ANXIETY AND PERSONALITY CHARACTERISTICS IN CHILDREN UNDERGOING DENTAL INTERVENTIONS

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Abstract
Anxiety about and fear of dental treatment have been recognized as sources of problems in the management of child dental patients. It has been suggested that some individuals who are fearful of or anxious about dental treatment have a constitutional vulnerability to anxiety disorders as is evidenced by the presence of multiple fears, generalized anxiety or panic disorders. Concerning the child population, maternal anxiety is considered to be a major factor affecting the behaviour of young children expecting dental intervention. The aim of the study was to measure general anxiety of children undergoing dental intervention and to compare it with some personality characteristics, such as psychopathology, extroversion and neuroticism. The evaluated sample comprises 50 children (31 girls and 19 boys), randomly selected at the University Dental Hospital, Skopje. The mean age for girls was 11.4 (± 2.4) years, and for boys 10.7 (± 2.6) years. Two psychometric instruments were used: the General Anxiety Scale for Children (GASC) and the Eysenck Personality Questionnaire (EPQ). The study confirms the presence of a high anxiety level (evaluated with GASC) among all children undergoing dental intervention. It also confirmed differences in anxiety scores between girls and boys, girls having higher scores for anxiety. Personality characteristics (evaluated with EPQ) showed low psychopathological traits, moderate extroversion and neuroticism, but accentuated insincerity (evaluated with L scale). L scales are lower with increasing age, but P scores rise with age, which could be related to puberty. No correlation was found between personality traits (obtained scores for EPQ) and anxiety except for neuroticism, which is positively correlated with the level of anxiety. In the management of dental anxiety some response measures (psychological support, biofeedback, and relaxation techniques) are recommended.

Key words: anxiety, dental intervention, personality characteristics, children.

Introduction
The term "stress" differs according to the context where it is used (physics, linguistics, etc). In psychology and medicine it means unpleasant feelings, tension, and the awareness of the person wanting to do something about the actual situation or state (Sarason 1981). The concept of stress is often used ubiquitously in research literature to refer to either acute or chronic strains. Generally, stress is related to different stimuli which need some responses on the part of the individual. Hans Sally described
General Adaptation Syndrome (GAS) as a common bodily reaction to stress (Sally, 1956). Calls for action differ according the relevance of the cognitive tasks selected as a challenge or threat. It is difficult to separate stress from the actual anxiety state which could be an immediate response to the stress.

Anxiety is an emotion that is distressing. Sometimes it may have no specific cause, unlike fear the cause of which can be seen and dealt with by fighting or running away. Anxiety is related to personal salience as a product of personality variables that shapes the perception of "self" and the other world. Anxiety produces the same physiological responses as fear (an increase in sympathetic activity in the ANS) but this level may be maintained for some time if the individual cannot find a way of removing the source of anxiety. The feeling of anxiety is frequently generalized from one situation or stimulus to another. Anxious people describe themselves as being tense, having some feeling that something terrible will happen. Anxiety is a combination of perceived physiological overarousal, feelings of worry and dread, self-depreciating thoughts, tension, and somatic symptoms that occur during different situations. It is a physiological condition in which people experience discomfort especially during and/or before stressful situations. Some level of anxiety is normal and often helpful to stay mentally and physically alert. It corresponds to "healthy stress" or eustress, as described by Sally. When one experiences too much anxiety, however, it can result in emotional or physical distress, difficulty concentrating and emotional worry which negatively influence the behavior. Responses consist of increased heart rate, stress hormone secretion, restlessness, vigilance, and fear of a potentially dangerous environment. Generally, anxiety prepares the body physically, cognitively, and behaviourally to detect and deal with threats to survival. As a result, a person's body begins to hyperventilate to allow more oxygen to enter the bloodstream, divert blood to muscles, and sweat to cool the skin. We can generalize that the body is at the same time the medium of experience and the instrument of action. Through its actions we shape and organize our experiences and distinguish our perceptions of the outside world from sensations that arise within the body itself.

Some physiological measures, such as polygraph recordings of heart rate, hand temperature, skin response, or brain wave pattern can be used for evaluating the state of anxiety or stress, but the practical usefulness of these procedures is limited because measurements, per se, can evoke an increase of the anxiety which complicates the obtained results. The most consistently employed measurements are rating scales determined by the subject or by an observer. The degree to which an anxiety response is developed is based on the probability of bad things happening in the environment and the individual's ability to cope with them.

