Evaluation of Anxiety, Fear and Physiological Responses among Children with and without Presence of Their Parents in Dental Clinic during Dental Treatment

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Abstract: Background: Fear of and anxiety towards going to dentists are major problems for a sizeable proportion of children, dispute exists in literature regarding presence of parents during their child's dental treatment the aims of present study to evaluate anxiety, fear, and physiological responses among children with and without presence of their parents in dental clinic during dental treatment (pulpotomy treatment). Materials and method: sixty child were involved in current study dividing into two groups according to presence or absence of their parents in dental clinic during pulpotomy treatment of their primary molars, assessment of anxiety was done using Colored Version of Modified Facial Affective Scale – three faces: 1. No Anxiety; 2. Some Anxiety; 3. Very High Anxiety, assessment of fear was done by using Fear assessment picture scale for girls and boys. Assessment of physiological response (pulse rate, oxygen saturation) was done by using pulse oximeter. The assessment of variables (anxiety, fear, pulse rate, oxygen saturation) was measured in three intervals first before pulpotomy treatment (during oral examination), second during pulpotomy treatment when placed of pulpotomy material inside pulp chamber, third after finished pulpotomy treatment. Result: Statistically non-significant differences were showed in anxiety, fear, pulse rate and oxygen saturation among children with and without presence of their parents in dental clinic regarding three intervals of measure (before, during and after pulpotomy treatment). Non-significant differences found in fear, pulse rate and oxygen saturation among three intervals of measure within inter group (children with and without presence of parents during dental treatment) while significant differences in anxiety found between two intervals (during and after dental treatment) through using Friedman test within inter group of children with presence of parent while did not reach to significant value among children with absence of their parents at three interval of measure. Conclusion: with limitation of present study the presence and absence of parents in dental clinic had no impact or effect on objective and subjective measures of anxiety and fear of children aged 6-9 years old and anxiety may elevate during the middle interval of pulpotomy treatment among children with their parents presence in dental clinic.

Keywords: presence of parent, fear, anxiety, physiological responses

1. Introduction

Dental fear and anxiety are common when treating child patients. Dental fear is a key factor that may cause patients to avoid, delay, or even cancel dental appointments, leading to irregular attendance patterns. Early recognition of children’s dental fear is essential to effective dental treatment. Dental anxiety can be defined as a feeling of worry about dental treatment, which is not necessarily connected to a specific external stimulus. It may lead to avoidance of dental care, increasing the risk of caries development and oral diseases. While fear is an unpleasant emotional state consisting of psychological and psychophysiological changes in response to real external threat or danger. Anxiety is a multidimensional construct, one of the well-accepted statements about it and it is consists of somatic, cognitive, and emotional elements which is ranked fifth among the most commonly feared situations for individuals. It has been estimated that the anxious patient requires approximately 20% more chair time than the non-anxious patient.

Several risk factors for developing dental fear and anxiety have been identified, e.g. low age, parental dental fear, general anxiety in the child, temperamental traits, and painful dental treatments.

Assessment of fear and anxiety was involve numerous difficulties regarding technique and result interpretation. As fear and anxiety was being subjective components, it was advisable to obtain a self-report on the child’s perception of a response, which, however, is not an easy task. The assessment of dental anxiety before dental treatment will be helped the dentist to facilitate proper technique for anxiety management. There are four types of dental anxiety assessing scales in children are: psychometric scales, projective techniques, behavior evaluation and physiological measures.

Pediatric dentistry, along with developing suitable oral health among children, has been attempted to manage the children's anxiety and fear utilizing different techniques. Techniques, such as providing information, Tell-

Show-Do, Reinforcement, Relaxation, Distraction, and Parental Involvement were used for better interactions. More invasive techniques, such as Voice Control, HOM (Hand over mouth), and Physical Limitations to reduce the probable inappropriate behavior of the child during the visit were also used. Following the social changes, less aggressive methods were more acceptable to children as well as to their parents. The most widely used technique among the pediatric dentists, which was less invasive, was the parental presence/absence. In this technique, the parents are present in the dental operation room, and in case the child is
uncooperative, the parent is asked to leave the room, and after the cooperation is stabilized, and as a reward, the parent is again asked to be present in the room(22). Parents play an important role in the dental behavior of a child patient, and it was for this reason that the role of the parent in dental fear remained a topic of concern to pediatric dentists.(23-26) There was a controversy on effect of parental presence in treatment room on children's dental anxiety. Studies in this research area conducted in children of different ages reported conflicting results (27-31). Most children respond positively when their parent is in the treatment room(32). Afshar et al(33) reported that parent's absence/presence in the dentistry operation room had no impact on the cooperation and anxiety of the 5-year-old Iranian children who had had no previous dentistry presentation in neither the first nor the second visit.

