

TRANSLATION, CULTURAL ADAPTATION AND VALIDATION OF URDU VERSION OF RONALD MORRIS LOW BACK PAIN AND DISABILITY QUESTIONNAIRE IN PAKISTANI POPULATION

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HIGHLIGHTS

- A cross-sectional study was conducted in Lahore, Pakistan, to translate the original Ronald Morris low back pain and disability questionnaire in Urdu to adapt culturally and to measure the psychometric properties of the Urdu version of the scale.
- The Urdu version of this scale demonstrated very good test-retest reliability, (ICC= 0.846 (0.808-0.880); CI=95 percent). Cronbach's alpha was 0.860, indicating that it has very good internal consistency.
- The study found a strong correlation between Ronald Morris low back pain and disability questionnaire and the visual analog scale which means that this scale has strong convergent validity.

ABSTRACT

Background:

The most common cause of disability is low back pain and it is common in every population, especially in the older generation. The most prevalent type of low back pain is non-specific low back ache. Low back pain is causing functional disabilities in both populations belonging to developed and underdeveloped countries.

Objective: To translate, culturally adapt and validate the Urdu version of Ronald Morris low back pain and disability questionnaire in the Pakistani population.

Materials and Methods: The translation and cultural adaptation were performed in this study on 150 participants (86 men and 64 women)

within one year. Kline method was used to calculate sample size and guidelines were followed to conduct this cross-sectional study. Data were taken with a gap of 48 hours for test re-test reliability, whereas the visual analog scale and Oswestry disability index-Urdu were used to measure validity. **Results:** The Urdu version of Ronald Morris low back pain and disability questionnaire demonstrated very good test-retest reliability (ICC= 0.846 (0.808-0.880); CI=95 percent). Cronbach's alpha was 0.860, indicating that it has very good internal consistency. The item-total correlation value is 0.23, confirming that the Urdu version of the this questionnaire is internally consistent. Pearson's correlation coefficient was used to assess the convergence validity. The study found a strong correlation between Ronald Morris low back pain and disability questionnaire and the visual analog scale, which means that this scale has strong convergent validity.

Conclusion: Ronald Morris low back pain and disability questionnaire-Urdu Version is a reliable and valid instrument to measure low back pain and disability in the Pakistani population with excellent psychometric properties.

Keywords: Oswestry disability index, Ronald Morris low back pain and disability questionnaire, translation, validity, visual analog scale

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INTRODUCTION

The most common cause of disability is low back pain, which is common in every population, especially in the older generation.¹ Low back pain is not a disease but a symptom. Low back pain has many causes, just like headaches and dizziness. The most prevalent type of low back pain is non-specific low back ache. Low back pain is causing functional disabilities in both populations belonging to developed and underdeveloped countries. It is the sixth number in terms of overall disease burden. Low back pain can also occur with other pain disorders, like headaches, irritable bowel syndrome, pelvic girdle pain, migraine, and other musculoskeletal pains. It can also occur with other health disorders like anxiety and depression. Low back pain can be complex and multidimensional.² Ronald Morris low back pain and disability questionnaire (RMDQ) is the most common questionnaire to assess low backache and disabilities related to low back pain. The RMDQ is one of the most extensively utilized and well-known disease-specific primary outcomes in back pain research. The questionnaire was developed by Martin Ronald in the year 1983. This questionnaire contains 24 item questions about daily life functioning and was designed to use in the primary care system. It is an excellent tool to assess the level of disability in individuals suffering from low back pain. It has been the most common tool to assess low back pain since 1983. Despite many cultural adaptations and translations, the original questionnaire is mostly used around the world.³

This questionnaire is commonly used by researchers, and it is considered a standardized measure in many clinical trials. It is translated into over 35 languages and culturally adapted into shorter forms.⁴ Raheem undertook research in 2021 to interpret and inter-culturally modify

