Validation of the Spanish Version of the Roland-Morris Questionnaire

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Study Design. Validation of a translated, culturally adapted questionnaire.

Objectives. To translate and culturally adapt the Spanish version of the Roland-Morris Questionnaire (RMQ), and to validate its use for assessing disability in Spanish patients with low back pain (LBP).

Summary of Background Data. The RMQ is a reliable evaluation instrument for disability, but no validated Spanish version is available.

Methods. Translation/retranslation of the English version of the RMQ was done blindly and independently by four different individuals, and adapted by a team that included five primary care physicians, three back specialists, and two methodologists. The study was done in the primary care setting in Mallorca, with 195 patients who visited their physician for acute or chronic LBP: 50 in the pilot study and 145 in the validation study. Individuals were given the RMQ and three other scales (VAS, Oswestry, and EuroQol) on their first visit and 14 days later. For the pilot study, on the first visit, patients were also given a second RMQ with the questions in a different order and they were subsequently asked for comprehension of each item of the questionnaire.

Results. Only 2 questions were partially rephrased after the pilot study, and no request for aid in interpretation was made during the validation study. Scores of the two RMQs on day 1 were 10.04 (SD, 5.01) and 10.9 (SD, 4.8), with an intraclass correlation coefficient of 0.874. The 95% limits of agreement by the Bland-Altman method was 0.340 ± 4.81. Cronbach's α was 0.8375 (day 1) and 0.9140 (day 15) in the validation. Concurrent validity, measured by comparing RMQ responses with the results of VAS, was $r = 0.347$ ($P = 0.0000$) for day 1, and $r = 0.570$ ($P = 0.0000$) for day 15. Construct validity, tested by determining the correlation between the Spanish RMQ and the Spanish adaptation of the Oswestry Questionnaire, yielded $r = 0.197$ ($P = 0.0061$) on day 1 and $r = 0.341$ ($P = 0.0000$) on day 15.

Conclusions. The Spanish version of the RMQ has good comprehensibility, internal consistency, and reliability, and is an adequate and useful instrument for the assessment of disability caused by LBP. [Key Words: low back pain, disability evaluation, Spanish version, Roland-Morris Questionnaire] **Spine 2002;27:538–542**

Nonspecific or common low back pain (LBP) is defined as pain between the costal margins and the inferior gluteal folds, usually accompanied by painful limitation of movement and often influenced by physical activities and posture, that may be associated with referred pain. Diagnosing common LBP implies that the pain is not related to conditions such as fractures, spondylitis, direct trauma, or neoplastic, infectious, vascular, metabolic, or endocrine-related processes.[12,31]

LBP is one of the most frequent ailments in industrialized countries, with a lifetime prevalence of more than 70%,[1,9,12] and is responsible for a major portion of work absenteeism.[2,18,31] Because of health and labor costs, LBP is actually among the conditions that generate the greatest expense.[12,24,29,31]

LBP may have an impact on the functional status of the patient, interfering with basic activities like standing, walking, dressing, and many work-related activities. Although LBP may lead to disability, pain and disability are two different dimensions. In fact, it is possible to modify disability without modifying pain, and vice versa,[25] and each dimension seems to be associated with different risk predictors. Some biomechanic factors increase the risk of pain, but disability is more influenced by psychosocial factors.[5,8,16,25,31]

Measuring disability is important in LBP. First, as an outcome measure, it is an important indicator of the quality of life of the patient. In addition, in chronic patients, disability may also become an ailment of its own, somewhat independent of its initial cause, which needs treatment methods that are different from those used to treat pain.[31] Thus, early monitoring and reliable follow-up of disability are useful for identifying patients at a higher risk for chronic disability and for deciding treatment goals and methods at any given time. Because the intensity of pain and the degree of disability do not correlate, pain scales should not be used to measure disability.[30] Disability scales have been shown to correlate with

Table 1. Demographic Data

	Pilot Study (n = 50)	Validation Study (n = 145)
Age*	53.3 (±15.93)	44.26 (±22.24)
Sex [no. (%)]		
Male	19 (38)	72 (50)
Female	31 (62)	73 (50)
Profession [no. (%)]		
Blue collar	18 (36)	41 (28)
Intermediary level	6 (12)	18 (12)
White collar	2 (4)	7 (5)
Retired	2 (4)	4 (3)
Housewife	15 (30)	32 (22)
Others†	7 (14)	43 (30)

* Mean (SD).
† "Others" includes: students, those on disability, and unemployed.

disability better than scales that measure the intensity of pain, X Rays, MRIs, and CT Scans.[11,13,19,27,28]

One of the most widely used and validated scales for measuring disability is the Roland-Morris Questionnaire (RMQ).[26] It is simple, fast, and can be filled out by the patient. It consists of 24 items, which reflect limitation in different activities of daily living attributed by the patient to LBP. The patient must mark each item that applies to his or her current status. Scoring is also simple and fast; each checked item receives a score of 1, so scores range between 0 (no disability caused by LBP) and 24 (the maximum possible disability).

