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The modulating effect of culture on the expression of dental anxiety in children: a literature review

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Summary. The experience of anxiety is a universal human phenomenon. Studies have shown a world-wide variation in the prevalence of dental anxiety with estimates ranging between 3% and 43%. The aetiology of dental anxiety is multifactorial, with factors acting in synergy to affect its expression. For children, age and gender play fundamental roles in its expression. However, these two factors are modulated by other variables such as culture which may influence the context in which anxiety is experienced, the interpretation of its meaning and responses to it. The modulating effect of culture in synergy with other variables may be one of the reasons why reports on dental anxiety have varied from region to region. This paper attempts to identify the interrelating roles of culture, age and gender, and how these relationships may affect variability in the expression and measurement of dental anxiety in children.

Introduction

Dental anxiety is defined as a feeling of apprehension about dental treatment that is not necessarily connected to a specific external stimulus. Its presence has been recorded in early childhood, and in different countries and amongst varying ethnic groups. World-wide studies have shown that between 3% and 43% of children exhibit dental anxiety [1–5]. Bedi *et al*. [6] reported a prevalence of 7·1% in the UK. In the USA, Morgan *et al*. [7] reported a prevalence of 6%, and Gatchel [8] reported a prevalence of 9–10·5% in two different school populations. Milgrom *et al*. [9] reported a prevalence of 21·4% in Canada, while 11·5% was reported in Singapore [10] and 43·4% in China [11]. It appears that the only study that has described the prevalence of dental anxiety in African children was the one by Sote and Sote [12,13]. These authors reported a prevalence of 29·8% for dental anxiety amongst urban Nigerian children. The considerable variation in reported prevalence could be caused partly by differences in methodologies. It may also be partly a reflection of the complex network and interplay of characteristics and variables affecting anxiety, which may be influenced by concomitant environmental factors, one of which is culture.

Culture may be defined as a system of shared beliefs, values, customs, behaviours and artefacts that members of society use to cope with their world. It is a shared system of attitudes and feelings. Because its effects are wide-ranging, it would seem likely that the modulating effect of culture, in synergy with other variables, contributes to the variation seen in reports of dental anxiety between regions.

One study pointing to the role of culture in the aetiology of dental anxiety is that reported by Weisenberg *et al*. [14]. This cross-cultural study was carried out amongst three ethnic groups in the USA. The results showed that the incidence of dental anxiety was highest amongst Puerto Rican immigrants, followed by Caucasians and was lowest amongst blacks. The importance of the effect of culture on dental anxiety in children was further corroborated by Ingman *et al*. [15]. Their study showed that, even within the same region, Christian children reported

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more fears than Muslims. This result may be related to the effect of Islamic culture since Muslim children are particularly encouraged to be braver in the face of anxieties.

That there is a modulating effect of culture on the complex network of aetiological factors is possible because the response to felt/trait anxiety depends to a large extent on processes of cognitive appraisal and coping mechanisms developed by the individual. Culture will also influence the context in which anxiety is experienced, as well as the interpretation of its meaning and the responses to it [16]: it gives a subtle, variable twist to a simple universal phenomenon, trait anxiety related to the individual, giving rise to a state of anxiety that is expressed with relative similarity in people with similar cultures.

This review attempts to identify the interrelating role of culture with age and gender in the variability of dental anxiety measures in children reported in the literature.

Interrelationship between culture and age, and the effect on dental anxiety in children

Findings with regard to dental anxiety in relation to age have been consistent in most studies, showing a strong correlation between child dental anxiety and age [17–19]. Holst and Crossner [20], and Klingberg *et al*. [21] were able to establish that dental anxiety was more pronounced in younger children (4–6 years) compared to older children (9–11 years). Corkey and Freeman [19] also reported that dental anxiety begins to decrease by 6–7 years, with most children being able to cope with dental situations by that age.

However, this age-related expression of dental anxiety is dependent on the psychological development of the child and not necessarily on chronological age. This psychological development significantly affects the cognitive aspect of the child's development. Usually, the child is in the pre-operative period of the stage of representative intelligence between the ages of 2 and 4 years. At this stage, the child can only focus on one perceptual dimension and finds comprehending the whole ramification of an issue to be difficult. For example, a child who was once hurt by a needle prick would find it difficult to comprehend that the dental needle is different and that the method of application may not cause any hurt. At this stage of mental development, perceptual illusions are believed to predominate over logical reasoning [22].

