

## Research Report

# The Mozart effect towards dental anxiety in 6–12 year old children

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## ABSTRACT

**Background:** Children anxiety in dental treatment often becomes a barrier for dentist to perform optimum dental treatment procedure. Various methods to manage anxiety and fear in children have been applied including listening to classical music during dental treatment. One of the classical music usually used is music by Mozart. **Purpose:** This study is aimed to discover the role of classical music by Mozart in dental anxiety changes. **Method:** This study was a quasi experimental study using purposive sampling method. The samples consist of 30 children between 6–12 years old group who were treated at the Pediatric Dentistry Clinic, Dental Hospital, Faculty of Dentistry Padjadjaran University. The anxiety data was collected using Visual Analogue Scale (VAS) before and after listening on the classical music during treatment. **Result:** The result of this study showed that there were 23 children (76.67% of subjects) who present decreased anxiety, 7 children (23.33% of subjects) did not present decreased anxiety and none of subjects showed increased anxiety. **Conclusion:** It was concluded that listening to music by Mozart during dental treatment can reduce anxiety in 6–12 year old children.

**Key words:** Mozart effect, dental anxiety, children

## ABSTRAK

**Latar belakang:** kecemasan pada anak saat perawatan gigi seringkali merupakan penghalang bagi dokter gigi untuk melaksanakan prosedur perawatan gigi yang optimal. **Berbagai metode untuk mengatasi kecemasan dan rasa takut pada anak telah dilakukan termasuk mendengarkan pada musik klasik selama perawatan gigi.** Salah satu musik klasik yang banyak digunakan adalah music oleh Mozart. **Tujuan:** Penelitian ini ditujukan untuk menemukan peran music klasik Mozart dalam perubahan kecemasan pada perawatan gigi. **Metode:** penelitian ini adalah kuasi eksperimental menggunakan metode pengambilan sampel purposif. Sampel terdiri dari 30 anak antara 6–12 tahun yang dirawat di Klinik Kedokteran Gigi Anak, Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Padjadjaran. Data kecemasan diambil dengan Visual Analogue Scale (VAS) sebelum dan setelah mendengarkan music klasik selama perawatan. **Hasil:** Hasil menunjukkan bahwa terdapat 23 anak (76,67% dari subjek) yang menunjukkan penurunan kecemasan, 7 anak (23,33%) tidak menunjukan perubahan kecemasan dan tidak ada (0 anak atau 0%) yang menunjukkan peningkatan kecemasan. **Kesimpulan:** Disimpulkan bahwa mendengarkan musik Mozart selama perawatan gigi dapat menurunkan kecemasan di antara anak-anak usia 6–12 tahun.

**Kata kunci:** efek Mozart, kecemasan, anak-anak

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## INTRODUCTION

Anxiety related to dental treatment is frequently found, especially in children. This often becomes a

direct reason why a child reluctantly goes to a dentist.<sup>1,2</sup> A study of Milgrom and Weinstein in 1993 has proven that anxiety during dental treatment occupies the fourth rank among other anxieties.<sup>1</sup> Anxiety is an individual normal

emotional reaction that appears when facing dangerous or life threatening situation because basically each person wants comfort in his or her life.

Dental treatment in clinics can create anxiety leading to non cooperative behavior of the patient during the treatment that may interfere the medical procedures causing longer chair time. Uncooperative patient will cause difficulties in treatment leading to non-optimum treatment result.<sup>1</sup> According to a study performed by Kartono and Sartono in 1992 at Sutadi,<sup>3</sup> the factors of anxiety include the sound of a bur, 81.46%, sitting on dental chair 50.72%, needle 39.13%, dental instruments 39.13%, and negative story on dental treatment 33.33%.

Anxiety and fear in children during dental treatment is not a new phenomenon in dentistry. The child anxiety in dental treatment often becomes a barrier for the dentist to perform optimum dental treatment procedure.<sup>1,2</sup> Anxiety is become severe by unpleasant experiences during the previous visit that make the child refuses to continue dental treatment.

