ORIGINAL ARTICLE

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VALIDATION OF THE BULGARIAN VERSION OF OXFORD FOOT AND ANKLE QUESTIONNAIRE FOR CHILDREN WITH FLAT FOOT DEFORMITY

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Abstract. Background: *Pediatric flexible flatfoot, defined by a diminished or absent medial longitudinal arch, is a common anatomical variant with potential biomechanical consequences. While many cases are asymptomatic, symptomatic flatfoot can impair gait mechanics and postural stability, leading to long-term functional limitations. Health-related quality of life (HRQoL) in children with flatfoot remains underexplored, necessitating validated, patient-reported outcome measures (PROMs). The Oxford Ankle Foot Questionnaire for Children (OxAFQ-C) is the only validated PROM designed for pediatric foot and ankle disorders, yet its psychometric properties have not been evaluated in Bulgarian-speaking populations.* ***Objective:*** *This study aimed to adapt and validate the Bulgarian version of the OxAFQ-C, assessing its reliability, internal consistency, construct validity, and feasibility in pediatric patients diagnosed with flexible flatfoot.* ***Methods:*** *The translation and cultural adaptation followed international guidelines, including forward-backward translations, expert panel reviews, and pre-testing with children and guardians. The final Bulgarian OxAFQ-C was administered to 995 children (aged 6-16) across three Bulgarian regions. Psychometric analyses included internal consistency (Cronbach's alpha, α), test-retest reliability (Intraclass Correlation Coefficient, ICC), and construct validity through correlation with the Visual-Analogue-Scale Foot and Ankle (VAS FA). Exploratory Factor Analysis (EFA) assessed structural validity.* ***Results:*** *The Bulgarian OxAFQ-C demonstrated excellent internal consistency (Cronbach's α > 0.90). Parent-child agreement was highest in the Physical Function domain (ICC ≥ 0.75) and moderate for other domains. Construct validity was confirmed, with moderate correlations between the Physical Function domain and VAS FA scores (r ≈ -0.43). EFA confirmed the three-factor structure.* ***Conclusion:*** *The Bulgarian adaptation of the OxAFQ-C is a reliable and valid instrument for assessing HRQoL in children with flexible flatfoot. Its strong psychometric properties support its clinical and research utility in orthopedic and epidemiological studies.*

Key words: *validation, flexible flatfoot, pediatric, OxAFQ-C*

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INTRODUCTION

Pediatric flexible flatfoot is defined by a diminished or absent longitudinal arch in the midfoot region. This condition is regarded as an anatomical variation of foot structure. Clinicians classify this condition into two categories: asymptomatic (painless) and symptomatic (painful) [1]. This classification arises from the natural history of pediatric flexible flatfoot, which typically shows spontaneous improvement over time, and from the relative ease of reaching a consensus on treatment for symptomatic cases. As the foundation of the body's support, the feet play a critical role in maintaining biomechanical alignment. Flatfoot disrupts the biomechanical center of gravity and the kinetic chain, resulting in increased stress on the ankle, knee, hip, and spinal joints. This disruption can lead to gait abnormalities and postural defects across all age groups. Understanding how flat feet affect children's health-related quality of life is essential for guiding clinical decisions and enhancing patient outcomes. Thus, additional research is necessary to clarify the relationship between measurable indicators of foot structure and function and the health-related quality of life in children with asymptomatic flexible flat feet.

Conventional clinical assessment methods include quantifying range of motion, evaluating muscle strength, and utilizing X-rays, clinical rating scales, and gait analysis. However, these methods do not account for patient-reported outcomes and may not accurately represent children's functional capabilities in their typical environments, such as at home and school. Instruments designed for adult populations may not adequately capture the perspectives of pediatric patients or accurately reflect how children engage with their typical environments. In the past two decades, there has been a growing focus on health-related quality of life outcomes among pediatric populations. Quality of Life (QoL) in children encompasses their perceived social, physical, and emotional well-being, reflecting their subjective experiences and developmental context. It is highly sensitive to the dynamic changes that occur throughout growth and maturation [2, 3].

