

Linguistic Validity and Reliability of Urdu Version of Psychosocial Impact of Dental Aesthetic Questionnaire (PIDAQ) For Orthodontic Patients in Lahore, Pakistan

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Abstract

Objective: Psychosocial Impact of Dental Aesthetic questionnaire (PIDAQ) is an efficient subjective measure for quality of life. The purpose of this study was to assess the linguistic validity and reliability of the URDU version of the PIDAQ.

Methods: PIDAQ questionnaire in English was selected and translated to Urdu language. This process included forward translation and backward translation. The primary draft was then discussed in detail in a committee of different personnel including public health professional, orthodontists, and translators. Pretesting was conducted at Rashid Latif Dental College in Lahore involving ten participants via face-to-face interviews. Inclusion criteria included all patients coming for orthodontic treatment, that had not yet started their treatment and were able to read and comprehend in Urdu language. Exclusion criteria included those who had any other underlying treatment needs such as caries or periodontal treatment and or any mental or learning disability. The pretest included face to face interviews with 10 subjects to further clarify the understanding and cultural significance of the translated questions. A test-retest reliability study was undertaken over a period of two weeks involving another 24 patients. Cronbach α and kappa scores were calculated to assess the semantic, idiomatic, experimental, conceptual as well as content and face validity of the questionnaire. Twenty-three translated questions under four subscales were produced.

Results: The Intraclass correlation coefficient values achieved for the translation were between 0.81 to 0.97 for the multiple subscales. The Cronbach α was 0.91 for dental self-confidence, 0.81 for social impacts, 0.88 for psychological impacts and 0.97 for aesthetic concerns.

Conclusion: The PIDAQ-Urdu appeared to be linguistically valid and reliable with excellent test-retest results.

Keywords: PIDAQ, Urdu translation, Validation, Reliability

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Introduction

Traditional measures of oral health have long relied solely on clinical parameters, such as X-rays, dental examinations, and periodontal assess-

assessments¹. However, as awareness of oral health and preventive measures has increased, there has been a growing recognition of the importance of incorporating subjective measures alongside these traditional assessments¹. This recognition has led to the development of Quality of Life (QoL) instruments in the field of dentistry. Oral health-related Quality of Life (OHRQoL) instruments aim to capture the subjective experiences and perceptions of individuals regarding their oral health, providing a more holistic understanding of their oral health needs¹. These subjective measures, when combined with clinical assessments, offer a comprehensive approach to evaluating and addressing patients' oral health concerns.

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Malocclusion, a common dental condition characterized by misalignment of the teeth and jaws, not only affects oral function and aesthetics but also has significant social, psychological, and financial impacts². Research has demonstrated that individuals with malocclusion may experience negative effects on their self-esteem, social interactions, and overall well-being³. Despite these multifaceted impacts, orthodontic treatment has traditionally focused primarily on normative needs, overlooking the subjective experiences and perceptions of patients³. This gap in understanding highlights the importance of incorporating subjective measures, such as the Psychosocial Impact of Dental Aesthetic Questionnaire (PIDAQ), into orthodontic assessment and treatment planning.

Developed by Klages et al. in 2006, PIDAQ is a validated instrument designed to assess the psychosocial impacts of malocclusion on individuals' quality of life⁴. The questionnaire comprises 23 items divided into four sub-scales: dental self-confidence, social impacts, psychological impacts, and aesthetic concerns. By capturing both positive and negative aspects of individuals' experiences with malocclusion, PIDAQ provides a comprehensive overview of the various ways in which malocclusion can affect patients' lives. The first domain comprises dental self-confidence and includes six questions in the positive format. The second domain comprises social impacts and has eight questions. The third and fourth domain are psychosocial impacts and aesthetic concerns having six and three questions respectively. The last three domains require answers in the negative format. Each question consists of a statement in the present tense to be answered in the first person singular. Each item is scored using a five-point Likert scale, allowing respondents to indicate the intensity of their experiences, ranging from "0 = "not at all", 1 = "a little", 2 = "somewhat", 3 = "strongly" and 4 = "very strongly".