To date, no Spanish version of the RMQ has been validated. Therefore, the objectives of this study were to translate into Spanish and culturally adapt the RMQ, and to validate its use among Spanish back pain patients.

■ **Methods**

The study was carried out in three phases: the first was translation into Spanish and cultural adaptation of the questionnaire; the second was a pilot study to assess the comprehensibility and reproducibility of the Spanish version; and the third was a validation study to determine its metric characteristics.

Translation. The questionnaire was translated into Spanish by two different and independent native Spanish speakers, who were both unaware of the purpose of the translation and of the fact that another translator was doing the same task. Both Spanish translations were then compared for inconsistencies. The two translations were then retranslated, also blindly and independently, into English by two native English speakers. Each of the English translations was then compared with the original English RMQ and checked for inconsistencies.

The Spanish version was then jointly reviewed by a bilingual team including the four translators, five primary care physicians, three back specialists, and two methodologists to assess the necessity of performing a cultural adaptation and to fine-tune it for use among Spanish patients. They again compared the Spanish version with the original English version to detect errors of interpretation and nuances that might have been missed. This version was finalized after slight changes were made by consensus.

Pilot Study. The pilot study was carried out with 50 patients, who consulted their physician for acute or chronic LBP in the Primary Care Centers of the Spanish National Health System in Mallorca, and had the lowest educational level possible without being illiterate.

Each patient was given the RMQ twice on the day of admission to the study (day 1) and once 14 days later (day 15). At both visits, patients were also given the validated Spanish versions of three other scales; one for measuring pain (Visual Analogue Scale, VAS),[20] one for measuring disability associated with LBP (Oswestry's Self Applied Questionnaire of Lumbar Pain Disability),[15,17] and one for measuring general quality of life (EuroQol).[3,14]

On day 1, each patient was given a first RMQ, which was identified as the "Roland questionnaire." To assess repeatability, 30 minutes after filling out the VAS, Oswestry, and Euro-Qol, the patient was given a second RMQ, which was called the "Morris questionnaire," and listed the questions in a different order. After filling out the "Morris questionnaire," each patient was asked by the clinician about his or her comprehension of the meaning of each one of the questions.

Validation Study. The validation study was carried out with the final Spanish version of the RMQ on 145 individuals that were selected in the same manner and using the same inclusion criteria as the pilot study, with the exception of the requirement for a low educational level, which was removed.

The patients were given the RMQ once on the day they consulted their physician for LBP (day 1), and again 14 days later (day 15). Each time, they were also given the Spanish versions of the VAS, Oswestry, and EuroQol scales.

Analysis. Comprehension was estimated in the pilot study from the patients' answers to the questions exploring their understanding of each item on the questionnaire, and was measured in both the pilot and validation studies by the patients' requests for aid in interpretation.

Test-retest reliability was measured in the pilot study, comparing the results of the first and second RMQs, identified, respectively, as "Roland" and "Morris" questionnaires.

Cronbach's alpha[6] was used to evaluate internal consistency, and reliability was assessed with Bland and Altman's[7] limits of agreement and the intraclass correlation coefficient.[4] Validity was measured by the linear correlation coefficient.[22]

■ **Results**

Table 1 contains sex, age, and occupational level of the study subjects in both the pilot and validation studies, and Table 2 contains the mean values for scores on the RMQ, VAS, Oswestry, and EuroQol scales for days 1 and 15.

At the end of the pilot study, no patient had asked for aid in interpretation, but five of them had expressed concern about the exact meaning of two questions on the RMQ. These questions were then modified slightly, based on the patients' suggestions and comments made by the clinicians who administered the questionnaire. The final version of the Spanish RMQ was thus established and used in the validation study (Table 3). There were no requests for aid in interpretation in the validation study.

The RMQ and VAS had no missing values; the Oswestry Questionnaire had a total of 38 in both the pilot and validation studies, and the EuroQol had 26.

Table 2. Mean Scores

	Pilot Study (n = 50)	Validation Study (n = 145)
RMQ		
Day 1	10.56 (±4.99)	9.86 (±5.02)
Day 15	6.17 (±5.57)	5.50 (±5.67)
VAS		
Day 1	5.36 (±2.17)	6.21 (±2.15)
Day 15	2.80 (±2.67)	3.02 (±2.71)
Oswestry		
Day 1	30.29 (±15.15)	21.78 (±18.94)
Day 15	19.79 (±16.92)	16.11 (±15.52)
EuroQol		
Day 1	0.49132 (±0.31899)	0.35925 (±0.33963)
Day 15	0.73119 (±0.24528)	0.62411 (±0.36180)

Values are mean (SD).

