, BPS – back performance scale, QoL – quality of life
* $p < 0.001$

calculating Spearman's (*rho*) and Pearson's (*r*) correlation coefficients. A moderate correlation was found between the M-ODQ and M-RMDQ (*rho* = 0.521). The M-ODQ showed fair correlations with the GPE (*rho* = 0.389), BPS (*rho* = 0.469), and the mental component of the Stark QoL questionnaire (*rho* = –0.341), while showing moderate correlations with the VAS (*r* = 0.514) and the physical component of the Stark QoL questionnaire (*r* = –0.513). For the M-RMDQ, fair correlations were observed with the GPE (*rho* = 0.383), BPS (*rho* = 0.480), and the physical component of the Stark QoL questionnaire (*rho* = 0.499), whereas moderate correlations were noted with the VAS (*rho* = 0.527) and the mental component of the Stark QoL questionnaire (*rho* = –0.505). Detailed correlation coefficients are presented in Table 4.

Discussion

The M-ODQ and M-RMDQ used in this study were culturally adapted according to the recommended guidelines and are considered reliable and valid outcome measures for the LBP patients [11, 15]. This study determined the responsiveness of both questionnaires in individuals with subacute and chronic nonspecific LBP in the Myanmar population living in Thailand. According to the literature, although there are several approaches to assessing responsiveness, no consensus exists on which one is best [34]. The responsiveness of the questionnaires was analysed using both distribution-based and anchor-based methods, and the overall results indicate that the M-ODQ and M-RMDQ have acceptable responsiveness suitable for both clinical and research use.

The distribution-based approach was evaluated using *ES* and *SRM*, while the anchor-based approach was examined through correlations with external criterion measures and ROC curve analysis [12, 23]. External criterion measures included the 7-point GPE scale, VAS, Stark QoL questionnaire, and BPS, with a four-week interval to detect changes, which is consistent with previous reports [35–37].

The M-ODQ and M-RMDQ demonstrated moderate to large responsiveness, with *ES* values of 0.73 and 0.66 for the improved group, respectively. The Brazilian-Portuguese ODQ showed an *ES* of 0.78 in the improved group [17], which is consistent with the findings of the present study. In contrast, studies on the Italian and German versions of the ODQ reported larger *ES* values of 0.84 [12] and 1.27 [38], respectively. The *ES* of the M-RMDQ was smaller than that of the Brazilian-Portuguese RMDQ (0.89 for the improved group) [17]. The *SRM* values of 0.85 and 0.78 for M-ODQ and M-RMDQ indicate moderate to large responsiveness, which aligns with findings reported by Frost *et al*. [39] (*SRM* = 0.86 and 0.70) and Monticone *et al*. [12] (*SRM* = 0.80 and 0.81). *AUC* values of 0.724 and 0.718 for M-ODQ and M-RMDQ further indicate acceptable discriminative ability, which is consistent with Korean (*AUC* = 0.70) [13], Italian (*AUC* = 0.71) [12], and Brazilian-Portuguese (*AUC* = 0.73) [17] versions. The Nepali and Danish ODQ studies reported higher *AUC* values of 0.88 [5] and 0.82 [18], respectively. For the RMDQ, the Brazilian-Portuguese and German versions demonstrated high *AUC*s of 0.83 [17] and 0.84 [38], whereas the Italian and Hong Kong Chinese versions showed lower values of 0.64 [12] and 0.68 [8], respectively.

The comparable *ES*, *SRM*, and *AUC* values with international studies support the robustness of the M-ODQ and M-RMDQ in detecting clinically meaningful changes. Differences in findings across studies may be explained by variations in follow-up duration, patient population, and anchor measures. For instance, longer follow-up periods in previous studies (6–8 weeks) [8, 13] may have contributed to higher responsiveness compared with the 4-week follow-up in this study. Moreover, the appropriate selection of patient-reported measures, such as the subjective GPE scale, is crucial for detecting clinical changes during the study period and contributes to determining responsiveness. A 7-point GPE scale was used in this study because it is recommended for better discrimination of change in ROC analysis [12]. In contrast, previous studies used 15-point or 21-point global rating scales as external criteria for responsiveness [8, 10]. Additionally, differences in chronicity of pain and intervention types may influence responsiveness.

