

Development and structural validity of a Nigerian culture- and environment-friendly low back pain outcome measure: Ibadan Low Back Pain Disability Questionnaire

Bolanle A. Nottidge¹, Adesola C. Odole², Nse A. Odunaiya², Matthew O. Akpa³, Olufunmilayo I. Fawole³ and Aderonke O. Akinpelu²

Ghana Med J 2019; 53(2): 126-134 doi: <http://dx.doi.org/10.4314/gmj.v53i2.7>

¹Department of Physiotherapy, University of Uyo Teaching Hospital, Uyo, Akwa-Ibom State, Nigeria

²Department of Physiotherapy, College of Medicine, University of Ibadan, Nigeria

³Department of Epidemiology and Medical Statistics, College of Medicine, University of Ibadan, Nigeria

Corresponding author: Bolanle Nottidge

E-mail: nottidgebolanle@yahoo.com

Conflict of interest: None declared

SUMMARY

Background: Low Back Pain (LBP) is the leading cause of disability globally. Standardized outcome measures for measuring LBP disability exist but none was developed with consideration for the Nigerian culture and environment.

Objective: This study was aimed to develop a Nigerian culture- and environment-friendly LBP scale, the Ibadan Low Back Pain Disability Questionnaire (ILBPDQ).

Methods: Items on ILBPDQ were devised from literature review, interview of patients (231 consecutively-sampled patients with chronic non-specific LBP) and 12 professionals experienced in LBP management and were content-validated. The first draft of the questionnaire underwent pretesting twice among individuals with chronic non-specific LBP (n=35 and 114 respectively), factor analysis and experts' reviews to produce the final version.

Results: The final scale comprised 18 items with a two-factor structure (common Activity of Daily Living [ADL] and culture-specific ADL). It has eigen value ≥ 1 and explained 60% of variance. Items on ILBPDQ covered important constructs relevant to an average Nigerian patient with LBP.

Conclusion: A scale for assessing disability in LBP is made available for use in Nigeria and similar populations.

Keywords: Low back pain, Outcome measure, Ibadan, Development, Structural validity

Funding: None declared

INTRODUCTION

Low Back Pain (LBP) was reported to be the leading cause of disability globally; ahead of 290 other conditions.¹ It has also been described as the most prevalent musculoskeletal condition, causing much individual suffering and use of health services.² LBP is also a major cause of significant global socioeconomic burden to those affected.³ The total cost of LBP in the United States of America was estimated to be between 100 and 200 billion dollars annually, of which two thirds resulted from reduced wages and productivity.⁴ LBP is also common in Nigeria, with an annual prevalence of 39.1% among healthcare workers.⁵ In addition, the annual economic burden of low back pain has been estimated at 139,156.25±77091.16 naira (about 385±213 US dollars).⁶

There are different methods of treating LBP such as medication, surgery and physiotherapy. Physiotherapy approaches to treating low back pain include massage⁷, exercise⁸, manipulation⁹, spinal mobilisation¹⁰, traction¹¹

and electrotherapy.¹² In order to assess the disability level of the patient prior to treatment and the effectiveness of the treatment, there is a need for outcome measures, that is, tools that measure the outcome of treatment.

Patient reported outcome measures are structured tools that provide the patients' perspective of their health conditions and treatment outcomes, independent of external interpretation by assessors such as a physician or therapist.^{13,14,15} Many patient-reported outcome measures or questionnaires are available for measuring disability in LBP. According to Stevelink and van Brakel¹⁶, patient-reported questionnaires are often developed with consideration for the culture and environment of the people they were meant for originally. Consequently, many available LBP disability questionnaires do not include some activities (sweeping with a short broom, drawing water from a well and sitting on a mat or low stool) which patients with low back pain in Nigeria complain they have difficulty performing.

In addition, a few of the available LBP disability questionnaires include activities (watering flowers, putting on pantyhose) that many Nigerian patients with LBP may not perform throughout their lifetime. This study aimed to develop a Nigerian culture- and environment-friendly questionnaire for assessing disability in patients with LBP.

METHODS

Study Design

A cross-sectional survey design was adopted. The study area included secondary and tertiary hospitals in the six geopolitical zones in Nigeria. The study population were patients with LBP and LBP experts made up of physiotherapists and orthopaedic surgeons.

Conceptual framework

The conceptual basis of the questionnaire was that certain activity limitations are experienced by patients with LBP. We therefore operationalized disability in LBP as difficulty experienced while performing common activities of daily living. The questionnaire was developed taking into consideration the activities reported to be difficult and changes in the physical functioning of patients with LBP. Also, consideration was given to those activities that are of cultural relevance to Nigerian patients with LBP.

