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Research Article

The Biopsychosocial and Cultural Aspect in the Oral Health-Related Quality of Life of Adolescent Orthodontic Patients

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Abstract

Objective: Evaluate how the psychosocial aspect of oral health-related quality of life (OHRQoL) in Moroccan adolescents receiving orthodontic treatment is impacted by individual factors (dental aesthetics and social comparison of dental appearance) and sociocultural factors (social reinforcement from parents, peers, and the media regarding dental aesthetics), as well as how these factors interact.

Methods: Social comparison of dental appearance was assessed using four items that were translated and cross-culturally adapted from the Physical Appearance Comparison Scale (PACS), and the sociocultural aspect was measured with six items adapted from the Perceived Sociocultural Pressure Scale (PSPS).

Results: Both measurement scales were reliable and reproducible, with an intra-class correlation coefficient (ICC) ranging from 0.74 to 0.85 for the PSPS and 0.81 for the PACS. The media subdimension of the PSPS showed good internal reliability with an alpha of $\alpha = 0.54$, while the PACS demonstrated good internal reliability with an alpha of $\alpha = 0.66$. No significant correlations were found between the various dimensions of the PSPS and PACS with gender, age, satisfaction level with dental appearance, or diagnosis. However, parents were found to have the most influence on their children in initiating orthodontic treatment.

Conclusion: This study highlights the need for informed public policies in our country aimed at facilitating access for adolescents to orthodontic treatments that meet their specific needs. This would significantly improve their OHRQoL and overall well-being.

***Keywords**: Oral Health Related Quality of Life; Orthodontics; Biopsychosocial-Cultural Model; Adolescents; Social Reinforcement; Malocclusion; Dental Aesthetics*

Introduction

Orthodontics, as a branch of dentistry, is not limited to correcting malocclusions or improving dental alignment but is involved in a broader context in which biological, psychological, and socio-cultural dimensions play a crucial role in the perception of the impact of oral health on patients' quality of life, particularly that of adolescents. Adolescents, who are in the process of physical and psychological development, are particularly sensitive to external influences, whether these come from their immediate environment (parents and peers, etc.) or from the social media, which convey aesthetic standards that are often unattainable. From this perspective, exploring the dynamics

that govern Oral Health-Related Quality of Life (OHRQoL) in adolescents undergoing orthodontic treatment is of vital importance [1]. OHRQoL, a complex and multidimensional concept, encompasses the way in which oral health influences an individual's psychosocial well-being and overall satisfaction [2]. It is imperative to consider this dimension in its global perspective, taking account of the subtle interactions between the biological, psychological, socio-cultural and aesthetic components that shape individual perceptions of dental appearance and, by extension, oral health. The standards of beauty that emerge from family, peers and the media exert a dominant influence on their assessment of their own dental appearance. This complex dynamic, which combines personal judgements and social expectations, inevitably shapes their experience of orthodontic treatment and, consequently, the impact on their OHRQoL [1].

This investigation is rooted in an original approach that aims to go beyond the conventional orthodontic paradigm by fully integrating biopsychosocial and cultural facets into the assessment of OHRQoL in adolescents [3]. Based on pre-existing theoretical models and a socio-cultural framework of body image dissatisfaction, it aims to examine the intimate workings underlying the psychosocial dimension of oral health in this specific population. Likewise, it is imperative to take into account the socio-cultural characteristics that shape the orthodontic experience of adolescents. Each society, community, and cultural group has its own aesthetic standards and values when it comes to teeth [4].

Our research questions are as follows: to what extent are adolescents influenced by those around them, particularly their parents and social networks, when they decide to undergo orthodontic treatment? And to what extent do these influences lead them to compare themselves with the dental appearance of others, thereby affecting their perception of their own dental appearance and their psychosocial well-being?