Our correlation analyses revealed fair to moderate relationships between the M-ODQ and M-RMDQ and the GPE, VAS, Stark QoL questionnaire, and BPS, with *rho* values ranging from –0.341 to 0.527. This indicates that both instruments can capture changes in patient-perceived outcomes, pain intensity, QoL, and mobility-related disability. Monticone *et al.* [12] similarly reported fair to moderate correlations between ODQ and RMDQ with external measures, including VAS (*rho* = 0.539 and 0.474), GPE (*rho* = 0.431 and 0.287), and QoL (*rho* = –0.332 and –0.517), respectively. In a study of 63 individuals with chronic LBP, Mannion *et al*. [38] reported moderate correlations of the German versions of the ODQ and RMDQ with a 5-point GPE scale (*rho* = 0.69 and 0.67, respectively). Variations in global outcome scales, sample size, and patient characteristics likely account for some discrepancies across studies.

In summary, the M-ODQ and M-RMDQ demonstrated acceptable responsiveness as assessed by *ES*, *SRM*, *AUC*, and correlations with external criteria. Their performance was comparable to other validated language versions, supporting their applicability in both clinical and research contexts for detecting meaningful changes among individuals with subacute and chronic nonspecific LBP in the Myanmar population. Although no significant difference was observed between the *AUC*s of the two instruments, they should not be used interchangeably, as each questionnaire captures distinct aspects of patient-reported outcomes. Administering both instruments together is therefore recommended to ensure comprehensive assessment of LBP-related disability. Furthermore, our findings on the questionnaire responsiveness align with broader evidence that daily physical activity contributes to the prevention of LBP, reinforcing the importance of outcome measures that capture functional improvement and support interventions aimed at enhancing mobility and quality of life [6].

Limitations

This study has several limitations. First, 12 participants (11.8%) were lost to follow-up; although this attrition rate is acceptable, it may have reduced statistical power and increased the risk of type II error. Second, no validated Myanmar-language QoL measure was available. We therefore used the image-based Stark QoL questionnaire in the correlation analysis, which may have affected our results. Previous studies used culturally validated language versions of the Short Form-36 (SF-36), which provides a detailed assessment of an individual's QoL. The physical component of the Stark QoL questionnaire included only six activities related to physical function, whereas the physical functioning component of the SF-36 consists of ten types of physical activities to assess the physical function of an individual. The mental component of the Stark QoL questionnaire covered aspects of mental health assessment, together with social

engagement and energy levels, while the mental component of the SF-36 contains more specific components measuring mental health. Third, no pain intensity criterion was applied for inclusion, which may have influenced participants' levels of disability. Future studies should therefore focus on specific pain intensity levels and examine correlations with additional external criteria, including biopsychosocial and fear-avoidance measures.

Conclusions

The M-ODQ and M-RMDQ demonstrated acceptable responsiveness to clinical change in individuals with subacute and chronic nonspecific LBP after the intervention. Therefore, the M-ODQ and M-RMDQ can be applied in both clinical practice and research involving the Myanmar population with subacute and chronic nonspecific LBP. Moreover, using both questionnaires together may be beneficial for evaluating LBP-related disability and for guiding appropriate interventions in individuals with nonspecific LBP.

Acknowledgements

The authors would like to thank all the individuals who participated in this study.

Ethical approval

The research related to human use complied with all the relevant national regulations and institutional policies, followed the tenets of the Declaration of Helsinki, and was approved by the Research Ethics Review Committee for Research Involving Human Research Participants, Chulalongkorn University (approval No.: 102/65, letter dated 11 May 2022).

Informed consent

Informed consent was obtained from all individuals included in this study.

Disclosure statement

No author has any financial interest or received any financial benefit from this research.

Conflict of interest

The authors state no conflict of interest.

Funding

This research was supported by Faculty of Allied Health Sciences Endowment Fund Chulalongkorn University, Bangkok, Thailand.

