

Translation, Cultural Adaptation and Validation of the Urdu Version of Ronald Morris Low Back Pain and Disability Questionnaire in Pakistani Population

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Abstract

Background: The most common cause of disability is low back pain and it is common in every population especially in older generation. Low back pain is not a disease but a symptom instead. A most prevalent type of low back pain is non-specific low back ache. Low back pain is causing functional disabilities in both of the populations belong to developed and under developed countries. It is on sixth number in terms of overall disease burden.

Methodology: According to the pre-defined guidelines the translation and cultural adaptation was performed in the study. A total of 150 participants were recruited (86 men and 64 women). There were two stages to the research: 1) Translation and cultural adaptation 2) Testing for reliability and validity The final Urdu version of the RMDQ was tested for reliability (test-retest and internal consistency at 95% confidence interval) and validity (Convergent validity).

Results: The Urdu-RMDQ demonstrated very good test-retest reliability (ICC= 0.846 (0.808-0.880); CI=95 percent). Cronbach's alpha was 0.860, indicating that RMQ has very good internal consistency. The item total correlation value is 0.23, confirming that the Urdu version of the RMQ is internally consistent. Pearson's correlation coefficient was used to assess convergence validity. The study found strong correlation between RMDQ and Visual analogue scale that means RMDQ has strong convergent validity.

Conclusion: RMDQ Urdu is reliable and valid instrument to measure low back pain and disability in Pakistani population with excellent psychometric properties.

Background

The most common cause of disability is low back pain and it is common in every population especially in older generation.(1)Low back pain is not a disease but a symptom instead. There are many causes of low back pain just like headaches and dizziness.A most prevalent type of low back pain is non-specific low back ache. Low back pain is causing functional disabilities in both of the populations belong to developed and under developed countries. It is on sixth number in terms of overall disease burden.(2)Low back pain can occur with other pain disorders as well 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 in nature.(3)

RMDQ is most common questionnaire to assess low backache and disabilities related to low back pain.The RMDQ is one of most extensively utilized and well-known disease-specific primary outcome in back pain research.(4) The questionnaire was developed by Martin Ronald in year 1983.Ronald Morris low back pain and disability questionnaire contains 24 item questions (yes/no) about daily life functioning and was designed to use in primary care system. It is an excellent tool to assess the level of disability in individuals suffering from low back pain. It is the most common tool to assess the low back pain since 1983.Inspite of many cultural adaptations and translations, the original questionnaire is mostly used around the world.(5)

Ronald Morris low back pain and disability questionnaire is commonly used by the researchers and it is considered as a standardized measure in many clinical trials. This questionnaire is translated in more than 35 languages and culturally adapted in shorter forms.(6)Raheem undertook a research in 2021 to interpret and inter-culturally modify Roland-Morris Disability Questionnaire (RMDQ) into Hausa, as well as to 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 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 Hausa version for future clinical and research purposes.(7)

In year 2017 Chidozie Emmanuel Mbada conducted a study in which he translated the original version of Ronald Morris low back pain and disability questionnaire in 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.(8)Dana Maki conducted a study in year 2014.The aim of the study was to culturally adapt and translate the Modern Standard Arabic version of RMDQ. The study also checked the psychometric properties like reliability and validity of 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 Modern Arabic version of RMDQ for Arabic speaking population having.(9) 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 tell about the actual state of their condition. As a result, the objective of the study was to translate the RMDQ into a local language, evaluate its psychometric features (Validity and Reliability).

Methodology

The data for this cross-sectional study was gathered over nearly two years (November 2020 to November 2021). The research was split into two parts: translation and cross-cultural adaptation, and RMDQ Urdu version psychometric testing. All of the procedures were carried out in accordance with the pre-determined guidelines Informed consent was obtained from all the participants before allowing them to enter the 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 Ronald Morris Low Back Pain and Disability Questionnaire and

provided clinical equivalency, whereas the other translator was unaware of the notions being quantified and had no clinical and medical background. Each translator submitted an audit document on the translation that they accomplished. Additional remarks were given to draw attention to difficult words or uncertainty. The written statement also summarized their reasons for their selections.

SYNTHESIS OF THE 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 synthesis 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 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 from each member of the committee. This committee's composition was critical to achieving cross-cultural equivalency. The basic things were made up by translators (both forward and back translators), language professionals and methodologists, 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, semantic equivalence are all examples of equivalence..

