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Original Article PT&R

The validity and reliability of Turkish adaptation of the Fear-Avoidance Beliefs Questionnaire in patients with neck pain

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ABSTRACT

OBJECTIVE: "Fear-avoidance behavior" means that the individual avoids a specific activity or movement due to the perception that it may cause injury. Fear of movement associated with pain can reduce individuals' adaptation to exercise programs. This situation may cause individuals to refrain from taking action and increase the existing limitation. Our aim is investigating of Fear-Avoidance Beliefs Questionnaire (FABQ) in patients with neck pain and creating a questionnaire option for clinicians and researchers to evaluate the fear-avoidance behavior in neck pain in Turkish.

METHODS: The sample of the research was comprised 175 patients between the ages of 18–65, who have a complaint of neck pain that lasted for at least 3 months. The test was applied on patients with neck pain and no treatment, with an interval of 2–7 days. The Visual Analog Scale (VAS), Neck Disability Index (NDI), and Nottingham Health Profile (NHP) were applied on the participants to evaluate the validity of the FABQ.

RESULTS: Accordingly, between FABQ and NHP (r=0.227), pain (NHPP) (r=0.214), emotional reactions (r=0.220), and physical activity (NHPPA) (r=0.243), a weak relationship was observed. A weak correlation was observed between physical activity (FABQ-PA) which are subscales of the FABQ questionnaire and NDI (r=0.210), NHPP (r=0.205), and NHPPA (r=0.267).

CONCLUSION: FABQ is a valid and reliable tool for patients with neck pain. In our study, a weak relationship was detected between FABQ, NDI, and NHP, as like VAS.

Keywords: Fear avoidance; neck pain; physiotherapy.

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With the development of the industry, the prevalence of neck pain is quite high in today's employees. The prevalence of neck pain in employees has been reported at rates varying between 20.5% and 47.8% [1]. In chronic neck pain, which is typically considered non-specific owing to the difficulty in determining the source of the pain, imaging tests are not adequate to establish an accurate pathological diagnosis [2]. Considering that psychological variables have a serious effect, this clinical condition is assumed to have multiple symptoms in both physical and somatosensorial terms [3, 4].

"Fear-avoidance behavior" means that the individual avoids a specific activity or movement due to the perception that it may cause injury [5]. In recent studies on pain behavior, fear avoidance was reported to be more important than pain severity in individuals and it might prevent

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motor disorders from healing [6]. From this perspective, fear-avoidance behavior also prevents the recovery of normal function and leads to the emergence of maladaptive coping strategies. The destructive effect of the pain increases the fear of getting injured again, which increases the avoidance response and results in non-use in the long term, depression, and neck pain-related disability [7].

Previous studies have put forward that the fear-avoidance model is not limited to patients with low back pain; it is also observed in a large group of patients with chronic painful conditions [8]. In our study, we aimed at investigating whether the application of Fear-Avoidance Beliefs Questionnaire (FABQ) was reliable and valid in patients with neck pain and creating a questionnaire option for clinicians and researchers to evaluate the fear-avoidance behavior in neck pain in Turkish.

MATERIALS AND METHODS

The sample of the research was comprised 175 patients between the ages of 18 and 65, who applied to the Department of Physical Therapy and Rehabilitation with a complaint of neck pain that lasted for at least 3 months. Data were collected between October 2015 and May 2018 from a Physiotherapy Departments of a hospital in Denizli. Ethics committee approval of the study was obtained from the Medical Ethics Committee of Pamukkale University with the decision numbered 16 on September 17, 2015.

This study individuals who had undergone an operation related to the neck pain problem and had been diagnosed with a tumor, infection, ankylosing spondylitis, rheumatoid arthritis or inflammatory diseases, fracture and cauda equina syndrome, pregnant women, and patients who might have difficulty in understanding the questionnaires were not included in the study. Written informed consent was obtained from the patients before joining the study.

The adaptation of the questionnaire to Turkish and its cultural adaptation was performed with a study including the executive of the research (Bingul and Aslan, 2013) [9].

The reliability of the questionnaire and its internal consistency calculation were determined through the test–retest method. The test was applied on patients with neck pain and no treatment, with an interval of 2–7 days. The Visual Analog Scale (VAS), Neck Disability Index (NDI), and Nottingham Health Profile (NHP) were applied on the participants to evaluate the validity of the FABQ. The validity of the questionnaire was examined by investigating the relationship between FABQ and other measurement methods.