RMDQ into Hausa and test its psychometric qualities in a combined rural and urban population of patients suffering from low backache. The results of the study reveal that the RMDQ version in the Hausa language was successfully developed and proved to be an accurate tool for the measurement of functional disability in people having low back pain in Hausa culture. The study recommended the use of the Hausa version for future clinical and research purposes.⁵ In the year 2017, Chidozie Emmanuel Mbada conducted a study in which he translated the original version of Ronald Morris's low back pain and disability questionnaire into the Yoruba version. According to the findings of the study, the Yoruba version of the RMDQ has high validity and reliability, and it could be a useful clinical and research tool for Yoruba-speaking people with low backaches.⁶

Dana Maki conducted a study in the year 2014, aimed to culturally adapt and translate the modern standard Arabic version of RMDQ. The study also checked the psychometric properties like reliability and validity of the Arabic version of RMDQ. The results of the study found that the modern standard Arabic version of RMDQ has good acceptability, comprehensibility, and good internal consistency. The study recommends the use of the Modern Arabic version of RMDQ for Arabic speaking population.⁷ Although the RMDQ has been translated into over 35 languages, the Pakistani Urdu version is not yet constructed. By doing Urdu translation, it can be made sure that each clinical setup rather urban or rural in Pakistan can easily use the validated Urdu version of this questionnaire to evaluate the disability level of patients with low back pain in Pakistan. Patients can easily understand the questionnaire in their native language and can talk about the actual state of their condition. As a result, the objective of the study was to translate the RMDQ into a local language and evaluate its psychometric features.

MATERIAL AND METHODS

The translation and cultural adaptation were performed in this study on 150 participants (86 men and 64 women) within the duration of one year (November 2021- November 2022). Kline method was used to calculate sample size, and beaten guidelines were used to conduct this cross-sectional study.

STAGE I: Translation and Cross-Cultural Adaptation Process

Initial Translation: The first step in adaptation is forward translation; two professional translators completed two forward translations of the questionnaire from the source language (English) to the target language (Urdu). One translator was aware of the context in the RMDQ and provided clinical equivalency, whereas the other translator was unaware of the notions being quantified and had no clinical or medical background. Each translator submitted an audit document on the translation that they accomplished. Additional remarks were to be given to draw attention to difficult words or uncertainty. The written statement also summarized their reasons for their selections.

Synthesis of Translation: The second step of translation was completed by working from the original RMDQ. A synthesis of the first translator's (T1) and second translator's (T2) versions of the questionnaire was first conducted, which resulted in one common translation T-12 in the form of a written report. The 2 interpreters and an audio spectator sat down to synthesize the translation results in a written statement that meticulously documented the method for the synthesis and addressed and resolved each of the issues.

Backward Translation: The questionnaire was then translated back into its original language by a translator who worked from the T-12 version and was completely blind to the initial form. This is a validation procedure to ensure that the translated version contains the same item content as the

original versions. Back translation is one sort of validity check that identifies major discrepancies or conceptual flaws in the translation. The back-translations (BT1 and BT2) were created by two people who were native speakers of the original language (English). The two translators were not aware of the topics being investigated and had no medical training. The team was strengthened by the addition of a third, unbiased member. That person's responsibility was to act as a mediator in conversations about translation difficulties, as well as to create a written record of the process. The main motivations were to avoid knowledge bias and elicit unusual interpretations from the paraphrased questionnaire responses (T-12). Backward translation was used to create the B-12 questionnaire synthesis.

Expert Committee: Consent forms were signed by each member of the committee. This committee's composition was critical to achieving cross-cultural equivalency. The basic things were made up of translators (both forward and back translators), language professionals and methodologists and health professionals who took part in the procedure up to this moment. During that stage of the process, the original questionnaire developers kept in close connection with the expert panel. The expert committee was charged with developing an initial version of the questionnaire for field testing. Committee decisions were made to achieve equivalence between the source and target versions in four areas: Conceptual equivalence, experiential equivalence, idiomatic equivalence and semantic equivalence are all examples of equivalence.

Test of Prefinal Version: In the adaption process, the pretest was the final step. In this field test, the pre-final version of the new questionnaire was administered to individuals from the target context. Thirty people were put through the wringer. Each respondent filled out the questionnaire and is then questioned to find out what he or she believed each questionnaire item and response signified. The items' and

respondents' meanings were investigated. While this stage elaborates on how the person clarifies the questionnaire questions, it ignores construct reliability, validity and item response patterns, all of which are equally important in explaining effective cross-cultural adaptation. The explained procedure includes some quality assurance in terms of content validity.