References

[1] Atlas SJ, Deyo RA. Evaluating and managing acute low back pain in the primary care setting. J Gen Intern Med. 2001;16(2):120–31; doi: 10.1111/j.1525-1497.2001.91141.x.
[2] Pensri P, Foster NE, Srisuk S, Baxter GD, McDonough SM. Physiotherapy management of low back pain in Thailand: a study of practice. Physiother Res Int. 2005;10(4): 201–12; doi: 10.1002/pri.16.
[3] Walker BF. The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. J Spinal Disord. 2000;13(3):205–17; doi: 10.1097/00002517-200006000-00003.
[4] Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. Best Pract Res Clin Rheumatol. 2010;24(6):769–81; doi: 10.1016/j.berh.2010.10.002.
[5] Binaya K, Kajal T, Ranjeeta AS, Govinda N. Responsiveness of Nepali version of Oswestry Disability Index (ODI) on individuals with non-specific low back pain. J Patient Rep Outcomes. 2021;5:67; doi: 10.1186/s41687-021-00343-9.
[6] Opara J, Polak A. The role of daily physical activity in preventing low back pain. Physiother Quart. 2025;33(3): 13–9; doi: 10.5114/pq/1991126.
[7] Ma C, Wu S, Xiao L, Xue Y. Responsiveness of the Chinese version of the Oswestry Disability Index in patients with chronic low back pain. Eur Spine J. 2011;20:475–81; doi: 10.1007/s00586-010-1624-2.
[8] Tsang RC. Measurement properties of the Hong Kong Chinese version of the Roland Morris Disability Questionnaire. Hong Kong Physiother J. 2004;22(1):40–9; doi: 10.1016/S1013-7025(09)70049-1.
[9] Hartvigsen J, Hancock M, Kongsted A, Louw Q, Ferreira ML, Genevay S, Hoy D, Karppinen J, Pransky G, Sieper J, Smeets RJ, Underwood M; Lancet Low Back Pain Series Working Group. What low back pain is and why we need to pay attention. Lancet. 2018;391:2356–67; doi: 10.1016/S0140-6736(18)30480-X.
[10] Perillo M, Bulbulian R. Responsiveness of the Bournemouth and Oswestry questionnaires: a prospective pilot study. J Manipulative Physiol Ther. 2003;26(2):77–86; doi: 10.1067/mmt.2003.6.
[11] Oo PS, Akkradate S, Praneet P. Cross-cultural adaptation of the Roland-Morris Disability Questionnaire for individuals with low back pain in Myanmar: psychometric validation study. J Health Sci Altern Med. 2023;5(3): 44–53; doi: 10.14456/jhsam.2023.16.
[12] Monticone M, Baiardi P, Vanti C, Ferrari S, Pillastrini P, Mugnai R, Foti C. Responsiveness of the Oswestry Disability Index and the Roland Morris Disability Questionnaire in Italian subjects with sub-acute and chronic low back pain. Eur Spine J. 2012;21:122–9; doi: 10.1007/s00586-011-1959-3.
[13] Moon J, Kim YC, Park SY, Lee SC, Choi SP, Nahm FS, Lee PB, Goo EK, Kang J-M. Psychometric characteristics of the Korean version of the Roland-Morris Disability Questionnaire. J Korean Med Sci. 2011;26(10): 1364–70; doi: 10.3346/jkms.2011.26.10.1364.
[14] Mbada CE, Oguntoyinbo OE, Fasuyi FO, Idowu OA, Odole AC, Ayanniyi O, Johnson OE, Orimolade EA, Oladiran AB, Fatoye F. Cross-cultural adaptation and psychometric evaluation of the Yoruba version of Oswestry Disability Index. PLOS ONE. 2020;15(1):e0221138; doi: 10.1371/journal.pone.0221138.
[15] Oo PS, Siriphorn A, Pensri P. The Myanmar version of the Oswestry Disability Questionnaire: a cross-cultural adaptation, reliability and validity study in the low back pain population. J Health Sci Med Res. 2024;43(1):20241078; doi: 10.31584/jhsmr.20241078.
[16] Vianin M. Psychometric properties and clinical usefulness of the Oswestry Disability Index. J Chiropr Med. 2008;7(4):161–3; doi: 10.1016/j.jcm.2008.07.001.
[17] Coelho RA, Siqueira FB, Ferreira PH, Ferreira ML. Responsiveness of the Brazilian Portuguese version of the Oswestry Disability Index in subjects with low back pain. Eur Spine J. 2008;17(8):1101–6; doi: 10.1007/s00586-008-0690-1.
[18] Lauridsen HH, Hartvigsen J, Manniche C, Korsholm L, Grunnet-Nilsson N. Danish version of the Oswestry disability index for patients with low back pain. Part 2: sensitivity, specificity and clinically significant improvement in two low back pain populations. Eur Spine J. 2006;15: 1717–28; 10.1007/s00586-006-0128-6.
[19] Chou R. Low back pain (chronic). BMJ Clin Evid. 2010; 2010:1116.