Devising the items

Items included on the questionnaire were devised through three methods: 1) Literature review 2) Interview of patients 3) Interview of healthcare Professionals

Literature review

Nine commonly cited LBP specific standardised scales were identified through a search on OVID and PubMed databases from 2000 – 2010, using the search terms – LBP, back pain, scoliosis, spinal stenosis, ankylosing spondylitis AND questionnaires, outcome measures, outcome assessment. A total of 1,381,110 articles were retrieved. These results were narrowed down by combining low back pain AND outcome assessment OR outcome measure OR questionnaire. This yielded 288 articles. After reviewing the abstracts of the 288 articles, 120 articles that utilised a low back outcome measure or questionnaire were selected. A review of the full text of the 120 articles identified nine LBP-specific questionnaires with evidence of two or more psychometric properties and utility in five or more studies (figure 1). The nine questionnaires are Oswestry Disability Index (ODI)¹⁷, Roland-Morris Disability Questionnaire (RMDQ)¹⁸, Million Visual Analogue Scale (MVAS)¹⁹, Low Back Outcome Score (LBOS)²⁰, Quebec Back Pain Disability Scale (QBPDS)²¹, Aberdeen Low Back Disability Scale (ALBDS)²², North American Spine Society Lumbar Spine Outcome (NASS LSO)²³, Low Back Pain Rating Scale (LBPRS)²⁴ and Wadell Disability Index (WDI).²⁵ The activities selected for devising the items were those that occurred in at least four of the nine reviewed questionnaires (Table 1). Activities that were selected included walking, standing, sitting, lifting, self-care and travelling and 12 items were generated from these activities.

Table 1 Review of activities on nine commonly used LBP questionnaires

Activity	*ODI	†RMDQ	‡LBOS	§QBPDS	MVAS	¶ALBDS	**NASS LSO	††LBPRS	‡‡WDI
Sleep	√	√	√	√	√	√	√	√	√
Self-care	√	√	-	√	-	√	-	-	-
Walking	√	√	√	√	√	√	√	√	√
Sitting	√	√	√	√	√	√	√	√	√
Standing	√	√	-	√	√	√	√	-	√
Lifting	√	√	-	√	-	-	√	√	√
Sex life	√	-	√	-	-	-	√	-	√
Travelling	√	-	√	-	-	-	√	-	√
Social life	√	-	-	-	√	-	√	√	√
Work	-	√	√	-	√	-	-	√	-
Dressing	-	√	√	-	-	-	√	√	√
Sport	-	-	√	√	-	√	-	-	-
Stairs	-	√	-	√	-	-	-	√	-
Housework	-	√	√	√	-	√	-	√	-
Resting	-	√	√	-	-	√	-	-	-
Car driving	-	-	-	√	-	-	-	√	-
Throwing	-	-	-	√	-	-	-	-	-
Twisting	-	-	-	-	√	-	-	-	-
Bending	-	-	-	-	-	√	-	-	-

*Oswestry Disability Index, †Roland-Morris Disability Questionnaire, ‡Low Back Outcome Score, §Quebec Back Pain Disability Scale, ||Million Visual Analogue Scale, ¶Aberdeen Low Back Disability Scale, **North American Spine Society Lumbar Spine Outcome, ††Low Back Pain Rating Scale, ‡‡Wadell Disability Index.

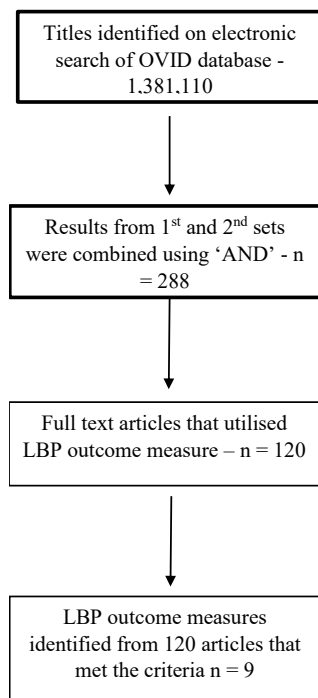


Figure 1 Flow-chart showing the steps undertaken in the search for articles on LBP disability questionnaires

Interview of Patients: A cross-sectional survey of patients with LBP was conducted to determine activities of daily living with which patients had difficulty. Two hundred and thirty-one consecutively sampled patients receiving physiotherapy at nine randomly-selected tertiary hospitals spread over the six geo-political zones of the country were interviewed. The respondents comprised patients with non-specific LBP without pain in the joints of the lower limbs. Respondents were interviewed using a semi-structured questionnaire by physiotherapists to find out which of the listed ADL they have difficulty with due to the pain on the back. Eleven items were devised from the interview of patients.