In order to contribute to answering these questions, the purpose of this study was to examine the impact of socio-cultural factors, such as social reinforcement from parents, peers, and the media, on adolescents' decisions to undergo orthodontic treatment. To do this, we used two psychometric measurement scales dedicated to this purpose, as outlined below:

- **Perceived socio-cultural pressure scale (PSPS**): This is an evaluation scale used to measure the socio-cultural pressure perceived by individuals in their daily lives. It focuses on socio-cultural factors such as family, friends, the media, advertising, and other sources of social influence. It measures the pressure individuals feel to conform to socio-cultural norms and expectations in terms of behavior, thinking, and physical appearance. The social reinforcement of dental aesthetics by parents, peers, and the media was examined using six questions, translated and adapted to Moroccan Arabic, from the PSPS. [5].
- **Physical appearance comparison scale (PACS)**: This scale measures an individual's tendency to compare themselves with others in terms of physical appearance. It was developed to assess the influence of social comparison on self-esteem linked to physical appearance [6].

In order to respect the cultural specificity of our population, a transcultural translation and a psychometric validation of these two scales are carried out before their use as a tool in order to explore how these external influences favor the social comparison of dental appearance and to what extent this comparison has an impact on the OHRQoL of adolescents.

Methods

A cross-sectional study was carried out on a target population of adolescents attending the orthodontics department of the Ibn Rochd Casablanca University Hospital. A sample of 63 adolescent participants aged between 9 and 17 was selected consecutively and the study took place between October 2023 and July 2024.

An anonymous questionnaire was drawn up to collect the data required for the investigation. It consisted of three main parts: The first part collected general information about the patient (age, gender, etc.); the second part collected information about the orthodontic treatment in progress (the reason for the patient's consultation, the skeletal and dental diagnosis), as well as the patient's level of satisfaction with the state of his or her teeth and information about the patient's socio-economic level using the (professional codes established by the WHO).

The second part consisted of 10 questions translated from English into Moroccan Arabic (Moroccan dialect). For all the questions, a Likert scale ranging from 1 to 5 was used, where 1 expresses a little and 5 expresses a lot, in order to obtain a final score. The 10 questions were divided into two areas. The first included six questions adapted from the PSPS. The second included four items adapted from the PACS.

For the PSPS, the questions were slightly modified to reflect the pressure exerted to improve the appearance of teeth. Two items for each source (parents/peers/media) were used to assess the perceived pressure to have good-looking teeth (for example, I perceived a strong message from my parents to have good-looking teeth). Subjects responded on a 5-point Likert scale ranging from 1 = none to 5 = a lot [5].

Regarding the PACS, four items were used to measure social comparison of dental appearance (e.g. 'At parties or other social occasions, I compare my dental appearance with that of others.'). Subjects responded on a 5-point Likert scale ranging from 1 = never to 5 = always. Scores were averaged to form the appearance comparison variable, with higher scores indicating a higher level of social comparison about teeth [6].

The PACS and PSPS used were translated and culturally adapted to Moroccan Arabic. Four main stages were followed: translation, back-translation, committee review, and pre-testing. Translation of the original English version of PACS and PSPS was carried out independently by two native speakers of Moroccan Arabic with a good command of English. The resulting versions were then translated back into English by two bilingual teachers [7]. A reading committee of six people (two translators, two back-translators and two Moroccan professors of orthodontics) was convened to discuss the semantic equivalence of the different versions of PACS and PSPS (the original, the two Arabic versions and the two back-translated versions). Disagreements between the various members of the revision committee were resolved through discussion until a consensus was reached. It was decided to change some words in more colloquial Moroccan Arabic in order to make the questionnaire easier to understand and more relevant to the context of use [8]. Some examples of these words are: PSPS item 6: ''family members tease me about my dental appearance" The expression ''tease me '' means كيتـرمن or كيتـسهأز but the committee opted for the word كيتـرمن. The word "appearance" ''رهظم '' in classical Arabic has been replaced by the word '' لكش '' despite the fact that it means shape and when we talk about appearance it's the whole shape, size, colour.... Except that for the teenage audience this word was more appropriate to express this term. PACS item 4: ''when I'm with a group of friends, I compare my smile to the smile of others '' the word ''smile'' '' اباتـسامة'' in classical Arabic was a topic of discussion to be replaced by the word '' ةكحض'' because it is the common term in Moroccan Arabic, except that it was decided to keep the term '' اباتـسامة'' because it's more precise.

The statistical analysis was conducted using Jamovi software, (The Jamovi Project, 2021). jamovi. (Version 2.0) [Computer Software]. Retrieved from https://www.jamovi.org). Qualitative variables were expressed by their numbers and percentages, and quantitative variables by their mean and standard deviation. Internal consistency reliability was determined from Cronbach's alpha, and the intraclass coefficient of item scores was obtained after 1 month in a group of 30 subjects. Pearson's r correlation coefficient was used for the statistical associations. For all static tests, the signification level was set at $p \leq 0.05$.

