



Cross-cultural adaptation, validity and reliability of Turkish version of Oxford Ankle Foot Questionnaire for children with congenital talipes equinovarus

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ABSTRACT

Background: The purpose of the study was to evaluate the reliability and validity of the Turkish version of the Oxford Ankle Foot Questionnaire (OxAFQ) to provide cultural adaptation.

Methods: This study involved translation, back translation, and cross-cultural adaptation. Forty-nine patients with congenital talipes equinovarus were evaluated using the Turkish version of OxAFQ. Turkish version of the Childhood Health Assessment Questionnaire (CHAQ) was used as a gold standard to validate the Turkish version of the OxAFQ. The validation was assessed with Spearman correlation analysis by using CHAQ. The reliability of the questionnaire was assessed with Cronbach alpha (internal consistency) and exploratory factor analysis.

Results: High validity was found between OxAFQ and CHAQ ($r = -0.422-0.292$) ($p < 0.01$). Reliability analysis showed that OxAFQ had a high level of Cronbach alpha ($\alpha = 0.88-0.96$) and internal consistency (ICC = 0.90–0.96).

Conclusion: The Turkish version of OxAFQ is a valid, reliable and useful quality of life questionnaire in patients with congenital talipes equinovarus and it is proper for use by health professionals and researchers.

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1. Introduction

Foot disorders significantly limit patients' activity and worsen their quality of life. It is emphasized that evaluating foot functions is important for the assessment of progress in conservative and surgical treatment [1]. Therefore, there are many methods and scales that have been successfully validated and are applied in many countries to evaluate foot functions in children and adults [2].

Besides objective evaluation and assessment methods, the need for Patient Reported Outcome Measures (PROMs) reflecting patients' subjective perspective regarding their functionality is increasing [3–5]. Considering the disabled patients, the generic PROMs may not address problems in a specific body region, patient groups or pathology. Therefore, specific PROMs may be more helpful in understanding the dysfunctional problem in detail. However, most of the region-specific PROMs are not generated for children and are adult-specific. Considering daily needs and activities of daily living for children, adult-specific PROMs may not reflect problems in the paediatric population and there is a need for PROMs specified for children [2].

While several PROMs are available for adults with foot and ankle problems, they are not found to be valid, reliable and suitable for children. The Oxford Ankle Foot Questionnaire (OxAFQ) for children was developed as a site-specific (ankle/foot) instrument; an inexpensive and expedient method for assessing health status and evaluating outcomes regarding the child's perspective [6].

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Meanwhile, OxAFQ for children is a proper tool as a PROM to assess foot and ankle problems in children. This questionnaire is designed to assess the problems related to the ankle and foot among children aged between 5–16 years old. OxAFQ for children consists of 14 questions focusing on three subdomains experienced by child and his/her parents during the previous week and includes “physical activity”, “school and play” and “emotional” sections and one question about footwear [7].

This questionnaire has been found to have cross-sectional validity and internal test-retest reliability [8,9]. Previous translations of the OxAFQ were published in Italian, Danish and Dutch languages before and there is not a Turkish version available [10–12]. The first aim of the present study was to translate the questionnaire into Turkish language to be used in clinical care. The second aim of the study was to perform the validation, cross-cultural adaptation and test-retest reliability of the OxAFQ for children in Turkish population.

2. Material and methods

This study was approved by the Institutional Non-invasive Clinical Research Ethics Committee and was performed according to the Declaration of Helsinki and the guidelines for Good Clinical Practice. Informed written consent was obtained from all patients and their parents. The permission to use the OxAFQ for translation to Turkish was approved by Oxford University Innovation¹.

Cross-cultural adaptation in different phases was performed based on the established guidelines and with modifications [13]. A cultural adaptation committee (CAC) of 5 physiotherapists and a paediatric orthopaedist was set up. Two independent translators simultaneously performed Turkish translation of OxAFQ for forward translation. The first Turkish version of OxAFQ was obtained after a consensus meeting of CAC by evaluating the translations and comparing inconsistencies. Then, a professional native English translator with medical background retranslated this provisional Turkish version into English. The second meeting of CAC consensus was performed to check for inconsistencies or all translation problems. The original version and back translation English version of OxAFQ were found to be semantically similar and only a few adjustments were made due to the semantic shift. Final Turkish version of OxAFQ was administered to 10 patients with talipes equinovarus and their parents. None of them reported any problems about completing the questionnaire because of language problem.

