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Translation and validation of the Hindi version of the psychosocial impact of the dental aesthetics questionnaire (PIDAQ)

Prateek Shakti[1], Sudhir Kumar[2], Khushtar Haider[3], Sreevatsan Raghavan[4], Abhishek Purohit[5]*, Jitendra Kumar[6]

[1]*Dept. of Orthodontics, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India*
[2]*Dept. of Plastic Surgery, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India*
[3]*Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India*
[4]*Private practitioner, Jhansi, Uttar Pradesh, India*
[5]*Post Graduate Institute of Medical Education and Research, Chandigarh, India*
[6]*All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, India*

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ABSTRACT

Objectives: The validity and reliability assessment of the Hindi version of PIDAQ for application in adolescents.

Study Design: A cross-cultural questionnaire was translated and adapted,which was completed by 350 adolescents (aged 10 -25). The adolescents were examined by two (2) examiners who had calibrated against a gold standard and relative to each other in determining treatment needs with the Index of Orthodontic Treatment Need (IOTN) DHC and AC components as well as the Perception of Occlusion scale. Construct validity was analyzed with factor analysis and discriminant validity was checked with the Kruskal-Wallis ANOVA test

Results: Cronbach´s alpha of the translated PIDAQ ranged from 0.81 to 0.86. The 23 items of the questionnaire were divided into four domains that explained 60.5% of the variance. The test-retest reliability of the questionnaire ranged from 0.78 to 0.88. Discriminant validity revealed a significant association between the scores for the questionnaire and its subscales or domains and those for the POS, IOTN-DHC and IOTN-AC treatment need indices. Adolescents with orthodontic treatment scored higher in the questionnaires.

Conclusions: The results in the study show that the Hindi version of PIDAQ has a very similar internal structure and psychometric properties to those of the original questionnaire and demonstrate its validity for use with Hindi (Central Indian) adolescents.

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1. Introduction

An overall measure of a patient's overall health in terms of physical, mental, and social well-being is Quality of life (QOL)[1,2] Studies have confirmed that differences in dental aesthetics can have a large impact on quality of life. This effect was more pronounced in subjects with self-awareness.[3] Malocclusion affects function and aesthetics, but it also has important social, psychological, and economic consequences.[4]

Person's concern with the appearance of their own teeth and other social and psychological factors determine the need for dental treatment[5,6] Professionals and patients have different perceptions of the appearance of teeth and the need for orthodontic treatment.[3] The

* *Corresponding author*.
E-mail address: khushtarhaider@gmail.com (A. Purohit).

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psychological consequences of malocclusion cannot be ignored. Researchers examining oral health quality of life (OHRQOL) have become more interested in psychological indicators[7,8] and have focused on patients' experiences of understanding body image during orthodontic treatment planning.[9] Several authors have demonstrated that combining the OHRQOL instrument with occlusal indexes is effective in predicting orthodontic problems.[10–12] Teenagers are often concerned with their physical appearance, which plays an important role in emotional and social change as well as academic success.

Questionnaires are the most used QOL assessment tools. Klages et al[13] developed a new questionnaire called the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), a method specifically designed for the assessment of orthodontic medicine in relation to quality of life. The PIDAQ can distinguish self-reported dental aesthetics from the Orthodontic Treatment Needs Index (IOTN-AC)[14] and the esthetic component of the Occlusal Perception Scale (POS).[15] Most of the questionnaires, including the PIDAQ, were developed and written in English in English-speaking countries, but rigorous translation and verification procedures are required before use for people of a different culture. The International Quality of Life Assessment (IQOLA) has published interpretable and valid criteria.[16]

Brazilian[17], Chinese,[18] Italian[19], Spanish,[20] Nepalese,[21] Croatian,[22] Malayalam (Indian),[23] Moroccan Arabic,[24] Malay,[25] Albanian[26] and Turkish[27] versions of the PIDAQ have been published recently. A comparative study using the Hindi (Indian) version of PIDAQ was conducted in 2017 by Garg et al[28] but a comprehensive assessment of the questionnaire (validity, reproducibility and reliability) in comparison to the original version (English) is yet to be done. Hindi is the most commonly spoken language in northern, central, and some eastern parts of India. The linguistic region covering parts of northern, central, and eastern India which includes nine states named Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and Uttarakhand, is referred to as The Hindi Belt. It also includes the union territory of Chandigarh and the National Capital Delhi. In the narrower context, the modern standard Hindi is equated in the central part of India. This study aimed to adapt the PIDAQ for a Hindi-speaking public from the central part of India and assess its validity.

