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## The Impact of Educational Intervention on Dental Anxiety in Patients Undergoing Non-Surgical Endodontic Procedures: A Randomized Experimental Study

Tariq AlSwayyed<sup>1</sup>, AlMaha AlGazlan<sup>2\*</sup>, Shahad AlAjaji<sup>2\*</sup>, Sarah AlAbdullatif<sup>2\*</sup>, Omar AlShanqeety<sup>3</sup>

<sup>1</sup> Consultant/JAA Assistant Professor, King Abdulaziz Medical City, National Guard Health Affairs/ King Saud Bin Abdulaziz University For Health Sciences, Riyadh, Saudi Arabia.

<sup>2</sup> College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

<sup>3</sup> King Abdullah International Medical Research Center, National Guard Health Affairs, Riyadh, Saudi Arabia.

\***Corresponding Author:** Tariq AlSwayyed. Consultant/JAA Assistant Professor, King Abdulaziz Medical City, National Guard Health Affairs/ King Saud Bin Abdulaziz University For Health Sciences, Riyadh, Saudi Arabia **E-mail:** tariqss1@yahoo.com

**Citation:** Tariq AlSwayyed et al (2017). The Impact of Educational Intervention on Dental Anxiety in Patients Undergoing Non-Surgical Endodontic Procedures: A Randomized Experimental Study.. Int J Dent & Oral Heal. 3:10,117-122

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**Received** 11 December 2017; **Accepted** 19 December 2017; **Published** 30 December 2017

### Abstract

**Aim:** the purpose of this experimental study was to evaluate the impact of preoperative education methods on anxiety levels amongst dental patients; those undergoing endodontic procedures in particular.

**Methods:** this study consisted of 70 patients who were about to undergo non-surgical endodontic procedures. The 70 patients were randomly distributed to two equal groups; intervention and control. The dental anxiety was measured for all patients prior to the experiment using the Modified Dental Anxiety Scale (MDAS). After that, the intervention group received an audiovisual tool explaining the RCT procedure in detail, while patients in the control group were handed a brief written description of the procedure similar to what is offered in standard practice. The dental anxiety was measured afterwards using the same scale (MDAS).

**Results:** overall, a decrease in the level of anxiety was noticed in both groups. However, the difference between the pre and post anxiety score means was much more significant in the intervention group.

**Conclusion:** The results of this experimental study prove that proper education prior to a feared dental procedure can decrease the level of anxiety amongst patients; thus highlighting the need for better patient education in the dental setting.

**Background:** Dental anxiety, as defined by the medical dictionary, is "Fear related to seeking or receiving dental care".<sup>1</sup> The association of anxiety with dental appointments has been the concern of various studies for many years, some as early as 1987.<sup>2</sup> Literature has shown that Dental anxiety can be induced by a stimulus either real or imaginary. This stimulus can be obtained from surrounding people (parents, friends, relatives. etc.). It can also be a negative past dental experience or an environmental factor such as dental office, instrument appearance and sound and unfavorable smells.<sup>3</sup>

Dental anxiety can pose a predicament for all parties involved. Anxious patients may neglect their oral health, which could lead to symptomatic dental decay that usually results in a Dental visit. This in turn escalates the patient's original anxiety and thereby completing a cruel cycle. Moreover, anxious patients not only present trouble to themselves but also to their dental practitioner, as they tend to have lower pain thresholds, be uncooperative during dental visits, and repeatedly cancel their appointments.<sup>4</sup>

Among the various dental treatments, Root Canal Therapy (RCT) has the reputation of being the most unpleasant and most painful.<sup>5</sup> Patients undergoing RCT report higher anxiety levels, leading to its classification among the high anxiety category of dental procedures.<sup>6</sup> In Saudi Arabia, different numbers have been reported regarding the prevalence of dental anxiety. According to a recent study conducted in Dammam, the prevalence of anxiety among dental patients was measured to be 27%.<sup>7</sup> Another study that used the Modified Dental Anxiety Scale (MDAS), a validated instrument that was also used in our study, demonstrated the level of anxiety among dental patients in Jeddah as being 48.3%.<sup>8</sup>

Unfortunately, in Saudi Arabia, few studies have been conducted about the importance of education in relieving patients' anxiety. We intend to address this gap in knowledge by conducting a study that will measure the anxiety before and after educational intervention.