Shindova and Belcheva(34) concluded Parental presence or absence in the treatment room had no impact on anxiety level of children aged 6-12 years during their clinical examination. While Pani et al(35) within the limitations of their study they concluded that the presence of the parent in the operatory reduces the physiological manifestations of anxiety of children in their first restorative dental visit.

Fear and anxiety bring about the physiological change in body such as increase in perspiration, breathing rate, blood pressure and pulse rate, which is primarily due to release of stress hormones in the blood such as cortisol, adrenaline, and nor-epinephrine. Objective stress parameters can be obtained by measuring pulse rate, breath rate, skin resistance, blood pressure(36,37). To record these physiological changes, portable pulse oximeter, a noninvasive technique is widely used in dentistry and its use has been found increase in research on pediatric dental behavior(38). It helps in real-time recording of physiological parameters such as blood pressure, pulse rate, oxygen saturation, and body temperature(39). Monitoring of heart rate had been shown to offer a valid measure of dental anxiety in children and was sensitive to changes in the level of dental anxiety during the course of treatment(39,40).

The aim of present study is to assess the differences in the anxiety, fear, pulse rate and oxygen saturation among children with the presence and absence of their parents in dental clinic during dental treatment (pulpotomy treatment) at three intervals of measure before, during and after dental treatment.

2. Materials and Method

1) Sample: The present study conducted in period extend from 2016 till the end of 2017 included 60 children aged from 6 to 9 years of both gender who attending the Department of Pedodontic and Preventive Dentistry, College of Dentistry University of Baghdad and their attendance to dental clinic was the first time in their lives and did not have a previous experience of dental treatment. All children were included need dental treatment (pulpotomy treatment) for their primary molars and they were divided in two groups according to presence/absence of parents, each group with 30 child: group A children with presence of their parents in dental clinic and group B children without presence of their parents in dental clinic during treatment.

2) Assessment of anxiety and fear and physiological responses: Assessment of anxiety was done by using Colored Version of Modified Facial Affective Scale – three faces: 1. no anxiety; 2. some anxiety; 3. very high anxiety (Figure1) Facial affecting scale, visual scale was used to evaluate the degree of child anxiety quickly and reliably. So, the MFS- three faces was used Assessment of fear was done by using Fear assessment picture scale for girls and boys (Figure2), the scale was designed by taking a part of Klingberg’s children dental fear picture test (CDFP) pointing picture(38,41) and the images were drawn in frontal aspects so that the expressions can be seen. A girl or a boy cartoon in the dental chair was drawn both these pictures were paired with “not fearful” and “fearful” a facial expression. In “not fearful” cartoon the expressions were calm, and relaxed; gave score 1 while in “fearful” there was change in expressions such as increased eye white area and facial grimace gave score 2(38,41).

![Figure 1: Colored Version of Modified Facial Affective Scale](image)

![Figure 2: Fear assessment picture scale for girls and boys](image)
when a dentist checks your oral cavity with instruments?”
This time the child was made to answer by pointing on Fear
Assessment Picture Scale. The physiological responses were
recorded on pulse oximeter alongside the above tests. Later,
during second phase (placement of pulpotec material) the
same questions were reframed and asked as “how do you feel
to visit a dentist now?” and “what feeling did you have
when the dentist used air-rotor on your tooth and placed
pulpotec material?”. Finally after finished the treatment
repeated questions and asked as “how do you feel to visit a
dentist after complete the treatment of your teeth?” and
“what feeling did you have when the dentist placed final
restoration(18, 41). The response of child on projective scales
(Modified Facial Affecting Scale and Fear Assessment
Picture Scale) and reading of pulse rate and oxygen
saturation were recorded, and statistical analysis were done.