2. Materials and Methods

The Hindi version of the PIDAQ was Assesed for validity and reliability

The validity and reliability assessments of the Hindi version of the PIDAQ were carried out in the city of Jhansi, Uttar Pradesh, India.350 adolescents and young adults aged 12–25 years, with a mean age of 16 years (standard deviation = 3.7), were included for the assessment of the psychometric properties of the instrument,. In which Gender was evenly distributed, with 173 (49.6 percent) and 177 females (50.4 percent). The subjects were sampled from the bystanders/relatives of outpatients reporting at Government Medical College, Jhansi, along with the students at Government Medical College, Jhansi, India. All individuals read and signed the terms of informed consent before participation. The study received approval from the Ethics Committee of the Government Medical College, Jhansi, Uttar Pradesh, India.

The exclusion criteria were:- 1) Intellectual and/or physical inability to answer the questionnaire: 2) the presence of carious lesions with cavities, 3) missing or fractured teeth, 4)moderate to severe fluorosis (dark areas) or pigmented spots in the anterior region, and 5) previous orthodontic treatment.

The Dental Health Component (IOTN-DHC) and self-rated Aesthetic Component (IOTN-AC) of the Index of Orthodontic Treatment Need[15] were used to assess the adolescents' orthodontic treatment need.2 examiners (PS and SK) who had been calibrated against a gold standard and relative to each other (Kappa >0.85) in measuring these three indices as determined using the same subjects used during the pilot studies.

Perception of Occlusion Scale (POS)-The subj presented with six items referring to dental arrangements with aesthetic significance. The six items are 'There are gaps between the upper front teeth', 'The upper front teeth are crowded', 'The lower front teeth are crowded', 'The upper front teeth are irregular', 'The lower front teeth are irregular' and 'The upper front teeth are positioned too far anterior to the lower front teeth (the overjet is too large)'. The scoring of POS is an agreement on a five-point scale as PIDAQ.

The sample was also divided into 5 IOTN DHC groups, 4 IOTN-AC groups (score 1, score 2, score 3 and scores 4 and above) and 3 POS groups (score 0-5, score 6-10 and score of 11 or above).

3. Description of the PIDAQ

The PIDAQ is a psychometric instrument containing 23 items. Structurally, it is composed of four subscales, one positive and three negatives, which represent 4 domains: aesthetic concern (AC; 3 items), psychological impact (PI; 6 items), social impact (SI; 8 items), and dental self-confidence (DSC; 6 items). A five-point Likert scale is used, ranging from 0 (no impact of dental aesthetics on QoL) to 4 (maximal impact of dental aesthetics) for each item. The response options are as follows: 0=not at all; 1=a little; 2=somewhat; 3=strongly; and 4=very strongly.

3.1. Translation and cross-cultural adaptation of the PIDAQ

The PIDAQ was first translated into Hindi by two separate translators who then worked together to produce the initial draft. Two different translators separately back-translated this draft into English. A committee made up of two orthodontists and two public health dentists with expertise and fluency in English and Quality of Life (QoL) and with no prior knowledge of the study assessed the semantic and conceptual equivalence of the 23 items and adapted them for the Hindi version of the PIDAQ. They compared the back-translated English version with the original English language version. The aim of this step was to achieve a 'similar effect' from respondents who speak English and Hindi.