Meuleners et al. [4]. conceptualize QoL as a multidimensional construct that encapsulates an individual's overall sense of happiness and life satisfaction, shaped by their ability to engage in meaningful opportunities and experiences. Eiser and Morse [5] extend this framework by incorporating not only the child's social and emotional well-being but also the broader psychosocial impact on their family environment, emphasizing the interconnected nature of family dynamics and child development.

A subset of the broader concept of Quality of Life (QoL) is Health-Related Quality of Life (HRQoL), which specifically encompasses the health-related aspects of an individual's well-being.

In the pediatric population, the conceptualization and measurement of HRQoL remain incompletely defined, primarily due to the methodological and statistical complexities involved in its assessment. The diversity of measurement instruments, the use of different questionnaires, and the dynamic nature of child development further complicate its standardization [6]. Additionally, the interplay between physical, psychological, and social domains in a growing child introduces further challenges in accurately capturing the full scope of HRQoL in pediatric research. Numerous studies have investigated the agreement between children's self-reported scores and those reported by their parents across various medical conditions [7]. However, there is limited information available regarding the reliability of patient-reported outcomes in children and the comparative accuracy between child and parent responses. Although patient-reported outcome measures (PROMs) for foot and ankle conditions exist for adults, only one questionnaire – the Oxford Ankle Foot Questionnaire (OAFQ) – has been specifically designed for pediatric foot and ankle diseases.

Initially devoleped by Morris in 2008 the questionnaire is adapted as valid instrument with crosssectional validity, internal test–retest reliability, responsiveness and longitudinal validity [8, 9]. Currently, the Oxford Ankle Foot Questionnaire for Children (OxAFQ-C) stands as the sole validated tool for assessing the subjective well-being of children aged 5 to 16 years with foot and ankle conditions within pediatric populations. The purpose of the current study is to perform cross-cultural adaptation and to evaluate the psychometric properties of the Bulgarian version of the OAFQ.

MATERIALS AND METHODS

This study 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/guardians. The permission to use the OxAFQ for translation to Bulgarian was approved by Oxford University.

OFAQ

The Oxford Ankle-Foot Questionnaire for Children (OxAFQ-C) is a validated patient-reported outcome measure designed to assess foot and ankle health and its impact on quality of life in pediatric populations.

The instrument comprises 15 items, distributed across three subscales: Physical Activity (six items), School and Play (four items), and Emotional Well-being (four items), along with a single item assessing Footwear difficulties [10]. Each item is rated on a five-point Likert scale, ranging from 0 (no impairment) to 4 (severe impairment). The total score for each subscale is computed independently, provided that at least 50% of the items within the subscale are completed, and is subsequently normalized to a 0–100 scale, where 100 denotes an absence of functional impairment and 0 represents maximal disability. The selection of specific subscales for clinical assessment is contingent upon the clinical context and patient presentation [11].

To ensure linguistic and cultural validity, the translation and adaptation process adhered to international best practices for the cross-cultural validation of health-related patient-reported outcome measures. The process was conducted in coordination with the Linguistic Validation and eCOA Manager – Clinical Outcomes, Oxford University Innovation Limited. The original English version of the OxAFQ-C was independently translated into Bulgarian by two professional translators. Subsequently, a medical expert fluent in English evaluated both translations and selected the version that best preserved the semantic and conceptual equivalence of the original questionnaire. Following this, a back-translation into English was performed by two additional independent translators, and the resulting version was compared with both the original English questionnaire and the Bulgarian translation. No statistically significant discrepancies were identified, confirming the accuracy of the translation process. The final Bulgarian version of the OxAFQ-C was then administered to nine pediatric patients and their parents/guardians, who were not included in the primary study cohort, to evaluate the clarity and comprehensibility of the instrument. The sample size for linguistic validation was predetermined by the linguistic correspondent at Oxford University. A strong correlation between the responses of patients and their parents/guardians further supported the validity and interpretability of the adapted version.

