JBACHS
Journal of Basic and Clinical Health Sciences

J Basic Clin Health Sci 2022; 6: 148-154
https://doi.org/10.30621/jbachs.995009
RESEARCH ARTICLE

THE RELIABILITY OF PATIENT-REPORTED OUTCOMES IN PATIENTS WITH CHRONIC LOW BACK PAIN WHEN ANSWERED IN ONLINE, TELEPHONE, AND FACE-TO-FACE INTERVIEW FORMAT

Ceyhun Turkmen[1], Hasan Erkan Kilinc[2]

[1] Cankırı Karatekin University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Cankiri, Turkey
[2] Lokman Hekim University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Ankara, Turkey

Corresponding Author: Ceyhun Turkmen, PhD., **E-mail:** fztceyhunturkmen@gmail.com
Received: 13.09.2021; **Accepted:** 15.12.2021; **Available Online Date:** 27.01.2022

Cite this article as: Turkmen C, Kilinc HE. The reliability of patient-reported outcomes in patients with chronic low back pain when answered in online, telephone, and face-to-face interview format. J Basic Clin Health Sci 2022; 6: 148-154.

ABSTRACT

Purpose: Patient-reported outcomes (PROs) are unique indicators of disease and treatment impact on patients that help in the selection of the correct interventions for their treatment. The aim of our study was to investigate the reliability of PROs that are frequently used in patients with chronic low back pain in face-to-face interview, online, and telephone formats.
Methods: The participants were randomized into groups until there were at least 120 participants each in the face-to-face interview, online, and telephone groups. All participants completed the Oswestry Disability Index, the Roland–Morris Disability Questionnaire, and the Fremantle Back Awareness Questionnaire according to the format characteristics of their group.
Results: Among the 364 patients, in the online group (n=120) the completion time for all three questionnaires was significantly shorter than that in the face-to-face interview (n=121) (ODI: p=0.002, RMDQ: p=0.003 and FreBAQ: p=0.032) and telephone (n=123) (ODI: p=0.007, RMDQ: p=0.001 and FreBAQ: p=0.024) groups. When the test–retest reliability was examined, the ODI (ICC: 0.86), RMDQ (ICC: 0.93), and FreBAQ (ICC: 0.81) showed an excellent correlation in the face-to-face interview group. In the telephone group, the ODI, RMDQ, and FreBAQ showed good correlations. In the online group, there was a good correlation in the RMDQ (ICC: 0.74) and FreBAQ (ICC: 0.65), while there was a moderate correlation in the ODI (ICC: 0.59).
Conclusion: Although the ODI, RMDQ, and FreBAQ for chronic low back pain patients had lower reliability correlations in both the online and telephone versions compared to the face-to-face interview, mostly they had adequate reliability. Moreover, the online version was a more useful and quicker evaluation method than the telephone version. However, we do not recommend using the online version of the ODI due to its lower reliability.

Keywords: Interview, online, patient reported outcome measures, reproducibility of results, telephone

INTRODUCTION

The measurement of interventions by healthcare professionals with patient-reported outcomes (PROs) is considered more valuable than with physiological measures or observer-reported outcomes (1). Using PROs, various health-related outcomes can be measured, such as patients' symptoms, physical functioning levels, general health perceptions,

psychosocial well-being, and satisfaction with care or rehabilitation services. PROs can also assist in determining patient inclusion criteria for specific clinical applications, such as pain, functional level, and cognitive status (2). In short, PROs are unique indicators of disease and treatment impact on patients that help in the selection of the appropriate interventions for their treatment. In addition, they are useful for interpreting clinical results and deciding on treatment by strengthening the relationship between patients and healthcare providers (3).

In recent years, patients in many disease groups, including chronic low back pain, have made significant progress in accessing and using digital devices (4). Paper-based PROs that evaluate the symptoms or functionality of individuals with low back pain have started to be applied frequently using the Internet or telephone after technological developments in the field of telehealth and telerehabilitation. In addition to the patient-oriented advantages of PROs completed electronically, such as being completed in a short time and being preferred by patients, they also provide clinicians with special benefits such as low cost (5), ease of access to data (6), and easy decision making (7). For example, individuals with low back pain preferred the measurement with the computer-based rather than a paper-based questionnaire at a rate of 68% when filling out the Oswestry Disability Index (ODI), which is used to evaluate levels of pain and disability (8).