Highlight key points

- Fear avoidance behavior is a condition that decreases the effectiveness of treatment as well as increases the limitation in patients with neck pain.
- Pain could have an impact on both physical activity and work performance.
- There was a weak relationship between FABQ and NHP, FABQ and NDI.
- FABQ was evaluated in respect of Turkish validity and reliability in patients with neck pain whom it had never been applied before.

FABQ

FABQ aims at comprehensively evaluating the cognitive, behavioral, and sensory components of the fear-avoidance behavior in patients with painful medical conditions. Each item is scored on a 6-point Likert-type scale as 0 "I strongly disagree" and 5 "I strongly agree." The total score indicates one of the severity levels varying between 0 and 100. The best score is 0, and the worst score is 100. In this scale, there are two subdimensions such as physical activity (FABQ-PA) and work activity (FABQ-WA) [9].

NDI

NDI is a questionnaire adapted to Turkish by Kesiktaş in 2012. This questionnaire includes 10 items involving the disability caused by neck pain. Each item is assessed by scoring between 0 "no limitation" or 5 "excessive limitation or functional limitation." Scoring is carried out after the scale is answered. The total score is divided by 50, and when the result is multiplied by 100, the total score received from the scale is calculated [10].

NHP

Kucukdeveci et al. [11] adapted NHP to Turkish in 2000. This questionnaire consists of 45 items and is divided into six categories: Pain (NHPP), physical activity, social isolation, sleep (NHPS), emotional reaction (NHPER), and emotional state (NHPES). A score of maximum of 100 can be obtained in each category.

VAS

Patients with neck pain represent their neck pain levels with a scale of 0–100 mm. A VAS score of 0 refers to a painless condition and a score of 100 points at the worst pain. Patients select a range on this scale and mark this point.

Table 1. Factor analysis and internal consistency of FABQ (n=175)

	Median	SD	Corrected item-total correlation	Cronbach's alpha if item deleted
FABQ 2	3.9657	2.22033	0.507	0.803
FABQ 3	3.5314	2.18087	0.561	0.798
FABQ 4	4.5371	2.00217	0.403	0.813
FABQ 5	4.1943	2.08635	0.347	0.818
FABQ 6	2.3143	2.37530	0.336	0.820
FABQ 7	4.0743	2.21026	0.557	0.799
FABQ 9	2.8971	2.38307	0.507	0.803
FABQ 10	3.5543	2.13245	0.635	0.792
FABQ 11	3.4286	2.20613	0.646	0.790
FABQ 12	2.9771	2.36340	0.517	0.802
FABQ 15	2.0971	2.27852	0.357	0.818

FABQ: Fear-Avoidance Beliefs Questionnaire; SD: Standard deviation.

Table 2. Medians, standard deviations, and lower and upper bound effects of scales after test–retest (n=69)

	Median	SD	Intraclass correlation[b]	% lower bound	% upper bound
FABQ			0.867[c]	0.784	0.917
Test	38.43	15.49			
Retest	37.02	15.94			
NDI			0.823[c]	0.772	0.867
Test	33.23	13.97			
Retest	30.64	15.36			
NHP			0.958[c]	0.932	0.974
Test	2.37	134.34			
Retest	2.23	131.27			
VAS			0.863[c]	0.779	0.915
Test	5.70	1.44			
Retest	5.10	1.87			

SD: Standard deviation; FABQ: Fear-Avoidance Beliefs Questionnaire; NDI: Neck Disability Index; NHP: Nottingham Health Profile; VAS: Visual Analog Scale; c: Coefficient; (test n=106, retest n=69).

The reliability and internal consistency of the questionnaire will be determined through the test–retest method. The test was carried out on patients with neck pain and no treatment with an interval of 2–7 days. The FABQ was applied on the participants to evaluate the validity of the NDI, NHP, and VAS. The relationship between FABQ and other measurement methods was investigated, and the validity of the questionnaire was checked.

Statistical Analysis

The data were analyzed with the SPSS 25.0 (IBM Statistic version 25.0 Windows/Essential for Python 25.0) package program. For the reliability of the scale, Cronbach's Alpha coefficient and intraclass reliability coefficient were calculated. In the evaluation of Cronbach's alpha coefficient, a value above 0.80 was considered high, between 0.80 and 0.60 moderate, and below 0.60 low [2]. Spearman correlation analysis was used to investigate the relationships between the scales. Continuous variables were stated as mean±standard deviation and categorical variables as numbers and percentages. $P \leq 0.05$ was considered statistically significant.

RESULTS

One hundred seventy-five patients with chronic neck pain were included in our research. The participants expressed that the scales reflected their own condition.