## Introduction

### Materials & Methods

#### Research Design and Study Sample

The present study is a randomized experimental trial of patients undergoing non-surgical Endodontic procedures in multiple private and government clinics distributed along all areas of Riyadh, Saudi Arabia. 70 patients participated in the study, exceeding our estimated target sample size of 66. We included all patients above the age of 15 years. Consent was obtained prior to subjects' participation.

Following a brief description of the study, patients completed a pre-interventional MDAS survey with a unique study ID. After that, random probability sampling was used to assign each subject to one of the study groups. Participants picked randomly from a bowl of colored pieces of paper. They were then assigned, based on their pick, to the specific groups; a control group offered a written description of RCT, and an intervention group shown an educational video. Ethical approval was obtained from the Institutional Review Board of King Abdullah International Medical Research Center, Riyadh, Saudi Arabia.

#### Study Materials

**Questionnaire:** A validated Arabic version of the MDAS questionnaire was used for both the pre-intervention and post-intervention survey in this study. The MDAS is a 5-item multiple choice questionnaire designed to measure anxiety in response to different dental situations. Each item has five responses that range from one (not anxious), to five (highly anxious). The final score is a sum of the responses to all questions, and it ranges from 5-25.

**Intervention Materials:** The control group received a brief written description of the procedure obtained from the Saudi Endodontic Society, which is similar to what is offered in standard practice. On the other hand, the interventional group received a 2:48 minute educational video explaining the procedure in detail. This audiovisual tool was obtained from the publicly available domain of the American Association of Endodontics,<sup>9</sup> translated to Arabic, and further edited to cover the following ten major points of RCT, as stated in the Journal of Dental Education<sup>10</sup>:

- Rate of success for RCT.
- Reasons for RCT.
- Total length of RCT.
- Description of pulp.
- Follow-up adherence.
- Sensations during injections.
- Latency of anesthesia effects.
- When discomfort is typically experienced.
- Where numbness occurs after injections.
- Sensations during pulp removal.

#### Results

This experimental study was conducted on 70 patients in the dental waiting area, who were about to have RCT. 27.14% (19) were males and 72.86% (51) were females. Their age was ranging between 15-70 years old with an average of 32.48. The majority of the participants were Saudis, with only 10% being non-Saudi patients. Regarding the educational status, most of the patients (60%) studied or are currently studying at college. 24% were at the level of high school and 14% were intermediate. The socioeconomic status was categorized to three classes: an average class receiving a monthly income in the range of 5000-10000 Saudi Riyals, more than that was above-average and below that range was classified as below-average. A majority of the participants belonged to the average class (46.15%) and a minority (10.77%) had a low socioeconomic status. Reporting the frequency of dental visits, most of the patients (49.28%) seek dental care only if needed. 36.23% have regular dental visits, while 14.49% did not follow their dentists regularly.

When asked about their past RCT experience, nearly 58.57% of the study sample had a positive past RCT, the remaining were almost equally distributed between having a negative experience or no past RCT. On the other hand, 48.57% of the sample reported a positive RCT experience for a family member, while 35.71% reported a negative experience, and 15.71% did not have a family member who underwent RCT. (Table1)