VAS FA

The Visual-Analogue-Scale Foot and Ankle (VAS FA) is a newly developed assessment tool designed to evaluate foot and ankle conditions through a structured questionnaire. This instrument comprises 20 questions, all requiring subjective responses, and is categorized into three domains: pain (4 questions), function (11 questions), and other complaints (5 questions). The weighting of these categories reflects their relative significance, with function carrying the highest influence due to its greater number of questions, followed by pain and other complaints [12].

Each question is rated from 0 to 100 points, allowing for a total raw score between 0 and 2000 when all 20 questions are answered. To derive the final score, this total value is divided by 20, yielding a possible range from 0 to 100 points. In cases where responses are missing, the total score and category-specific scores can still be calculated by adjusting for the number of answered questions.

We validated the Bulgarian version of the Oxford Ankle Foot Questionnaire for Children (OxAFQ-C) in terms of reliability (child–parent agreement and internal consistency), feasibility (floor and ceiling effects), and construct validity. Additionally, factor analysis was performed on the data collected using the instrument to assess its structural validity.

Statistical analysis

Cronbach's alpha (α) was employed to evaluate internal consistency, with a threshold of ≥ 0.7 considered satisfactory [13]. To assess child–parent agreement across each domain, the intraclass correlation coefficient (ICC) was utilized. Construct validity was examined by correlating the OxAFQ-C subscales with the VAS FA subscales, using Pearson's correlation coefficient [14]. The strength of these correlations was classified as weak ($r < 0.3$), moderate ($0.3 \leq r < 0.7$), or strong ($r \geq 0.7$). Exploratory Factor Analysis (EFA) is a sophisticated multivariate statistical technique employed to identify latent structures within a set of observed variables. By analyzing the interrelationships among questionnaire items, EFA reveals the underlying constructs they represent, offering critical insights into the dimensionality of a measurement instrument. This method is particularly instrumental in psychometric validation, ensuring that an assessment tool accurately captures its intended theoretical framework. Exploratory Factor Analysis (EFA) involves several key steps, beginning with data preparation, where standardization, Kaiser-Meyer-Olkin (KMO) tests, and Bartlett's test for sphericity ensure suitability [15]. Factor extraction (e.g., PCA, MLE, PAF), factor retention (eigenvalues, scree plot, parallel analysis), factor rotation (Varimax for independent factors, Promax for correlated factors), and factor loadings analysis (≥0.40 for meaningful relationships) refine the model, ensuring optimal construct representation.

The primary objective of EFA is to determine the optimal number of latent factors that explain variance in the dataset while mapping questionnaire items onto their respective conceptual domains. In the validation of the Bulgarian version of the OxAFQ-C, EFA was applied to examine whether its items coherently

cluster around the expected three-factor structure – Physical Function, School & Play, and Emotional Well-being. This approach ensures that the questionnaire maintains structural integrity and effectively measures the constructs it was designed to assess.

Psychometric properties

The psychometric validation of the Bulgarian version of the OxAFQ-C was conducted within a randomized screening study aimed at assessing the prevalence of pediatric flatfoot deformity. The study cohort was stratified by geographic region, comprising participants from Sofia (n = 429; males = 228, females = 201), Etropole (n = 239; males = 117, females = 112), and Chirpan (n = 328; males = 171, females = 157). The age range of the study population was 6–16 years (Mean = 10.7, SD = 5.92), with an approximately equal male-to-female ratio (50% male, 49% female). The inclusion criteria mandated:

- Clinical evaluation confirming the presence of flatfoot deformity
- Native Bulgarian speakers with the cognitive ability to understand and complete the questionnaire

Exclusion criteria included:

- Children whose primary language was not Bulgarian
- Children under the age of 6 years
- Children with cognitive or developmental impairments
- Children whose parents/guardians refused to finalize the OxAFQ-C.