Of the patients included in our study, 139 (79.4%) are female and 36 (20.6%) are male. While 85 (48.6%) of these patients work, 90 of them do not. In total, only 70 (40.0%) of 175 patients applied to the physical therapy departments of the hospitals for chronic neck pain. Besides, only 31 (17.7%) patients with chronic neck pain, who participated in our study, used a neck collar.

While the mean age of the participants was found as 43.41±10.96 years of age and the mean of body mass index was found 27.31±5.02 kg/m^2. In this study, the mean duration of the patient's pain was found 54.76±69.22 months. The mean scores obtained from the scales were in line with the responses of the participants and the standard deviation values were found as follows: The FABQ mean score was 37.57±14.62, the NDI mean score was 33.45±14.64, the NHP mean score was 243.98±138.61, and the VAS mean score was 5.68±1.85.

In our study, Cronbach's alpha value of FABQ was found to be 0.820 as a result of statistical analysis. The Cronbach's alpha values of the items vary between 0.79 and 0.82 (Table 1).

While a ceiling effect was observed on the FABQ-PA subscale of FABQ, no base and ceiling effects were observed on FABQ, FABQ-W, and NDI (Table 2).

To evaluate the invariance of the scale over time, 69 patients with neck pain completed the first test, and af-

Table 3. Cronbach α and ICC values of scales

Scales	Cronbach α (n=175)	ICC (95% CI) (n=69)
FABQ	0.820	0.867 (0.78–0.92)
FABQ-PA	0.750	0.830 (0.72–0.89)
FABQ-W	0.795	0.828 (0.72–0.89)
NDI	0.823	0.818 (0.70–0.88)
NHP	–	0.958 (0.93–0.97)
VAS	–	0.863 (0.78–0.91)

ICC: Interclass correlation; CI: Confidence interval; FABQ: Fear-Avoidance Beliefs Questionnaire; FABQ-PA: Physical activity subscale of the Fear-Avoidance Beliefs Questionnaire; FABQ-W: Work pain subscale of the Fear-Avoidance Beliefs Questionnaire; NDI: Neck Disability Index; NHP: Nottingham Health Profile; VAS: Visual Analog Scale.

ter 48 h, the same patients completed the questionnaire again, and the mean scores and standard deviations of FABQ, NDI, NHP, and VAS were analyzed (Table 2).

Considering the ICC values, FABQ was 0.867 while FABQ-PA and FABQ-W were calculated as 0.830 and 0.828, respectively. Whereas NDI was found as 0.818, NHP and VAS were calculated as 0.958 and 0.863. While Cronbach's α value was calculated as 0.750 for FABQ-PA and 0.795 for FABQ-W. The Cronbach's α value of NDI was found to be 0.823 (Table 3).

The correlation between FABQ and its subscales of FABQ-PA and FABQ-W and NDI, VAS, NHP, and the subscales of NHP are shown in Table 4. Accordingly, a strong relationship was observed between FABQ and NHP. While a strong relationship was observed between FABQ-PA and NDI, there was a significant relationship between FABQ and NDI. There was a weak relationship between VAS and FABQ, FABQ-PA, and FABQ-W.

DISCUSSION

Previous studies have revealed that the fear-avoidance model is not only limited to patients with low back pain, it is also observed in a large group of patients with chronic painful conditions [12]. There are studies indicating that several psychological factors, including pain and fear-avoidance beliefs, can significantly contribute to the onset and development of chronic pain and disability in patients with neck pain [13, 14]. In our study, FABQ was evaluated in respect of Turkish validity and reliability in patients with neck pain, to whom it had never been applied before.

Table 4. Correlations among the FABQ (and its subscales), the NDI, the NHP (subscales), and VAS

	FABQ-PA	FABQ-W	FABQ
NDI	0.210**	0.114	0.156*
VAS	0.113	-0.016	0.027
NHP	0.199**	0.196**	0.227**
NHPES	0.091	0.138	0.132
NHPP	0.205**	0.173*	0.214**
NHPER	188*	194*	0.220**
NHPS	0.124	0.064	0.103
NHPSI	0.089	0.152*	0.145
NHPPA	0.267**	0.179*	0.243**

*: P<0.001; **: P<0.05; Spearman correlation analyses, FABQ: Fear-Avoidance Beliefs Questionnaire; FABQ-PA: Physical activity subscale of the Fear-Avoidance Beliefs Questionnaire; FABQ-W: Work pain subscale of the Fear-Avoidance Beliefs Questionnaire; NDI: Neck Disability Index; NHP: Nottingham Health Profile; NHPES: Emotional state subscale of the Nottingham Health Profile; NHPP: Pain subscale of the Nottingham Health Profile; NHPER: Emotional reactions subscale of the Nottingham Health Profile; NHPS: Sleep subscale of the Nottingham Health Profile; NHPSI: Social isolation subscale of the Nottingham Health Profile; NHPPA: Physical activity subscale of the Nottingham Health Profile; VAS: Visual Analog Scale.