Interview of healthcare Professionals: Eight Physiotherapists and four Orthopaedic surgeons, (first set of experienced professionals) selected based on their experience in managing patients with LBP were interviewed by one of the authors. Each respondent was provided with a list of activities and items devised through literature review and patients interview. They were then asked to go through the list and add more activities that their patients complain they have difficulty with which have not been included on the list. Additional 20 items were devised from the activities suggested by these professionals. The total number of items devised from all three methods was 43.

Content validation

A content validation package comprising information on the purpose of the study, the list of 43 items and instructions regarding the role of experienced professionals were sent to five physiotherapists, four orthopaedic surgeons and a neurologist (second set of experienced professionals) who were experienced in management of LBP. They were asked to rate each of the 43 items for relevance to measuring disability in LBP using a 5-point scale, in which 1 meant 'item is not relevant and should not be included'; 2 meant 'item is marginally relevant and does not need to be included'; 3 meant 'item is acceptable and may be included'; 4 meant 'item is important and should be included' and 5 meant 'item is essential and must be included'. They were also requested to assess the list of items for coverage. Based on their ratings of the items, Content Validity Index (CVI) was calculated as the proportion of respondents who rated an item as essential (5) or important (4) to the total number of respondents and only items with $CVI \geq 0.7$ were retained on the list.²⁶ Three items with content validity index less than 0.7 were deleted. Two items judged by some of the professionals as overlapping were separated resulting in four items, hence the total number of items on completion of the content validation was 42.

Response scale

A five-point (0-4) scale that rates the level of difficulty experienced while performing activities of daily living was adopted from an earlier study²⁷ as the response scale for the questionnaire. The response scale ranged from 'not difficult at all' (0) to 'unable to carry out activity' (4). The questionnaire was named the Ibadan Low Back Pain Disability Questionnaire (ILBPDQ) after the university (University of Ibadan) where the scale was developed.

Item Selection

The initial draft (42 items) of the ILBPDQ was pretested for comprehensibility (first pretesting) among 35 patients with non-specific LBP attending physiotherapy clinics of two teaching hospitals in Uyo, south-south Nigeria and Ibadan, south-west Nigeria. A panel of experts (first expert panel) comprising of nine healthcare professionals (two orthopaedic surgeons, six physiotherapists and a Neurologist) experienced in LBP management and a lay-person with chronic non-specific LBP was constituted. The panel reviewed the initial draft of the questionnaire and feedback from the pretest. The panel modified 36 items, merged 6 items into 3, removed one item and added five new items, bringing the total number of items to 43. The second draft of the questionnaire which contained 43 items was then pre-tested (second pretesting) on 114 patients with non-specific chronic LBP from nine tertiary hospitals in all the six geopolitical zones in Nigeria.

Feedback from the second pre-test showed that thirty-three percent of the respondents found the questionnaire too lengthy. To shorten the questionnaire, the pre-test data were subjected to an exploratory factor analysis.

Exploratory Factor Analysis of 43 items

Completed questionnaires were checked for completeness and consistency. Data were cleaned and entered into SPSS version 18. Exploratory Factor Analysis (EFA) was conducted on the pretested data to assess the measurement model of the ILBPDQ. Exploratory Factor Analysis was conducted using Principal-axis factoring extraction with a direct oblimin rotation. Items were regarded as

loading on the subscale if they loaded ≥ 0.40 (in absolute value) on the relevant factor and < 0.40 on the other factors.^{28,29,30}

The items loaded on four factors, but four items of which two are culturally relevant did not load on any factor while three items (one of the three items is of cultural relevance) loaded on more than one factor (Table 2). Hence, findings from the factor analysis could not be used for the purpose of shortening the questionnaire. Consequently, copies of the questionnaire were sent to a third set of ten healthcare professionals experienced in LBP management.