One of the factors that cause anxiety during dental treatment is the sound of dental bur. Based on the study done by Wardle 1982 as mentioned by Budiman,<sup>4</sup> anxiety during dental preparation using bur occupies the second place after dental extraction. The sound of bur instrument often creates anxiety in children.<sup>3</sup> One of the methods to deal with anxiety and fear in children during dental treatment is by using distraction technique, i.e. distracting the child's attention away from the source of anxiety.<sup>4</sup>

One of the ways to distract patient's attention is by listening to the music.<sup>5</sup> Pediatric patients who are afraid of the sound and the vibration of handpiece can be managed by simple audio technology, i.e. installing stereo music instrument in the dental clinic. This can reduce and cover unpleasant sounds. Therefore, music can help reducing stress and make the patient relax.<sup>6</sup>

A soft and gentle music can reduce fear and anxiety in children. A soft classical music can neutralize the sharp noise of bur used by the dentist. A study by Campbell<sup>5</sup> has proven that listening to classical music during treatment is very effective for relaxation, especially in reducing discomfort in pediatric patients.

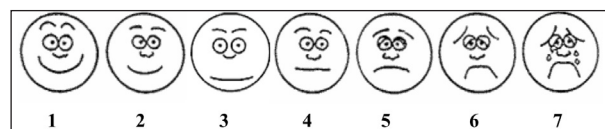
Six to twelve year is a transitional age from the childhood to teenage which is also often called the end period of childhood. In this period the child's attention to the surrounding environment increases. In terms of dental treatment, the children in 6–12 years old group are generally cooperative and have the ability to accept the treatment. With better cognitive development the child will enable to absorb abstract explanation. However, some still cannot accept it, which will leading to be anxious.<sup>7</sup>

The aim of this study is describing the effect of the classical music on anxiety changes in children aged 6 to 12 years old before and after listening to classical music at the Pediatric Dentistry Clinic, Dental Hospital, Faculty of Dentistry Padjadjaran University by using the visual analogue scale (VAS).<sup>7</sup>

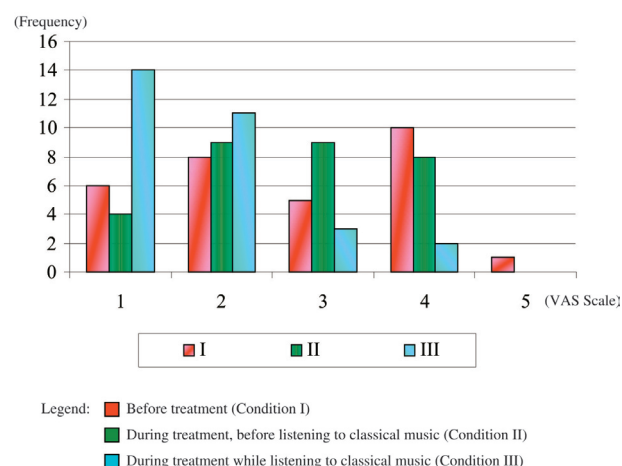
## MATERIALS AND METHOD

The type of this study is a quasi-experimental method. The study population were pediatric patients which will receive dental treatment at Pediatric Dentistry Clinic, Dental Hospital, Faculty of Dentistry Padjadjaran University. The purposive sampling technique is used with the following criteria: 30 children age 6–12 years old, male and female, come for a class one cavity preparation for dentin caries in lower first molar and with a good general health condition.

A walkman and a Mozart's song (Andantino Grazioso from Symphony No.18) was used as an instrument to listen. Visual Analogue Scale sheet is used to assess the anxiety level with a scale from 1 to 7 which shows the expression degree of increased anxiety (Figure 1). The anxiety changes are measured from VAS pictures. The anxiety was stable when there was no change in VAS scale. The anxiety was reduced when there was reduction in VAS scale and it was increased when there was increase in VAS scale.