There is a difference between generalized anxiety disorders (GAD) and state-anxiety. GAD is characterized by anxiety which results in a person experiencing high levels of stress across a wide range of situations. In contrast, people with state anxiety are anxious due to high levels of nervousness specific to the concrete situation (e.g. dental intervention).

Practically all dental interventions are stressful and are usually followed by accentuated anxiety, especially in childhood. It has been suggested that some individuals who are fearful of or anxious about dental treatment have a constitutional vulnerability to anxiety disorders as evidenced by the presence of multiple fears, generalized anxiety or panic disorders. Concerning the child population, maternal anxiety is considered to be a major factor affecting the behaviour of young children expecting dental intervention (Johnson, 1968).

When treating an anxious child, it is important for the dentist to understand the reason for the child's nervousness. Some research has identified several factors which may have effects on dental anxiety, the most frequent being a painful or unpleasant dental experience, contact with other persons who have had previous unpleasant dental experiences or fantasy about dental situations. However, one of the most important factors in explaining children's dental anxiety is their level of general anxiety.

In their everyday activities dentists must consider not only the total physical condition of their patients but also their psychological and emotional states. Dental anxiety and fear of dental treatment has been recognized as a source of problems in the management of child dental patients.
The aim of the study was to measure the general anxiety of children as well as to compare it with some personality characteristics measured by the Eysenck Personality Questionnaire, such as psychopathology, extroversion and neuroticism.

**Subjects and method**

The study comprised evaluation of 50 children randomly selected prior to dental intervention. As psychological tests we used Sarason’s General Anxiety Scale (GASC) [22, 23] and the Eysenck Personality Questionnaire (EPQ) [8].

Obtained results were statistically evaluated by the Window Statistics Package 7. We calculated distributive statistics, correlations and the ANOVA test.

The Eysenck Personality Questionnaire (EPQ) is a self-report instrument that is based on Eysenck’s theory of personality. The EPQ was developed by Hans J. Eysenck, one of the most influential personality theorists, and Sybil B. G. Eysenck, and is part of a group of scales developed by Eysenck and his colleagues. The first published scale in this line of work was the Maudsley Personality Inventory (MPI; H. J. Eysenck & Knapp, 1962), which measured two personality tendencies, neuroticism (N) and extraversion (E). Following the publication of the MPI, a lie scale was added and two alternate forms were devised, forming the Eysenck Personality Inventory (EPI; H. J. Eysenck & Eysenck, 1964). Subsequently, a third personality dimension, psychoticism (P), was added, creating the Eysenck Personality Questionnaire. The psychoticism subscale had undesirable psychometric properties and was criticized for having low reliability, a low range of scoring, and a skewed distribution. In response, in 1985 the scale was revised by removing certain items from the P scale and adding certain items to the P, N, and E scales. The revised measure, the EPQ-R, is the form of the questionnaire used currently (SBG. Eysenck, Eysenck, & Barrett, 1985) and is a prime measure of Eysenck's personality dimensions.

Obtained high E scores indicate extraversion, and individuals tend to be outgoing, impulsive, uninhibited, have many social contacts, and often take part in group activities. Typically, the extravert is highly social, likes gatherings, has many friends, needs to have people to talk to and dislikes solitary pursuits such as reading, studying, and contemplation. Instead, the typical extravert prefers excitement, likes to take chances, often acts on the spur of the moment, and is generally quite active. Such a person may be fond of practical jokes and usually has an answer to anything. From the neurological point of view, extroverts have under-arousal as a basic characteristic of brain activity.

By contrast, introvert tends to be quiet, retiring and studious. The typical introvert is reserved and distant except with intimate friends, tends to plan ahead and usually distrusts acting on impulse. Such persons prefer a well-arranged existence, keep their feelings well controlled, and are more passive than aggressive. Generally reliable although somewhat pessimistic, typical introverts seldom lose their temper and tend to place great value on ethical standards. Introverts have over-arousal as a basic brain activity.