As the child gradually moves to the concrete operational stage at a later age, logical reasoning commences. Only then can one logically reason with the child in the dental chair with any hope of gaining cooperation. Before this, a child may be termed pre-cooperative [22].

At a later age, children move into the stage of formal operation. At this stage of cognitive development, the child is able to consider possibilities and hypotheses. They may work out all the possibilities (combinational operations), and use a scientific or experimental approach (holding all factors constant except one) [23]. Thus, anxiety becomes more based on reality [24]. These developmental changes may help to explain why the incidence of dental anxiety decreases with age.

In spite of the universal phenomenon of cognitive development of the child, culture, in the same way as education and language, may affect the age at which the differing stages are reached [25]. In general, cognitive development occurs much earlier in people with formal schooling and those who participate in a technological culture [25]. Culture also affects education and language, just as it affects the details of conceptualization [25].

In pre-cooperative children however, culture does not play a significant role in the development of dental anxiety since all children act the same in younger age groups. By the stage of representative intelligence, however, cultural influences start to become apparent and appear to become highly visible by the stage of formal operation. This is because culture, through cultural beliefs and values, directly affects the cognitive schemas which interpret events as threatening, and which specify appropriate coping or avoidance responses [26]. As the cognitive sphere becomes more developed, so also does the influence of culture upon it.

Unlike most Euro-American-based studies, however, at least one study carried out in Nigeria [27] failed to find any statistically significant relationship between age and dental anxiety. This was attributed to the homogeneity of the age group studied. The participants were all older than the transition age of 6–7 years, an age when dental anxiety in children is expected to start decreasing. However, studies of anxiety in Nigerian children aged 7–16 years, and in Nigerian and Kenyan children by Ollendick *et al*. [28] and Ingman *et al*. [15], respectively, also found no age differences in self-reported anxiety levels. This is in contrast to findings in children from

America, Australia and China. A third and earlier study in Nigeria [12] had also shown that, except in the case of pre-cooperative children, chronological age did not seem to influence dental anxiety and could not be used as a predictor to cooperative behaviour in children.

Although cultural differences in the regions of study may be inferred to be a reason for differences seen in the relationship between age and dental anxiety, more complex factorial analysis using the same culturally relevant instruments may be needed for more rigorous deductions to be made.

Interrelationship between culture and gender, and the effect on dental anxiety in children

Findings with regard to the effect of gender on dental anxiety appear even more varied than do those related to age. A large number of Euro-American-based studies have reported a higher prevalence of dental anxiety in girls than in boys [5,7,19,29–31], while a few others have reported no difference [2,8]. However, the few studies carried out in African countries consistently demonstrate no gender differences in the expression of dental anxiety [12,27,32]. This second sharp contrast of findings between Africa and other regions may at least be partly a consequence of the fact that African children show sex segregation in peer groups at a later age than do Euro-American children [33]. However, the sexual differences noted in Euro-American-based studies may be artefacts of variation in self-disclosure patterns between boys and girls which may have a basis in cultural development [34].

As in the case of variation with age, a cross-cultural factorial analysis on gender differences in dental anxiety expression may be of value to allow a better comparison and rationalization of findings.

Culture and assessment of dental anxiety in children

Both dental anxiety and general anxiety are multidimensional constructs consisting of behavioural, cognitive and physiological components. Frequently, the clinical diagnosis of dental anxiety is made solely on the basis of observations and ratings of behaviour [35–37], thereby assessing only one component of a multidimensional construct.

Unfortunately, it may be difficult to make a clinical diagnosis of dental anxiety in children who have developed coping mechanisms when only behavioural ratings scales are used. Just as culture plays a significant role in the cognitive development and expression of anxiety in the child, so it also affects both behaviour and symptoms related to anxiety [38]. It may contribute to variability in interpretation and style of response to stimuli which provoke anxiety. This may be a result of the differing levels of dissimulation in different cultures [16]. A number of cross-cultural studies have found substantial differences in the symptomatology of anxiety [15]. Inaccuracy in recording dental anxiety may be increased when scales developed for Euro-American children (and based solely on observed behaviour) are used in Africa because of the differences in culture: African cultures may stress obedience, self-control and emotional restraint, differing from Euro-American countries, which may encourage greater externalization of feelings.

Behaviour ratings are subjective modalities of measuring dental anxiety, and therefore, there is also the possibility of culturally based observer bias. This is because every culture may have its own way of interpreting organized symptoms [15], leading to the possibility of cross-cultural differences and inaccuracies in assessment of anxiety levels for given behaviours.