Table 2 Results of factor analysis of 43 items loading on four factors

Item Number	Item Question	Extracted Factors				h ²
		Factor1	Factor2	Factor3	Factor4	
1	Walking (15 mins or less)	.51	.09	.18	.09	.71
2	Sitting (30 mins or less)	.47	.00	.34	.33	.76
5	Getting up from an office/ dining chair	.67	.07	.15	.07	.60
6	Standing (1 hour or more)	.42	.35	.07	.03	.73
7	Bending to put on underclothes	.66	-.15	.03	.28	.79
10	Performing your routine job activities	.55	.052	.19	.28	.63
13	Sitting at floor level	.68	-.02	-.19	.03	.73
14	Getting up from a modern toilet	.77	-.00	.21	-.07	.67
15	Sitting on low chair (30 mins or less)	.57	.02	-.13	.24	.66
16	Getting off a high vehicle (jeep/bus)	.51	.15	-.29	.06	.81
19	Bending to put on shoes or wash feet	.73	-.04	.11	.08	.73
20	Getting up from a low chair or stool	.73	-.06	-.21	-.02	.72
21	Standing (15-20 mins)	.56	.34	.12	-.04	.65
26	Night sleep	.45	.15	-.21	.02	.66
30	Going down the stairs	.43	.30	-.19	-.11	.64
32	Getting into a high vehicle (jeep/ bus)	.57	.04	-.33	-.02	.77
34	Turning in bed during sleep	.53	.16	-.08	.09	.60
38	Climbing stairs	.76	-.01	-.12	-.13	.71
39	Getting up from floor level	.72	-.00	-.26	-.03	.77
41	Sitting on low stool (1 hour or more)	.59	-.05	-.23	.17	.71
42	Prolonged kneeling	.51	.17	.10	-.00	.73
17	Lifting weight (10 kg)	.02	.51	-.22	.20	.85
22	Getting into a low vehicle saloon car	.15	.61	-.04	-.12	.64
25	Travelling (1 hour or more)	.32	.53	.01	-.21	.69
27	Driving for 1 hour or more	-.02	.63	.32	.20	.77
29	Getting off a low vehicle (saloon car)	.04	.72	-.17	-.06	.80
31	Travelling (less than 1 hour)	.27	.61	-.17	-.03	.74
40	Lifting weight (4-5 kg)	-.12	.62	-.21	.15	.87
9	Getting on a motorbike/ motorcycle	.15	.01	-.44	.34	.69
33	Squatting (pit toilet/ latrine)	.23	.02	-.48	.16	.68
43	Getting off a motorbike/ motorcycle	.01	.28	-.61	.19	.81
3	Lifting weight (20-25kg)	.16	.05	.08	.41	.74
4	Bending at floor level (wash clothes)	.27	-.16	-.02	.62	.70
8	Sitting (1 hour or longer)	.36	-.14	.02	.46	.60
35	Sweeping with a broom	.23	-.06	-.18	.63	.75
37	Riding a motorbike/ motorcycle	-.21	.25	-.31	.53	.69
11	Religious/ social functions*	.46*	.06	.13	.41*	.73
12	Driving (30 mins or less)*	.04	.67*	.42*	.15	.83
36	Farming/ gardening activities*	-.23	.45*	.03	.45*	.74
18	Walking for one hour (3-4 km) †	.34	.33	-.19	.17	.74
23	Having sexual intercourse †	.12	.35	.32	.26	.65
24	Greeting (prostrating/ kneeling/ squatting) †	.22	.15	-.37	.11	.66
28	Drawing water from a well †	-.04	.16	-.19	.39	.55

h²- Communality

* Items loaded on more than one factor

† Items not loaded on any factor

Bold items are those loading on the respective factors under which they appear.

They were asked to rate the items on a 5-point Likert scale (5 representing 'extremely important' and 1 representing 'not important'). Items that were rated as extremely important and very important by at least seventy percent of the third set of ten healthcare professionals were noted.

Based on the feedback received from the third set of ten healthcare professionals, another experts' panel meeting (experts panel two) comprising of five Physiotherapists and an epidemiologist was convened to select the final items on the questionnaire.

The criteria used for selecting the final items were: (1) Items rated as extremely or very important by at least 70% of the third set of ten experienced professionals in the assessment of disability in LBP (assigned 1 point). (2) Items considered relevant to Nigerian culture and environment (assigned 2 points). (3) Items on the existing low back pain questionnaires (assigned 1 point). The panelists agreed that items scoring two or more points out of a maximum obtainable of four should be included in the final questionnaire. Eighteen items were eventually selected in the final questionnaire. These 18 items when subjected to factor analysis, loaded on two factors, which were Common Activities of Daily Living and Culture-Specific Activities of Daily Living.

Scoring

The maximum obtainable score on the ILBPDQ was 72, which can be obtained by multiplying the total no of items on the questionnaire (18) by the highest response option (4), if the respondent checks all the 18 items. If some items are not applicable to the respondent and thus not checked, the total possible score will be the number of items checked multiplied by 4. A respondent's score is calculated in percentage by summing up the scores on items checked by the respondent, divided by the maximum obtainable score (number of items checked multiplied by 4) and multiply the product by 100.

Respondents score = $\frac{\text{Sum of scores of items checked}}{100}$ X

Maximum obtainable score

The higher the score of a participant on ILBPDQ, the higher the level of disability.