**Figure 1.** Visual Analogue Scale.<sup>7</sup>



**Figure 2.** Distribution of VAS scale before treatment and during treatment without and with listening to Mozart music.

The study was started by asking the child to select a picture in VAS that represented his/her emotion before the treatment procedure was applied. Next, the child's tooth was prepared using round diamond bur for two minutes. During the first two minutes the child is asked to mark the picture in VAS that he or she considered as representing his or her anxiety. After that, the child listened to the music using walkman through an earphone. The preparation work using bur is continued while the child was listening to the classical music. After the preparation was finished the

child was asked to mark the picture in VAS that he or she considered as representing his or her anxiety.

## RESULTS

Based on the study results of 30 children, data on the anxiety during treatment is represented in the following tables. The child anxiety change before the treatment and after the treatment without listening to Mozart music showing 40% of the children reduced anxiety, 23.33% increased anxiety and 36.67% showed no decrease or increase in anxiety (Table 1).

**Table 1.** Anxiety change before dental treatment and during dental treatment without Mozart music

| Condition         | f  | %     |
|-------------------|----|-------|
| Reduced anxiety   | 12 | 40.00 |
| Increased anxiety | 7  | 23.33 |
| No change         | 11 | 36.67 |

The child's anxiety change before the treatment and during the treatment by listening to Mozart music. It showed that there was 70% of the children reduced the anxiety, 10.00% increased the anxiety and 20.00% with no anxiety increase or decrease (Table 2).

**Table 2.** Anxiety changes before dental treatment and during treatment while listening to Mozart music

| Condition         | f  | %     |
|-------------------|----|-------|
| Reduced anxiety   | 21 | 70.00 |
| Increased anxiety | 3  | 10.00 |
| No change         | 6  | 20.00 |

The child's anxiety change before listening to the classical music during treatment and after listening to Mozart music. A reduction in anxiety was found in 76.67% and 23.3% of the samples do not show increase or decrease in anxiety. No sample shows any increase in anxiety (Table 3).

**Table 3.** Anxiety change during dental treatment while listening to Mozart music after the previous condition I and II

| Condition         | f  | %     |
|-------------------|----|-------|
| Reduced anxiety   | 23 | 76.67 |
| Increased anxiety | 0  | 0.00  |
| No change         | 7  | 23.33 |

Overall, the data collected is grouped based on the three conditions when the anxiety is measured and the VAS scale selected by the respondents. Table 4 show the scale distribution in the Visual Analogue Scale marked

by respondents in each treatment, i.e. before treatment (condition I), during preparation without listening to Mozart music (condition II) and during preparation while listening to Mozart music (condition III).

**Table 4.** Distribution of VAS scale before treatment and during treatment without and with listening to Mozart music.

| VAS Scale | Condition |       |    |       |     |       |
|-----------|-----------|-------|----|-------|-----|-------|
|           | I         | %     | II | %     | III | %     |
| 1         | 6         | 20.00 | 4  | 13.33 | 14  | 46.67 |
| 2         | 8         | 26.67 | 9  | 30.00 | 11  | 36.67 |
| 3         | 5         | 16.67 | 9  | 30.00 | 3   | 10.00 |
| 4         | 10        | 33.33 | 8  | 26.67 | 2   | 6.67  |
| 5         | 1         | 3.33  | 0  | 0.00  | 0   | 0.00  |
| 6         | 0         | 0.00  | 0  | 0.00  | 0   | 0.00  |
| 7         | 0         | 0.00  | 0  | 0.00  | 0   | 0.00  |

Note: I: Before treatment  
II: During treatment, before listening to classical music  
III: During treatment while listening to classical music

## DISCUSSION

The aim of this study was to get the effect of classical music by Mozart to the anxiety change in dental treatment. The instrument used to measure anxiety change in this research is the Visual Analogue Scale from Karlsson<sup>7</sup> that gives ordinal data. The study is performed by observing changes in the same subject with three different conditions, i.e. before treatment, during preparation without listening to the music and during preparation while listening to the music. Each sample received three assessments so that anxiety changes before and after treatment can be observed.