[20] Hüllemann P, Keller T, Kabelitz M, Gierthmühlen J, Freynhagen R, Tölle T, Forstenpointner J, Baron R. Clinical manifestation of acute, subacute, and chronic low back pain in different age groups: low back pain in 35,446 patients. Pain Pract. 2018;18(8):1011–23; doi: 10.1111/papr.12704.
[21] Roland M, Fairbank J. The Roland–Morris disability questionnaire and the Oswestry disability questionnaire. Spine. 2000;25(24):3115–24; doi: 10.1097/00007632-200012150-00006.
[22] Boonstra AM, Preuper HRS, Reneman MF, Posthumus JB, Stewart RE. Reliability and validity of the visual analogue scale for disability in patients with chronic musculoskeletal pain. Int J Rehabil Res. 2008;31(2):165–9; doi: 10.1097/mrr.0b013e3282fc0f93.
[23] Hardt J. A new questionnaire for measuring quality of life-the Stark QoL. Health Qual Life Outcomes. 2015;13:174; doi: 10.1186/s12955-015-0367-5.
[24] Strand LI, Moe-Nilssen R, Ljunggren AE. Back Performance Scale for the assessment of mobility-related activities in people with back pain. Phys Ther. 2002;82(12):1213–23.
[25] Davidson M, Keating JL. A comparison of five low back disability questionnaires: reliability and responsiveness. Phys Ther. 2002;82(1):8–24; doi: 10.1093/ptj/82.1.8.
[26] Chiarotto A, Maxwell LJ, Terwee CB, Wells GA, Tugwell P, Ostelo RW. Roland-Morris Disability Questionnaire and Oswestry Disability Index: which has better measurement properties for measuring physical functioning in nonspecific low back pain? Systematic review and meta-analysis. Phys Ther. 2016;96(10):1620–37; doi: 10.2522/ptj.20150420.
[27] Evans R, Bronfort G, Maiers M, Schulz C, Hartvigsen J. "I know it's changed": a mixed-methods study of the meaning of global perceived effect in chronic neck pain patients. Eur Spine J. 2014;23(4):888–97; doi: 10.1007/s00586-013-3149-y.
[28] Alrwaily M, Schneider M, Sowa G, Timko M, Whitney SL, Delitto A. Stabilization exercises combined with neuromuscular electrical stimulation for patients with chronic low back pain: a randomized controlled trial. Braz J Phys Ther. 2019;23(6):506–15; doi: 10.1016/j.bjpt.2018.10.003.
[29] Koldaş Doğan Ş, Sonel Tur B, Kurtaiş Y, Atay MB. Comparison of three different approaches in the treatment of chronic low back pain. Clin Rheumatol. 2008;27(7):873–81; doi: 10.1007/s10067-007-0815-7.
[30] Palmer E. Hot packs. Glendale: Cinahl Information Systems, a division of EBSCO Information Services; 2021.
[31] Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HCW. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34–42; doi: 10.1016/j.jclinepi.2006.03.012.
[32] Ward MM, Marx AS, Barry NN. Identification of clinically important changes in health status using receiver operating characteristic curves. J Clin Epidemiol. 2000;53(3):279–84; doi:10.1016/S0895-4356(99)00140-7.
[33] DeLong ER, DeLong DM, Clarke-Pearson DL. Comparing the areas under two or more correlated receiver operating characteristic curves: a nonparametric approach. Biometrics. 1988;44(3):837–45; doi:10.2307/2531595.
[34] Husted JA, Cook RJ, Farewell VT, Gladman DD. Methods for assessing responsiveness: a critical review and recommendations. J Clin Epidemiol. 2000;53(5):459–68; doi: 10.1016/S0895-4356(99)00206-1.
[35] Bejia I, Younes M, Kamel BS, Letaief M, Touzi M, Soltani M, Bergaoui N. Validation of the Tunisian version of the Roland-Morris questionnaire. Eur Spine J. 2005;14(2):171–4; doi: 10.1007/s00586-004-0730-4.
[36] Costa LOP, Maher CG, Latimer J, Ferreira PH, Pozzi GC, Ribeiro RN. Psychometric characteristics of the Brazilian-Portuguese versions of the functional rating index and the Roland Morris disability questionnaire. Spine. 2007;32(17):1902–7; doi: 10.1097/BRS.0b013e31811eab33.
[37] Payares K, Lugo LH, Restrepo A. Validation of the Roland Morris Questionnaire in Colombia to evaluate disability in low back pain. Spine. 2015;40(14):1108–14; doi: 10.1097/BRS.0000000000000963.
[38] Mannion AF, Junge A, Grob D, Dvorak J, Fairbank JCT. Development of a German version of the Oswestry Disability Index. Part 2: sensitivity to change after spinal surgery. Eur Spine J. 2006;15:66–73; doi: 10.1007/s00586-004-0816-z.
[39] Frost H, Lamb SE, Stewart-Brown S. Responsiveness of a patient specific outcome measure compared with the Oswestry Disability Index v2.1 and Roland and Morris Disability Questionnaire for patients with subacute and chronic low back pain. Spine. 2008;33(22):2450–7; doi: 10.1097/BRS.0b013e31818916fd.