**Table 1:** Descriptive Table

|                    |              | Control |         | Intervention |         |       |       |
|--------------------|--------------|---------|---------|--------------|---------|-------|-------|
|                    |              | count   | %       | count        | %       | Total | %     |
| Gender             | Male         | 10      | 28.57%  | 9            | 25.71%  | 19    | 27.14 |
|                    | Female       | 25      | 71.43%  | 26           | 74.29%  | 51    | 72.86 |
| Total              |              | 35      | 100.00% | 35           | 100.00% | 70    | 100   |
|                    |              | count   | %       | count        | %       | Total | %     |
| Nationality        | Saudi        | 30      | 85.71%  | 33           | 94.29%  | 63    | 90    |
|                    | Non Saudi    | 5       | 14.29%  | 2            | 5.71%   | 7     | 10    |
| Total              |              | 35      | 100.00% | 35           | 100.00% | 70    | 100   |
|                    |              | count   | %       | count        | %       | Total | %     |
| Level of Education | Intermediate | 7       | 20.00%  | 3            | 8.82%   | 10    | 14.49 |
|                    | High school  | 8       | 22.86%  | 9            | 26.47%  | 17    | 24.64 |
|                    | College      | 20      | 57.14%  | 22           | 64.71%  | 42    | 60.87 |
| Total              |              | 35      | 100.00% | 34           | 100.00% | 59    | 85.51 |
|                    |              | count   | %       | count        | %       | Total | %     |
| Social Status      | Above Ave    | 10      | 33.33%  | 18           | 51.43%  | 28    | 43.08 |
|                    | Average      | 16      | 53.33%  | 14           | 40.00%  | 30    | 46.15 |
|                    | Below Ave    | 4       | 13.33%  | 3            | 8.57%   | 7     | 10.77 |
| Total              |              | 30      | 100.00% | 35           | 100.00% | 37    | 56.92 |
|                    |              | count   | %       | count        | %       | Total | %     |
| RCT Experience     | No previous  | 7       | 20.00%  | 7            | 20.00%  | 14    | 20    |
|                    | Negative     | 5       | 14.29%  | 10           | 28.57%  | 15    | 21.43 |
|                    | positive     | 23      | 65.71%  | 18           | 51.43%  | 41    | 58.7  |
| Total              |              | 35      | 100.00% | 35           | 100.00% | 56    | 80.13 |
|                    |              | count   | %       | count        | %       | Total | %     |
| Family Experience  | No previous  | 4       | 11.43%  | 7            | 20.00%  | 11    | 15.71 |
|                    | Negative     | 14      | 40.00%  | 11           | 31.43%  | 25    | 35.71 |
|                    | Positive     | 17      | 48.57%  | 17           | 48.57%  | 34    | 48.57 |
| Total              |              | 35      | 100.00% | 35           | 100.00% | 59    | 84.28 |
|                    |              | count   | %       | count        | %       | Total | %     |
| Dental Visit       | Regular      | 14      | 41.18%  | 11           | 31.43%  | 25    | 36.23 |
|                    | Irregular    | 1       | 2.94%   | 9            | 25.71%  | 10    | 14.49 |
|                    | On need      | 19      | 55.88%  | 15           | 42.86%  | 34    | 49.28 |
|                    | Total        | 34      | 100.00% | 35           | 100.00% | 44    | 63.77 |

The anticipated level of pain during RCT was marked by the subjects on a scale from one to ten. 44 of the patients gave it a score of 5 or more. Among those, 6 patients anticipated the highest pain levels of 9 and 10. The remaining 20 patients rated the expected pain as less than 5.

**Table 2:** Statistics table

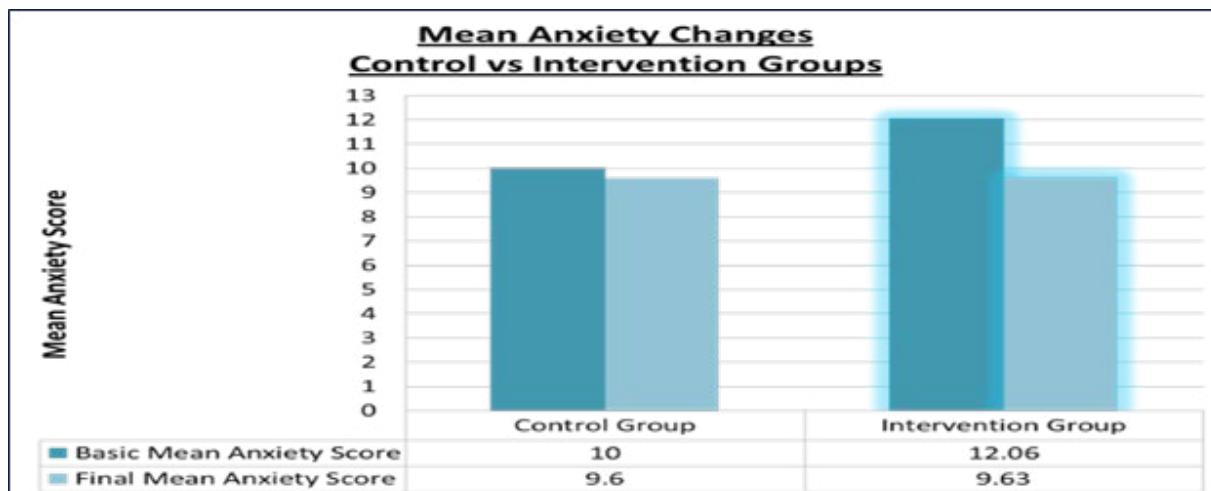
|                               | Mean baseline anxiety score | Mean final anxiety score | Difference between the means | Pr >  t  (P value) |
|-------------------------------|-----------------------------|--------------------------|------------------------------|--------------------|
| <b>Control group(1)</b>       | <b>10.00</b>                | <b>9.6000</b>            | <b>0.4000</b>                | <b>0.1423</b>      |
| <b>Intervention group (2)</b> | <b>12.06</b>                | <b>9.6286</b>            | <b>2.4286</b>                | <b>0.0001</b>      |