Although the PROs that are applied with the help of devices that enable remote access such as the telephone or computer are increasingly preferred, they have certain disadvantages. The most important of these is the differences in technological literacy knowledge that emerge in similar or different age groups. It was observed that more than 50% of elderly people do not have the necessary technological competence for online or remotely filled out PROs (9). Another disadvantage is due to the different technical features and costs of the technological devices used while filling out the PROs. In particular, individuals with low quality of life and limited technical capacity have faced many barriers when filling out PROs other than paper-based ones and by face-to-face interviews (10).

During the COVID-19 pandemic, patients with chronic low back pain in need of rehabilitation and care were evaluated with the help of PROs applied remotely (11). Although the frequently used PROs for low back pain have been shown to have high reliability when applied face-to-face (12-14), their reliability in telephone or online formats has not been determined yet. Therefore, the aim of our study was to investigate the reliability of PROs that are frequently used in patients with chronic low back pain in face-to-face interview, online, and telephone formats. It was hypothesized that in patients with chronic low back pain PROs answered by telephone or online may be as reliable as face-to-face interview responses.

MATERIAL AND METHODS

Study design

The study had a randomized design to examine differences in responses given by telephone and email to the ODI, the Roland–Morris Disability Questionnaire (RMDQ), and the Fremantle Back Awareness Questionnaire (FreBAQ) PROs compared to face-to-face interviews for patients who have had low back pain for more than three months. The participants were randomized into groups until there were at least 120 in all three groups (online, telephone, or face-to-face interview formats).

Procedure

After approval was obtained from the Institutional Review Board, individuals with low back pain who agreed to participate in the study were started to be randomly included in the groups. The inclusion criteria consisted of being aged 18-65 years with no indication for surgery and no signs of radiculopathy.

The demographic information of the eligible patients was obtained and they were included in one of the three groups. Using a random number generator, the face-to-face interview group was assigned a value of 1, the telephone group a value of 2, and the online group a value of 3. The number generator continued to generate random numbers until all groups included 120 individuals. All patients included in the study signed the informed consent form. The patients in the face-to-face interview group sat facing the researcher and the questionnaires were completed by obtaining verbal answers from the patients. The questions were asked to the patients in the telephone group in telephone conversations. Google forms questionnaires were created in the online format. The participants answered the questionnaires in a similar way to the paper-based method, but online. All participants completed the ODI, RMDQ, and FreBAQ according to the format characteristics of their group.

Table 1. Demographic characteristics and PRO total scores of patients with chronic low back pain

Demographic Characteristics	Face-to-face interview (n=121)	Telephone (n=123)	Online (n=120)	p (total)	p (F vs. P)	p (F vs. O)	p (P vs. O)
Age (year)	40.2 (13.9)	42.4 (14.5)	39.1 (9.9)	0.139			
Sex							
Female n (%)	72 (59%)	76 (61.7%)	79 (65.8%)	0.590			
Male n (%)	49 (41%)	47 (38.3%)	41 (34.2%)				
Height (cm)	168.6 (10.3)	168.1 (10.0)	168.4 (8.4)	0.929			
Weight (kg)	74.9 (15.7)	76.9 (18.0)	73.4 (16.1)	0.247			
Educational Status							
Primary education n (%)	15 (12.3%)	18 (14.6%)	9 (7.5%)	0.195			
High School n (%)	32 (26.5%)	41 (33.3%)	45 (37.5%)				
Bachelor's degree or higher n (%)	74 (61.2%)	64 (52.1%)	66 (55.0%)				
VAS (activity)	5.2 (2.4)	5.8 (2.4)	5.2 (1.9)	0.074			
VAS (rest)	2.6 (2.2)	2.9 (2.2)	2.4 (2.0)	0.303			
PROs							
ODI (0-50)	10.12 (7.10)	11.17 (6.83)	9.46 (5.72)	0.127			
ODI completion time (min)	5.00 (2.77)	4.86 (3.09)	3.73 (2.72)	0.001*	1.000	0.002*	0.007*
RMDQ (0-24)	8.22 (6.19)	9.40 (6.34)	8.11 (5.24)	0.172			
RMDQ completion time (min)	4.58 (2.92)	4.76 (4.18)	3.15 (2.63)	<0.001*	1.000	0.003*	0.001*
FreBAQ (0-36)	7.19 (6.55)	8.77 (7.67)	7.34 (4.31)	0.102			
FreBAQ completion time (min)	2.88 (2.59)	2.90 (2.43)	2.12 (1.71)	0.011*	1.000	0.032*	0.024*