2.1. Patients

Seventy-six patients aged between 6 and 18 years with congenital talipes equinovarus were recruited. The patients who agreed to participate were included in the study. Patients with neuromuscular problems, psychiatric problems or cognitive disorders that could not answer the questionnaire were excluded from the study. The children and parents were requested to fill out the Turkish version “child/teenagers” and “parent” of OxAFQ and Childhood health assessment questionnaire (CHAQ) [14]. As no serious changes could have been expected in the clinical outcomes after one-week period, and the patients would be more likely not to remember their previous answers, the OxAFQ was re-administered after one week.

2.2. Instruments

The children and parents were asked to fulfil “child/teenagers” and “parent” versions of the Turkish version OxAFQ. Additionally, CHAQ was used for assessing the functional ability.

2.2.1. OxAFQ

OxAFQ consists of two different forms each with 15 items as child & teenager and parent questionnaire. 14 out of 15 items of The OxAFQ-child/teenager (OxAFQ-C) are divided into three subscales: 6 items for physical, 4 items for emotional and 4 items for school and play. Each item is scored with a five-point Likert scale ranging from 0 “poor function” to 4 “good function”. The last item is about the patient’s satisfaction on his/her footwear. The OxAFQ-parents (OxAFQ-P) contains same items; parents are asked about functional status and satisfaction of their child/teenager.

The scores of all items were summed respectively for all subscales (Physical, Emotional, School and Play) and were transformed to a percentage scale (0–100) for both forms, where a higher score represents better functioning. Besides, scores of footwear satisfaction were converted to a percentage scale (range, 0–100).

2.2.2. CHAQ

The Turkish version of the CHAQ was used to assess functional ability. It was reported that CHAQ is a valid and reliable tool for measuring the physical, functional and psychosocial assessment of children with chronic disabilities [14]. The CHAQ includes eight activities of daily living. The activities were scored on a scale of 0–3 (0 = able to do with no difficulty, 1 = able to do with some difficulty, 2 = able to do with much difficulty, and 3 = unable to do). The mean of the eight scores defined the CHAQ score (range, 0–3) [15].

2.3. Statistical analysis

The data were analysed using SPSS version 21.0 (Statistical Package for the Social Sciences, USA). $p < 0.05$ was regarded as statistically significant. Relationship between CHAQ and OxAFQ was analysed using The Spearman Correlation Analysis to assess the validation. Internal consistency (Cronbach Alpha) and exploratory factor analysis were used to evaluate reliability of the questionnaire. The Cronbach Alpha reliability classification occurs as follows: Very low ($\alpha \leq 0.30$); Low ($0.30 < \alpha \leq 0.60$); Moderate ($0.60 < \alpha \leq 0.75$), High ($0.75 < \alpha \leq 0.90$) and very high ($\alpha > 0.90$) [16,17].

3. Results

Seventy-six patients with congenital talipes equinovarus were recruited and 49 patients who met the criteria were included in the study. The average age of participants was 8.83 years. Demographic and clinical characteristics of the patients are shown in Table 1. Descriptive statistics for the scores at baseline and at the second assessment of the OxAFQ and CHAQ are provided in Table 2.

3.1. Internal consistency, test-retest reliability

The Cronbach’s alpha first assessment values were 0.94, 0.96, 0.92 for the physical, school-play and emotion in the OxAFQ Child/teenager version subscales, respectively, indicating high internal consistency. At the same time the Cronbach’s alpha first assessment values were 0.93, 0.94, 0.90 for the Physical, School and play and Emotion in the OxAFQ Parent version subscales, respectively, indicating high internal consistency.

The test-retest reliability of the OxAFQ Child/teenager version for physical, school-play and emotion were very high for all subscales, with an ICC of 0.93, 0.94 and 0.96 respectively ($p < 0.001$) Also, the

¹ The Oxford Ankle Foot Questionnaire for Children (OxAFQ-C) <https://innovation.ox.ac.uk/outcome-measures/the-oxford-ankle-foot-questionnaire-for-children-oxafq-c/>

Table 1
Demographic and clinical variables of patients.