The study was approved by the University of Ibadan/ University College Hospital Ethics Committee (UI/EC/11/0079) and the University of Uyo Teaching

Hospital Research Ethics Committee. Written informed consent was obtained from each participant. Participants were informed about confidentiality of data and anonymity was maintained.

RESULTS

Item Selection

Almost all (94%) of the 35 participants involved in the pretesting for comprehensibility (first pretesting) reported that the questionnaire was easy to understand. However, six percent of the respondents reported that they had difficulty understanding two words 'instrument' and 'administering' in the introductory letter. Fifteen percent of the respondents complained of the questionnaire being too long and repetitive. Thirteen percent of the respondents complained that two questions were vague, that is, question 12 - participating in social functions for example wedding, naming, birthday and burial ceremonies, and question 38 - participating in religious gatherings for example Jumat or Church services. The participants commended the use of units of measurements that Nigerians are familiar with.

Final item Selection

Eighteen items with score of two points out of a maximum obtainable of four points were selected to be on the final scale, which takes about five minutes to administer, and two minutes to score.

Structural Validity of the 18-item ILBPDQ

Two orthogonal factors were extracted in the factor analysis of the 18 items. The extracted factors had eigenvalue ≥ 1 (Table 3) and correspond to the results of scree plot (Figure 2). With eigenvalue of 9.3 and 1.6 (respectively), the two factors extracted accounted for 60.3% of the total variance. Factor 1 explained 51.5% of the total variance, while factor two explained 8.8% of the total variance. Items were considered as loading on a particular factor if the absolute value of the factor loading is ≥ 0.5 ²⁹. A total of 13 items relating to Common Activities of Daily Living loaded on the first factor while 4 factors relating to Culture Specific Activities of Daily Living loaded on the second factor (Table 3). One item (having sexual intercourse) did not load on any of the two factors. The item was however retained on the questionnaire on the recommendation of experts that this item is important in assessment of disability in LBP.

Table 3 Factor Analysis of the 18 Items on the Final Version of ILBPDQ
Factors

Item Number	Item question	*CADL	†CSADL	‡Communality (h ²)
1	Walking (15 – 20mins)	.76	.18	.64
2	Sitting on a chair (1 hour or more).	.70	.22	.54
3	Lifting heavy weight	.75	.28	.64
4	Standing (15 - 20 minutes)	.84	.21	.75
5	Bending (wash clothes floor level)	.65	.41	.60
6	Climbing the stairs	.64	.40	.57
8	Sitting at floor level	.63	.42	.58
10	Standing (1 hour or more)	.89	.20	.83
13	Getting up from floor level	.71	.43	.68
15	Sleeping through the night	.53	.19	.32
16	Sweeping with a broom	.59	.45	.55
17	Getting up from a low chair/ low stool	.64	.40	.58
18	Bending to put on underclothes.	.74	.33	.65
7	Greeting (kneeling/prostrating)	.14	.64	.43
9	Farming/gardening activities	.41	.53	.45
11	Drawing water from the well	.18	.70	.51
12	Squatting (pit toilet/latrine).	.21	.70	.53
14	Sexual intercourse [§]	.33	.06	.11
	% Variance explained	51.50	8.83	
	Eigen value	9.27	1.59	

*Common Activities of Daily Living

†Culture Specific Activities of Daily Living

‡The amount of variability in the item explained by the two factors

§Item not loaded on any factor

Bold items are those loading on the respective factors under which they appear.