F: Face-to-face interview, P: Phone, O: Online, cm: centimeter, kg: kilogram, VAS: Visual analogue scale, PROs: Patient-related outcomes, ODI: Oswestry Disability Index, min: minute, RMDQ: Roland–Morris Disability Questionnaire, FreBAQ: Fremantle Back Awareness Questionnaire, *p<0.05

Statistical Analysis

The data were analyzed using SPSS version 26.0 (SPSS Inc, Chicago, IL, USA). To assess differences in scores between the face-to-face interview, telephone, and online formats of the ODI, RMDQ, and FreBAQ, one-way ANOVA was conducted. Alpha levels were defined at 0.05. In statistical analyzes using One Way ANOVA, Bonferroni correction was performed as a post hoc test to reduce Type I error during pairwise comparisons if there was a difference between the three groups.

Test–retest reliability was calculated using an intraclass correlation coefficient (ICC) with a two-way random effects model with absolute agreement to assess homogeneity between the online, telephone, and face-to-face interview formats of the ODI, RMDQ, and FreBAQ. An ICC value of at least 0.60 was considered the lower limit for reliability. An ICC between 0.60 and 0.80 indicated a good and an ICC greater than 0.80 indicated an excellent correlation (15). Internal consistency was evaluated by the use of Cronbach's alpha. Values between 0.70 and 0.95 were considered good (16).

RESULTS

A total of 364 patients were included in the analysis (121 in the face-to-face interview, 123 in the telephone, and 120 in the online groups). The sociodemographic characteristics and pain-related variables of the study population are presented in

Table 1. In the online group, the completion time for all three questionnaires was significantly shorter than that in the telephone (ODI: p=0.007, RMDQ: p=0.001, and FreBAQ: p=0.024) and face-to-face (ODI: p=0.002, RMDQ: p=0.003, and FreBAQ: p=0.032) groups. As shown in Table 2, overall internal consistency was high for items scored in the questionnaires in all three groups (Cronbach's α: 0.84-0.93). Similarly, the average inter-item correlation coefficient of all three groups was at an acceptable level (between 0.29 and 0.45).

When the test–retest reliability was examined, the ODI (ICC: 0.86), RMDQ (ICC: 0.93), and FreBAQ (ICC: 0.81) showed excellent correlations in the face-to-face interview group. In the telephone group, the ODI (ICC: 0.79), RMDQ (ICC: 0.75), and FreBAQ (ICC: 0.74) showed good correlations. Finally, in the online group, there were good correlations in the RMDQ (ICC: 0.74) and FreBAQ (ICC: 0.65), while there was a moderate correlation in the ODI (ICC: 0.59).

DISCUSSION

The administration of the ODI, RMDQ, and FreBAQ is generally limited to in-clinic assessments during patient examination. This can result in significant data loss due to the inability of patients residing in rural areas who need to be followed up for a certain period to respond to face-to-face interviews (17-19). In addition, due to the restriction of face-to-face interviews during the COVID-19 pandemic, study protocols have changed, research has been delayed, and the amount of data loss has increased, especially in follow-up studies (20). Relying on paper-based or face-to-face administration in the clinic is cumbersome for patient follow-up and burdens research staff (21). For this reason, telephone or online formats of PROs that are widely used for low back pain patients should be tested and their reliability should be determined.

Our study, in which we examined the reliability of PROs in patients with chronic low back pain when answered online, by telephone, and in face-to-face interviews, showed that (1) the internal consistency of the three questionnaires used to evaluate chronic low back pain in different formats was similar; (2) the test–retest reliability of questionnaires completed online was lower than that of the other formats; (3) questionnaires filled out online were completed in a shorter time compared to the other formats; (4) among the questionnaires filled out online, the RMDQ was more reliable than the other questionnaires regarding low back pain.

The present study demonstrates strong ICCs similar to the originally reported test–retest reliability when performed using face-to-face interviews for the ODI, RMDQ, and FreBAQ (22-24). When looking at the ICC scores of the questionnaires in other formats, all

Table 2. Reliability of patient-reported outcomes in patients with chronic low back pain when answered by online, telephone, and face-to-face interview format.