Supplementary materials

Lumbar stabilization exercises program

The lumbar stabilization exercises programme includes stabilisation exercises with emphasis on abdominal bracing exercises in supine position. It consists of 4 abdominal bracing exercises in supine, supine with heel slide, supine with leg lifts, and supine with bridging. The exercise programmes are home-based independent programmes run for 4 weeks, with exercise sessions 2 times *per* week.

1. Abdominal bracing (supine)
Lie on your back with your knees bent. Tighten your stomach muscles without pressing your back flat to the floor (Figure S1). Hold for 8 s, counting aloud to avoid holding your breath. Relax and repeat to 30 repetitions.

Figure S1



2. Abdominal bracing (supine with heel slide)
Lie on your back with knees bent (Figure S2a). While tightening your stomach muscles, slide the heel of one foot away from you until your knee is straight (4 s count) (Figure S2b). Then, slide your heel back toward you until your knee is in its original bent position (4 s count) (Figure S2a). Relax and repeat 20 repetitions for each leg.

Figure S2a



Figure S2b



3. Abdominal bracing (supine with leg lifts)
Lie on your back with knee bent (Figure S3a). While tightening your stomach muscles, lift one foot about 6 in off the floor for a 4 s count. Then, return it to the floor at a 4 s count. Relax and repeat 20 repetitions for each leg.

Figure S3a



Figure S3b



4. Abdominal bracing (supine with bridging)
Lie on your back with knees bent (Figure S4a). While tightening your stomach muscles, tighten your buttocks and slowly lift them off the floor (Figure S4b). Do not allow your back to arch. Hold for 8 s and then relax and repeat to 30 repetitions.

Figure S4a



Figure S4b



Copyright: © 2026 Wroclaw University of Health and Sport Sciences. This is an Open Access journal distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) (https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode), allowing third parties to download and share its works but not commercially purposes or to create derivative works.