High N scores indicate strong emotional lability and over activity. Persons with high scores tend to be emotionally over-responsive, and encounter difficulties in calming down. Such persons complain of vague somatic upsets, and report many worries, anxieties, and irritating emotional feelings. When under stress, they may develop neurotic disorders which fall short of actual neurotic collapses. High scores do not preclude such persons functioning adequately in the family and work situations.

Persons with high P scores are inclined towards being cruel, inhumane, socially indifferent, hostile, aggressive, and not considerate of danger; insular, glacial, and intolerant. They show a propensity towards making trouble for others, belittling, acting disruptively, and lacking in empathy. The physiological basis suggested by Eysenck for psychoticism is testosterone, with higher levels of psychoticism associated with higher levels of testosterone.

EPQ has an additional fourth scale, the lie (L) scale which is a measure of non-sincerity, when a person gives socially available answers to shows him/herself as adaptable and without conflicts. EPQ has proved useful for numerous applications in human resources, career counseling, clinical settings and research. Figure 1 shows the schematic picture of temperament-related personality traits as supposed by Eysenck.
The General Anxiety Scale for Children (GASC) is a 45 item yes/no scale for use with children in grades 1–9. It measures chronic, generalized anxiety. An obtained score of 12 or below ranks in the low anxiety range. A score of 12–20 ranks in the medium range. Any score above 20 signifies high anxiety. Scoring 15 or over is a good indication that a child experiences considerable discomfort about the situation in which s/he is.

Psychological tests in this study were applied prior to dental intervention. Usually, children were accompanied by their mothers and they gave prior consent for the study. In our previous studies we have had a very positive experience with both GASC and EPQ (Pop-Jordanova N, Zorcec T. 2009; 2010).

**Results**

The evaluated sample comprised 50 children (31 girls and 19 boys), randomly selected at the University Dental Hospital, Skopje. The mean age for girls was 11.4 (± 2.4) years, and for boys 10.7 (± 2.6) years. Ethnicity of the evaluated children is shown in Figure 2. The majority were Macedonian (64%), Albanian accounted for 28%, while Serbs were only 8%, which corresponds to the general ethnic distribution in our county.
Figure 3 shows the obtained scores for GASC. It is obvious that all the children evaluated showed an accentuated anxiety level (obtained scores over 20). However, girls showed higher scores for anxiety than boys.

ANOVA shows no significant difference between GASC scores depending the age (Fig. 4). There are some peaks at 12 and 13 years which are probably related to the onset of puberty.
In addition, statistics showed that there was no correlation found between age and obtained scores on GASC \((r = 0.017)\). However, we obtained a negative correlation between GASC scores and gender \((r = -0.28)\). As was mentioned before, girls have higher anxiety scores than boys.

![Figure 5 – ANOVA for Sarason score and gender](image)

Obtained scores for EPQ are shown in Figure 6. Generally, children have low psychopathological traits, moderate extroversion and neuroticism. Obtained scores for L scales are pretty high. There was no significant difference in obtained scores between girls and boys.

![Figure 6 – Obtained scores for EPQ](image)
Distribution of personality variables obtained by EPQ according to age is shown in Fig. 7. We calculated, in addition, a correlation between GASC scores and scores obtained for EPQ. There is no correlation between GASC scores and P scores ($r = 0.056$), E scores ($r = 0.03$) and L scores ($r = 0.002$), but there is a positive correlation between N scores and GASC ($r = 0.18$), which seems logical. Concerning P scores and age we obtained a positive correlation (Fig. 8) which means that psychopathological traits rise with the age.
Generally, this study showed accentuated anxiety among children expecting dental intervention; girls were more stressed than boys. There are no differences in personality characteristics between boys and girls. The children evaluated showed low psychopathological traits, moderate extroversion and neuroticism and accentuated non-sincerity in their answers. There was no correlation between personality traits and the level of anxiety, except for the neurotic tendencies.

Discussion

It is well known that the stress system is among the most important and highly preserved systems in the organism. It is located and functions in both the central nervous system (CNS) and the peripheral. Adequate responsiveness of the stress system to stressors is responsible for attaining homeostasis and achieving a sense of well-being. The adaptive or stress response depends not only on the intensity of the stressor but also on the inherent ability of the stress system to achieve and maintain an appropriate level and duration of activity. The stress response is influenced by both genetic and developmental factors. In humans the physiological responses to social pressures, information overload, and rapid cultural change resemble those that are produced during physical stress and/or danger and outright threats to survival.