Submission of Documentation for Appraisal:

All reports and forms were submitted to the instrument's creator or the committee in charge of keeping track of the translation at the end of the adaptation process. It is a method review, with all procedures taken as well as all required reports completed. The Adapted Version was tested further to explain the process of translating and adapting self-report health metrics. Cultural adaptation attempts to maintain consistency in the content and face validity of a questionnaire across the source and target versions. As a consequence, if the original version was reliable and genuine, the consequent version should be as well. It is strongly advised that, following the translation and adaption procedure, investigators confirm that the latest edition has demonstrated the measurement qualities needed for the target purpose. Both item-level properties like internal consistency and item-to-scale correlations, as well as score-level properties like responsiveness, construct validity, and reliability, should be preserved in the new tool.⁸

STAGE II: Psychometric Testing

A total no of 150 participants were included in the study. The sample size was determined by Kline method⁹ The study recruited 57.3% of male and 42.7% of female participants. The data were collected after approval by the University of Lahore's Institutional Review Board. The data was gathered at the University of Lahore Teaching Hospital's Department of Physical Therapy. Before collecting data, patients were asked to provide informed written consent. Patients between the ages 18 to 50¹⁰ having pain for at least 6 weeks¹¹ and those who are married,

willing and able to understand Urdu language were recruited in the study. Individuals using walking aid devices, with diagnosed fibromyalgia, or any other systematic or muscular disorder were not included in the study. Patients having sciatica, malignant tumors and infectious and visceral diseases¹² were also excluded from the study.

Participants and Testing:

Visual analog scale for pain, Oswestry disability index (ODI) Urdu version for disability in addition to the Urdu Version of RMDQ were filled by 150 individuals having low back pain and fulfilling the sampling criteria.

Reliability: The RMDQ-Urdu version was applied two times on two different occasions so that the test-retest reliability could be determined. To check intra-rater reliability, RMDQ-Urdu was reapplied 48 hours later. To minimize the clinical differences between the two assessments, no treatment was administered.

Validity: The correlation between RMDQ-Urdu, VAS and ODI Urdu¹³ was used to determine convergent validity. Pain intensity measured through the visual analog scale and RMDQ score have a strong positive relationship and so it can be documented that the Urdu version of the RMDQ scale has excellent convergent validity criterion validity. A p-value of <0.001 confirms the statistical significance of the relationship. Analysis was carried out on SPSS version 21. The quantitative variables were presented with mean $\pm$ SD and qualitative variables were presented with frequency and percentage. To determine reliability, measurement errors, internal consistency and test-retest reliability across repeated measures were used. The intra-class correlation coefficient (ICC) at 95 percent confidence intervals was used to determine test-retest reliability (CIs). Internal consistency was determined by Cronbach's alpha. To calculate measurement error, the standard error of measurement (SEM) and the smallest detectable change were used (SDC). SEM and SDC are calculated using the formulas $SEM = SD \sqrt{1 - ICC}$ ¹⁴

and $SDC=1.96 \times 2 \text{ SEM}$,¹⁵ respectively. If the SEM value is lower, the instrument is considered more reliable.¹⁶ SEM values of 2.15-6.5¹⁷ and SDC values of 6-13.7¹⁸ are considered acceptable.

RESULTS

The participants' mean age was 37.86 years, with a standard deviation of 6.46. Whereas participants were a minimum of 24 years and a maximum of 50 years. Out of total, 86(57.3%) participants were males and 64(42.7%) were females (Table I).

Table I: Descriptive Statistics for Age And Gender of Patients (n=150)

Variables	Minimum	Maximum	Mean	Standard Deviation
Age (years)	24.00	50.00	37.86	6.46
	Frequency		Percentage	
Gender	Male	86	57.3%	
	Female	64	42.7%	

The internal consistency (Cronbach's Alpha score) was assessed for every item of Urdu version-RMDQ and it was ranging between 0.841 to 0.860 which was interpreted as a very good item-to-item internal consistency (Table II).