Anxiety is a manifestation of fear without clear cause.<sup>8</sup> The anxiety that is related to the dentist and dental treatment is generally triggered by the lack of knowledge of the patient on the treatment that he or she is going to receive. Information from friends about unpleasant dental treatments can increase the anxiety. The condition that triggers anxiety during dental treatment is various, including dental preparation using bur. Another factor that may affect patient's anxiety level is the dentist is skill to communicate with the patient.<sup>9</sup>

Generally anxiety experiences by patient who visit the dental practices for the first time because the patient could not predict what the dentist will do on him/she. The study sample generally includes patients who have visited the dentist before to treat his or her teeth periodically at Pediatric Dentistry Clinic, Dental Hospital, Faculty of Dentistry Padjadjaran University. Patients tend to be cooperative because they are used to the instruments and equipments used by the operator. The communication between the operator and the patient is good that patient tends to be not anxious. The patient knows about the

treatment to be because it has informed by the operator beforehand. They also have heard stories from their school friends who have received dental treatment that the dental treatment at this clinic is quite pleasant.

Music is a universal language that encompasses status, age, religion, and race borders. Classical music can calm, soothe and heal. It can also give joy and joy is a kind of therapy. Calm classical music can function as emotional barrier. In the medical field, music is used for treatment just like medicine.<sup>5</sup> It has been reported that the pulse, respiration, electromyogram and electroencephalogram are changed when the patient listens to music.<sup>11</sup>

Changes in the form of increased anxiety level in this study are seen mostly during before treatment and during treatment without music (Table 1). Reduced anxiety level in this study is mostly seen during before and after listening to the classical music during dental treatment (Table 2). Subjects who did not experience increased or reduced anxiety are mostly found during before and during treatment without music (Table 1).

Increased anxiety during listening to the classical music in the treatment may be triggered by the loud volume of the walkman or the volume was too weak that the patients unable to hear the music. No changes in anxiety level may be caused by the condition where the children have never listened to the classical music before or because the child's psychological nature showed no response to situation change or uneasiness in using headphones.

Reduced anxiety during dental treatment by listening to classical music was caused by the distraction ability of the classical music or because listening to classical music may trigger relaxation effect and analgesia. The study shows that the anxiety experienced by the subject during dental drilling was reduced if the drilling is performed while the patient listens to the classical music. This is according to previous study showing positive response in dental patients who receive treatment while listening to the music.<sup>5</sup>

Reduced anxiety during dental treatment with classical music is caused by the fact that children like and able to enjoy music that make the children feel more relax. According to Marzuki,<sup>6</sup> music for relaxation can reduce heart beat up to beat per second that the heartbeat becomes calmer. The slower heartbeat and pulse create lower stress and physical tension level. One of the efforts of the dentist to reduce anxiety and making the patient relax is by providing relaxing music. Classical music has sedative effect that anxiety and tension can be lowered making the patients feel calmer. Slow classical music makes the patient's emotion low and relax that the anxiety level during dental treatment will be reduced.

Not all classical music can be used for anxiety therapy. Classical music used for therapy includes music with 60 beats per minute or less tempo that will affect physiological and psychological aspects. According to Campbell<sup>5</sup> slow music such as Andantino Grazioso from Symphony No. 18 of Wolfgang Amadeus Mozart can be used as musical therapy for children who experience stress to make them more relax.

Gentle sound and soft beat will be perceived by the brain that a person becomes relax. In relax individual, there is reduced sympathetic nerve activity in autonomic nervous system part that will lead to reduced epinephrine (adrenaline) secretion. Adrenalin plays a role in one of the anxiety clinical symptom, i.e. pulse and blood pressure. Reduced adrenalin release will reduce pulse and blood pressure.<sup>12</sup>

Based on this study, patients who listen to classical music while recovering dental treatment feel more relax than those who did not listen to the music. It can be concluded that classical music reduces anxiety in dental treatment of children aged 6–12 years old at this clinic.

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