3) Statistical analysis
Shapiro–Wilk test showed that the pulse rate and oxygen
saturation were not normally distributed hence nonparametric
tests namely, Mann–Whitney U-test, Friedman test, Wilcoxon Signed Ranks test.
McNemar’s test were applied for further data analysis also Pearson Chi
square test was used for analysis of data. For
these tests, P-value < 0.05 was considered statistically
significant. Data analysis was done using Statistical Package
for Social Sciences (SPSS) v. 19 (IBM Corporation, 1 New
Orchard Road, Armonk, New York 10504-1722, United
States) for Windows.

3. Result
Table (1) illustrates distribution of sixty child in two groups
(group A children with presence of their parents in dental
clinic during dental treatment and group B children without
presence of their parents in dental clinic during dental
treatment) according to age and gender. The result showed
the highest percentage among 9 years old children (41.67%) followed by
(25%, 20%) among 8, 6 years old children respectively and the lowest percentage (13.33%) among 7
years old children in both groups(A and B) with statistically
non-significant differences among age groups at P>0.05 also table represents equal percentage (50%) according to
gender in both groups(A and B) with statistically non-
significant differences among gender at P>0.05.

Table (2) demonstrates the comparison of anxiety between
group A and group B at the three Intervals of measure.
Anxiety was higher among group A than group B in the two
intervals before, during dental treatment with mean rank
(31.78, 29.22, 31.53, 29.47) respectively and nearly same
finding between group A and B after dental treatment
interval(30.23, 30.77) respectively with statistically non-
significant differences at P>0.05.

Table( 3) describes association of fear with presence or
absence of parents with their children in dental clinic at
three intervals of measure, statistically non-significant
differences reported about the association of fear with
presence or absence of parents with their children in dental
clinic before, during and after dental treatment pulpotomy
treatment. Table (4) shows the difference of mean rank
of pulse rate between group A and B before, during and after
dental treatment. The findings revealed that lowest mean
rank among group A than group B in three intervals
(29.07, 31.93, 28.57, 32.43, 27.95, 33.05) respectively and
statistically did not reach to significance value of difference
in any interval.

Table (5) illustrates the comparison of oxygen saturation
between group A and B before, during and after treatment.
Oxygen saturation showed slightly higher mean rank among
group A than B before dental treatment (30.68, 30.32 )
while the lower mean rank found among group A than B
during and after dental treatment (29.32, 31.68-28.12, 32.88)
with statistically non-significant differences found in all
intervals. Table (6) illustrates comparison of parameter at
three different intervals of measure within inter group using
Friedman test than for adjustment of P-value using
Wilcoxon signed ranks test through post hock. Statistically
non-significant difference of (anxiety within group B, pulse
rate, oxygen saturation within group B) found among three
intervals of measure. While statistically significant
differences found in anxiety among three intervals of measure within group A at P<0.05 through post hock to
adjustment of P-value the significance was found between
during and after treatment intervals. For oxygen saturation
within group A although overall Friedman test was reached
to significance value at p <0.05 but when adjustment of
P-value through post hock using Wilcoxon signed ranks test P-value was found not significance at P>0.05. Result revealed
no change found in fear at three intervals from (before to
after intervals ), (from before to during intervals) and
(from during to after intervals) in both group A children with
presence of their parent in dental clinic and group B children
without presence of their parent in dental clinic with P
value(0.727, 1.00, 0.625) for group A and with P value
for group B(1.00, 1.00, 1.00) using McNemar’s test, the test was
used for two related dichotomous variables.

4. Discussion
The visit to the dentist’s office is a stressful event for many
children that can elicit feeling of anxiety (42). The issue of
parental presence in the dental clinic during treatment is
critical for pediatric dentists and had been a topic of debate for
decades (25). While there have been authors who had
argued that removal of the parent from the operatory could
improve the behavior of the child (43, 45), others have
suggested that it is important to keep parents in the operatory and
had even suggested guidelines for keeping parents in the operatory (46, 47).
In current study used the pulse rate and
oxygen saturation as objective indicators of anxiety and fear.
Studies have used heart rate, oxygen saturation, blood
pressure, and body temperature. However, it has been
demonstrated that heart rate and oxygen saturation were
a sensitive and reliable indicators because an increase in heart
rate was the most common physiologic indicator for anxiety
and fear. The decision to measure only the heart rate and
oxygen saturation in this study was based on the fact that
placement of several recording devices on a child can in
itself result in an increased physiological fear response
(48, 35). For these reasons current study was designed to
evaluate differences in the anxiety, fear and physiological
responses among of children with the presence and absence
of their parent in dental clinic during dental treatment.