TEST OF THE 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 individual 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 how the person clarify 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 translated at the end of the adaptation process. It is a method review, with all procedures were taken as well as all required reports were 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. (10)

Stage II: Psychometric testing

Total no of 150 participants were included in the study. The sample size was determined by kline method(11) 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 age 18 to 50 (12) having pain for at least 6 weeks (13), those who are married, willing and able to understand Urdu language were recruited in the study. Individuals using walking aid devices, with diagnosed fibromalgia, any other systematic or muscular disorder were not included in the study. Patients having sciatica, malignant tumors, infectious and visceral diseases (14) were also excluded from the study.

Participants and Testing:

Visual analogue scale for pain, ODI Urdu 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:

RMDQ-Urdu was applied two times at 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 Urdu (15) was used to determine convergent validity. Pain intensity measured through visual analogue scale and RMDQ score have a strong positive relationship and so it can be documented that Urdu version of RMDQ scale has excellent convergent validity criterion validity. P value of < 0.001 confirms the statistical significance of the relationship.

Data Analysis:

Analysis was carried out on SPSS version 21. 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 $SEM = SD \sqrt{1 - ICC}$ (16) and $SDC = 1.96 \times 2 \times SEM$, (17) respectively. If the SEM value is lower, the instrument is considered more reliable. (18) SEM values of 2.15–6.5 (18–24) and SDC values of 6–13.7 (18, 25–27) are considered acceptable.

Reliability Testing

The study used RMDQ-Urdu 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. Between both of the assessments no treatment was provided to minimize the clinical differences. The study discovered that test-retest reliability was very good (ICC = 0.846 (0.808–0.880); CI = 95 percent). Cronbach's alpha was 0.860 ($\alpha = 0.860$), indicating that RMQ had excellent internal consistency. Item total correlation value 0.23 which is also confirming that Urdu version of RMQ is internally consistent. SEM and SDC of RMQ was 4.58 and 12.69 respectively. Table 3

Validity Testing

The validity of RMDQ Urdu with VAS and ODI Urdu was tested using Pearson's correlation. According to the findings, there was a p 0.001 correlation between RMDQ and VAS. The study also found overall strong correlation between RMDQ and ODI Urdu. Table 4

Results

The participants' mean age was 37.86 years, with a standard deviation of 6.46. Whereas participants were minimum of 24 years and maximum of 50 years. Out of total, 86(57.3%) participants were males and 64(42.7%) were females. Table 1

Table 1
Descriptive statistics of age and gender of the patients (n = 150)

Variables	Minimum	Maximum	Mean	Std. Deviation
Age (years)	24.00	50.00	37.86	6.46
	Construct	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 interpreted as very good item to item internal consistency. Table 2

Table 2
Internal Consistency for every item of RMDQ.

Items of RMDQ	Cronbach's Alpha Score
Q1	0.844
Q2	0.856
Q3	0.843
Q4	0.845
Q5	0.845
Q6	0.859
Q7	0.841
Q8	0.850
Q9	0.845
Q10	0.844
Q11	0.842
Q12	0.845
Q13	0.848
Q14	0.845
Q15	0.852
Q16	0.854
Q17	0.846
Q18	0.848
Q19	0.844
Q20	0.848
Q21	0.860
Q22	0.856
Q23	0.848
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 3

Table 3
Test-retest reliability, measurement errors,
Cronbach's alpha and item-total correlation
values for RMQ scale

N	150
1st measurement	14.15 ± 5.51
2nd 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 ranged between - 1 to + 1. In this, 0 portrays no relationship, value in plus presents positive relationship whereas correlation value in negative exhibits negative relationship between both variables. Pain intensity measured through visual analogue scale and RMQ score have a strong positive relationship and so it can be documented that Urdu version of RMQ scale has excellent construct validity. P value of < 0.001 confirms the statistical significance of the relationship. A strong positive relationship between all sections of ODI and RMQ with Pearson correlation value of 1 whereas; only one section of ODI; "Sex life" had insignificant p value (p = 0.43). On the whole, it can be stated that Urdu version of RMQ scale has excellent criterion validity. P value of < 0.001 confirms the statistical significance of the relationship. Table 4

Table 4
Pearson Correlation of RMQ score with Visual Analogue Scale
and with Oswestry Disability Index Scale