RESULTS

Internal consistency

The Bulgarian OxAFQ-C exhibits exceptional internal consistency across all three towns, with Cronbach's α values surpassing 0.90 in the majority of domains, most notably within the Physical Function domain, thereby reinforcing its psychometric robustness in the evaluation of functional impairments. Nevertheless, the slightly attenuated Cronbach's α coefficients observed in the Emotional domain (Sofia: Child α = 0.870, Parent α = 0.874) and the School & Play domain (Chirpan: Child α = 0.861, Parent α = 0.855) denote a discernible degree of divergence in parent-child agreement.

Intraclass Correlation Coefficient (ICC)

The Bulgarian OxAFQ-C exhibits strong parent-child agreement in the Physical Function domain (ICC ≥ 0.75) and moderate agreement in the School & Play and Emotional domains (ICC = 0.643–0.757), particularly in Sofia and Chirpan.

Table.1 Cronbach's Alpha (Internal Consistency) by Town

Town	Domain	Cronbach Alpha (Child)	Cronbach Alpha (Parent)	Interpretation
Etropole	Physical	0.945	0.935	Excellent
Etropole	School & Play	0.910	0.962	Excellent
Etropole	Emotional	0.937	0.911	Excellent
Sofia	Physical	0.951	0.922	Excellent
Sofia	School & Play	0.952	0.926	Excellent
Sofia	Emotional	0.870	0.874	Good (Child), Acceptable (Parent)
Chirpan	Physical	0.926	0.911	Excellent
Chirpan	School & Play	0.861	0.855	Good (Child), Acceptable (Parent)
Chirpan	Emotional	0.915	0.902	Excellent

Table 2. Intraclass Correlation Coefficient (ICC) by Town

Town	Domain	ICC (Child)	ICC (Parent)	Interpretation
Etropole	Physical	0.768	0.739	Excellent (Child), Moderate (Parent)
Etropole	School & Play	0.757	0.643	Excellent (Child), Moderate (Parent)
Etropole	Emotional	0.795	0.733	Excellent (Child), Moderate (Parent)
Sofia	Physical	0.784	0.773	Excellent agreement
Sofia	School & Play	0.713	0.689	Moderate agreement
Sofia	Emotional	0.731	0.727	Moderate agreement
Chirpan	Physical	0.755	0.749	Excellent agreement
Chirpan	School & Play	0.742	0.700	Moderate agreement
Chirpan	Emotional	0.683	0.691	Moderate agreement

Construct Validity

Construct validity is essential for assessing whether a questionnaire accurately measures its intended theoretical concept. This study evaluates the construct validity of the OxAFQ-C through convergent validity, divergent validity, and structural validity.

Convergent validity evaluates whether related constructs exhibit significant correlations, with the OxAFQ-C Physical and School/Play Scores anticipated to correspond with VAS FA Function and Pain Scores. Pearson's correlation analysis demonstrated a moderate negative correlation between the OxAFQ-C Physical Score and VAS FA Function Scores ($r \approx -0.43$ to -0.44), while the School & Play Score showed a weaker correlation ($r \approx -0.23$). These results substantiate the OxAFQ-C's effectiveness in assessing functional impairments, reinforcing its construct validity through alignment with the VAS FA measurement framework.

Divergent validity assesses whether unrelated constructs exhibit weak or no correlation, with the OxAFQ-C Emotional Score expected to show minimal association with VAS FA Function and Pain Scores, as emotional concerns should be independent of physical function. Pearson's correlation analysis confirmed near-zero correlations ($r \approx -0.01$ to -0.02) between the OxAFQ-C Emotional Score and VAS FA scores, supporting this assumption.

Structural validity ensures that a questionnaire's items align with their intended theoretical domains, with Exploratory Factor Analysis (EFA) confirming the three-factor structure of OxAFQ-C (Physical, School & Play, Emotional) using Maximum Likelihood Estimation (MLE) and Varimax rotation. The factor loading analysis demonstrated that Physical Function items loaded strongly ($\geq |0.60|$) onto Factor 1, while School & Play items exhibited moderate loadings with some overlap with Physical Function, and Emotional items showed broader distribution across factors. These findings indicate that while the Physical domain is well-defined, the interconnections between School & Play and Physical domains highlight the complex relationship between mobility and participation, and the Emotional domain captures a multidimensional aspect of well-being.