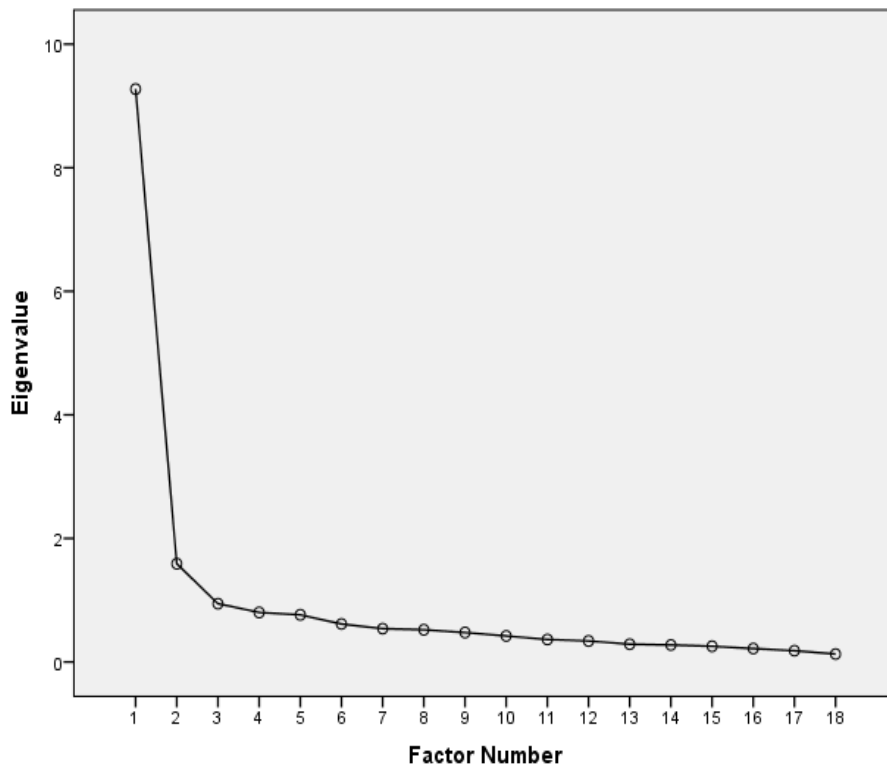


Figure 2 Scree Plot of final 18 items on ILBPDQ

DISCUSSION

The aim of this study was to develop a questionnaire for assessing disability in LBP that is relevant to the Nigerian culture and environment. Other available questionnaires for measuring disability in LBP are relevant to the Western culture^{18,22,23}, but are not readily amenable to the Nigerian culture. We developed an 18 item, two-domain questionnaire that takes five minutes to administer and two minutes to score. It is more acceptable and culturally relevant to the Nigerian populace. The commonly used questionnaires for LBP for example, ODI¹⁷ and RMDQ¹⁸, were developed for the Western culture and do not have a clear method of item generation and construction. Our method of development followed the rigorous steps outlined by Streiner and Norman²⁶ – namely devising the items, content validity, response scale, item selection (pre-testing, experts panel meetings/review).

Nigeria is a multicultural nation with six geopolitical zones, each of which was represented in this study. Patients were recruited from major hospitals in each zone, to ensure captured items are relevant to the major ethnic groups in the country. For example, kneeling by women and lying prostrate by men to greet elders in the community is important to the Yoruba ethnic group as a way of showing respect³¹, squatting is common among the Hausa/Fulani people, while the Igbo women embrace and men shake hands while exchanging greetings.³²

The use of units of measurement that patients were familiar with, enhanced the acceptance of the questionnaire. For example, measuring distance walked using time (in minutes), rather than the actual distance (metre, kilometre or miles) and using litres (20-25L water container) as units of weight rather than kilogrammes or pounds. Anecdotally, neither units of weight (kilogramme or pounds) nor distance measures like miles, blocks and kilometres are popular in the Nigerian parlance. Our finding suggests that researchers involved in scale development should endeavour to conceptualise units of measurement that are easy to understand by the target population.²⁷

Our experience during the process of developing the scale showed that pretesting the initial draft on a sample of the target population is essential.²⁷ For example, we included many items on sitting, travelling and lifting in the initial draft based on healthcare professionals' opinion that these items were important for evaluating disability in LBP. However, to our surprise, participants considered some of these items as repetitious and unnecessary. However, the experts were able through careful and detailed review to merge and select the important items under these activities. This finding supports the fact that patients do not perceive issues as healthcare providers do.²⁷

It also emphasized the importance of involving end users in the process of developing a new tool. The results from factor analysis of the 43 items with some items loading on more than one factor and some culturally relevant items not loading on any factor showed that factor analysis though very useful in guiding item selection should not be used in isolation.³³

The use of factor analysis helped to evaluate the factor structure of the items included in the final questionnaire, providing evidence of its structural validity. Two factors were extracted using principal axis functioning extraction with a direct oblimin rotation. Factor analysis of items on a LBP questionnaire developed by Duruoz, Ozcan, Ketcenci and Karan³⁴, also suggested two -dimensions. Kopeck et al²¹, used factor analysis to classify 20 functional disability items in patients with LBP into six categories: movement, bed / rest, sitting / standing, ambulation, handling of large objects, bending or stooping. Factor analysis identified two factors – Common Activities of Daily Living and Culture-Specific Activities of Daily Living. This addressed the objective of this study that aimed to develop a questionnaire that is culturally relevant. The item on sexual activity did not load on any factor. It was included because of experts' opinion that this item is important in assessing disability in LBP. Other authors have argued that items on sexual activity should not be included on LBP questionnaires since there is a high tendency for omission.^{21,35} Interviewer administration would address the problem with omitting items. Our scale can also be self-administered.

The limitations of this study are that our scale was developed specifically to assess disability in patients with chronic non-specific LBP. Consequently, our questionnaire may not be effective in predicting an outcome such as return to work. A predictive index developed specifically for that purpose will be able to predict such an outcome effectively.