3.2. Pilot study

The Hindi version was pilot-tested on a convenience sample of 30 students at the Government Medical College, Jhansi. The pilot test demonstrated that the Hindi version of the PIDAQ exhibited appropriate semantic and conceptual equivalence. Attention was given to the meaning of the words in the different languages to obtain similar effects of respondents from different cultures. According to the 30 completed questionnaires, appropriate amendments were made to the existing Hindi version, and eventually, the final Hindi version of PIDAQ was formed (Appendix 1).

3.3. Study sample

The sample was calculated according to the rule of thumb suggested by Plichta and Kelvin.[29]

3.4. Statistical analysis

The Statistical Package for the Social Sciences for Windows version 20.0(IBM Corp., Armonk, USA)® was used for data analysis. Descriptive analyses were performed (mean and standard deviation of the four subscales and of the PIDAQ questionnaire as a whole). To study the questionnaire's psychometric properties and calculate the total score, the variables in the dental self-confidence, were re-coded to bring the direction of the scores into line with the other 3 subscales.

Descriptive analyses were performed (mean, median, standard deviation, interquartile range analysis of total and individual PIDAQ domain scores to generate PIDAQ total, and domain scores for each participant), since the data was not normally distributed. The scores were reversed for the 1^{st} part of PIDAQ (Dental self-confidence), as it records positive outcomes compared to the other 3 subdomains. Internal consistency of the Hindi PIDAQ was tested using Cronbach's alpha coefficient[30] for the subscales. Test–retest reliability was assessed by calculating the ICC with a two-way random effects model for the PIDAQ score using data from 80 subjects who responded to the questionnaire a second time after a two-week interval.

Construct validity was studied by factor analysis of scale (Varimax rotation with Kaiser Normality), Correlation of PIDAQ and the other three scales was analyzed to test its criterion validity and discriminant validity was tested by comparing the groups classified according to their POS, IOTN-DHC and IOTN-AC scores with the scores for each subscale using Kruskal Wallis test (non-parametric one way ANOVA) since the data was not normally distributed and Mann Whitney U test was used for differences for averages amongst males and females.

4. Results

The results of the panel of specialists demonstrated the existence of conceptual equivalence between both languages. Defining the concepts of interest, experts in QoL established that the subscales of the original instrument were relevant and pertinent to the Hindi context for which it was adapted. In terms of item and operational equivalence, the instrument exhibited good comprehension of the items by Hindi adolescent and young adults between 12 and 25 years of age, suggesting that the questionnaire may be administered to these subjects in the same format as the original. There were 350 valid questionnaires involving no one with missing data, and 100 % of 80 retest questionnaires were completed.

A total of 20 subjects were placed in IOTN DHC grade 1, 83 in IOTN DHC grade 2, 105 in IOTN DHC grade 3, 85 in IOTN DHC grade 4, and 57 in IOTN DHC grade 5 respectively. Similarly, 111 patient was placed in POS Category 1 (scores 0-5), 131 were placed in POS Category 2 (scores 6-10), and 108 in Category 3 (scores 11 or above).

The distribution of the IOTN AC grading after categorizing them into 4 categories was, 65 in IOTN AC Category 1(score 1), 67 in IOTN AC Category 2 (score 2), 75 in IOTN AC Category 3 (score 3), and remaining 143 in IOTN AC category 4 (score 4 and above) respectively. Table 1 summarizes the other descriptive of the subscale scores of the PIDAQ and total score.

4.1. Reliability

ummarizes the reliability data for theHindi version. The Cronbach's alpha for the subscales ranged from 0.81 for AC to 0.86 for DSC, thus indicating acceptable to excellent internal consistency. Test–retest reliability was assessed using the ICC, which ranged from 0.78 to 0.88.