Unlike traditional clinical assessments, which focus primarily on objective measures of dental health, PIDAQ takes a patient-centered approach, emphasizing the importance of understanding patie-

nts' perspectives and incorporating their input into treatment decisions⁴. By providing insights directly from the patient's viewpoint, PIDAQ helps clinicians tailor treatment plans to meet the individual needs and preferences of each patient, ultimately improving treatment outcomes and patient satisfaction. It gives a clearer picture from the perspective of the patient instead of the doctors emphasizing the importance of patient consent and involvement in treatment decisions⁵. This instrument comprises four parts, dental self-confidence, social impact, psychological impact, and aesthetic concerns⁴. PIDAQ is intended to serve as a self-assessment tool, enabling patients to express their own perspectives and experiences related to malocclusion. This self-rating instrument empowers patients to contribute valuable insights that complement the orthodontist's treatment plan^{6, 7}.

OHRQoL measures stemming from first world countries, have the advantage to be developed in the English language. In Pakistan, where the majority of the population speaks Urdu, it is difficult to implement⁸. Even though a majority of the population is able to understand and speak basic English, the comprehension and understanding is limited. Experienced and proper English speaking and understanding is present in only highly educated individuals belonging to the higher social strata⁸. This leaves out the rest of the low and middle income classes from comprehending complex structural questions related to the psychosocial impacts and medical terminologies. Applying PIDAQ in diverse linguistic and cultural contexts presents challenges. Direct translation of PIDAQ from English may not accurately capture the meaning of the Urdu language or the cultural context of Urdu-speaking populations⁷. To address this challenge, rigorous linguistic validation and cultural adaptation of PIDAQ are necessary to ensure its validity and reliability in Urdu-speaking populations. Translating PIDAQ into Urdu requires more than just linguistic translation; it also requires cultural adaptation to ensure that the questionnaire resonates with Urdu-speaking individuals and accurately captures their experiences and perceptions related to malocclusion. This process involves not only translating the

questionnaire into Urdu but also adapting it to reflect cultural norms, values, and expressions specific to Urdu-speaking populations⁹. Moreover, linguistic validation involves assessing the semantic, experiential, and inferential equivalence of the translated questionnaire to ensure that it retains the same meaning and relevance as the original English version. This may involve conducting focus groups or cognitive interviews with Urdu-speaking individuals to assess their understanding of the translated questionnaire and identify any areas of confusion or ambiguity⁹.

Once the Urdu translation of PIDAQ is developed, it must undergo rigorous psychometric testing to evaluate its reliability, validity, and responsiveness in Urdu-speaking populations. This involves assessing internal consistency, test-retest reliability, construct validity, and discriminant validity to ensure that the translated questionnaire accurately measures what it intends to measure and produces consistent and reliable results¹⁰. In addition to linguistic and psychometric validation, cultural adaptation of PIDAQ also involves considering the socio-cultural context in which the questionnaire will be administered. This includes factors such as cultural beliefs, attitudes towards oral health and malocclusion, and societal perceptions of beauty and aesthetics, all of which can influence individuals' experiences and perceptions related to malocclusion⁹.

Overall, the translation and cultural adaptation of PIDAQ into Urdu represent an important step towards improving the assessment and treatment of malocclusion in Urdu-speaking populations. By ensuring that PIDAQ accurately captures the subjective experiences and perceptions of Urdu-speaking individuals, clinicians can better understand the psychosocial impacts of malocclusion and tailor treatment plans to meet the unique needs and preferences of each patient, ultimately improving patient outcomes and satisfaction. Looking at the benefits of the PIDAQ questionnaire, this study aims to translate and culturally adapt the PIDAQ to Urdu context.

The translation process of the English version of PIDAQ commenced with two individuals proficient in English but with Urdu as their first language working independently. Subsequently, the translated version underwent back translation by three bilingual teachers in Lahore. A review committee comprising nine members, including orthodontists, dental public health professionals, a pediatric dentist, and translators, was formed to evaluate the semantics of the original, initial translation, and back-translation versions. Any discrepancies were thoroughly discussed, leading to necessary adjustments to ensure the appropriateness of the translation.

The final iteration of the translated questionnaire underwent an exhaustive pretest phase at the orthodontics department within Rashid Latif Dental Hospital in December 2020. Inclusive criteria encompassed patients scheduled for orthodontic treatment who had not yet commenced their procedures and demonstrated proficiency in reading and understanding Urdu. Conversely, exclusion criteria were applied to individuals with additional treatment requirements, such as caries or periodontal issues, as well as those with mental or learning disabilities. To refine comprehension and ascertain cultural relevance, the pretest involved conducting face-to-face interviews with a cohort of 10 subjects. Subsequently, a comprehensive test-retest reliability assessment was conducted with 24 participants sharing similar inclusion and exclusion parameters, randomly drawn from the Orthodontics Department, over a two-week interval. Notably, demographic data collection was deemed unnecessary for questionnaire validation purposes. Utilizing a comparable sample size to previous PIDAQ translations in diverse languages ensured robust statistical validation, thereby upholding methodological consistency and bolstering the reliability of findings across varied language populations. This meticulous approach to validation underscored the commitment to ensuring the accuracy and efficacy of the Urdu version of the PIDAQ instrument, thereby contributing to its broader utility and applicability in clinical and research settings focused on orthodontic care and patient outcomes⁷.

