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Evaluation of Anxiety, Fear and Physiological Responsesamong 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 childrendispute exists in literature regarding presence of parentsduring 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 (pulpatomy 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 pulpatomy 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 pulpatomytreatment (during oral examination), second during pulpatomy treatment when placed of pulpotec material inside pulp chamber ,third after finished pulpatomy treatment. Result:.Statistically non-significant differences were showed in anxiety, fear, pulse rate and oxygen saturation among children with and without presences of their parents in dental clinic regarding three interval of measure(before, during and after pulpatomy treatment). Non-significant differences found in fear, pulse rate and oxygen saturationamong three intervals of measure within inter group (children with and withoutpresence of parents during dental treatment)while significant differences in anxiety found between two intervals(during and after dental treatment)through using Friedman test within intergroup of children with presences of parent while did not reach to significant value among children with absences of their parents at three interval of measure. Conclusion: with limitation of present study the presences 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 pulpatomy treatment among children with their parents presences in dental clinic .***

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

1. Introduction

Dental fear and anxiety are commonwhen treating child patients.[(1)]Dental fear is a key factor that may cause patients to avoid, delay, or even cancel dental appointments, leading to irregular attendance patterns [(2)]. Early recognition of children's dental fear is essential to effective dental treatment [(3,4)] .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 cariesdevelopment and oral diseases [(5)].While fear is an unpleasant emotional state consisting of psychological and psychophysiological changes in response to real external threat or danger[(6)].Anxiety is a multidimensional construct ,one of the well-accepted statements about it and it is consistsof somatic, cognitive, and emotional elementsin which its rank 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[(7,8)]

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 [(9-16)].

Assessment of fear and anxiety was involve numerous difficulties regarding technique and result interpretation [(17)]. Asfear 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[(18)] .Theassessment of dental anxiety before dental treatment will be helped the dentist to facilitateproper technique for anxietymanagement. There are four types of dental anxiety assessingscales in children are: psychometric scales, projectivetechniques, behavior evaluation and physiological measures[(19).]

Pediatric dentistry, along with developing suitable oral health among children, has been attemptedto 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[(20,21)]. 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 andits 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[37] .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 (pulpatomy 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 6to 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 (pulpatomy 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 MFAS- 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[18,41] 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 1while in "fearful" there was change in expressions such as increased eye white area and facial grimace gave score 2[18,41].

Figuer 1: Colored Version of Modified Facial Affective Scale – three faces: 1. No Anxiety; 2. Some Anxiety; 3. Very High Anxiety

Figure 2: Fear assessment picture scale for girls and boys

Assessment of physiological response(pulse rate , oxygen saturation) was done by using pulse oximeter model JPD-500AShenzhen Jumper Medical Equipment Co, Ltd, China

The assessment of parameters (anxiety, fear, pulse rate oxygen saturation) were measured at three intervals first beforepulpatomy treatment (during oral examination),second duringpulpatomy treatment when placed of pulpotec material ,third after finished pulpatomy treatment. When the child was seated on the dental chair, his/her index finger was plugged with pulse oximeter leads. Then the child was asked the question "how do you feel to visit a dentist for oral examination"? The child had to answer the above question by pointing to the Colored Version of Modified Facial Affecting Scale. Then the child was asked "what do you feel

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 responds 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 ofpulpotec material?. Finally after finished the treatment repeated questionsand 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 testand McNemar's test were applied for further data analysis also Pearson Chi square test was used foranalysis distribution of data . For thesetests, P- value*P*< 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 P0>.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 pulpatomy 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 oftheir parent in dental clinic during dental treatment

(pulpatomy treatment)at three intervals of measure before, during and after dental treatment. In current study children were divided in to two groups according to presence or absence of their parent in dental clinic ,each group was contained 30 child with different age groups and gender because distribution of children according to age and gender statistically non-significant.

Present study revealed that the group A children with presence of their parents in dental clinicduring dental treatment had higher mean rank of anxiety than group B children without presence of their parents in dental clinic with statistically non-significant differences in which this finding was in agreement withLewis and Law[27],Venham et al[28], Pfefferle et al[29],Fenlon et al [30] that found lack of parental influence on children's cooperation and objective stress parameters Afshar et al[33] andShindova and Belcheva[34]and disagree with Marzo et al[31].Definitive reason for this result was not documented butsuggested due to the different design of studies was considered to be the possible reason, although did not reach to significant value of differences the higher mean rank of anxiety among group A than group B may discussed as some parent exhibit anxiety toward dental office or treatment and as a consequence of the effect of parent anxiety was transmitted to the child Rãducanu et al[49].The outcome of present study regarded to the fear showed the statistically non-significant differences regarding associationof fear with presences or absences of parents with their children in dental clinic before, during and after pulpatomy treatment , these finding in line with finding of anxiety mentioned previously in present study, as anxiety is an emotion similar to fear but arising without any objective source of danger and another explanation was that dental treatment(pulpatomy treatment) a fearful procedure in presence and absence of child's parent orthis result might be due to sample size or study design.

