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Investigation of Psychometric Properties of Turkish Version of the Self-Efficacy Scale for Clinical Reasoning in Physiotherapists

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ABSTRACT

Objective: This study aimed to adapt the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' into Turkish and to examine its psychometric properties, thereby providing a valid and reliable tool for assessing self-efficacy in clinical reasoning among Turkish physiotherapists.

Materials and Methods: The study followed a two-phase cross-sectional design. In the first phase, the scale was translated into Turkish using established cross-cultural adaptation guidelines to ensure linguistic and conceptual equivalence. In the second phase, psychometric properties were evaluated with 132 Turkish physiotherapists, recruited through snowball sampling. Data were collected via an online survey, and analyses included factor analysis, internal consistency (Cronbach's alpha), test-retest reliability (Intraclass Correlation Coefficient, ICC), and known group validity.

Results: Factor analysis revealed a two-factor structure consistent with the original scale, distinguishing professional and general self-efficacy items. Internal consistency was strong, with a Cronbach's alpha of 0.812, while test-retest reliability was excellent (ICC = 0.841). Known group validity analyses showed significant differences in self-efficacy scores based on years of professional experience, with higher scores observed in physiotherapists with over ten years of experience (p = 0.015).

Conclusion: The Turkish version of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' demonstrated robust validity and reliability. It is a suitable instrument for evaluating self-efficacy in clinical reasoning among Turkish physiotherapists. It can be applied in research and clinical education contexts to measure and potentially enhance this skill.

Keywords: Self efficacy, clinical reasoning, psychometrics, cross-cultural comparison, physical therapists.

Fizyoterapistlerde Klinik Muhakemeye Yönelik Öz Yeterlilik Skalasının Türkçe Formunun Psikometrik Özelliklerinin İncelenmesi

ÖZET

Amaç: Bu çalışmanın amacı, 'Klinik Akıl Yürütme İçin Fizyoterapist Öz-Yeterlilik Skalası"nı Türkçe'ye uyarlamak ve skalanın psikometrik özelliklerini incelemek, böylece Türk fizyoterapistlerde klinik muhakeme öz yeterliliğini değerlendirmek için geçerli ve güvenilir bir araç sağlamaktır.

Gereç ve Yöntem: Çalışma iki aşamalı kesitsel bir tasarım izlemiştir. İlk aşamada, ölçek, dilsel ve kavramsal eşdeğerliği sağlamak için yerleşik kültürler arası uyarlama yönergeleri kullanılarak Türkçeye çevrilmiştir. İkinci aşamada, psikometrik özellikler kartopu örnekleme yoluyla 132 Türk fizyoterapist ile değerlendirilmiştir. Veriler çevrimiçi bir anket aracılığıyla toplanmış ve analizler faktör analizi, iç tutarlılık (Cronbach's alpha), test-tekrar test güvenilirliği (Intraclass Correlation Coefficient, ICC) ve bilinen grup geçerliliğini içermiştir.

Bulgular: Faktör analizi, mesleki öz yeterlilik ve genel öz yeterlilikle ilgili maddeleri birbirinden ayırarak orijinal ölçekle tutarlı iki faktörlü bir yapı ortaya koymuştur. İç tutarlılık 0,812 Cronbach alfa ile güçlü iken test-tekrar test güvenilirliği mükemmeldir (ICC = 0,841). Bilinen grup geçerliliği analizleri, mesleki deneyim yıllarına bağlı olarak öz yeterlilik puanlarında önemli farklılıklar olduğunu göstermiş, on yıldan fazla deneyime sahip fizyoterapistlerde daha yüksek puanlar gözlenmiştir (p = 0,015).

Sonuç: Klinik Akıl Yürütme İçin Fizyoterapist Öz-Yeterlilik Skalası'nın Türkçe versiyonu geçerlilik ve güvenilirlik göstermiştir. Türk fizyoterapistler arasında klinik muhakeme öz yeterliliğini değerlendirmek için uygun bir araçtır. Bu beceriyi ölçmek ve potansiyel olarak geliştirmek için araştırma ve klinik eğitim bağlamlarında uygulanabilir.