4.2. Construct validity

The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.87 and Bartlett´s test of sphericity was 4406.350 (p=0.00). Principal components analysis extracted the same

Table 1: Table showing descriptive parameters for the various sub-domains of the Hindi translated PIDAQ as per participant's inputs

Value		Social Impact	Psychological Impact	Aesthetic Concern	Pidaq total	Dental Self-Confidence
Mean		9.37	11.14	4.56	33.59	8.53
Median		7.00	10.00	4.00	31.00	7.00
Std. Deviation		7.602	6.615	3.657	14.077	5.755
Range		31	24	12	60	24.00
Minimum		0	0	0	7	.00
Maximum		31	24	12	67	24.00
Percentiles	25	4.00	6.00	1.00	23.00	4.00
	50	7.00	10.00	4.00	31.00	7.00
	75	14.00	16.00	8.00	45.25	11.00

Table 2: Data summarizing reliability scores for the Hindi version of PIDAQ

Variable	Number of items	Cronbach's Alpha	ICC (95 % Confidence Interval) *
Dental Self-confidence	6	0.864	0.840 - 0.885
Social Impact	8	0.853	0.829 – 0.875
Psychological Impact	6	0.856	0.831 – 0.878
Aesthetic Concern	3	0.818	0.783 – 0.849

* Two-way random effects model: $P < 0.001$ for all values

four dimensions as the original questionnaire (Table 2). In factor analysis, four common factors were extracted. Common factor 1 contained the items (items 1 – 6) of the original sub-domain of dental self-confidence. Common factor 2 included items (items 7-14) reflecting the social impact of teeth appearance. Common factor 3 embodied items (items 15-20) reflecting individual self-confidence/psychological impact of dental appearance, and common factor 4 (items 21-23) reflecting the impact of teeth appearance on the individual aesthetic attitude i.e., Aesthetic Concern (Table 3)

5. Criterion validity and Discriminant validity

Correlation between PIDAQ, IOTN-AC, IOTN-DHC, and POS were statistically significant (Tables 4, 5 and 6).Table 7 shows gender differences in responses to the PIDAQ, all except Dental self-confidence did not show any statistically significant difference in response. For the subscale of Dental self-confidence, males had a higher average score (16.38 ± 5.6) as compared to females (15.00 ± 5.74) which was statistically significant ($p \leq 0.05$)

6. Discussion

The present research was conducted in a representative sample of 350 children aged 10 to 25 years. Members of this section of society have the highest concern for their image, which plays an essential role in their psychological and social well-being.

Questionnaires are often used in instruments designed to measure patients' OHRQoL. Foreign tools need translation, cultural adaptation, and validation before they can be used in other cultural contexts and different languages. A cultural translation process was developed to ensure that the translation was valid and comparable across international studies (translation, back-translation, and cultural adaptation law). PIDAQ QOL is culture-dependent but should be culture-specific. Before quality-of-life health surveys can be used in other countries, they must undergo cultural adaptation procedures, including translation of the surveys and assessment of psychological characteristics. A questionnaire could be used in the local cultural context only when it shows good psychometric properties. This study followed the cultural exchange process of the Hindi version of the PIDAQ prepared by the IQOLA 17 project to ensure that the development of the Hindi questionnaire was valid. The cross- cultural use of the questionnaire should be based on the local culture and society. The translation of the PIDAQ is a challenging process consisting of four steps: translation, back translation, cultural adaptation, and pre-testing. To translate accurately and reflect the main meaning, the PIDAQ was translated into simplified Hindi by two translators who are experts in Hindi and English, conveying its meaning as accurately as possible. Translation quality is evaluated in three areas: translation accuracy, comprehension, and popularity.

To assess potential problems in the translation, the back-translation version was compared to the original version. Most of the back-translated items were found in agreement with the original items. Only a few words differ from the original text, but the content is similar.

Cultural adaptation is the process of assessing the equivalence of the original questionnaire with the new questionnaire. For this purpose, at least four

Table 3: Summarizing scores for principal component analysis for all the items in the Hindi translated version of PIDAQ