A comparison of the scores of the two RMQs on day 1 yielded: Roland = 10.04 (SD, 5.01) and Morris = 10.9 (SD, 4.8), with an intraclass correlation coefficient for both of 0.874. The 95% limits of agreement by the Bland-Altman method were 0.340 ± 4.81.

Internal consistency was assessed with Cronbach's α, which was 0.8375 (day 1) and 0.9140 (day 15) in the validation study.

Concurrent validity was measured by comparing the responses to the RMQ with the results of the Visual Analogical Scale for self-rated pain (10 cm). The RMQ/VAS showed a positive correlation for day 1, ($r = 0.347$ [$P = 0.0000$]), and for day 15, ($r = 0.570$ [$P = 0.0000$]).

Construct validity was tested by determining the correlation between the Spanish version of the RMQ and the Spanish adaptation of Oswestry's Self-applied Questionnaire of Lumbar Pain Disability. The resulting correlation was, for day 1, ($r = 0.122$ [$P = 0.2282$]) and for day 15, ($r = 0.326$, [$P = 0.0044$]).

A detailed analysis of the correlation of the results of the VAS, RMQ, Oswestry, and EuroQol scales was not the objective of this study, and will be described in a forthcoming manuscript.

■ Discussion

The results of this study indicate that the Spanish version of the RMQ is a reliable and valid instrument for the measurement of disability in Spanish-speaking patients with LBP.

The need for a low educational level in the subjects for the pilot study was for obvious reasons: if patients with a low sociocultural level could understand it, then it would pass the test of comprehensibility. In spite of having the lowest educational level possible without being illiterate, only five of them, out of 50, expressed concern about the exact meaning of two questions of the Spanish version of the RMQ. After slight modifications of these two questions were made according to the patients' suggestions, none of the 145 patients in the validation study requested aid in interpretation, suggesting the adequate comprehensibility of the final Spanish version of the RMQ.

Reliability was measured in the pilot study on the same day, by giving the patient two RMQs. To avoid

recall bias, both questionnaires had a different name on top ("Roland" for the first one and "Morris" for the second one), a 30-minute interval was observed between both tests and, meanwhile, the patients were asked to fill out the VAS, Oswestry and EuroQuol scales. In addition, the questions were in a different order in the Roland and the Morris questionnaires. Although the change in the order of the questions might alter the results, because a patient may consider a previous question in answering the next, it was felt that this risk was worthwhile to avoid recall bias. In fact, the intraclass correlation coefficient between both questionnaires was more than 0.87, showing a good reliability in spite of the different order of the questions. None of the patients identified the Roland and the Morris questionnaires as being the same, suggesting that

Table 3. Spanish Version of the Roland-Morris Questionnaire

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Cuando su espalda le duele, puede que le sea difícil hacer algunas de las cosas que habitualmente hace. Esta lista contiene algunas de las frases que la gente usa para explicar cómo se encuentra cuando le duele la espalda (o los riñones). Cuando las lea, puede que encuentre algunas que describan su estado de *hoy*. Cuando lea la lista, piense en cómo se encuentra usted *hoy*. Cuando lea usted una frase que describa como se siente hoy, póngale una señal. Si la frase no describe su estado de hoy, pase a la siguiente frase. Recuerde, tan solo señale la frase si está usted seguro de que describe cómo se encuentra usted hoy.

1. Me quedo en casa la mayor parte del tiempo por mi dolor de espalda.
2. Cambio de postura con frecuencia para intentar aliviar la espalda.
3. Debido a mi espalda, camino más lentamente de lo normal.
4. Debido a mi espalda, no puedo hacer ninguna de las faenas que habitualmente hago en casa.
5. Por mi espalda, uso el pasamanos para subir escaleras.
6. A causa de mi espalda, debo acostarme más a menudo para descansar.
7. Debido a mi espalda, necesito agarrarme a algo para levantarme de los sillones o sofás.
8. Por culpa de mi espalda, pido a los demás que me hagan las cosas.
9. Me visto más lentamente de lo normal a causa de mi espalda.
10. A causa de mi espalda, sólo me quedo de pie durante cortos períodos de tiempo.
11. A causa de mi espalda, procuro evitar inclinarme o arrodillarme.
12. Me cuesta levantarme de una silla por culpa de mi espalda.
13. Me duele la espalda casi siempre.
14. Me cuesta darme la vuelta en la cama por culpa de mi espalda.
15. Debido a mi dolor de espalda, no tengo mucho apetito.
16. Me cuesta ponerme los calcetines - o medias - por mi dolor de espalda.
17. Debido a mi dolor de espalda, tan solo ando distancias cortas.
18. Duermo peor debido a mi espalda.
19. Por mi dolor de espalda, deben ayudarme a vestirme.
20. Estoy casi todo el día sentado a causa de mi espalda.
21. Evito hacer trabajos pesados en casa, por culpa de mi espalda.
22. Por mi dolor de espalda, estoy más irritable y de peor humor de lo normal.
23. A causa de mi espalda, subo las escaleras más lentamente de lo normal.
24. Me quedo casi constantemente en la cama por mi espalda.

the measures undertaken to avoid recall bias worked well.