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present study revealed that the group A (children with presence of their parents in dental clinic) during dental treatment had higher mean rank of anxiety than group B (children without presence of their parents in dental clinic). In statistically non-significant differences in which this finding was in agreement with Lewis and Law(26), Venham et al(28), Pfiefferle et al(29), Fenlon et al (30) who found lack of parental influence on children’s cooperation and objective stress parameters. Afshar et al (31) and Shindova and Belcheva (32) disagree with Marzo et al (33). Definitive reason for this result was not documented but suggested due to the different design of studies. Friedman test was significant but when adjusted P-value through post hoc by Wilcoxon signed ranks test was not significant at P>0.05. While the finding of anxiety among three intervals within inter group A showed significant differences during and after intervals of dental treatment. This significance discuss as during pulpatomy treatment using turbine and hand piece to complete cavity preparation and opened the pulp chamber and this driling procedure and a pain that may accompanied entrance inside pulp chamber brought an anxiety to elevated during dental procedure. While anxiety remained non-significant differences among three intervals within group B. Present study showed no change of fear at three intervals of measure when tested by McNemar’s test in both inter group (A and B) at P-value >0.05. So with limitation of present study the presences and absence of parents with their children in dental clinic had no impact or effect on objective and subjective measures of anxiety and fear of children aged (6-9) years old and anxiety may elevated in the middle interval of pulpatomy treatment among children with parents presences in dental clinic.

References


[34] Shindova M, Belcheva A. The effect of parental presence on the dental anxiety during clinical examination in children aged 6-12 years journal of imab - annual proceeding (scientific papers) 2013, vol. 19, issue 4: 435-438


Table 1: Distribution of two groups (group A children with presence of their parents and group B children without presence of their parents in dental clinic) according to age and gender with comparison significant.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Group A</th>
<th>Group B</th>
<th>Chi-square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5</td>
<td>7</td>
<td>12</td>
<td>100%</td>
</tr>
<tr>
<td>% within age</td>
<td>41.67%</td>
<td>58.33%</td>
<td>11.67%</td>
<td>20%</td>
</tr>
<tr>
<td>% of total</td>
<td>8.33%</td>
<td>8.33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>100%</td>
</tr>
<tr>
<td>% within age</td>
<td>62.55%</td>
<td>37.50%</td>
<td>5%</td>
<td>13.3%</td>
</tr>
<tr>
<td>% of total</td>
<td>8.33%</td>
<td>8.33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>6</td>
<td>X²=1.793</td>
<td></td>
</tr>
<tr>
<td>% within age</td>
<td>60%</td>
<td>40%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>% of total</td>
<td>15%</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>11</td>
<td>14</td>
<td>P=0.667</td>
<td>25</td>
</tr>
<tr>
<td>% within age</td>
<td>44%</td>
<td>56%</td>
<td>23.33%</td>
<td>41.67%</td>
</tr>
<tr>
<td>% of total</td>
<td>18.33%</td>
<td>18.33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>% within age</td>
<td>50%</td>
<td>50%</td>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>% of total</td>
<td>50%</td>
<td>50%</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Group A</th>
<th>Group B</th>
<th>Chi-square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>15</td>
<td>15</td>
<td>X²=000</td>
<td>100%</td>
</tr>
<tr>
<td>% within gender</td>
<td>50%</td>
<td>50%</td>
<td>15%</td>
<td>50%</td>
</tr>
<tr>
<td>% of total</td>
<td>25%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>15</td>
<td>P=1.000</td>
<td>100%</td>
</tr>
<tr>
<td>% within gender</td>
<td>50%</td>
<td>50%</td>
<td>15%</td>
<td>50%</td>
</tr>
<tr>
<td>% of total</td>
<td>25%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Comparison of anxiety between group A children with presence of their parents and group B children without presence of their parents in dental clinic at the three Intervals of measure