S. No	Item	Dental Self-Confidence	Social Impact	Psychological Impact	Aesthetic Concern	Alpha if item deleted
1	Proud of teeth	.786*	.594	.243	-.060	.842
2	like to show when I smile	.642*	.489	.113	-.163	.846
3	pleased to see teeth in the mirror	.870*	.667	.034	.029	.829
4	teeth attractive to others	.738*	.632	-.109	.263	.852
5	satisfied with appearance of my teeth	.830*	.649	.213	.044	.828
6	I find my tooth position to be nice	.758*	.590	-.009	.176	.845
7	hold myself back when I smile	.453	.596*	.144	-.086	.867
8	concerned about unknown people opinion about my teeth	.683	.554*	-.064	-.025	.829
9	afraid of other making offensive remarks about my teeth	.746	.628*	-.083	-.110	.821
10	somewhat inhibited in social contacts due to my teeth	.558	.734*	-.491	-.037	.836
11	catch myself holding my hand in front of my mouth to hide my teeth	.575	.667*	-.416	-.063	.837
12	Sometimes I think people are staring at my teeth.	.657	.767*	-.388	.063	.830
13	Remarks about my teeth irritate me even when they are joking	.671	.556*	-.085	-.067	.831
14	I sometimes worry about what members of the opposite sex think about my teeth	.595	.732*	-.374	-.165	.833
15	I envy the nice teeth of other people.	.542	.191	.458*	-.081	.863
16	I am somewhat distressed when I see other people's teeth	.683	.212	.684*	-.174	.825
17	Sometimes I am somewhat unhappy about the appearance of my teeth	.782	.149	.746*	-.209	.802
18	I think most people I know have nicer teeth than I do	.678	.282	.737*	-.154	.820
19	I feel bad when I think about what my teeth look like.	.739	.084	.745*	-.217	.812
20	I wish my teeth looked better	.495	-.087	.623*	-.114	.861
21	I don't like to see my teeth in the mirror.	.502	.086	-.174	.727*	.904
22	I don't like to see my teeth in photographs.	.631	.022	.370	.834*	.650
23	I don't like to see my teeth when I look at a video of myself	.634	-.038	.211	.838*	.625
Amount of variance explained (initial solution)		1.540	8.062	2.883	1.428	
Percentage of variance explained (initial solution)		54.284	35.052	47.589	60.492	
Amount of variance explained (rotated solution)		3.718	4.011	3.935	2.249	
Percentage of variance explained (rotated solution)		50.714	17.440	34.551	60.492	

* Rotated Component matrix. Rotation Method: Varimax with Kaiser Normalization.

Table 4: Cross tabulation between the sub-components of the Hindi translated version of PIDAQ and the IOTN-DHC

PIDAQ	IOTN-DHC	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Dental self-confidence	1	20	11.40	6.581	1.471	8.32	14.48
	2	83	11.66	7.446	.817	10.04	13.29
	3	105	8.02	4.977	.486	7.06	8.98
	4	85	6.62	3.761	.408	5.81	7.43
	5	57	6.72	4.057	.537	5.64	7.80
	Total	350	8.53	5.755	.308	7.92	9.13
Social impact	1	20	10.05	6.901	1.543	6.82	13.28
	2	83	6.99	6.092	.669	5.66	8.32
	3	105	8.60	6.605	.645	7.32	9.88
	4	85	10.91	9.209	.999	8.92	12.89
	5	57	11.70	7.915	1.048	9.60	13.80
	Total	350	9.37	7.602	.406	8.57	10.16
Psychological impact	1	20	13.80	9.423	2.107	9.39	18.21
	2	83	9.75	6.901	.758	8.24	11.25
	3	105	10.30	6.003	.586	9.13	11.46
	4	85	10.38	5.771	.626	9.13	11.62
	5	57	14.93	5.803	.769	13.39	16.47
	Total	350	11.14	6.615	.354	10.44	11.84
Aesthetic concern	1	20	4.20	3.518	.787	2.55	5.85
	2	83	3.31	3.131	.344	2.63	4.00
	3	105	4.74	3.695	.361	4.03	5.46
	4	85	4.27	3.483	.378	3.52	5.02
	5	57	6.60	3.807	.504	5.59	7.61
	Total	350	4.56	3.657	.195	4.18	4.94

