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Influencing factors of paediatric dental anxiety levels in an undergraduate dental clinic

ABSTRACT

Aim To examine the nature of dental anxiety in paediatric patients, and to identify factors relevant to paediatric dental anxiety in a sample of 5 to 17 year-old children residing in Cairns, Australia.

Materials and methods A convenient sample of 125 children, their parents and corresponding student practitioners were selected. Each was assessed with questionnaires.

Results A higher level of dental anxiety was seen in children who were subject to radiographic examination as part of their treatment ($b=0.462$; $p=0.012$). Similarly, children of Asian ethnicity showed higher dental anxiety levels than their Caucasian counterparts ($b=1.187$; $p=0.010$). Finally, the children's overall dental anxiety levels decreased after being treated by student practitioners ($t=2.311$; $df=124$; $p=0.022$).

Conclusion Children experienced greater anxiety before receiving dental treatment than after. Treatment involving radiographic examination exacerbated dental anxiety and children of Asian descent were more anxious prior to receiving treatment. Further investigation is indicated.

Keywords Dental anxiety; Paediatric patient; Radiographic examination; Student practitioner; Undergraduate clinic.

Introduction

Dental anxiety is an issue inherently encountered by dentists when treating paediatric patients, characterised as children of ages 5 to 17 years [Porritt et al., 2013]. The term dental anxiety is used to describe the sense of apprehension experienced by a patient when preparing oneself to receive dental treatment in anticipation of a negative experience [Klinberg, 2008; Porritt et al., 2012]. Research into this field of dentistry has found evidence that links paediatric dental anxiety and socioeconomic status as well as geographical location [Townend et al., 2000; Klinberg, 2008]. Gender, toothache and past history of negative dental experiences have also been implicated in contributing to dental anxiety [Ramos-Jorge et al., 2012].

A previous study has reported that the prevalence of dental anxiety in those 18 years or younger was approximately 9% [Ramos-Jorge et al., 2012] and it was higher among younger age groups [Peretz et al., 2004; Klinberg & Anders, 2007]. This inferred that the younger the patient, the more crucial it is to deliver dental care that is approachable, sensitive and tailored specifically so as to minimise dental anxiety.

Dental anxiety has been seen to impede the efficacy of dental practice, as it is often the underlying cause of disruptive behaviour in patients in the dental setting, exerting a negative impact on the attitude of dentists and effectiveness of executing treatment plans [Townend et al., 2000]. Analysing the anxiety experienced by children and the factors that instigate or influence this will better equip dental health professionals to operate through a means that inflict minimal fear in paediatric patients and thus, enhance the quality of care delivered [Peretz et al., 2004]. Dental anxiety is not only distressing for children and their parents, but also associated with poor oral health outcomes in addition to expensive dental specialist care [Peretz et al., 2004; Porritt et al., 2012; Ramos-Jorge et al., 2012]. The effects of dental anxiety in childhood have been shown in numerous studies to persist through to adulthood, exacerbating the state of poor oral health [Aartman et al., 1996; Buchanan & Niven, 2002]. In order to optimise the quality of care delivered by dental practitioners, it is essential to understand the psyche behind this dental anxiety.

An abundance of studies have previously been conducted examining dental anxiety in paediatric patients [Townend et al., 2000; Klinberg, 2008; Porritt et al., 2012; Porritt et al., 2013]. However, to the best of our understanding no past study has reported the issue in far north Queensland. Therefore, this study aimed to examine the nature of dental anxiety in paediatric patients, and to identify factors relevant to paediatric dental anxiety in a sample of 5 to 17 year-old children residing in Cairns (Australia).

Materials and methods

Prior to commencement, appropriate ethic approval has

been obtained from the James Cook University (JCU) Human Research Ethics Committee (Reference ID: H5092). From 1st of July to 30th of September 2013, all 5 to 17 year old patients attending JCU dental clinic, their accompanying guardians and corresponding student practitioners were invited to participate. After receiving informed consent from each participant, children, parents and student practitioners were assessed with Questionnaire One, Two and Three, respectively.

Questionnaire One involved a self-evaluation of anxiety levels prior to and following treatment, using a Facial Image Scale (FIS) [Townend et al., 2000]. The FIS was employed as a means of assessing levels of paediatric dental anxiety experienced by the child [Townend et al., 2000]. It comprises five images of facial expressions, the most anxious face being assigned a dental anxiety score (DAS) of 1 and the least anxious face assigned a DAS of 5.

Questionnaire Two was used to collect data regarding children's age, gender, ethnicity, level of schooling, number of siblings, and previous dental experience and a parent-assessment of the child's anxiety level to dental treatment with the FIS system above. Questionnaire Three was applied to collect data of student practitioners' age, gender, year of dental study, whether they were a parent or had previous experience as a dental patient. Type of treatment performed (using the Australian Dental Association codes) in the appointment and the child's post-anxiety level with the FIS system were also assessed by Questionnaire Three.