<table>
<thead>
<tr>
<th>Intervals of measure</th>
<th>Group A</th>
<th>Group B</th>
<th>Mann-Whitney U test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Median</td>
<td>Mean rank</td>
<td>No Median</td>
</tr>
<tr>
<td>Before dental treatment</td>
<td>30</td>
<td>1</td>
<td>31.78</td>
</tr>
<tr>
<td>During dental treatment</td>
<td>30</td>
<td>2</td>
<td>31.53</td>
</tr>
<tr>
<td>After dental treatment</td>
<td>30</td>
<td>1</td>
<td>30.23</td>
</tr>
</tbody>
</table>
Table 3: Association of fear with presence or absence of parents with their children in dental clinic at three intervals of measure

<table>
<thead>
<tr>
<th>Interval of measure</th>
<th>Group A With presence of parent</th>
<th>Group B without presence of parents</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before dental treatment</td>
<td>No fearful 24 (40%)</td>
<td>24</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>fearful 6 (10%)</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During dental treatment</td>
<td>No fearful 22 (36.7%)</td>
<td>23</td>
<td>0.089</td>
<td>0.766</td>
</tr>
<tr>
<td></td>
<td>fearful 8 (13.3%)</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After dental treatment</td>
<td>No fearful 24 (40%)</td>
<td>23</td>
<td>0.098</td>
<td>0.754</td>
</tr>
<tr>
<td></td>
<td>fearful 6 (10%)</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Comparison of the pulse rate between group (group A children with presence of their parents and group B children without presence of their parents in dental clinic) at the three intervals of measure

<table>
<thead>
<tr>
<th>Intervals of measure</th>
<th>Group A</th>
<th>Group B</th>
<th>Mann-Whitney U test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>No</td>
<td>Z</td>
</tr>
<tr>
<td>Before dental treatment</td>
<td>30</td>
<td>30</td>
<td>0.637</td>
</tr>
<tr>
<td>During dental treatment</td>
<td>92</td>
<td>96</td>
<td>0.859</td>
</tr>
<tr>
<td>After dental treatment</td>
<td>91.5</td>
<td>96</td>
<td>1.133</td>
</tr>
</tbody>
</table>

Table 5: Comparison of the oxygen saturation between group (group A children with presence of their parents and group B children without presence of their parents in dental clinic) at three intervals of measure

<table>
<thead>
<tr>
<th>Intervals of measure</th>
<th>Group A</th>
<th>Group B</th>
<th>Mann-Whitney U test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>No</td>
<td>Z</td>
</tr>
<tr>
<td>Before dental treatment</td>
<td>30</td>
<td>30</td>
<td>0.083</td>
</tr>
<tr>
<td>During dental treatment</td>
<td>96</td>
<td>98</td>
<td>0.531</td>
</tr>
<tr>
<td>After dental treatment</td>
<td>96</td>
<td>96</td>
<td>1.069</td>
</tr>
</tbody>
</table>

Table 6: Intergroup (group A children with presence of their parents and group B children without presence of their parents in dental clinic) comparison of parameters (anxiety, pulse rate, oxygen saturation) at three intervals of measure during pulpatomy treatment

<table>
<thead>
<tr>
<th>Inter Group</th>
<th>No</th>
<th>Parameters</th>
<th>Before dental treatment</th>
<th>During dental treatment</th>
<th>After dental treatment</th>
<th>Friedman test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>30</td>
<td>Anxiety</td>
<td>1.95</td>
<td>2.30</td>
<td>1.75</td>
<td>10.33</td>
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<tr>
<td></td>
<td></td>
<td>Pulse rate</td>
<td>2.12</td>
<td>1.80</td>
<td>2.08</td>
<td>1.847</td>
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<tr>
<td></td>
<td></td>
<td>Oxygen saturation</td>
<td>2.18</td>
<td>2.18</td>
<td>1.63</td>
<td>6.313</td>
</tr>
<tr>
<td>Group B</td>
<td>30</td>
<td>Anxiety</td>
<td>1.88</td>
<td>2.23</td>
<td>1.88</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse rate</td>
<td>1.88</td>
<td>2.03</td>
<td>2.08</td>
<td>0.696</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oxygen saturation</td>
<td>1.90</td>
<td>2.13</td>
<td>1.97</td>
<td>0.945</td>
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