Table 5: Table showing cross tabulation between PIDAQ and IOTN-AC

Descriptives								
PIDAQ	IOTN AC		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
							Lower Bound	Upper Bound
Dental self confidence	c	1	65	10.83	7.247	.899	9.04	12.63
		2	67	8.93	5.153	.630	7.67	10.18
		3	75	9.91	6.450	.745	8.42	11.39
		4+	143	6.57	4.040	.338	5.90	7.23
		Total	350	8.53	5.755	.308	7.92	9.13
Social impact		1	65	7.48	7.610	.944	5.59	9.36
		2	67	8.36	6.156	.752	6.86	9.86
		3	75	8.36	6.869	.793	6.78	9.94
		4+	143	11.22	8.223	.688	9.86	12.58
		Total	350	9.37	7.602	.406	8.57	10.16
Psychological impact		1	65	8.65	6.922	.859	6.93	10.36
		2	67	10.70	6.731	.822	9.06	12.34
		3	75	11.43	6.595	.762	9.91	12.94
		4+	143	12.33	6.149	.514	11.31	13.35
		Total	350	11.14	6.615	.354	10.44	11.84
Aesthetic concern		1.00	65	3.37	4.029	.500	2.37	4.37
		2.00	67	5.19	3.120	.381	4.43	5.96
		3.00	75	3.79	3.457	.399	2.99	4.58
		4.00	143	5.21	3.636	.304	4.61	5.81
		Total	350	4.56	3.657	.195	4.18	4.94

Table 6: Table showing cross tabulation between PIDAQ and POS

PIDAQ	POS	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Dental self-confidence	1.00	111	9.47	6.468	.614	8.25	10.69
	2.00	131	10.02	5.765	.504	9.03	11.02
	3.00	108	5.74	3.623	.349	5.05	6.43
	Total	350	8.53	5.755	.308	7.92	9.13
Social impact	1.00	111	6.90	6.954	.660	5.59	8.21
	2.00	131	8.21	6.841	.598	7.02	9.39
	3.00	108	13.31	7.636	.735	11.85	14.76
	Total	350	9.37	7.602	.406	8.57	10.16
Psychological impact	1.00	111	8.20	5.776	.548	7.11	9.28
	2.00	131	10.73	6.159	.538	9.66	11.79
	3.00	108	14.67	6.370	.613	13.45	15.88
	Total	350	11.14	6.615	.354	10.44	11.84
Aesthetic concern	1.00	111	1.77	1.792	.170	1.44	2.11
	2.00	131	3.67	2.862	.250	3.18	4.17
	3.00	108	8.50	2.386	.230	8.04	8.96
	Total	350	4.56	3.657	.195	4.18	4.94

Table 7: Table showing hypothesis test summary (Gender wise)

S NO.	Null Hypothesis	Test	Sig	Decision
1	The distribution of the dental self-confidence is the same across both categories of gender	Independent samples MANN-WHITNEY U test	.013	Reject the null hypothesis
2	The distribution of the social impact is the same across both categories of gender	Independent samples MANN-WHITNEY U test	.308	Retain the null hypothesis
3	The distribution of the psychological impact is the same across both categories of gender	Independent samples MANN-WHITNEY U test	.895	Retain the null hypothesis
4	The distribution of the Aesthetic concern is the same across both categories of gender	Independent samples MANN-WHITNEY U test	.840	Retain the null hypothesis

types of equivalence should be considered: conceptual equivalence, semantic equivalence, technical equivalence, and psychometric equivalence. In this study, a significant group of Orthodontists participated in the discussion about the translation of each item, especially the conceptual and semantic equivalence of the Hindi version to the original one. After taking the views and suggestions of many young people, these vague and confusing words were revised to make the Hindi version acceptable for young people of various levels and backgrounds to learn. The fact that the back-translated version, as a result of a long and comprehensive process, is the same as the original version reveals the equivalence between the English and Hindi versions of the survey.

As evidenced by the above data, the psychometric properties of the PIDAQ's Hindi version were found to be similar to the original instrument developed by Klages et al.[13] The questionnaire was found to be valid and reliable for use among young adults of similar age in central India (Uttar Pradesh).