Variables	Mean \pm SD / n (%) [min–max]
Age (years)	8.83 \pm 3.30 [6–18]
Gender	
Female	13 (26.5%)
Male	36 (73.5%)
BMI (kg/m ²)	18.38 \pm 9.28 [12.86–29.66]
Affected side	
Right foot	13 (26.5%)
Left foot	9 (18.4%)
Bilateral	27 (55.1%)
History of Surgery	
Yes	33 (67.3%)
No	16 (32.7%)
History of cast	
Yes	31 (63.3%)
No	18 (36.7%)
Orthotic use	
Yes	12 (24.5%)
No	37 (75.5%)

Abbreviations: SD, standard deviation; min, minimum; max, maximum; BMI, body mass index; kg, kilogram; m, meter.

Table 2
Descriptive statistics for the patient and parent reported outcome measures used in this study.

Outcome Measurements	Mean \pm SD
First assessment	
OxAFQ Child and teenager version	
Physical	71.59 \pm 21.27
School and play	91.45 \pm 18.29
Emotional	83.29 \pm 21.96
OxAFQ Parent version	
Physical	73.97 \pm 21.80
School and play	91.07 \pm 19.47
Emotional	82.90 \pm 25.12
Second assessment	
OxAFQ Child and teenager version	
Physical	71.59 \pm 21.77
School and play	92.04 \pm 17.79
Emotional	83.66 \pm 22.23
OxAFQ Parent version	
Physical	74.14 \pm 22.18
School and play	90.76 \pm 20.37
Emotional	82.81 \pm 25.96
CHAQ total	0.47 \pm 0.55

Abbreviations: SD, standard deviation; OxAFQ, Oxford Ankle Foot Questionnaire; CHAQ, Childhood Health Assessment Questionnaire.

test-retest reliability of the OxAFQ Parent version for physical, school-play and emotion were very high for all subscales, with an ICC of 0.90, 0.92 and 0.95 respectively ($p < 0.001$) (Table 3).

3.2. Construct validity

The correlation between the subscales of the OxAFQ and CHAQ are presented in Table 4. The Turkish version OxAFQ Child/teenager version demonstrated good correlation with the CHAQ, but only physical subscale demonstrated good correlation with the CHAQ in OxAFQ Parent version.

4. Discussion

This study was performed to test the cultural adaptation, validity, and reliability of the Turkish version of OxAFQ in patients with congenital talipes equinovarus. As a result, Turkish version of OxAFQ indicates high reliability, appropriate construct validity and good measurement properties. Therefore, it can be suggested that the Turkish OxAFQ can be used in foot and ankle problems of Turkish patients with congenital talipes equinovarus.

The present study included 4 phases of the validation process: translation, cultural adaptation, and reliability and validity analysis. The original version of the OxAFQ was successfully translated and adapted to the Turkish language. High internal consistency was demonstrated by Cronbach's α for OxAFQ-C (ICC: 0.89–0.94) and OxAFQ-P (ICC: 0.88–0.96), like original version of OxAFQ study by developers and previously reported data [9,10]. Similar to the present study, high internal consistency (0.87–0.99) was reported in the Italian version of OxAFQ [10]. However, the Danish study for validity of OxAFQ suggested lower consistency in all domains of the questionnaire, which is argued to be because of the administered method. The authors reported that it is possible for parents to intervene, thereby create a source of bias, making the survey less reliable and agreeable than perceived, rather than projecting children's own interpretations [11]. Also, like Italian, Danish and Dutch versions of OxAFQ, test-retest reliability of the OxAFQ Child/teenager version for physical, school-play and emotion were very high for all subscales, respectively, with an ICC of 0.93, 0.94, and 0.96 in the present study. It was reported that the OxAFQ-c is not very sensitive in observing changes in individual patients, because Bland–Altman plots showed an extensive random variability indicated by vast limits of agreement in the Dutch version [12]. We suppose that it is difficult to make a general opinion because Bland Altman was not reported in the original version and other versions as well. Consequently, we suggest that it is useful as a PROM for assessing foot functions in patients with congenital talipes equinovarus since the Turkish version of OxAFQ is very sensitive to evaluate foot and ankle complaints.