During states of excitement or stress, the body releases adrenaline. Adrenaline is known to cause physical symptoms that accompany anxiety, such as increased heart rate, sweating, and rapid breathing. In many cases having a certain amount of adrenaline is a good thing. It is helpful when dealing with stressful situations, ensuring alertness and preparation. But for some people the symptoms are difficult or impossible to handle, making it impossible to focus. Anxiety reactions can be generalized from previous experiences to similar situations. Feelings of inadequacy, helplessness, and anticipations of punishment or loss of status and self-esteem are manifestations of anxiety responses.

The relationship between anxieties in dental settings is important for determining the nature of a child’s dental fear. Previous studies have revealed that dental anxiety may reflect more general anxiety, rather than fear learned in response to a specific situation.

Our study corresponds to some other similar studies concerning dental anxiety. Locker et al. (2001) in their study concluded that young patients having high rates of psychological disorder were characteristic of those with a high level of dental anxiety. They supposed that psychological disorder was related to the maintenance of dental anxiety over time. Sari et al. (2005) found that trait anxiety of parents and state anxiety for children who were about to start orthodontic treatment were both high. After one year of treatment, the anxiety scores for patients were found to be normal. Fan Xiaoping et al. (2005) find that dental anxiety in patients before orthodontic treatment is extensive, and many factors are closely related to the parent’s dental anxiety level. They suggested that it is necessary to provide patients with psychological therapy and nursing guidance before intervention.

In a study by Toledano et al. (1995) three psychological variables were determined: anxiety, personality and intelligence. They found no significant relationship between levels of dental anxiety and age; anxiety was higher among girls. In addition, they found that children with high intelligence quotients showed less dental anxiety at their first dental visit. Also, they found no relationship between the children’s anxiety and their own personality variable. The results obtained in our study completely correspond to the one mentioned.

An extensive Danish study (1995) investigated dental fear and behaviour management problems in the child population. The results showed that age, general emotional status and maternal dental anxiety were identified as concomitant factors in the development of dental fear. Experiences of pain during dental treatment increased the risk of developing dental fear and behavioural problems. In a Scottish study (1992) the prevalence of dental anxiety was found to be 7.1%; girls also had higher levels of anxiety than boys. They found an association between anxiety and lower social class level (defined by father’s occupation). Two factors were pointed out as useful predictors of high dental anxiety: the length of time since the last visit to the dentist and the number of people known by the child to be afraid of going to the dentist. In a study by Taani (2002) results showed that dental anxiety in Jordan was more
pronounced in children from low and moderate social level of families. Similarly, Corkey and Freeman (1994) demonstrated that the child’s ability to cope with dental treatment was based upon his/her degree of psychological development together with the mother’s fear of dental treatment. It is pointed out that the role of the mother plays a central part influencing on the one hand the child’s degree of psychological development and on the other the child’s ability to cope with dental treatment.

In a study by Raadal et al. (1995) dental anxiety was found to be higher in boys, but a relationship between anxiety and the Child Behaviour Checklist (CBCL) scores was not demonstrated. In a study by Blomqvist et al. (2006) it was found that children with ADHD had more behaviour management problems, but did not exhibit a higher degree of dental anxiety than controls.

The age of onset of dental anxiety was studied in a study by Locker et al. (1999). Findings showed that negative dental experiences were predictive of dental fear regardless of age of onset. A family history of dental anxiety (as an exogenous etiological category) was predictive of child-onset anxiety. In 5-year-old children living in North West England dental anxiety was recognized as a common condition and was closely associated with a symptomatic irregular attendance pattern, a history of extraction and having a dentally anxious parent.

Dental anxiety may lead to neglect of dental care both among children and adults and represents a problem for patients and dentists alike. Previous dental experience has been cited as a cause of dental anxiety. There are reports of decreasing levels of dental anxiety with increasing age among children. The expectation of pain may be closely related to previous dental treatment. It is broadly accepted that personality characteristics intervene between stimuli and response, modifying the effects of the stimuli. Neverlien and Backer (1991) showed that both self-reported dental anxiety and optimism-pessimism were unique contributors to the prediction of behavioural rating of dental anxiety.