6.1. Psychometrics properties of the Hindi version of PIDAQ

Factor analysis confirmed that the structure of our PIDAQ questionnaire in Hindi is similar to the structure advanced by way of Klages et al. 14 and utilized by Sardenberg et al.[17] inside the Brazilian model of the PIDAQ and also by Montiel-company et al.[20] It has 4 domain names represented via subscales Aesthetic interest (AC), psychological impact (PI), Social impact (SI), and Dental Self-confidence (DSC), which collectively give an explanation for 60.429% of the variance. The Chinese version blended PI and AC into a single subscale, basically due to the cultural traits of the younger Chinese language populace, as the authors defined.[18]

PIDAQ's Hindi version showed good reproducibility as Cronbach;s alpha value ranged from.

To 0 86 for the 4 subscales Reproducibility above 0 74 is considered very good These results were compared with the original studies by Klages et al.[13] and with the results obtained by Sardenberg et al.,[17] Lin et al.,p[18] Settineri et

al,[19] and Montiel-Company et al.[20] In related studies, the Hindi version of the survey also yielded similar results. ICC was used to assess.

Test-retest reliability. The results showed good stability testing, with AC ranging from 0.78 to 0.84 and DSC ranging from 0.84 to 0.88. A value of ICC is considered outstanding if it is greater than 0.74.

In this study, there was a significant correlation between different aesthetic levels (IOTN-DHC and AC classification and POS) and the subscales — DSC (P < 0.00) designated to evaluate the impact of dental esthetics on emotional state and PI. (P < 0.05) refers to the negative emotions and unhappiness experienced by affected individuals compared to others with better dental esthetics. A similar significant relationship was found for the AC scale (p<0.05), unlike the findings of Sardenberg et al.[17] Montiel-Company et al.[20] did not find such a relationship, but was consistent with the findings of Lin et al.[18] and Klages et al. 14 PIDAQ, DSC, SI, and AC subscale total scores increased significantly as need for treatment (IOTN- DHC) increased, indicating a significant relationship when measured with any of the three scales used. Even when a self-rated AC was used, all four subscales increased compared to the IOTN-AC. This is similar to the original findings of Klages et al., except that DSC was not recorded as in our study.[13]

In some cases, the patient& s perception of malocclusion is not relevant to the actual need for treatment as objectively assessed by the indices.[5] In fact, the patient;s idea of malocclusion is often in contrast with the exper;s perception.[20] It should also be recalled, that as in similar studies, 18 most of the samples showed normal occlusion or only mild malocclusion, which is common when representative samples are used. This was not the case in our study, as the sample showed more treatments according to the IOTN-DHC classification.

The sample size of this study included a wide age range compared to other studies,.[17,18,20] and included both adults and adolescents. A potential disadvantage could be the exclusion of

older sample subjects, as included by Settineri et al,[19] who also represent a fair proportion of the regional population, but as most patients presenting to orthodontic clinics are in a similar age range to our study, the data could be used for most population of central India (Uttar Pradesh).

7. Conclusion

The results showed that the PIDAQ's Hindi version has a similar internal structure and psychometric properties as the original Klages questionnaire. It has good reproducibility and can be used effectively in Hindi-speaking orthodontic patients. The major limitation of the study is that the sample was selected only in Uttar Pradesh and hence is not representative of the entire Hindi-speaking population. This study is the first Hindi version of the scale. Since our results are positive, further translational research may not be necessary. The Hindi version of PIDAQ has been shown to have good reliability and validity. Its discriminant validity and psychometric evaluation provide theoretical evidence for further use in investigating orthodontics-specific quality of life among adults in Central India.

8. Source of Funding

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9. Conflict of Interest

None.

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Author's biography

Prateek Shakti, Assistant Professor https://orcid.org/0000-0002-6493-8212

Sudhir Kumar, Professor https://orcid.org/0000-0002-2918-6668

Khushtar Haider, Assistant Professor

Sreevatsan Raghavan, Private Practitioner https://orcid.org/0000-0003-3031-8469

Abhishek Purohit, Scientist D, ICMR

Jitendra Kumar, Senior Resident

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