Ethical approval for the study was diligently secured from the Rashid Latif Dental College Research Department, with reference number RLDC/002176/20, adhering to established ethical guidelines and protocols. Prior to participation, verbal consent was sought from all individuals involved, ensuring transparency and adherence to ethical standards. Subsequently, all gathered data was meticulously entered into the statistical analysis software package, STATA-14, developed by STATA Corp based in College Station, Texas, USA. The reliability of the collected data was rigorously evaluated using a combination of kappa scores and Cronbach's coefficient, providing robust statistical measures to ensure the accuracy and validity of the study outcomes. This comprehensive approach to ethical oversight and data analysis underscores the commitment to upholding ethical standards and ensuring the integrity of the research findings.

Results

All items required more detailed sentences to specify in-person impacts. Each questionnaire item was meticulously crafted to be inclusive and unbiased with regards to gender, reflecting a dedication to fairness and equity in the research process. Dental self-confidence having positive answers was specifically kept in the same tense, while social impacts, psychological impacts and aesthetics concerns being in the negative answer format were kept in the same. Some items that puzzled the committee members and the interviewed participants were the following.

Further review was needed for the question addressing the attractiveness of teeth to ensure it conveyed the intended sense of relating teeth to facial aesthetics rather than implying that teeth themselves are inherently attractive. The question concerning finding tooth position appealing required adjustment, as the direct translation of "position" did not effectively capture the intended meaning, which aimed to assess the overall alignment and orderliness of the teeth. Similarly, in the question about holding back when smiling, the translation of "holding back" fell short of conveying the intended

message, instead suggesting fear or sadness associated with smiling. For the question regarding offensive remarks about teeth, a more detailed translation was necessary, specifying who made the remarks and from where they originated, particularly targeting the participants' teeth. The question addressing envy also required refinement, as the term "envy" alone lacked clarity and had multiple interpretations in the Urdu translation. Instead, a more elaborate translation was employed to convey that participants recognize others as having better teeth and feel jealous as a result. Regarding the question about wishing for better teeth, further discussion was needed to distinguish between "wish" and "desire," leading to adjustments in the translation to align with the intended context. Additionally, a detailed discussion was conducted regarding the Likert scale used in the study, with modifications made to the translations of the scale's categories (0 = "not at all," 1 = "a little," 2 = "somewhat," 3 = "strongly," and 4 = "very strongly") to ensure the participants' responses accurately reflected their feelings and perceptions. Special attention was given to differentiating between "strongly" and "very strongly" to maintain the integrity of the scale.

The Cronbach's alpha coefficients for the different subscales ranged from 0.91 to 0.88, indicating high internal consistency. Test-retest correlation coefficients, calculated over a two-week interval, further underscored the reliability of the translated questionnaire. Specifically, kappa values for dental self-confidence, social impact, psychological impacts, and aesthetic concerns were 0.87, 0.97, 0.81, and 0.90, respectively (Table 1).

Table 1. Reliability statistics, Cronbach á and kappa scores

Subscales	Reliability		Reproducibility
	Internal Consistency Number of items	Cronbach á coefficient	Intraclass correlation coefficient (kappa)
Dental Self-Confidence	6	0.91	0.827
Social Impact	8	0.81	0.971
Psychological Impact	6	0.88	0.814
Aesthetic Concerns	3	0.97	0.900