Evidence for construct validity was obtained by determining the relationship between the Turkish OxAFQ and CHAQ in the present study. The correlation coefficient between the Turkish OxAFQ and the Turkish version of the CHAQ were varied for OxAFQ-C and OxAFQ-P subscales. We found a significant agreement between the subdomains of “physical”, “school and play” and “emotional” of OxAFQ-C and CHAQ-Total ($r = -0.402$, $r = -0.390$, $r = -0.292$, respectively). Meanwhile, only “physical” subdomain of OxAFQ-P demonstrated a significant agreement ($r = -0.325$). It can be possible that the CHAQ is more sensitive to the physical aspects of the disease and other subdomains are not detectable with CHAQ. Similarly, it was reported that lower correlations were identified between emotional subscale of OxAFQ-P and Child Health Questionnaire (CHQ) in Italian version of OxAFQ study. Additionally, all domains of the Italian version of OxAFQ-C had shown significant correlation with CHAQ [10]. The authors explained these results as follow; parents cannot feel correlations between the foot/ankle condition and emotions of their children and emphasized the importance of asking children about their symptom and health-related quality of life, because of the well-known discordance between child and parent reports of quality of life. We believe that the differences between child and parent results are common, as seen in other questionnaires.

Although there were various causes of foot problems in the participants of the previous studies, most of subjects had congenital talipes equinovarus. We concluded that our findings

Table 3

Internal consistency and test-retest reliability of the Turkish version of Oxford Ankle Foot Questionnaire.

	OxAFQ-Physical	OxAFQ-School and play	OxAFQ-Emotional
(Cronbach's alpha) first assessment- <i>Child and teenager version</i>	0.94	0.96	0.92
(Cronbach's alpha) first assessment- <i>Parent version</i>	0.93	0.94	0.90
(Cronbach's alpha) second assessment- <i>Child and teenager version</i>	0.89	0.91	0.94
(Cronbach's alpha) second assessment- <i>Parent version</i>	0.88	0.90	0.91
ICC <i>Child and teenager version</i>	0.93	0.94	0.96
ICC <i>Parent version</i>	0.90	0.92	0.95

Abbreviations: OxAFQ, Oxford Ankle Foot Questionnaire; ICC, intraclass correlation coefficient.

Table 4Correlations coefficient (Spearman's ρ) between related domains of OxAFQ and CHAQ total.

	CHAQ total	
	Tr	p
OxAFQ- <i>Child and teenager version Physical</i>	-0.422	0.012
OxAFQ- <i>Child and teenager version School and play</i>	-0.390	0.006
OxAFQ- <i>Child and teenager version Emotional</i>	-0.292	0.042
OxAFQ- <i>Parent Physical</i>	-0.325	0.023
OxAFQ- <i>Parent School and play</i>	-0.255	0.077
OxAFQ- <i>Parent Emotional</i>	-0.258	0.074

Abbreviations: OxAFQ, Oxford Ankle Foot Questionnaire; CHAQ, Childhood Health Assessment Questionnaire.

are in line with previous studies since children with congenital talipes equinovarus participated in the present study. From these results, it is not possible to generalize the suitability of the use of OxAFQ for other foot problems.

4.1. Limitations

The major limitation of the present study was that responsiveness to the Turkish version of OxAFQ was not assessed, which is critical to interpreting the difference in a patient's status. While the presented version of OxAFQ has been validated in the patients with congenital talipes equinovarus, the new version should be tested in more patients and in different populations. Future studies are necessary to assess the responsiveness and to determine the minimum clinically important differences for the Turkish version of OxAFQ in patients with congenital talipes equinovarus.

5. Conclusion

The Turkish version of Oxford Ankle Foot Questionnaire is a valid, reliable and useful questionnaire for quality of life in patients with congenital talipes equinovarus and it is proper for use by health professionals and researchers.

Conflict of interests

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.fas.2020.06.002>.

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