Regarding ethical considerations, all participants and their respective parents were informed of the aims of the study. Parental consent and permission were also obtained from all patients. Access to the orthodontic department was granted by the head of the department. The subject was submitted to and accepted by the commission of the College of Departments of the Faculty of Dentistry at Hassan II University in Casablanca, which acts as the ethics committee.

Results

63 adolescent patients aged between 9 and 17 years, with a mean age of 12.38 years, under the care of the orthodontic department, participated in this study. 30 were male (47.62%) and 33 female (52.38%). The socio-economic level of the patients was translated into three categories (low, medium or high) using the professional code established by the WHO. 37 patients (58.73%) had a low socio-economic level, 21 patients (33.33%) had an average socio-economic level, and 5 patients (7.94%) had a high socio-economic level. The majority of patients had an aesthetic complaint (42 patients (66.67%)), while 21 patients (33.33%) had a functional complaint. 20 patients (31.75%) were not very satisfied with the condition of their teeth. 15 patients (23.81%) were very satisfied. 14 patients (22.22%) were satisfied. 13 patients (20.63%) were very satisfied. Only one patient was very, very satisfied.

Table 1 shows Cronbach's alpha α for the different dimensions studied. The first dimension is the PSPS (perceived sociocultural pressure scale). This is subdivided into 3 groups: peers, mass media, and parents. Each sub-dimension was presented by 2 questions in our questionnaire. The second dimension concerns the PACS (physical appearance comparison scale), presented by 4 questions in our questionnaire.

Cronbach's alpha α tells us about the internal reliability of the scale. A Cronbach's alpha α greater than or equal to 0.6 means good internal reliability. The mass media only sub-dimension of the PSPS shows good internal reliability with an alpha α = 0.54. Also the PACS dimension shows good internal reliability with an alpha α = 0.66.

	Cronbach's alpha α
PSPS	0.16
Peers	0.30
Mass media	0.54
Parents	0.41
PACS	0.66

Table 1: *Internal reliability of PSPS and PACS.*

The answers to the questions are in the form of a score from 1 to 5, allowing us to refer to the biopsychosocial and cultural impact on the quality of life related to oral health in adolescent orthodontic patients. The higher the score, the greater the impact. Table 2 reports the mean score for each dimension and sub-dimension and its standard deviation (SD). The PSPS sub-dimension with the highest mean score was (parents) with a mean score of 3.50 and a standard deviation of 1.06, followed by (peers) with a mean score of 2.40 and a standard deviation of 1.01 and (mass media) in last place with a mean score of 1.94 and a standard deviation of 0.92.

	Mean	Standard deviation
PSPS	2.61	0.55
Peers	2.40	1.01
Mass media	1.94	0.92
Parents	3.50	1.06
PACS	2.97	0.91

Table 2: *Average score and standard deviation for PSPS and PACS.*

Table 3 compares the scores of the different dimensions and sub-dimensions according to the sex of the patients, using the mean score of their responses, the standard deviation, and the p-value. All the p-values for the dimensions and sub-dimensions were greater than 0.05, which means that the gender difference was not significant.

	Female Average	Male Average	P value
PSPS	2.69 (0.46)	2.53 (0.63)	0.24
Peers	2.55 (0.97)	2.23 (1.04)	0.65
Mass media	1.97 (0.90)	1.92 (0.96)	0.22
Parents	3.56 (0.95)	3.43 (1.17)	0.82
PACS	3.02 (0.90)	2.92 (0.93)	0.64

Table 3: *Comparison of scores by gender.*

Table 4 compares the scores of the different dimensions and sub-dimensions according to the patients' socio-economic level, using the mean score, standard deviation, and p-value.