Anahtar Kelimeler: Öz yeterlilik, klinik akıl yürütme, psikometri, kültürlerarası karşılaştırma, fizyoterapistler.

1. Introduction

Physiotherapists are autonomous healthcare providers who examine patients and healthy individuals. They diagnose conditions based on principles of physiotherapy and rehabilitation and plan and implement educational and individualized exercise programs (1). For this reason, contemporary physiotherapy practices place greater

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responsibility and autonomy on the physiotherapist than ever before (2). This autonomy in professional practice emphasizes the importance of clinical reasoning for physiotherapists. Several parameters are necessary to develop this clinical reasoning skill (3). Clinical reasoning is crucial at every stage, from initiating and organizing the clinical decision to concluding the chosen clinical practice. Success in these processes relies on the physiotherapist's beliefs and attitudes, particularly regarding their ability to effectively implement intervention plans and handle potential situations, which is a matter of self-efficacy (4,5).

The development of self-efficacy may be influenced by various experiences, including achievement in performance and the degree of stimulation from environmental factors (4). Specifically, reflecting on experienced situations enhances self-efficacy levels, and this increased self-efficacy, in turn, boosts the effectiveness of clinical reasoning (6–8). It is important to differentiate between the concept of general self-efficacy and that of specific self-efficacy. General self-efficacy is a stable construct that reflects cognition and other personality traits independent of any specific task. In contrast, specific self-efficacy is a more malleable motivational construct, closely related to goals, motivation, and anxiety concerning the encountered situation (9,10). The belief in one's own ability as a physiotherapist to accurately reason about a patient's clinical presentation exemplifies specific self-efficacy (11).

The curricula in physiotherapy and rehabilitation tend to emphasize the enhancement of psychomotor skills and performance, often resulting in the development of thinking and decision-making skills being somewhat neglected (12). Given the importance of self-efficacy for performance in clinical settings, several researchers have explored the impact of educational interventions on self-efficacy among physiotherapy and rehabilitation students (13–15). If these metacognitive processes are developed, tools for quantitatively demonstrating these results are limited. While tools exist to assess general self-efficacy, general occupation-related self-efficacy, and self-efficacy in physiotherapy and rehabilitation students, the only scale specifically designed to measure the self-efficacy of physiotherapists in clinical decision-making was developed by Venskus et al. in 2017 (11).

Given its critical role in clinical practice, a valid and reliable method to measure physiotherapists' self-efficacy in clinical decision-making is essential. This study aimed to evaluate the psychometric properties of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists,' developed by Venskus et al. in 2017.

2. Materials and Methods

This cross-sectional study was conducted in two stages. Initially, the original English version of the 'The Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' was translated into Turkish. Subsequently, in the second stage, we examined the psychometric properties of the Turkish version of the scale. Informed consent was obtained from all participants through an online questionnaire. Participants were recruited using snowball sampling by Google Forms (https://docs.google.com/forms/d/e/1FAIpQLSfUSlZSxve6Rqihd8GTZ9H0UVSbt4f8oIwZCaNxZb97hQqrjg/viewform?usp=sf_link).

Fayers and Machin recommended that in cross-cultural adaptation research, the sample size should be at least five times the number of questionnaires (16). We calculated our sample size as ten times the number of questionnaires, and we added an additional 10% to account for potential missing data. We reached 132 participants that answered the questionnaire completely out of 140 who were included in our study. The period between the first and second evaluation to determine the test-retest reliability of the questionnaire is 14 days (17). According to Cohen, it was suggested that 50-100 people should be included in the study for test-retest reliability, with a statistical significance level of $p<0.05$, a power of 80%, and an ICC of 0.70-0.90. In this direction, it was anticipated that there might be delays in the return, and the survey was sent to half of the participants again, and statistical analysis of the test-retest reliability was performed by receiving responses from 52 people.