Data entry and statistical analysis were implemented with the IBM SPSS Statistics (version 21.0, IBM Corporation, Somers, NY, USA). Data analysis included descriptive statistics (frequency distribution). A paired samples t-test was applied to assess the difference between pre-treatment and post-treatment anxiety levels. In addition, a linear regression model was used to examine the relationship between the dependent variable (anxiety level) and independent variables including child's age, gender, number of siblings, level of schooling, previous dental experience, student's age, gender, year of dentistry, whether they were a parent or not and whether they had previous experience as a dental patient or not. The level of two-sided significance was set at 5%.

Results

The number of participants obtained through the course of the three-month period was 127. Two participants were excluded due to incomplete information, resulting in a response rate of 98.4% (n = 125). The mean age recorded was 9.64 (95% CI: 9.1, 10.2). Ninety-five (76%) of the paediatric patients selected were 6-to-11years old and 30 (24%) were

adolescents aged between 12 and 17 years. The number of males (62; 49.6%) was similar to that of females (63; 50.4%) in this sample. Of the participating children, 117 (93.6%; 95% CI: 89.6%;97.6%) were Caucasian (originating from Australia, UK, New Zealand and Spain) and 8 (6.4% ; 95% CI: 2.4%; 10.4%) were of Asian descent (originating from China, Philippines and Thailand).

The mean DAS was 3.9 ± 0.1 and 4.1 ± 1.1 before and after the dental management, respectively ($t = 2.311$; $df = 124$; $p = 0.022$). Significance was established ($b = 1.187$; $p = 0.010$) when comparing Caucasian children with Asian children in their DAS pre and post-treatment (Fig. 1). Children of Asian descent 8 (6.4%) had a mean DAS of 3.00 ± 1.309 and 4.38 ± 1.261 pre and post-treatment, respectively. Alternately, the 117 (93.6%) Caucasian children had a mean DAS of 3.91 ± 0.938 before treatment and 4.09 ± 1.304 after treatment.

The use of radiographic examination in treatment showed significance ($b = 0.462$; $p = 0.012$) before and after treatment (Fig. 2). Radiographic examination includes the taking of periapical radiographs, bitewings and orthopantomograms. Sixty-six (52.8%) of the

The Effect of Ethnicity on Anxiety, Before and After Treatment

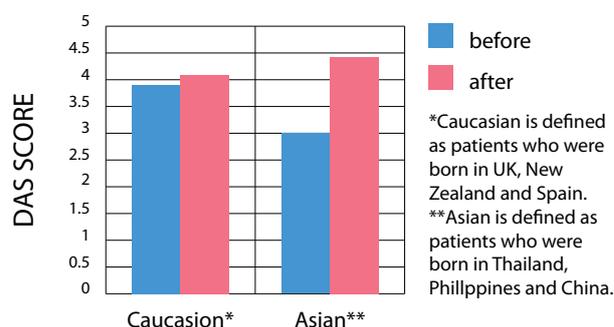


FIG. 1 A comparison of anxiety before and after treatment between Asian and Caucasian paediatric patients.

The Effect of X ray on Anxiety, Before and After Treatment

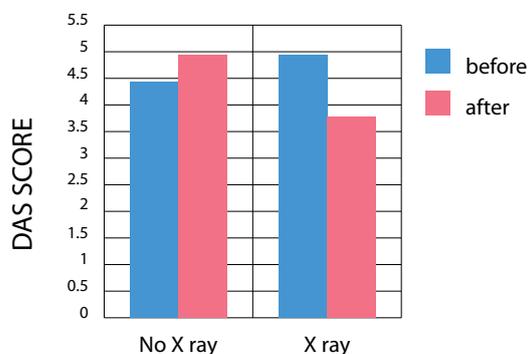


FIG. 2 A comparison of before-and-after-treatment DAS between treatment involving radiographic examination and treatment absent of radiographic examination.

children in this study were subject to radiographic examination exhibiting DAS prior to treatment (mean = 3.87 ± 1.152) and following treatment (mean = 3.79 ± 1.203). Fifty-nine (47.2%) children were not exposed to x-rays generated DAS before treatment (mean = 4.36 ± 0.961) and after treatment (mean = 4.91 ± 0.995).

Factors such as age of patient, gender, number of siblings, level of schooling and previous dental experience had no impact on dental anxiety prior to treatment ($p \geq 0.086$). The guardian's self-assessment of dental anxiety had no bearings on the anxiety of the child before treatment ($p = 0.166$).

The student practitioners' gender, age, level of dentistry schooling, whether or not they had previous dental treatment, whether or not they were a parent all showed no correlation with the child's anxiety after treatment ($p \geq 0.400$).