Table II: Internal Consistency for Each Item of RMDQ-U

Items of RMDQ	Cronbach's Alpha Score	Items of RMDQ	Cronbach's Alpha Score
Q1	0.844	Q13	0.848
Q2	0.856	Q14	0.845
Q3	0.843	Q15	0.852
Q4	0.845	Q16	0.854
Q5	0.845	Q17	0.846
Q6	0.859	Q18	0.848
Q7	0.841	Q19	0.844
Q8	0.850	Q20	0.848
Q9	0.845	Q21	0.860
Q10	0.844	Q22	0.856
Q11	0.842	Q23	0.848
Q12	0.845	Q24	0.855

The Urdu-RMQ demonstrated test-retest reliability with 150 respondents ($ICC=0.846$ (0.808-0.880); $CI=95$ percent). Cronbach's alpha was 0.860, indicating that RMQ had very good internal consistency. Item total correlation value 0.23, confirming that the Urdu version of the RMQ is internally consistent. The RMQ SEM and SDC were 4.58 and 12.69, respectively (Table III).

Table III: Test-retest Reliability, Measurement Errors, Cronbach's Alpha and Item-Total Correlation Values For RMDQ Scale

Test-retest Reliability	
N	150
1 st measurement	14.15±5.51
2 nd measurement	14.12±5.43
Inter Item Correlation	0.23
Cronbach's alpha	0.860
ICC (95% CI)	0.846 (0.808-0.880)
SEM	4.58
SDC	12.69

Pearson correlation was used to quantify their relationship and its scoring plus interpretation was made according to the value ranging between -1 to +1. In this, 0 portrays no relationship, the value in plus presents a positive relationship whereas the correlation value in negative exhibits a negative relationship between both variables. Pain intensity measured through the visual analog scale and RMDQ score have a strong positive relationship and so it can be documented that the Urdu version of the RMDQ scale has excellent construct validity. A p-value of <0.001 confirms the statistical significance of the relationship. A strong positive relationship between all sections of ODI and RMDQ with a Pearson correlation value of 1 whereas; only one

section of ODI; "Sex life" had an insignificant p-value ($p=0.43$). On the whole, it can be stated that the Urdu version of the RMDQ scale has excellent criterion validity. A p-value of <0.001 confirms the statistical significance of the relationship. (Table IV)

Table IV: Pearson Correlation of RMDQ score with Visual Analogue Scale and with Oswestry Disability Index Scale

Variables	r	p-value
VAS vs. RMDQ on Day 1	1	<0.001
VAS vs. RMDQ at day 3	1	<0.001
RMDQ vs. ODI Pain Intensity	1	<0.001
RMDQ vs. ODI Personal Care	1	<0.001
RMDQ vs. ODI Lifting	1	<0.001
RMDQ vs. ODI Walking	1	<0.001
RMDQ vs. ODI Sitting	1	<0.001
RMDQ vs. ODI Standing	1	<0.001
RMDQ vs. ODI Sleeping	1	<0.001
RMDQ vs. ODI Sex life	1	0.43
RMDQ vs. ODI Social life	1	0.001
RMDQ vs. ODI Traveling	1	<0.001

DISCUSSION

The present study demonstrates that the RMDQ Urdu version is a useful tool to measure pain and disability on two variant occasions. Multicultural adaptation of Ronald Morris's low back pain and disability questionnaire in the Urdu language has been made in the study. First of all, the tool was translated from English to the Urdu language to regularize its psychometric properties in the respondents of low back pain and then Urdu RMDQ was used among the patients having low back pain. The tool was used again after 48 hours to check its validity. The results of the study found that RMDQ Urdu has excellent test-retest reliability and internal consistency in individuals

suffering from low backache. The Urdu version of RMDQ is simple to understand and apparent in concept to all populations.