2.1. Scale Properties

The Self-Efficacy Scale for Clinical Reasoning in Physiotherapists comprises 13 questions, with the first five items focusing on aspects related to the profession and clinical practice, and the other items addressing self-efficacy in general life situations. Responses to all questions are recorded on a 5-point Likert scale.

2.2. Translation Process and Investigation of Psychometric Properties

Permission was obtained from the developer of the 'The Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' for its translation and adaptation into Turkish (11). The translation of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' into Turkish was conducted according to the protocol proposed by Beaton et al (18). Initially, two native Turkish speakers with advanced proficiency in English independently translated the scale. These translations were then amalgamated with the assistance of a third person serving as a moderator. Subsequently, a native English speaker with advanced Turkish proficiency retranslated this merged version back into English. An expert committee, comprising two health professionals, an English translator, and the study investigators, reviewed the adapted forms. Following these stages, we sent the final version of the scale to half of the targeted number of participants. A total of 15 physiotherapists responded to our e-mail and their responses were reviewed by the researchers. Based on their feedback, the final version of the scale was developed, with no major revisions needed at this stage.

Following the completion of the translation process, the psychometric properties of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' were evaluated. These properties included factor analysis to determine the factor structure, assessment of internal consistency and test-retest reliability for reliability, and known group validity to establish validity.

2.3. Ethical Aspects of the Research

The study protocol was approved by the İzmir Katip Çelebi University University Social Research Ethics Committee (date: 14.12.2021, number: 2022/22-01) and was in accordance with the Declaration of Helsinki.

2.4. Statistical Analysis

For statistical analysis, SPSS version 24.0 was utilized. The normal distribution of the data was assessed using histograms and the Kolmogorov-Smirnov Test. Depending on their distribution, numerical data were presented as median (1st-3rd quartile) or mean ± standard deviation, while categorical variables were expressed as numbers (percentage). All analyses were interpreted with a significance level set at $p < 0.05$.

Internal consistency was evaluated by calculating Cronbach's alpha coefficient, with a value of 0.70 or higher considered sufficient to demonstrate adequate internal consistency (19). The intraclass correlation coefficient (ICC) was used to evaluate test-retest reliability, with a 95% confidence interval. Reliability was categorized as 'acceptable' for ICC values between 0.50 and 0.75, 'good' for values between 0.75 and 0.90, and 'excellent' for values above 0.90 (20).

For assessing known group validity, variables such as gender, post-graduate education status, years of professional experience, the highest degree obtained, and both the subscores and total score of the scale were analyzed. This analysis utilized the Kruskal-Wallis and Mann-Whitney U Tests. The Mann-Whitney U test with Bonferroni correction was applied for pairwise comparisons in groups of three. Principal component exploratory factor analysis was employed to evaluate the scale's construct validity, aiming for a minimum explanatory rate of 60% (21).

3. Results

3.1. Characteristics of the Studies

The study comprised 132 participants, including 91 females (68.9%) and 41 males (31.1%), with an average age of 29 years. Regarding work experience, 67 participants (50.8%) had 0-5 years, 41 (31.1%) had 5-10 years, and 24 (18.2%) had more than 10 years. On average, participants worked 40 hours per week and saw 20 patients. Educational qualifications were as follows: 96 participants (72.7%) held a bachelor's degree, 34 (25.8%) a master's degree, and 2 (1.5%) a doctorate. While 36 (34.9%) of the participants were continuing their doctoral education, 37 (35.9%) of the participants were graduate students. A major of physiotherapists, 82.6% (n=109), had received postgraduate education. The sociodemographic data of the participants are summarized in Table 1, Figure 1, and Figure 2.