	Low level	Medium level	High level	P value
PSPS	2.55 (0.60)	2.68 (0.50)	2.83 (0.31)	0.47
Peers	2.34 (1.04)	2.48 (1.03)	2.50 (0.79)	0.86
Mass media	1.99 (0.94)	1.91 (0.97)	1.80 (0.67)	0.89
Parents	3.32 (1.13)	.3.64 (0.95)	4.20 (0.57)	0.17
PACS	2.96 (0.80)	2.96 (1.09)	3.10 (1.00)	0.95

Table 4: *Comparison of scores by socio-economic level.*

Table 5 compares the scores for the different dimensions and sub-dimensions according to the reason for consultation, using the mean score, standard deviation, and p-value.

	Aesthetics Mean	Functional Mean	P value
PSPS	2.55 (0.53)	2.74 (0.58)	0.21
Peers	2.31 (0.87)	2.57 (1.25)	0.34
Mass media	1.90 (0.91)	2.02 (0.95)	0.63
Parents	3.44 (1.17)	3.62 (0.77)	0.53
PACS	2.94 (0.95)	3.05 (0.84)	0.65

Table 5: *Comparison of scores by the chief complaint.*

The intra-class correlation coefficient (ICC) was calculated by comparing the results of the test and the re-test. When the value of the ICC is greater than 0.7, we can speak of good reliability and reproducibility of responses. The ICCs for all the dimensions and sub-dimensions were greater than 0.7, indicating good reliability and reproducibility between the test and the re-test (Table 6).

	CCI
PSPS	0.79
Peers	0.74
Mass media	0.83
Parents	0.85
PACS	0.81

***Table 6**: Intra-class correlation coefficients.*

Discussion

The aim of this investigation was to assess the impact of socio-cultural, psychological and biological factors and their impact on orthodontic-specific OHRQoL in adolescent patients. Two scales were selected and translated and cross-culturally validated, and then used to assess these factors. First, the PACS to explore the influence of social factors related to dentition, and the PSPS to assess perceived sociocultural pressure.

Both measurement scales were reliable and reproducible, with a CCI interclass coefficient ranging from 0.74 to 0.85 for the PSPS and 0.81 for the PACS. Internal reliability was assessed by Cronbach's alpha α. For our study, the media mass subdimension of the PSPS had good internal reliability with an alpha α = 0.54. While the PACS had good internal reliability with an alpha α = 0.54 for the PSPS. While PACS had good internal reliability with an alpha α = 0.66. Our results also showed that there was no significant correlation between the different dimensions of the PSPS and PACS with gender, age, parents' socio-economic level, reason for consultation, degree of satisfaction with the appearance of the dentition or the diagnosis.

These scales have already been used in Chinese populations and have also shown adequate internal consistency and good validity and reliability [9,10]. Also, in a study carried out at the University of Zagreb in Croatia, the aim of which was to study self-recognition and self-perception in patients with flat, convex and concave facial profiles, it was shown that there was no significant correlation between the different profiles, whereas girls and adolescents who were motivated to start orthodontic treatment showed a greater capacity for self-recognition of the profile [11].

On the other hand, the study carried out at the orthodontic department of the American University of Beirut revealed that the psychological traits assessed showed a significant correlation with the severity of the malocclusion, age and the patient's personal motivation for treatment. However, there was no correlation with gender. This was explained by the fact that patients with high self-motivation were more aware of aesthetic requirements in relation to the dentition [12].

The results of our study highlighted several key points: Firstly, the predominant parental role: parents had a significant influence on the aesthetic perception of adolescents' teeth, with a score of 3.50. Their support or comments could have a considerable impact on how the adolescents in our sample perceived the appearance of their teeth. Influence of peers: Although less obvious than that of parents, the influence of peers on the perception of the dental appearance of the adolescents in our sample was also noticeable, with a mean score of 2.40. The adolescents could be influenced by the beauty standards and aesthetic judgments of their peers. Impact of the mass media: Contrary to what one might think, the impact of the mass media on participants' perception of their dental appearance seemed to be less marked, with a score of 1.94. This could indicate that other social influences would be of greater importance to adolescents in this specific context.

In a study by Wilson., *et al*. 1995, who first introduced and highlighted socio-cultural factors to understand OHRQoL [13], and then proposed different theoretical models for OHRQoL [14,15], which integrated both clinical data and psychosocial factors. Then, a detailed framework involving environmental factors, socio-cultural factors, and psychological factor to understand OHRQoL was established in adults by Gupta., *et al*. 2015 which evaluated and highlighted the impact of socio-cultural changes and psychological factors and their impacts on OHRQoL [16]. Based on this work, a structural equation model was produced with the aim of linking these models to orthodontic-specific OHRQoL in adolescent patients [17,18]. The results of these studies are in agreement with the results of our study and presented a perspectival order, with parents-peers and mass media in last place. This gradation could be interpreted by the fact that adolescents of this age are in more direct contact with their parents [17,18].