Version changes of known and gold standard questionnaires are done to eradicate the cultural differences in terms of their psychometric properties. Step-by-step processes of translations were made that include forward and backward translation to convert the Original English version of RMDQ into Urdu RMDQ. After that, a critical analysis was made by the established review committee. Decisions were concluded after several steps of the translation procedure. A total of 150 participants with both gender having low back pain were added to the study.

Low back pain is a matter of concern globally.¹⁹ Increasing age, bad posture and non-ergonomic working conditions are the common risk factors for low back pain. In Pakistan, it is the most prevalent musculoskeletal disorder found in individuals belonging to different careers or fields affecting their daily life activities.²⁰⁻²³ Urdu is the National language of Pakistan that why its importance can't be neglected. As the population of people having low back pain is too high in Pakistan that's why the most common and reliable questionnaire RMDQ is converted into the Urdu language so that the Pakistani population can understand the questionnaire well and would be able to describe the actual state of their condition.

The RMDQ Urdu showed excellent test-retest reliability and good internal consistency just like the previous studies.^{6,24,25} The Test-retest reliability of 0.846, Cronbach's alpha value ($\alpha=0.86$) and strong convergent validity show that RMDQ Urdu is a very valid and reliable tool used for patients of low back pain in the Pakistani population. As per the author's best knowledge, it is the only study that not only translated the RMDQ original into Urdu language but also culturally adapted and validated the RMDQ Urdu in the Pakistani population. All the obstacles that were experienced during the translation and adaptation process were

efficiently resolved. The Expert review committee worked efficiently throughout the whole process. RMDQ Urdu is a very convenient and easy tool that should be used in all clinical setups. The present study recruited more men 57.3% than women 42.7%. Similar to the current study another study recruited more males 65.4% than females 34.6%²⁶ But in contrast to the current study, many studies recruited more females than males.^{7,27,28} Similar to the current study another study found the mean age of the participants 37.5 years²⁹ which is closer to the mean age observed in the current study which is 37.8 years.

Just like the other studies.^{12,26} ODI and RMDQ were compared in the current study. A positive correlation is found between ODI Urdu and RMDQ Urdu in the current study just like the other studies. But according to a study RMDQ is more suitable for mild to moderate disability while ODI is suitable for severe disability.³⁰ Strong correlation was found between pain intensity and RMDQ in the current study whereas another study found a low correlation between pain intensity and RMDQ.⁷ The standard error measurement observed for Amharic Version is 1.64²⁷ which is less than the SEM observed in the current study which is 4.58.

The Chinese Version of RMDQ used the same measures for validation¹² just like the current study. But the data was collected from patients ranging between ages 22-78 years while the current study collected data from patients ranging between the ages of 18-50 years. The Argentina version of RMDQ used the same inclusion and exclusion criteria¹¹ just like the current study but the sample size of the study was 132 while the current study worked on the sample size of 150 patients suffering from low back pain. The study performed the retest after 24 hours. While the current study performed the retest after 48 hours.

RMDQ is the most used tool to measure the level of pain and disability in individuals with low

backaches. Low back pain is a matter of concern globally and to assess the pain and disability RMDQ is translated in too many languages but the Urdu language for the Pakistani population was unavailable. That's why there was a need to convert the original English version into the Pakistani Urdu version so that the Pakistani population can easily read the Urdu questionnaire and will be able to talk about the actual state of their condition. As it is not an interventional study, no treatment was provided hence change over time or responsiveness was not calculated. As the test-retest was done after 48 hours it was not made sure that the condition of the patient remained unchanged. The memory effects could not be eradicated because of the short-interval retest. The psychometric properties of RMDQ Urdu were evaluated using a pre-defined hypothesis, which was the study's main strength. The use of two different scales to measure convergent validity was another strength of this study. The study recommends its use in clinics and hospital to assess low back pain.

CONCLUSION

Ronald Morris low back pain and disability questionnaire Urdu version is a valid and reliable tool with excellent psychometric properties. It is easy to use instrument for Urdu speaking population that can measure the level of disability and pain in individuals having low backache in Pakistan.

DECLARATIONS

Consent to Participate

Written consent had been taken from participants. All methods were performed following the relevant guidelines and regulations.

Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.

Competing interests: None

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