Pearson Correlation of RMQ score with Visual Analogue Scale		
	r	p-value
Pain Intensity vs. RMQ at day 1	1	< 0.001
Pain Intensity vs. RMQ at day 3	1	< 0.001
Pearson Correlation of RMQ score with ODI Scale		
RMQ vs. ODI Pain Intensity	1	< 0.001
RMQ vs. ODI Personal Care	1	< 0.001
RMQ vs. ODI Lifting	1	< 0.001
RMQ vs. ODI Walking	1	< 0.001
RMQ vs. ODI Sitting	1	< 0.001
RMQ vs. ODI Standing	1	< 0.001
RMQ vs. ODI Sleeping	1	< 0.001
RMQ vs. ODI Sex life	1	0.43
RMQ vs. ODI Social life	1	0.001
RMQ 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 low back pain and disability questionnaire in Urdu language has been made in the study. First of all, the tool was translated from English to 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. 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 includes forward and backward translation to convert Original English version of RMDQ in to Urdu RMDQ. After that a critical analysis was made by established review committee. Decisions were

concluded after several steps of translation procedure. A total of 150 participants with both gender having low back pain were added in the study.

Low back pain is the matter of concern globally(28). Increasing age(29, 30),bad posture(31) and non-ergonomic working conditions(32–36) 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(37–42).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 in to 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.(8, 43, 44).The Test-retest reliability 0.846, Cronbach's alpha value ($\alpha = 0.86$) and strong convergent validity shows that RMDQ Urdu is very valid and reliable tool used for the patients of low back pain in Pakistani population. As per to the author's best knowledge it is the only study that not only translated the RMDQ original in to Urdu language but also culturally adapted and validated the RMDQ Urdu in 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 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 male 65.4% than female 34.6%(45)But in contrast to the current study many studies recruited more female than male(9, 46, 47)Similar to the current study another study found the mean age of the participants 37.5 years(48) which is closer to the mean age observed in the current study which is 37.8 years.

Just like the other studies(14, 45) 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.(49)Strong correlation was found between pain intensity and RMDQ in the current study whereas another study found low correlation between pain intensity and RMDQ(9).The standard error measurement observed for Amharic Version is 1.64(46) which is less than the SEM observed in current study that is 4.58.

The Chinese Version of RMDQ used same measures for validation(14) just like the current study. But the data was collected from the patients ranging between ages 22–78 years while the current study collected data from patients ranging between ages of 18–50 years. The Argentina version of RMDQ used the same inclusion and exclusion criteria(13) 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 backache. Low back pain is a matter of concern globally and to assess the pain and disability RMDQ is translated in to many languages but Urdu language for Pakistani population was unavailable. That's why there was a need to convert the original English version in to Pakistani Urdu version so that the Pakistani population can easily read the Urdu questionnaire and will be able to tell about the actual state of their condition.

Conclusion

RMDQ Urdu 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. The study recommends its use in clinics and hospital to assess low back pain.

Limitations

As it is not an interventional study, no treatment was provided hence change over time or responsiveness was not calculated. As test retest was done after 48 hours it was not made sure that the condition of patient was remain unchanged. The memory effects could not be eradicated because of short interval retest.

Strengths

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.

List Of Abbreviations

Abbreviations	Full form
RMDQ	Ronald Morris Low back pain and disability questionnaire
ODI	Oswestry Disability Index
ICC	Intraclass correlation coefficient
SRM	Standard response means
ES	Effect size
SEM	Standard error of measurement
VAS	Visual Analogue scale

Declarations

Ethics approval and consent to participate

While conducting the research, the laws and regulations established by Lahore University's ethical committee were observed, and the rights of the research participants were respected. The University of Lahore's Institutional Review Board (17th June 2021) gave ethical approval (IRBUOL-FAHS/889/2021), and all subjects signed a permission form. All methods were carried out in accordance with relevant guidelines and regulations. Informed consent was obtained from all the participants before allowing them to enter the study.

Consent for publication

Not Applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article [and its supplementary information files].

Competing interests

None declared

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Authors' contributions

MS, SAA and AA: Substantial contribution to study concept and design MS and SAA: Acquisition of Data. AA and FA: Analysis and Interpretation of Data. MS and AM: Drafting of the Manuscript. SAA, AA, AM: Critical revision of the Manuscript for important intellectual content MS, FA, and AA: Statistical Analysis. All Authors: Final approval of the manuscript.

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