Most cross-cultural clinical and epidemiological studies of dental anxiety have not used culturally adapted questionnaires which tap into culture-specific signs and symptoms. As a result, comparisons are limited since clinical assessment of anxiety must consider the range of culturally prevalent symptoms. There is a need to develop culturally relevant behavioural scales which use symptoms to assess dental anxiety.

Dentistry has taken account of patient comfort for longer than many other health sciences, partly because many patients first present to a dentist with pain and symptoms. There is now an emerging literature on cultural issues and how these relate to oral health, including some studies focusing on paediatric dentistry [39]. Whilst there is a vast amount of information on how gender and age affect dental anxiety in children, there is as yet little about the effect of culture. Studies of dental anxiety have been carried out in countries with widely differing cultures. These differences seem likely to have contributed to the regional variations noticed in the expression of dental anxiety in children of different ages and gender, and its symptomatology. However, the results of

this review suggest that there is little firm evidence to support this hypothesis. More cross-cultural studies need to be done using culturally sensitive instruments which take account of cultural variability in cognitive development, and behavioural expressions of dental anxiety and its measurement.

Measurements of more universal phenomena such as heart rate, pulse rate, skin conduction, muscle tension, blood pressure, palmar sweating and decreased salivary secretion may be of particular value. However, the use of these tests has been limited because they often require special equipment that may be perceived as threatening and, in turn, affect the result. Despite this, these tests currently appear to be the most objective means of measuring dental anxiety in effective cross-cultural studies.

Résumé. L'expérience de l'anxiété est un phénomène humain universel. L'anxiété dentaire peut également être partagée. Des études ont montré des variations selon les populations sur la prévalence de l'anxiété dentaire avec des évaluation allant de 3 à 43%. L'étiologie de la peur dentaire est multifactorielle avec des facteurs agissant en synergie sur l'expression. Concernant les enfants, l'âge et le genre jouent des rôles fondamentaux dans son expression. Ces deux facteurs sont cependant modulés par d'autres variables telles la culture qui peut influencer le contexte dans lequel s'exprime l'angoisse dentaire, l'interprétation de sa signification et les réponses apportées. L'effet modulateur de la culture, en synergie avec d'autres variables, peut être l'une des raisons pour lesquelles les rapports sur l'anxiété dentaire ont varié de région à région. Cet article a pour objectif d'identifier les rôles en interrelation de la culture, de l'âge et du genre et comment ces relations peuvent affecter la variabilité de l'expression et la mesure de l'anxiété dentaire chez l'enfant.

Zussamenfassung. Das Erfahren von Angst ist ein universelles menschliches Phänomen. Auch Zahnbehandlungsangst kann häufig sein. Studien haben weltweit Prävalenzzahlen zwischen 3% und 43% berichtet. Die Entstehung der Zahnbehandlungsangst ist multifaktoriell mit Faktoren, welche synerg mit ihrer Expression sind. Für Kinder spielen Alter und Geschlecht eine fundamentale Rolle für die Ausprägung. Diese beiden Faktoren werden jedoch von weiteren Variablen beeinflusst, wie etwa kulturellen Einflüssen, die den Kontext der Angsterfahrung, ihrer Interpretation und des Umgangs damit bestimmen. Kulturelle Einflüsse könnten ein Grund für die regional unterschiedliche Prävalenzzahlen von Zahnbehandlungsangst sein. In dieser Arbeit wird versucht, unterschiedliche gegenseitige Beeinflussung von Kultur, Alter und Geschlecht zu identifizieren, und wie sich der Ausdruck und die Erfassung der Zahnbehandlungsangst bei Kindern verändern.

Resumen. La experiencia de la ansiedad es un fenómeno humano universal. La ansiedad dental puede ser también común. Estudios han mostrado variaciones a nivel mundial en cuanto a la prevalencia de ansiedad dental con porcentajes estimados entre el 3% y el 43%. La etiología de la ansiedad dental es multifactorial con factores que actúan en sinergia para afectar a su expresión. Para los niños, la edad y el género juegan papeles fundamentales en su expresión. Estos dos factores son sin embargo modulados por otras variables tales como la cultura que puede influir en el contexto en el que se experimenta la ansiedad, la interpretación de su significado y sus respuestas. El efecto modulador de la cultura en sinergia con otras variables puede ser una de las razones por la que los informes en ansiedad dental han variado de región en región. Este trabajo intenta identificar la interrelación de los papeles de la cultura, la edad y el género y cómo estas relaciones pueden afectar a la variabilidad de la expresión y medición de la ansiedad dental en los niños.

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