Feasibility

In terms of feasibility, no floor effects were found for all subscales. However, ceiling effects were observed for the school and play subscale and the emotional subscale for children (46.7%) and parents (43.9%) [16].

DISCUSSION

The validation of the Bulgarian version of the Oxford Foot and Ankle Questionnaire for Children (OxAFQ-C) constitutes a significant advancement in the psychometric evaluation of pediatric foot and ankle disorders. The findings of this study provide evidence supporting the reliability, validity, and feasibility of the adapted instrument, reinforcing its applicability in both clinical and research settings. Furthermore, the integration of Patient-Reported Outcome Measures (PROMs) in pediatric orthopedic assessments enhances the precision of functional health evaluations, aligning with internationally established frameworks such as COSMIN and COMET [17, 18].

The internal consistency of the Bulgarian OxAFQ-C demonstrated excellent psychometric properties, with Cronbach's alpha ($\alpha > 0.90$) values across most domains, indicating a high degree of homogeneity among questionnaire items. The high intraclass correlation coefficient (ICC) values further validate the test-retest reliability and parent-child agreement, which is essential for ensuring the stability of PROM-based assessments. ICC analyses revealed strong parent-child agreement in the Physical Function domain (ICC > 0.75), whereas moderate agreement was observed for the School & Play and Emotional domains (ICC = 0.643-0.757). This aligns with findings from previous cross-cultural adaptations of the OxAFQ-C, wherein functional impairments tend to be consistently reported by both children and parents, while subjective psychosocial experiences often demonstrate variability between respondent groups. The high ICC values reinforce the robustness of the adapted instrument for use in longitudinal patient assessments and comparative studies. The Dutch translation of the questionnaire demonstrated strong test–retest reliability, with intraclass correlation coefficients (ICCs) exceeding 0.7 in most domains. Construct validity was supported by correlations between the Turkish OxAFQ and CHAQ, with significant agreements in the "physical," "school and play," and "emotional" subdomains of the OxAFQ-C and CHAQ-Total ($r = 0.402$, $r = 0.390$, $r = 0.292$, respectively), while only the "physical" subdomain showed significance in the QAFQ-P ($r = 0.325$) [19]. These findings suggest that CHAQ is more attuned to physical impairments, whereas its sensitivity to psychosocial and functional limitations may be limited, a trend similarly observed in the Italian version. Ceiling effects were noted in the Italian and Danish versions, likely due to the lesser impact of foot and ankle conditions on school, play, and emotional well-being, as well as the mild disease severity among the study cohort [20]. The Korean version, developed through a rigor-

ous translation and transcultural adaptation process, demonstrated strong internal consistency across all subscales (Cronbach's α = 0.765-0.901) and high child–parent reliability [21]. Furthermore, factor analysis of the Korean version revealed a three-component structure, differing from the original four-subscale model due to the merging of the school and play and footwear subscales. Internal consistency remained satisfactory, though the Dutch and Danish versions exhibited weaker reliability in the emotional subscale, while construct validity analyses revealed stronger correlations between the child/adolescent version of the OAFQ and KIDSCREEN-52 HRQOL compared to the parent-proxy version, underscoring the need for direct parent-child communication in assessing health-related quality of life [22, 23].

Construct validity was assessed through convergent and divergent validity analyses. The moderate negative correlation between the OxAFQ-C Physical Function domain and VAS FA Function scores (r = -0.43 to -0.44) corroborates the ability of the questionnaire to measure functional impairments. The weaker correlation between the School & Play domain and VAS FA scores (r = -0.23) suggests some degree of conceptual overlap while also indicating the influence of contextual and environmental factors. Divergent validity was established by demonstrating near-zero correlations between the OxAFQ-C Emotional subscale and VAS FA Function/Pain scores (r = -0.01 to -0.02), confirming that the Emotional domain captures a distinct psychological construct.