Table 1. Sociodemographic characteristics of the participants

	n / x̃	% / IQR
Gender		
Male	41	31.1
Female	91	68.9
Age	29	5
Working Year		
0-5 Year	67	50.8
5-10 Year	41	31.1
+10 Year	24	18.2
Average working hours per week	40	5
Average number of patients per week	20	30
Postgraduate education status		
Yes	19	14.4
No	113	85.6
Last Level of Graduation		
Bachelor's degree	96	72.7
Master's Degree	34	25.8
Doctorate	2	1.5
Status of Post-Graduation Education		
Yes	109	82.6
No	23	17.4

n: number, x̃: median, %: percentage, IQR: interquartiles range
For categorical data n and %, for numerical data median and IQR are given.

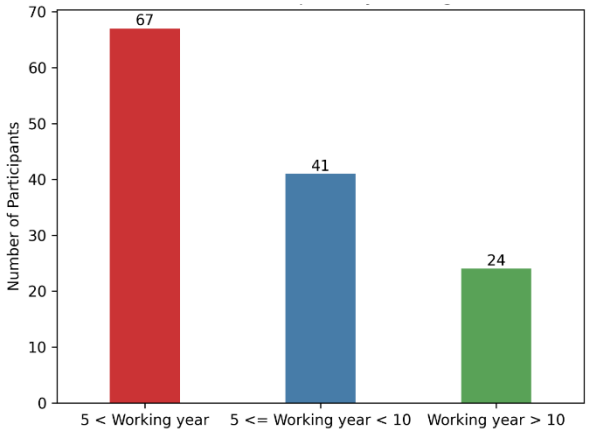

Figure 1. Number of participants by working year

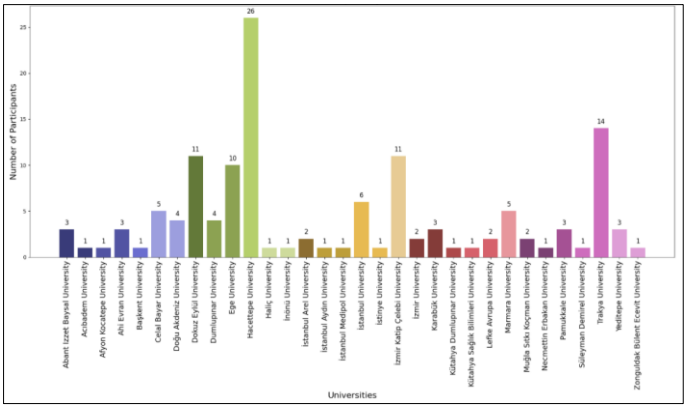

Figure 2. Number of participants by universities

Based on the Principal Component Analysis, the scale exhibited a two-factor structure. The first factor included Items 1 to 5, while the second factor comprised Items 6, 7, 8, 9, 10, 11, and 13. The exploratory factor analysis results indicated that Item 12 showed low loading with both factors, leading to its removal from further analysis. Upon reanalysis, it was found that the exploratory rate of the factors exceeded 60%, with factor loadings ranging between 0.622 and 0.859.

Table 2. Factor analysis of self-efficacy scale for clinical reasoning in physiotherapists

	Factor 1	Factor 2
	Factor Loading	Factor Loading
Item 1		0.622
Item 2		0.789
Item 3		0.779
Item 4		0.859
Item 5		0.641
Item 6	0.794	
Item 7	0.846	
Item 8	0.703	
Item 9	0.848	
Item 10	0.843	
Item 11	0.688	
Item 13	0.723	

*Kaiser Meyer Olkin and Bartlet Analysis

The internal consistency analysis for the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' revealed that the Cronbach's alpha coefficient was 0.783 for the physiotherapist self-efficacy sub-items, 0.792 for the general self-efficacy sub-items, and 0.812 for the total scale score (as shown in Table 3). The total scale and subscale scores were interpreted as having good internal consistency.

The test-retest reliability of the total score for the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' was classified as excellent, with an Intraclass Correlation Coefficient (ICC) of 0.841. For the subscales, the ICC values ranged from 0.701 to 0.867, indicating acceptable to good reliability, all within a 95% confidence interval (as detailed in Table 3).