Discussion

Numerous questionnaires have been meticulously crafted to delve into and elucidate patients' perceptions concerning their malocclusion and Oral Health-Related Quality of Life (OHRQoL). Utilizing measures tailored to assess malocclusions for evaluating OHRQoL offers valuable insights into the psychosocial impact of dental appearance on an individual's well-being¹¹. These tools enable the numerical representation of individuals' perceptions, but it's essential to acknowledge that QoL is a complex construct that cannot be fully quantified. It is crucial to align normative assessments by dental professionals with subjective perceptions of patients, as disparities between professional evaluations and patient perceptions are common¹². However, the presence of language barriers presents a significant challenge, compelling researchers to either devise new assessment tools in their native language or adapt existing instruments with thorough cultural modifications and validation processes. The latter approach, while more streamlined and cost-effective, demands careful attention to ensure linguistic and cultural relevance. The Psychosocial Impact of Dental Aesthetic Questionnaire (PIDAQ), initially developed in English, has undergone successful translations into Swedish, Spanish, Portuguese, and Chinese, as evidenced by previous studies^{13, 14}. This widespread adoption and successful translation of the PIDAQ underscore its reliability and effectiveness in capturing the psychosocial impacts of orthodontic treatment across diverse linguistic and cultural contexts, highlighting its value as a versatile research instrument.

The analysis has revealed that the structure of our Urdu PIDAQ questionnaire mirrors that developed by Klages and colleagues. It comprises four domains, namely aesthetic concern, psychological impact, social impact, and dental self-confidence subscales. The assessment of internal consistency using Cronbach's alpha coefficient revealed favorable values ranging from 0.81 to 0.91, indicative of near-ideal reliability. A comparison with similar studies on PIDAQ translations underscores the robustness of the Urdu version, with Cronbach's alpha

values aligning closely with those reported for the Brazilian and Spanish versions. Specifically, the Brazilian iteration demonstrated coefficients of 0.91 for dental self-confidence, 0.83 for social impacts, 0.75 for psychological impacts, and 0.75 for aesthetic concerns, while the Spanish version exhibited coefficients of 0.90, 0.86, 0.81, and 0.77 for the respective domains^{15,16}. Notably, the Urdu translation yielded nearly identical values, affirming its consistency and reliability across cultural contexts. Moreover, the repeatability analysis, conducted with 24 participants over a 2-week interval, demonstrated satisfactory results, with intraclass correlation coefficients ranging from 0.81 for psychological impacts to 0.97 for social impact.

Utilizing specialized measures tailored to assess malocclusions for evaluating Oral Health-Related Quality of Life (OHRQoL) holds promise in shedding light on the psychosocial ramifications of dental appearance on an individual's overall sense of well-being⁴. Crucially, these tools aim to quantify an individual's subjective perceptions, providing valuable insights into their lived experiences. However, it is essential to acknowledge that constructs such as Quality of Life (QoL) or OHRQoL are inherently abstract and cannot be fully encapsulated or directly compared through numerical metrics alone¹⁷. Satisfaction with physical appearance is highly individualized, as individuals may react diversely to their own physical attributes. Reduced public self-consciousness may diminish social sensitivity and perceptions of one's appearance within the sample¹⁸. Moreover, patient perceptions often diverge from standardized treatment needs, underscoring the importance of considering individual perspectives in treatment planning. Notably, the younger demographic tends to prioritize aesthetics and physical appearance, further emphasizing the subjective nature of malocclusion assessment¹⁹. Additionally, it's essential to recognize the diverse interpretations and definitions of malocclusion among patients, highlighting the need for personalized and patient-centered approaches in orthodontic care²⁰.

The primary objective of this study was to undertake the translation of the English version of PIDAQ into Urdu, adhering to established protocols

for cross-cultural validation and translation. The findings indicate that the Urdu rendition of PIDAQ closely mirrors the internal structure and psychometric characteristics of the original questionnaire developed by Klages et al⁴. Demonstrating remarkable reproducibility, the Urdu version emerges as a reliable and valid instrument for assessing orthodontic-related psychosocial impacts. The meticulous process of translation, back-translation, and pilot testing culminated in a version that is anticipated to be readily comprehensible and culturally acceptable within the local context.

The recommendations include using the cross-cultural validation protocols on the PIDAQ questionnaire to incorporate patient perspectives into treatment planning. Limitations of this study include constrained diversity within the sample, and exclusion of individuals with underlying treatment needs or disabilities, potentially affecting the generalizability of findings. Despite meticulous translation efforts, challenges in achieving semantic equivalence between the original and translated versions may persist. Further research is comparing the English version and Urdu version of PIDAQ on a bilingual large population would be interesting and give us a better assessment. Further changes to the translation may be required to account for regional cultural differences.

Conclusions

The findings of this investigation suggest that the Urdu iteration of PIDAQ, developed through meticulous adaptation from its original form, demonstrates robust reliability and validity. It effectively captures patients' self-assessments regarding orthodontic aesthetic considerations, offering valuable insights into their perspectives. This underscores its utility as a tool for assessing subjective experiences in orthodontic care.

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