Peretz and Efrat (2000) examined dental anxiety among young adolescent patients in Israel. The obtained results showed that girls had higher scores for anxiety than boys. The most anxiety-provoking stimuli were feeling and seeing the needle, but not sitting in the dental chair. Authors concluded that individual personality traits may be the final factor to indicate those who will eventually develop higher dental anxiety.

In addition, anxiety has been identified as being one of the major factors that impact on dental pain. However, expected pain is less intense than unexpected. Furthermore, anxious patients are more neurotic and unstable, less decisive, have a lower self-esteem and are less inclined to act. There is conclusive evidence that patients with acute dental pain do benefit from psychological intervention (Schuurs et al. 1987).

The management of dental anxiety in children comprises several issues: early education about the need for dental care, elimination of pain, psychological support, as well as certain techniques such as relaxation, and peripheral biofeedback. Support of the mother (family) is the most important for child behaviour management.

Conclusions
This study confirms the presence of a high anxiety level (evaluated with GASC) among children undergoing dental intervention.

It was confirmed that there are differences in anxiety scores between girls and boys, girls manifesting higher anxiety.

Personality characteristics (evaluated with EPQ) showed low psychopathological traits, moderate extroversion and neuroticism, but accentuated insincerity (evaluated with L scale). L scales are lower with increasing age, but P scores rise with age, which could be related to puberty.

No correlation was found between personality traits (obtained scores for EPQ) and anxiety, except for neuroticism, which is positively correlated with the level of anxiety.

In the management of dental anxiety certain response measures (psychological support, biofeedback, and relaxation techniques) are recommended.

REFERENCES

Резиме

АНКСИОЗНОСТА И ПСИХОЛОШКИТЕ КАРАКТЕРИСТИКИ КАЈ ДЕЦАТА ПРЕД ДЕНТАЛНА ИНТЕРВЕНЦИЈА

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Анксиозноста и стравот од дентални интервенции можат да бидат препознавани како извор на проблеми при менацирањето на стоматолошките пациенти.

Сугерирано е дека некои личности кои што се анксиозни или уплашени од стоматолошкот третман имаат конституционална
вулнерабилност кон анксиозни растојства, евидентирани преку разни стратови, генерализирана анксиозност или панични атаки. 
Што се однесува до детската популација, како најбитен фактор кој влијае на поведението на децата кои очекуваат каква било стоматолошка интервенција се смета постоенето на анксиозност кај мајката. 
Цел на трудот е мерење на општата анксиозност кај децата пред стоматолошка интервенција и нејзина споредба со некои карактеристики на личност како психопатологија, екстроверзија и невротизам.
Испитуваното примерок се состои од 50 деца (31 девојче и 19 момчиња), селектирани по случаен избор на Универзитетската стоматолошка клиника, Скопје. Средната возраст на девојчињата беше 11,4 (± 2,4) години, а за момчињата 10,7 (± 2,6) години.
Користени се два психометрички инструменти: скала за општа анксиозност кај деца (GASC) и Ајженков прашалник за личност (EPQ).
Студијата потврди присуство на висока анксиозност (евалуирана со GASC) кај сите деца пред стоматолошка интервенција. Потврдена беше разлика во нивото на анксиозност помеѓу девојчињата и момчињата, при што девојчињата покажаа повисоки скорови за анксиозност.
Карактеристиките на личност (евалуирани со EPQ) покажаа ниски психопатолошки тенденции, умерена екстроверзија и невротичност, додека нивото на неискрени одговори (мерени според L скалата) беше нагласено. Скоровите на L скалата стануваат пониски со зголемување на возраста, додека скоровите на P скалата растат со возраста, што најверојатно се должи на пубертетот.
Не е најдена корелација помеѓу карактеристиките на личност (добени преку скроповите на EPQ) и анксиозноста, освен кај невротичноста, која е позитивно корелирана со нивото на анксиозност.
При менацирането на денталната анксиозност препорачани се некои мерки (психолошка поддршка, биофидбек или релаксациони техники).
Ключни зборови: анксиозност, стоматолошки интервенции, карактеристики на личност, деца.