	Face-to-face interview (n=121)	Telephone (n=123)	Online (n=120)
Oswestry Disability Index			
ICC	0.86	0.79	0.59
Cronbach's alpha	0.89	0.86	0.86
Inter-item correlation	0.45	0.40	0.38
Roland–Morris Disability Questionnaire			
ICC	0.93	0.75	0.74
Cronbach's alpha	0.93	0.91	0.93
Inter-item correlation	0.34	0.29	0.33
Fremantle Back Awareness			
ICC	0.81	0.74	0.65
Cronbach's alpha	0.87	0.88	0.84
Inter-item correlation	0.43	0.44	0.38

ICC: Intraclass correlation coefficient

scores except that of the ODI administered online indicated a good level of reliability, although they had lower reliability compared to face-to-face interviews. This result may be due to the descriptive options in the answer sections of the ODI, as opposed to the simple answer content in the RMDQ (yes/no) and FreBAQ (never/rarely/often etc.). In addition, the reliability coefficients in the face-to-face interview method were higher than those in the original reliability-validity studies in which the questionnaires were applied using the paper-based method. This result may be because health professionals actively carry out survey practices in the face-to-face interview method. The relatively low level of reliability seen in the online group of the ODI questionnaire may be because patients in this group remained idle while answering the questions, so to speak. In the face-to-face group and the telephone group, researchers asked the questions and wanted the patient to answer, however in the online group, all the patients read and answered the questions by themselves.

With formats other than face-to-face interviews, problems affecting reliability can be seen, such as the perception of "convenience" experienced by patients on remote devices, increasing the margin of error in their answers, and the presence of family or friends while filling out the questionnaires (25). It is expected that the reliability of the answers given by chronic low back pain patients to the questionnaires will not be seriously affected by these problems, which may vary according to the type and severity of the disorder caused by the disease. However, we think that the ODI causes an exception due to the relatively excessive definitions and in the answer sections and the questions about sexuality it contains.

Electronic PRO systems, which are web-based and typically offered on tablets, computers, and other mobile devices, are now widely preferred (26). In our study, electronic PROs were administered in telephone and online formats, and the online format was completed in a much shorter time compared with the other formats. Among the PROs, the ODI performed in online format is less reliable than in the telephone format, despite the time advantage it creates for patients. For this reason, online questionnaires from electronic PRO methods can save time and reduce loss to follow-up, especially when patient evaluations are not possible by face-to-face interview. We think that in online format the use of both the RMDQ, which has questions similar to those of the ODI, and the FreBAQ during the follow-up of patients with chronic low back pain will preserve the reliability of these studies. However, when the ODI must be used with the help of remote devices, the preferred option should be the telephone.

Study Limitations

In order for the study to have a more reliable design, the designs described in the next sentences could be chosen. First, comparisons between these three forms could be made on the same subjects to assess the validity of the study. However, in this study design, patients should be exposed to the same questionnaire at least 6 times. In this case, a learning effect may occur in patients. In addition, the homogeneity of the questionnaire scores of the patients is also shown. In another more reliable design, face-to-face interviews are first conducted with patients with chronic low back pain. After a certain period of time, the patients are divided into three groups and the PRO results of the face-to-face interview, telephone and online groups are collected. After demonstrating the reproducibility of the face-to-face interview, the first face-to-face interview result should be compared with the online and telephone results. However, in our design, we investigated this method for patients for whom face-to-face interview format applications are not possible. Therefore, the above-mentioned more reliable designs are not suitable for our study.

CONCLUSION

In summary, we showed that although the ODI, RMDQ, and FreBAQ for chronic low back pain patients had lower reliability correlations in both the online and telephone versions compared to face-to-face interviews, mostly they had adequate reliability. We also consider the online version a more useful and quicker evaluation method than the telephone. However, we do not recommend using the online version of the ODI due to its lower reliability. Administration of the ODI, RMDQ, and FreBAQ over the telephone or online also offers additional opportunities. Studies can be completed earlier by reducing the number of follow-up losses in patients with chronic low back pain followed up in the clinic. In addition, online and telephone assessments can create new opportunities to evaluate patient populations in rural areas or followed up using telerehabilitation methods.

Acknowledgments: The authors would like to thank Russell Fraser for his English editing service.
Author contributions: Turkmen C. conceived the ideas, collected and analyzed the data, Kilinc E. led the writing and completed the examinations.
Conflict of Interest: No conflict of interest was declared by the authors.
Ethical Approval: It was approved by the non-interventional research ethics committee of Lokman Hekim University with the date of 29.04.2021, 2021057 GOA protocol number and decision number 2021/052.
Funding: None.
Peer-review: Externally peer-reviewed.

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