Concerning social pressure and comparison with others: adolescents who felt greater pressure regarding the appearance of their teeth tended to compare themselves socially with their peers. More specifically, adolescents who felt greater pressure from their parents and peers regarding the appearance of their teeth were more likely to compare themselves socially on the state of their teeth, which translated into a less favorable OHRQoL. Therefore, parents of adolescents should avoid making negative comments about their children's dental appearance [19].

Indeed, social reinforcement from parents, peers and the mass media has been identified as a key process in shaping adolescents' maladaptive attitudes, emotions and behaviors in the area of appearance and body image [20]. Appearance-related pressures from peers and parents (such as teasing, exclusion, negative comments and ignoring) have been shown to have negative effects on adolescents [22].

This study revealed the role of social reinforcement of dental aesthetics and social comparison of dental appearance in predicting psychological aspects of quality of life in adolescent orthodontic patients. Adolescent patients, as early as middle school, are already confronted with messages about how their teeth should look, partly through social comparison, during which they compare themselves with friends or models in the mass media to assess whether they meet standards of attractiveness and appearance. Our results provided preliminary evidence to support the hypothesis that social reinforcement of an attractive dental appearance in the immediate environment, in association with comparison of dental appearance, could have a negative impact on the psychosocial dimension of oral health-related quality of life. In addition, social reinforcement has also been found to interact with individual biological conditions (such as body mass index) and psychological characteristics (such as low self-esteem and social comparison of appearance) to promote body image disorders or eating disorders [22]. However, few studies have examined the effects of social reinforcement on orthodontic-related quality of life.

As a result of this study, future investigations are needed to determine whether positive feedback and social support from parents and peers could mitigate the negative impact of poor oral health, thereby reducing adolescents' dissatisfaction or worry about the appearance of their teeth, thus providing positive effects on the psychosocial impact of dental aesthetics. As it would be useful to test whether social reinforcement predicts a change in OHRQoL in a population whose need for orthodontic treatment has not been met [23]. This prospective design allows us to detect the causal relationship between sociocultural predictors and OHRQoL outcome.

A previous study showed that most adolescents in Morocco who seek orthodontic treatment do so to improve their facial appearance [24]. However, orthodontic treatment is not free in Morocco, and the absence or delay of orthodontic treatment is mainly due to family socioeconomic status [24]. Thus, the development of corresponding public policies, such as the generalised social coverage system, would provide more opportunities for adolescents with malocclusions to receive orthodontic treatment, thereby improving their OHRQoL, which is mainly affected by malocclusions [24].

Although this study only measured reinforcement from parents, peers and the mass media, the influence of clinicians' attitudes during orthodontic treatment could also be considered. Clinicians could pay particular attention to the psychological aspects of adolescent patients and avoid negative social reinforcement regarding dental appearance, thereby contributing to improved OHRQoL [25].

Conclusion

This study, attempted to shed valuable light on the impact of sociocultural and psychological factors on OHRQoL in adolescents undergoing orthodontic treatment, namely:

1. The significant influence of social reinforcement from parents, peers and the media on the perception of dental appearance and, by extension, on OHRQoL.
2. The vital importance of parental communication and support in the adolescent orthodontic process. Their understanding and benevolence towards their children's dental appearance are key factors in encouraging psychosocial development and a better perception of their oral health.
3. Social interaction between peers plays a significant role in the development of self-esteem and body image in adolescents undergoing orthodontic treatment.
4. This research makes an essential contribution to understanding the multiple dimensions influencing oral health-related quality of life in adolescents undergoing orthodontic treatment. It paves the way for more holistic and individualised approaches, focusing on psychosocial well-being and patient satisfaction, beyond the purely clinical aspect of orthodontics.

To sum up, this study emphasizes the necessity of enacting knowledgeable public policies in our nation to make it easier for teenagers to receive orthodontic treatment that is customized to meet their specific needs.

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