Exploratory Factor Analysis (EFA) supported the predefined three-factor structure of the OxAFQ-C, encompassing Physical Function, School & Play, and Emotional Well-being. Strong factor loadings (≥ 0.60) in the Physical Function domain corroborate its structural validity, confirming that these items effectively measure functional impairments. However, moderate cross-loadings between the School & Play and Physical Function domains suggest that participation-related challenges are inherently linked to mobility constraints.

The structural validity findings also highlight the ability of the OxAFQ-C to differentiate between varying levels of disease severity, which is essential for both clinical application and epidemiological research. However, refining the Emotional domain through the inclusion of more sensitive psychosocial indicators may further enhance its discriminatory power across diverse populations [24].

The questionnaire demonstrated minimal floor effects, confirming its ability to effectively capture severe impairments in pediatric patients. Although ceiling effects were present in the Physical Function and School & Play domains (up to 43.9%), this finding suggests that a substantial proportion of children reported optimal functional outcomes, reinforcing the instrument's capacity to assess a broad spectrum of functional abilities This trend aligns with existing validation studies, wherein negatively skewed scores among newly referred children were attributed to the absence of severe pathology necessitating orthopedic intervention.

The Bulgarian OxAFQ-C emerges as a methodologically rigorous and psychometrically sound instrument for evaluating pediatric foot-related quality of life. Its demonstrated reliability and validity position it as a valuable tool for clinical decision-making and epidemiological research [25, 26].

The capacity of the OxAFQ-C to stratify disease severity and monitor treatment outcomes renders it a valuable asset in both orthopedic clinical trials and routine patient assessments. Given the increasing reliance on PROMs in evidence-based healthcare, the Bulgarian version represents a standardized assessment tool that aligns with international recommendations for outcome measurement selection, including COSMIN and COMET guidelines [27].

CONCLUSION

This study establishes the Bulgarian adaptation of the Oxford Foot and Ankle Questionnaire for Children as a scientifically validated instrument for assessing functional, social, and emotional well-being in children with flexible flatfoot. The findings confirm its high psychometric reliability, reinforcing its suitability for both clinical application and epidemiological studies. Further refinements, particularly in the Emotional domain, may enhance its sensitivity and specificity, ensuring a comprehensive, patient-centered approach to pediatric foot health assessment.

Moreover, the validation results underscore the importance of integrating PROMs into clinical practice, as they augment objective clinical assessments by incorporating patient-centric perspectives. By adhering to international COSMIN and COMET guidelines, the Bulgarian OxAFQ-C contributes to a standardized framework for assessing pediatric foot health, thereby supporting improved patient outcomes and healthcare decision-making.

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Informed Consent from Participants: *Informed written consent was obtained from all patients and their parents/ guardians. The permission to use the OxAFQ for translation to Bulgarian was approved by Oxford University.*