When analyzing the sub-scores of the scale across different known groups, it was noted that participants categorized by gender, post-graduate education status, and the highest level of education attained showed similar scores in both sub-scores and the total score. Regarding years of professional experience, the findings indicated that participants had comparable scores in terms of general self-efficacy and the total scale score ($p > 0.05$, Table 4). However, a significant difference was observed in the physiotherapist self-efficacy sub-score ($p = 0.045$, Table 4). Further analysis revealed this difference was primarily between participants with less than 5 years of professional experience and those with more than 10 years, with the latter group exhibiting higher physiotherapist self-efficacy scores ($p = 0.015$).

4. Discussion

In this study, we adapted the 'the Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' into Turkish and conducted an extensive examination of its validity and reliability as part of its psychometric properties assessment. The findings indicate that the Turkish version of 'the Self-Efficacy Scale for Clinical Reasoning in Physiotherapists exhibits a two-factor structure, affirming its validity and reliability as a measurement tool.

The sociodemographic data (age, gender, years of employment) of the 132 physiotherapists in our study align with those reported in other studies in the literature(22). Among our participants, 91 were female (68.9%), and 41 were male (31.1%), with a mean age of 29. In terms of work experience, 67 participants (50.8%) had been working for 0-5 years, 41 (31.1%) for 5-10 years, and 24 (18.2%) for over 10 years. Additionally, 109 participants (82.6%) had received post-graduate education. In a study of the Hebrew-translated 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists', which involved 314 participants, the demographic profile included 173 female participants (55.1%), 141 males (44.9%), with an average age of 38 ± 9.8 years, and an average employment duration of 10 ± 9.9 years. Additionally, 92 participants (29%) had received postgraduate education (22). Although the participants in our study were younger than those in the aforementioned study, the higher rate of postgraduate education among our participants suggests a greater inclination towards self-improvement.

Table 3. Examination of the reliability of the self-efficacy scale for clinical reasoning in physiotherapists

Subscores of the Self-Efficacy Scale for Clinical Reasoning in Physiotherapists	Items	Intra-class Correlation Coefficient (95% CI)	Cronbach α	If Item Deleted Cronbach α
Physiotherapist Self-Efficacy Sub-items	Item 1	0.796 (0.612-0.903)	0.783	0.809
	Item 2	0.835 (0.652-0.921)		0.800
	Item 3	0.867 (0.723-0.936)		0.827
	Item 4	0.779 (0.671-0.847)		0.787
	Item 5	0.801 (0.682-0.905)		0.799
General Self-Efficacy Sub-items	Item 6	0.812 (0.606 -0.911)	0.792	0.808
	Item 7	0.730 (0.598-0.829)		0.788
	Item 8	0.729 (0.626-0.870)		0.792
	Item 9	0.724 (0.598 -0.791)		0.803
	Item 10	0.706 (0.594-0.817)		0.780
	Item 11	0.701 (0.572-0.858)		0.775
	Item 12	0.804 (0.688-0.907)		0.805
	Item 13	0.703 (0.599-0.764)		0.809
Total		0.841	0.812	

CI: Confidence interval

Table 4. Investigation of the known group validity of the self-efficacy scale for clinical reasoning in physiotherapists

Known Groups	Physiotherapist Self-Efficacy Subscore	General Self-Efficacy Subscore	Total Score
	p	*p*	*p*
Gender			
Female	0.790	0.361	0.515
Male			
Profession Year			
Less than 5 years			
5-10 years	0.045*	0.116	0.055
More than 10 years			
Status of Post-Graduation Education			
Yes	0.071	0.058	0.054
No			
Last Level of Graduation			
Bachelor's degree	0.057	0.071	0.059
Master's Degree			
Doctorate			

Mann Whitney U test was used for pairwise group comparisons and Kruskal Wallis Test was used for three group comparisons. Mann Whitney U test with Bonferonni correction was used if there was a difference in three-group comparisons. $p<0.05$ is significant difference.