In addition, all items on our questionnaire are assigned equal weight, as varied weighting would make scoring more complex and may be unnecessary unless it can be justified conceptually or empirically, for example, in a predictive measure. Even though experienced healthcare professionals were involved in reviewing the questionnaire at different stages of development, some of their responses might have been subjective; the use of three separate sets of healthcare professionals might have reduced this bias. Hence our results have good external generalisability.

CONCLUSION

An 18 item, two domain, Nigerian culture and environment -friendly questionnaire is made available as a practical tool for measuring disability in low back pain. It is recommended for use in Nigeria and similar settings. A companion paper will delve into psychometric testing of this tool.

REFERENCES

1. Buchbinder R, Blyth FM, March LM, Brooks P, Woolf AD, Hoy DG. Placing the global burden of low back pain in context. *Best Pract Res Clin Rheumatol.* 2013;27(5):575-89. doi: 10.1016/j.berh.2013.10.007. PMID: 24315140.
2. Djiken CB, Fjellman-Wikland A, Hildingsson C. Low back pain, lifestyle factors and physical activity: a population-based study. *J Rehabil Med.* 2008;40(10):864-69. doi: 10.2340/16501977-0273. PMID: 19242625.
3. Costa-Black KM, Loisel P, Anema JR, Pransky G. Back pain and work. *Best Pract Res Clin Rheumatol.* 2010;24(2):227-40. doi: 10.1016/j.berh.2009.11.007. PMID: 20227644.
4. Katz JN. Lumbar disc disorders and low-back pain: socioeconomic factors and consequences. *J Bone Joint Surg Am.* 2006;88 Suppl 2:21-4. doi: 10.2106/JBJS.E.01273. PMID: 16595438.
5. Awosan KJ, Yikawe SS, Oche OM, Oboirien M. Prevalence, perception and correlates of low back pain among healthcare workers in tertiary health institutions in Sokoto, Nigeria. *Ghana Med J.* 2017;51(4):164-74. PMID:29622830
6. Odole AC, Akinpelu AA, Adekanla BA, Obisanya OB. Economic burden of low back pain on patients seen at the outpatient Physiotherapy clinics of secondary and tertiary health institutions in Ibadan. *J. Nig. Soc. Physio.* 2011; 18(1-2):43-8.
7. Furlan AD, Giraldo M, Baskwill A, Irvin E, Imamura M. Massage for low-back pain. *Cochrane Database Syst Rev.* 2015;(9):CD001929. doi: 10.1002/14651858.CD001929. PMID: 26329399.
8. Lizier DT, Perez MV, Sakata RK. Exercises for treatment of nonspecific low back pain. *Braz J Anesthesiol.* 2012;62(6):838-46. doi: 10.1590/S0034-70942012000600008. PMID: 23176991.
9. Rubinstein SM, Terwee CB, Assendelft WJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for acute low-back pain. *Cochrane Database Syst Rev.* 2012;(9):CD008880. doi: 10.1002/14651858.CD008880.pub2. PMID: 22972127.
10. Lascrain-Aguirrebeña I, Newham D, Critchley DJ. Mechanism of Action of Spinal Mobilizations: A Systematic Review. *Spine (Phila Pa 1976).* 2016;41(2):159-72. doi: 10.1097/BRS.0000000000001151. PMID: 26751060.
11. Guild DG. Mechanical therapy for low back pain. *Prim Care.* 2012;39(3):511-16. doi: 10.1016/j.pop.2012.06.006. PMID: 22958560.
12. Murtezani A, Govori V, Meka VS, Ibraimi Z, Rrecaj S, Gashi S. A comparison of McKenzie therapy with electrophysical agents for the treatment of work related low back pain: A randomized controlled trial. *J Back Musculoskelet Rehabil.* 2015;28(2):247-53. doi: 10.3233/BMR-140511. PMID: 25159291.
13. Jose MV, Jordi A, Gordon HG. Measuring patient-reported outcomes: moving from clinical trials into clinical practice. *Med J Aust.* 2008;189(2):93-4. PMID: 18637778.
14. Bryan S, Davis J, Broesch J, Doyle-Waters MM, Lewis S, McGrail K et al. Choosing your partner for the PROM: a review of evidence on patient-reported outcome measures for use in primary and community care. *Health Policy.* 2014;10(2):38-51. PMID:25617514. PMID:PMC4748356.
15. Fong E, Li C, Aslakson R, Agrawal Y. Systematic review of patient-reported outcome measures in clinical vestibular research. *Arch Phys Med Rehabil.* 2015;96(2):357-65. doi: 10.1016/j.apmr.2014.09.017. PMID: 25305629. PMID: PMC4306632.
16. Stevelink SA, vanBrakel WH. The cross-cultural equivalence of participation instruments: a systematic review. *Disabil Rehabil.* 2013;35(15):1256-268. doi: 10.3109/09638288.2012.731132. PMID: 23789790.
17. Fairbank JCT, Davies JB, Couper J. The Oswestry Low-back pain Disability Questionnaire. *Physiotherapy.* 1980;66(8):271-73. PMID: 6450426.
18. Roland M, Morris R. A study of the natural history of back pain. Part I: development of a reliable and sensitive measure of disability in low – back pain. *Spine (Phila Pa 1976).* 1983;8(2):141-44. PMID: 6222486.
19. Million R, Hall W, Nilsen KH, Baker RD, Jayson MI. Assessment of the progress of the back – pain patient 1981 Volvo Award in Clinical Science. *Spine (Phila Pa 1976).* 1982;7(3):204-12. PMID: 6214028.
20. Greenough CG, Fraser RD. Assessment of Outcome in patients with low – back pain. *Spine (Phila Pa 1976).* 1992;17(1):36-41. PMID: 1531553.
21. Kopec JA, Esdaile JM, Abrahamowicz M, Abenhaim L, Wood-Dauphinee S, Lamping DL et al. The Quebec Back Pain Disability Scale: conceptualization and development. *J Clin Epidemiol.* 1996;49(2):151-61. PMID: 8606316.
22. Ruta DA, Garratt AM, Wardlaw D, Russell IT. Developing a valid and reliable measure of health outcome for patients with low back pain. *Spine (Phila Pa 1976).* 1994;19(17):1887-896. PMID: 7997920.