REFERENCES

1. Helfet AJ. Disorders of the foot. Philadelphia: Lippincott Williams & Wilkins, 1980.
2. Eiser C. Can parents rate their child's health-related quality of life? Results of a systematic review Qual Life Res. 2001, 10: 347–357
3. Bjornson KF, McLaughlin JF. The measurement of health-related quality of life (HRQL) in children with cerebral palsy. Eur J Neurol. 2001, 8:183–193.
4. Meuleners LB, Lee AH, Binns CW, et al. Quality of life for adolescents: assessing measurement properties using structural equation modelling. Qual Life Res. 2003, 12(3):283-290.
5. Eiser C, Morse R. Quality-of-life measures in chronic diseases of childhood. Health Technol Assess. 2001, 5(4):1-157.
6. Sherman MS, Slick DJ, Connolly MB, et al. Validity of three measures of health-related quality of life in children with intractable epilepsy. Epilepsia. 2002, 43:1230–1238.
7. Otley A, Smith C, Nicholas D, et al. The IMPACT questionnaire: a valid measure of health-related quality of life in pediatric inflammatory bowel disease. J Pediatr Gastroenterol Nutr. 2002, 35:557–563.
8. Morris C, Doll HA, Wainwright A, et al. The Oxford ankle foot questionnaire for children: scaling, reliability and validity. J Bone Joint Surg Br. 2008, 90(11):1451-1456.
9. Morris C, Doll H, Davies N, et al. The Oxford Ankle Foot Questionnaire for children: responsiveness and longitudinal validity. Qual Life Res. 2009, 18:1367–1376.
10. Hemmingsson H, Olafsdottir LB, Egilson ST. Agreements and disagreements between children and their parents in health-related assessments. Disabil Rehabil. 2017, 39:1059–1072.
11. Sousa VD, Rojjanasrirat W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. J Eval Clin Pract. 2011, 17(2):268-274.
12. Richter M, Zech S, Geerling J, et al. A new foot and ankle outcome score: Questionnaire-based, subjective, visual-analogue-scale, validated, and computerized. Foot Ankle Surg. 2006, 12(4):191-199.
13. Cronbach LJ, Warrington WG. Time-limit tests: estimating their reliability and degree of speeding. Psychometrika. 1951, 16(3):167–188.
14. Lee KM, Lee J, Chung CY, et al. Pitfalls and important issues in testing reliability using intraclass correlation coefficients in orthopaedic research. Clin Orthop Surg. 2012, 4:149–155.
15. Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence in Nursing Practice. 10th ed. Philadelphia, PA, USA: Lippincott Williams & Wilkins; 2016.
16. Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986, 1(8476):307–310.
17. Sousa VD, Rojjanasrirat W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. J Eval Clin Pract. 2011, 17(2):268-274.
18. Prinsen CAC, Mokkink LB, Bouter LM, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res. 2018, 27(5):1147–1157.
19. Hajebrahimi F, Tarakci D, Arman N, et al. Cross-cultural adaptation, validity, and reliability of the Turkish version of the Oxford Ankle Foot Questionnaire for children with congenital talipes equinovarus. Foot Ankle Surg. 2021, 27(4):439-442.
20. Martinelli N, Romeo G, Bonifacini C. Validation of the Italian version of the Oxford Ankle Foot Questionnaire for children. Qual Life Res. 2016, 25:117–123.
21. Cho SH, Chung CY, Park MS, et al. Transcultural adaptation and validation of a Korean version of the Oxford Ankle Foot Questionnaire for children. Health Qual Life Outcomes. 2020,18 (1):118.
22. Burger E, Selles R, van Nieuwkasteele S, et al. The Dutch version of the Oxford Ankle and Foot Questionnaire for Children: Useful for evaluation of pediatric foot problems in groups. Foot Ankle Surg. 2019, 25(2):204-210.
23. Martinkevich P, Møller-Madsen B, Gottliebsen M, et al. Validation of the translated Oxford ankle foot questionnaire in 82 Danish children aged between five and 16 years. Bone Joint J. 2015, 97-B(3):420-426.
24. Kocher MS, Smith JT, Iversen MD, et al. Reliability, validity, and responsiveness of a modified International Knee Documentation Committee Subjective Knee Form (Pedi-IKDC) in children with knee disorders. Am J Sports Med. 2011, 39:933–939.
25. Karabinov V, Slavchev SA, Georgiev GP. Translation and Validation of the Bulgarian Version of the Boston Carpal Tunnel Questionnaire. Cureus. 2020, 12(10):e10901.
26. Tsenkov T, Slavchev S, Dimitrov N. Linguistic validation, adaptation, and reliability of the Liverpool Elbow Score's patient-answered questionnaire in Bulgarian. Acta Medica Bulgarica. 2023;50(4):33-36.
27. Nguyen MQ, Iversen MM, Harboe K, et al. Validity and reliability of the Manchester Oxford Foot Questionnaire (MOXFQ) in one-year postoperative ankle fracture patients – a validation study. J Patient Rep Outcomes. 2025, 9(1):14:14.