The factor analysis of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' revealed a two-factor structure, distinguishing between questions focused on professional practice and clinical skills and those addressing general life situations. This bifurcation allows for a comprehensive assessment of physiotherapist self-efficacy across various scenarios, ranging from clinical practice to everyday life challenges. In the original study, factor analysis identified two independent component factors that accounted for 95.6% of the variance (11). Accordingly, our results confirm that the Turkish scale version similarly exhibits a two-factor structure consistent with the original version.

The 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' reliability was assessed using the Intraclass Correlation Coefficient (ICC) and Cronbach's alpha values. The results showed that the Cronbach's alpha values for the sub-dimensions related to general self-efficacy and professional self-efficacy were above 0.70, demonstrating strong internal consistency. Additionally, the ICC values, calculated as part of the test-retest reliability assessment, ranged from 0.701 to 0.867, indicating a reliability level ranging from 'acceptable' to 'good.' For comparison, the Cronbach's alpha for the Hebrew-translated version of the Self-Efficacy Scale for Clinical Reasoning in Physiotherapists was reported as 0.93 (22). In the same study, the analysis of correlation coefficients revealed that the Intraclass Correlation Coefficient (ICC) values were 'excellent' (ICC = 0.94), surpassing the values obtained in our study. This observed discrepancy in reliability values could be attributed to the more heterogeneous distribution of physiotherapists in our study based on their areas of work.

In the analysis of known group validity as part of the psychometric properties assessment of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists', no significant differences were found in self-efficacy scores based on gender, post-graduate education status, or the level of the last degree earned. However, a notable variation was observed with years of professional experience. Physiotherapists were categorized into three groups based on their years of experience: 0-5 years, 5-10 years, and more than 10 years. The results indicated that those with over 10 years of experience scored higher in self-efficacy, suggesting that increased clinical experience may positively influence self-efficacy levels. This aligns with previous literature findings that emphasize the importance of experience in enhancing self-efficacy and clinical reasoning skills (11, 21). For instance, in one study, it was observed that newly graduated physiotherapists had lower self-efficacy scores compared to their more experienced counterparts, indicating that self-efficacy in physiotherapy significantly increases with greater professional experience (23). 52% of participants reported that the contribution of all educational experiences to their self-esteem was "significant" and had significantly higher self-efficacy scores than those who did not perceive all experiences as "significant" ($p<0.001$) (23). Another study supported this finding, which reported a statistically significant increase in self-efficacy levels among students during their Doctor of Physiotherapy (DPT) training (11).

The present study has several limitations. A primary limitation is the relatively young age of our study participants, which may not represent the entire spectrum of physiotherapists' experiences. Furthermore, the differing sample sizes in the groups may have affected results. Additionally, our analyses were confined to specific measures of reliability and validity. Future research could expand to include different parameters, such as predictive validity and the determination of minimal clinically significant differences. Another limitation is the use of online methods for data collection, suggesting that further research is needed to confirm the stability of the scale's psychometric qualities when administered through various methods.

5. Conclusion and Recommendations

The study's findings indicate that the Turkish version of the 'Self-Efficacy Scale for Clinical Reasoning in Physiotherapists' is valid and reliable as a measurement tool. Researchers are encouraged to utilize this Turkish version in their studies to assess the self-efficacy of physiotherapists.

6. Contribution to the Field

This scale provides a robust tool for measuring physical therapists' professional self-efficacy levels, laying the groundwork for future research. This enables a more scientifically grounded evaluation of educational program effectiveness and professional development strategies. For clinicians, it not only helps them understand their self-efficacy levels but also allows them to identify individual development that will enhance their professional performance and improve patient outcomes.

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Conflict of Interest

There is no conflict of interest regarding any person and/or institution.

Authorship Contribution

Concept: MK, FT, KP, OÖ; Design: MK, FT, KP, OÖ; Supervision: OÖ; Funding: None; Materials: None; Data Collection/Processing: MK, FT, KP, OÖ; Analysis/Interpretation: MK; Literature Review: MK, FT, KP, OÖ; Manuscript Writing: MK, FT, KP, OÖ; Critical Review: OÖ.

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