23. Daltroy LH, Cats-Baril WL, Katz JN, Fossel AH, Liang MH. The North American spine society lumbar spine outcome assessment Instrument: reliability and validity tests. *Spine (Phila Pa 1976)*. 1996;21(6):741-49. PMID: 8882698.
24. Manniche C, Asmussen K, Lauritsen B, Vinterberg H, Kreiner S, Jordan A. Low back pain rating scale: validation of a tool for assessment of low back pain. *Pain*. 1994;57(3):317-26. PMID: 7936710.
25. Waddell G, Main CJ. Assessment of severity in low – back disorders. *Spine (Phila Pa 1976)*. 1984;9(2):204-08. PMID: 6233713.
26. Streiner LD, Norman RG. Health Measurement Scales: A practical guide to their development and use. 1st ed. New York; Oxford Press. 2008.
27. Akinpelu AO, Odole AC, Adegoke BOA, Adeniyi AF. Development and initial validation of the Ibadan Knee/Hip Osteoarthritis Outcome Measure. *South Afr J Physio*. 2007;63(2):3-8. doi: 10.4102/sajp.v63i2.127.
28. Akpa OM, Bamgboye EA, Baiyewu O. The Adolescents' Psychosocial Functioning Inventory (APFI): scale development and initial validation using Exploratory and Confirmatory Factor Analysis. *Afr J Psychol Study Soc Issues*. 2015;18(1):1-21. PMID: 25893221.
29. Liao AK, Chow D, Tan TK, Senf K. Development and Validation of the Personal Strengths inventory using Exploratory and Confirmatory Factor Analyses. *J Psychoeduc Assess*. 2011; 29(1):14-26. doi.org/10.1177/0734282910365648.
30. Yang Y, Montgomery D. Exploratory and Confirmatory Factor Analyses of the Multicultural Teaching Scale. *J Psychoeduc Assess*. 2011;29:261–72.
31. Ajayi TM, Balogun KO. Politeness in the Yoruba and French languages. *Int J Lang Stud*. 2014;8(4):77 – 94.
32. Omega C. Sex variation in taboo expressions in Igbo speech community and gender inequality. *J Igbo lang linguistics*. 2013;7:75–86.
33. McDowell I, Newell C. Measuring Health: A guide to rating scales and questionnaires, 2nd ed. New York: Oxford Press; 1996.
34. Duruoz MT, Ozcan E, Ketenci A, Karan A. Development and validation of a functional disability index for chronic low back pain. *J Back Musculoskelet Rehabil*. 2013;26(1):45-54. doi: 10.3233/BMR-2012-00349. PMID: 23411648.
35. Fritz JM, Irrgang JJ. A comparison of a modified Oswestry low back pain disability questionnaire and the Quebec back pain disability scale. *Phys Ther*. 2001;81(2):776-88. PMID: 11175676.

Copyright © The Author(s). This is an Open Access article under the CC BY license.