The results of the present study concluded that non-significant differences found in physiological responses (pulse rate and oxygen saturation) in presence and absence of child's parent in dental clinic during dental treatment these finding were in line withAfshar et al[33], who conclud non-significant differences founded in heart beat among chlidren with and without parents presences of the 5-year-old Iranian children who have had no previous dentistry presentation in neither the first nor the second visit, also these finding were in agreement with Shindova and Belcheva[34] who conclude non-significant differences in both the pulse rate and oxygen saturation in presences and absence of parent and disagree with Pani et al[35] who conclude that parental presence result in significantly lower heart rates across groups suggested that the presence of the parent calms the child and wasa form of reassurance ,also disagree with Kostanos et al[45] who suggest that parental presence or absence could serve as a potent behavior management tool.,as an explanation of these result might attribute to that the physiological responses of anxiety within line of subjective measurement mentioned previously in present study. Present study showed non-significant differences of (pulse rate, oxygen saturation) among three intervals of measurement(before, during and after dental treatment)in inter groups (A and B) although the overall test of oxygen saturation among group A (children with parents presence)in Friedman test was significant but when adjustment of P-value through post hock by using Wilcoxon signed ranks test was not significant at P>0.05.While the finding of anxiety among three interval 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 drilling 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 byMcNemar'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 .

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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.

Age (years)		Group A	Group B	Chi-square P-value	Total
6	**No** % within age % of total	**5** 41.67% 8.33%	**7** 58.33% 11.67%		**12** 100% 20%
7	**No** % withinage % of total	**5** 62.55% 8.33%	**3** 37.50% 5%		**8** 100% 13.3%
8	**No** % within age % of total	**9** 60% 15%	**6** 40% 10%	X^2=1.793	**15** 100% 25%
9	**No** % withinage % of total	**11** 44% 18.33%	**14** 56% 23.33%	P=0.667	**25** 100% 41.67%
Total	**No** % within age %of total	**30** 50% 50%	**30** 50% 50%		**60** 100% 100%
Gender		Group A	Group B	Chi-square p-value	Total
Male	**No** % within gender % of total	**15** 50% 25%	**15** 50% 25%	X^2=000 P=1.000	**30** 100% 50%
Female	**No** % within gender % of total	**15** 50% 25%	**15** 50% 25%		**30** 100% 50%

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

Intervals of measure	Group A			Group B			Mann-Whitney U test	
	No	Median	Mean rank	No	Median	Mean rank	Z	P –value
Before dental treatment	30	1	31.78	30	1	29.22	0.672	0.501
During dental treatment		2	31.53		2	29.47	0.508	0.611
After dental treatment		1	30.23		1	30.77	0.153	0.879

Table 3: Association of fear with presence or absence of parents with their children in dental clinic at three intervals of measure

Interval of measure		Group A With presence of parent	Group B without presence of parents	Chi-square	p-value
Before dental treatment	Not fearful **No.** %	**24** 40%	**24** 40%	0.000	1.000
	fearful **No.** %	**6** 10%	**6** 10%		
During dental treatment	Not fearful **No.** %	**22** 36.7%	**23** 38.3%	0.089	0.766
	fearful **No.** %	**8** 13.3%	**7** 11.7%		
After dental treatment	No fearful **No.** %	**24** 40%	**23** 38.3%	0.098	0.754
	fearful **No.** %	**6** 10%	**7** 11.7%		

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

Intervals of measure	Group A			Group B			Mann-Whitney U test	
	No	Median	Mean rank	No	Median	Mean rank	Z	P –value
Before dental treatment	30	91.5	29.07	30	94.5	31.93	0.637	0.524
During dental treatment		92	28.57		96	32.43	0.859	0.390
After dental treatment		91.5	27.95		96	33.05	1.133	0.257

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

Intervals of measure	Group A			Group B			Mann-Whitney U test	
	No	Median	Mean rank	No	Median	Mean rank	Z	P –value
Before dental treatment	30	98	30.68	30	97	30.32	0.083	0.934
During dental treatment		96	29.32		98	31.68	0.531	0.595
After dental treatment		96	28.12		96	32.88	1.069	0.285

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

Inter Group	No	Parameters	Intervals of measure			Friedman test	
			Before dental treatment	During dental treatment	After dental treatment		
			Mean rank	Mean rank	Mean rank	Chi-square	P-value
Group A	30	Anxiety	1.95	2.30	1.75	10.33	0.006
		Pulse rate	2.12	1.80	2.08	1.847	0.397
		Oxygen saturation	2.18	2.18	1.63	6.313	0.043
Group B	30	Anxiety	1.88	2.23	1.88	4.9	0.86
		Pulse rate	1.88	2.03	2.08	0.696	0.706
		Oxygen saturation	1.90	2.13	1.97	0.945	0.623