The type of treatment such as examination, x-rays, restorative procedures, extractions had no significant impact in the child's change of anxiety when comparing anxiety levels before and after ($p \geq 0.080$).

Discussion

The findings acquired through the completion of this study do support the validity of the FIS and its efficacy as a means to measure dental anxiety in children in a clinical setting [Townend et al., 2000]. Given that the issue of anxiety in the practice of dentistry is a prominent theme particularly in treating children, it is essential that the dentist is able to identify, measure and evaluate the degree of anxiety using a method that is reliable and accurate. The FIS provides this and this study provides evidence of its validity [Townend et al., 2000].

Review of literature indicates a shortage of studies conducted regarding influencing factors of paediatric dental anxiety in North Queensland. Due to limitation of sample size attributed to time constraints, comparison of our results with the other studies in relation to paediatric anxiety was challenging. Additionally, as the study was completed with a small sample size, the results obtained were broad and little significance in influencing factors could be identified.

In general, higher dental anxiety was recorded before treatment and conversely, after treatment dental anxiety had decreased significantly. This study demonstrated a significant association between these two variables which may be attributed to pain removal, comforting demeanor of the student practitioner or effective behaviour management [Klinberg, 2008; Porritt et al., 2012].

It was also found that ethnicity exerted an impact on paediatric dental anxiety. Children of Asian descent exhibited an overall greater degree of anxiety recorded pre and post-treatment when compared to their

Caucasian counterparts. Parallels with this finding can be drawn with previous studies that similarly, found that children of Asian descent exhibited greater dental anxiety than other nationalities [Riggs et al., 2013]. It has been discerned that migrants experience increased levels of dental anxiety and some studies have found the highest prevalence of dental anxiety is demonstrated in immigrants [Riggs et al., 2013]. This is due to the fact that culture exerts a direct impact on the cognitive development and the way in which children express anxiety [Doebling & Rowe, 2000; Folayan et al., 2004; Armfield et al., 2006; Hilton et al., 2007; Riggs et al., 2013]. Cultural beliefs and values play a significant role on the cognitive schemas which perceive events as threatening and may contribute to the variation in interpretation and type of response to stimuli which incites anxiety [Riggs et al., 2013]. Culture also has bearings on the context in which anxiety is felt, giving rise to types and degrees of anxiety expressed with relative similarities in individuals within the same or similar culture [Doebling & Rowe, 2000; Armfield et al., 2006; Hilton et al., 2007].

The process of taking radiographs was found to be correlated with higher levels of dental anxiety. Children that had radiographs taken as part of their treatment received at JCU dental clinic, recorded higher levels of anxiety prior to treatment. The correlation between radiographic examination and increased dental anxiety is underscored in numerous other studies that likewise, found that taking dental x-rays as part of treatment has a positive association with dental phobia [John, 2013]. Another study found that dental x-rays were one of the most negatively rated procedures in dental treatment, second to injections [Cuthbert & Melamed, 1994]. It is possible that the negative stimulus that x-rays embody may be attributed to the discomfort caused by the placement of film in the mouth and the associated apparatus involved in taking an x-ray [John, 2013]. In order to acquire an accurate diagnostic image, the placement of x-ray films and apparatus must be positioned in specific regions of the mouth and may cause unpleasant sensations such as gagging and impingement on tissues and the palate. Notably, children have smaller mouths, so radiographic imaging devices which are usually of standard size and shape are often more difficult to place without causing discomfort or pain [John, 2013]. Moreover, patient fear concerning the exposure to radiation generated by taking of an x-ray can also contribute to the negative perceptions and fear associated with this procedure.

In the study conducted, there was no significant difference found in the before and after anxiety assessment between girls and boys. Correspondingly, previous research into this subject matter postulates that there is no significance difference in anxiety pre and post-treatment between either genders [Assunção et al., 2013].

Number of siblings did not appear to impact the mean DAS of children. Factors such as parents' age, education or location of birth were not correlated to DAS pre and post-treatment of neither parent nor child. Other factors such as students' seniority, previous dental experience and the child's guardian attitude towards dental treatment did not appear to significantly affect DAS [Krikken & Veerkamp, 2012].

Conclusion

The present study successfully identified some of the influencing factors that affect paediatric dental anxiety. Generally, the results indicated that children were more anxious before receiving dental treatment than after. It was found that inclusion of dental x-rays in treatment increases anxiety levels, most likely due to the uncomfortable nature of the procedure and possible apprehension associated with radiation exposure. Culture also affects perception and experience of dental anxiety, with results indicating that children of Asian origin sense greater degrees of anxiety prior to treatment. Elements such as age, gender, number of siblings, previous dental experience and guardian's attitude towards dental treatment were not of significance with respect to dental anxiety.

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