In the analysis for concurrent validity, there was a correlation in a positive direction between the RMQ and VAS, and in the determination of construct validity there was an adequate correlation between the Spanish RMQ and the Spanish validated version of Oswestry's Self-Applied Questionnaire of Lumbar Pain Disability. The disability scales correlated well with each other, which is consistent with the observed results in other studies.[10,23,25,30] Although the correlation between the RMQ and Oswestry was positive, it was only significant on Day 15. The number of missing values in the Oswestry Questionnaire affected the statistical power of the analysis. This may account for the lack of significance on Day 1 and might have lessened the strength of the correlation between both disability scales.

The results of the RMQ on Day 1 and 15 show substantial improvement in disability over a 2-week interval, as is clinically expected, suggesting its sensitivity to change. However, this was not the purpose of this study and the patients were not recruited taking into account prognostic factors for disability, such as psychosocial factors, so these results cannot be used for comparison with other studies to calculate an "effect size."

The influence of psychosocial factors in the appearance of LBP, and its duration and related disability is well-known.[5,16,25,31] The specific circumstances of Mallorca's wealthy economy could influence, for example, the degree of disability related to LBP, or the predisposition to return to work. However, this should not affect the validity and generalizability of this version of the RMQ for measuring the degree of disability.

The Spanish National Health Service is free and available to everyone; however, the upper and upper-middle classes usually utilize private medicine to a greater extent than the rest of the population. For this reason, the white-collar sector is under-represented in the study sample (Table 1). The authors also do not believe that this should affect the applicability of the results to this segment of the population.

As far as the authors know, this Spanish version of the RMQ is the only one to have been validated. The Spanish Royal Academy of the Language is a multinational agency integrated by both Castillian and Mexican Spanish experts, and is committed to maintaining the unity of the Spanish language throughout the world. It ensures that academic language, dictionaries, and semantic and grammatical rules are homogenous all over the Spanish-speaking world. Therefore, this version of the RMQ may be used in any Spanish-speaking country, although some fine-tuning might be necessary in order to adapt it to the specific terms that may be used more commonly in informal language in some specific cultural environments.

Several scales are available for measuring disability. One of them being considered as an international standard could boost the implementation of disability assessment as a routine procedure and would help to compare the effect of different approaches to improve disability in different countries. The RMQ is a simple and fast scale that is quite easy to score and interpret. In addition, the ease of developing translated and culturally adapted versions that are as reliable as the original scale is a factor to take into account for considering a scale as an international standard. In this respect, the intraclass correlation of 0.87 is a very good measure of reliability of the Spanish version of the RMQ, and is in accordance with other translated versions.[21,32]

Although patients in a clinical environment are not usually asked to fill out four different questionnaires for their back pain, as they were in this study, the effect of patients' fatigue on their willingness to fulfill questionnaires should also be taken into account. In this respect, it should also be noted that all of them filled out the RMQ (even twice in the pilot study) and VAS, while there were missing values in both the Oswestry and EuroQol questionnaires.

In conclusion, the results suggest that the Spanish version of the RMQ validated in this study is an easy-to-understand, reliable, and valid instrument for the measurement of the limitation of functional ability caused by LBP in Spanish-speaking patients.

■ Key Points

• Although low back pain (LBP) may lead to disability, pain and disability are two different dimensions. Disability scales have been shown to correlate with disability better than scales that measure the intensity of pain, X rays, MRIs, and CT Scans.
• The Roland-Morris Questionnaire (RMQ) is a valid and reliable disability scale. The questionnaire was translated into Spanish and retranslated into English by four different imdividuals, and transculturally adapted by a team that included five primary care physicians, three back specialists, and two methodologists.
• Patients who visited primary care facilities of the Spanish National Health System because of low back pain were given the RMQ and three other scales--Visual Analogue Scale (VAS), Oswestry Questionnaire (OQ), and a EuroQol Questionnaire (EQ)--on their first visit and 14 days later. On their first visit, patients were also given a second RMQ with the questions in a different order and they were subsequently asked for comprehension of each item of the questionnaire. All of the patients filled out the RMQ and VAS, whereas there were missing values in both the Oswestry and EuroQol Questionnaires.
• The Spanish version of the RMQ is easy to understand, has good comprehensibility, internal consistency and reliabilty, and is an adequate and useful instrument for the assessment of disability caused by LBP in Spanish-speaking patients.

Acknowledgments

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