In our study, the internal consistency of the items of FABQ was examined (α=0.79–0.82). The internal correlation of the Greek FABQ version study (α=0.38–0.90) and the Italian FABQ version (α=0.62–0.91) is similar to our study [15, 16]. As a result of the analysis, a 2-factor structure was found in FABQ, as in its Italian, Spanish, English, French, Brazilian, Iranian, and Arabic versions [15–20]. However, the German and Chinese versions of FABQ found the questionnaire as a 3-factor structure [21, 22]. In the analysis, no need emerged to exclude any item.

The internal consistency of FABQ, its subscales of FABQ-PA and FABQ-W, and NDI, which we applied to patients with neck pain, were analyzed. Accordingly, the internal consistency of both scales was found to be high (FABQ α=0.820, FABQ-PA α=0.750, FABQ-W α=0.795, and NDI α=0.823). While some studies in the literature used FABQ, NDI, and Tampa Kinesiophobia Scale (TSK) together [17, 19], other studies used only FABQ and TSK [15, 16]. In general, the internal consistencies of FABQ, FABQ-PA, FABQ-W, and NDI were found high [15–17, 19].

In the Turkish reliability version study of FABQ, which was applied on patients with neck pain, all the scales were repeated 48 h after the first test. Thus,

it was aimed to minimize the changes in the clinical conditions of the patients with a reliability test conducted in a short time. At the end of our study, the correlation coefficient of the test–retest total score and subsection scores was found high. When the literature was reviewed, the test–retest scores of the Brazilian and Hausa versions were found to be higher compared to our study, however, the results of the Iranian, Arabic, French, and Italian versions were similar to our results [15, 16, 19, 20, 23, 24].

In our study, in which the validity of FABQ and its subscales were examined, a good-level correlation was discovered between FABQ and its subscales as a result of the comparison with NDI, NHP, and VAS. Furthermore, a weak relationship is observed between NDI and the subsection of FABQ-PA while a significant relationship is seen with FABQ. As a result of the correlation with VAS, a weak relationship was found between FABQ and its subsections. FABQ and its subscales correlated with NHP appear with a weak relationship. However, it was observed that NHPES and NHPS, which are among the subsections of NHP, had a weak relationship with FABQ and its subsections. While NHPER had a weak relationship only with FABQ-PA and FABQ-W, it had a significant relationship with FABQ. FABQ versions were produced in different languages. Whereas a significant relationship was detected between FABQ and NDI in the Iranian version, a weak correlation was found between the subsections of FABQ-PA and FABQ-W and VAS [19]. Similarly, in the Arabic and Hausa versions, a weak relationship was discovered between VAS and FABQ, which supports our study [20, 24]. A significant relationship was observed between the Iranian FABQ and NDI [19]. Besides, in the study of Cleland et al. [17], a significant relationship was discovered between FABQ-W and NDI in British patients with neck pain. This shows that our study is compatible with the literature.

In our research, as in the Chinese, English, Hausa, and Iranian versions, the study was carried out with patients with neck pain [17, 19, 21, 24]. However, in English, Italian, Brazilian, Arabic, and Spanish versions, studies were conducted on patients with low back pain [15–18, 20].

The fact that not all the patients included in our study were working and they did not present an equal distribution in terms of gender can be mentioned among the limitations of our study.

Conclusion

Consequently, this study showed us how the ability of individuals with neck pain to perform the activities of daily living is affected by measuring the fear about physical activities and work. The relationship between FABQ and NDI proves that this scale can be used safely in patients with neck pain.

Ethics Committee Approval: The Pamukkale University Clinical Research Ethics Committee granted approval for this study (date: 17.09.2015, number: 60116787-020/54426).

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Authorship Contributions: Concept – BO, UBA; Design – BO, UBA; Supervision – BO, GE; Fundings – BO, GE; Materials – BO; Data collection and/or processing – BO; Analysis and/or interpretation – BO, UBA; Literature review – BO, GE; Writing – BO; Critical review – BO, UBA, GE.

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