After randomly categorizing the study sample into Control and Intervention groups, the anxiety score was calculated pre- and post-test. The Control group had a baseline mean anxiety score of 10 out of 25 and after receiving the simple written sheet about RCT, the mean score was slightly reduced to 9.60. On the other hand, the Intervention group who watched the educational film about RCT, had a mean pre-intervention score of 12.06 and a post-score of 9.63 (Figure1). In both test groups, males exhibited a lower baseline (pre-intervention) anxiety score than females. Males in the control group had a mean baseline anxiety score of 9.80 and a post-intervention score of 9.00. While males in the intervention group had a mean pre-film score of 9.44 and a post-film score of 8.11. Alternatively, females in the control group had a mean of 10.08 as their baseline anxiety level and a mean of 9.84 as their post-interventional score. In the intervention group, females re-

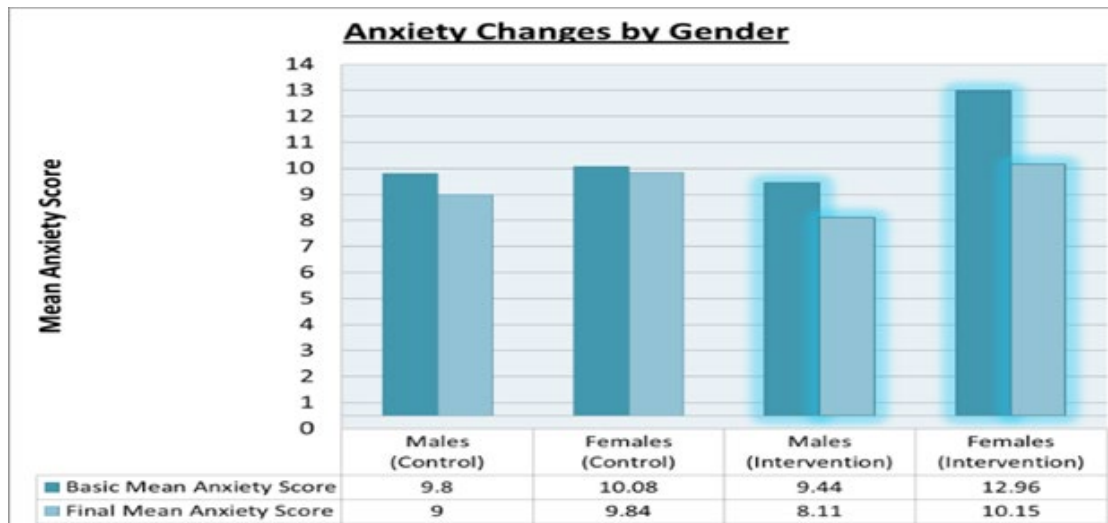
ported the mean pre-film score as 12.96 and the post-film score as 10.15 (Figure2).

**Discussion**

The results of the study indicated that a brief educational video was effective in reducing the level of dental anxiety as measured by the modified dental anxiety scale (MDAS). Patients who watched the film had a 2.43 (20.14%) reduction in the mean anxiety score. This is especially substantial compared to the control group; whom their mean anxiety level was reduced by 0.4 (4%) only. This significant reduction in anxiety highlights the need for proper patient education in the Dental setting. Patients who are aware of the procedure may not be as anxious as those who are not properly educated. This reduction in anxiety was present regardless of age or previous RCT experience, which supports the need for education as an anxiety reduction tool in all types of patients.



**Figure 1**



**Figure 2**

Furthermore, this study showed gender differences in that males had a lower baseline anxiety level compared to females. This may be due to females' personality and psychological status, since men tend not to reveal their fear as women do.<sup>3</sup> These findings were similar to the results in a study by Ganesh R et al (2014) who realized this point regarding gender factor.<sup>11</sup>

Anxiety reduction has an extended effect on both patient's oral health and quality of treatment. It has been reported that adolescents who are dentally anxious have been shown to have more severe caries and a higher incidence of Dental caries than those who don't suffer from Dental anxiety.<sup>12</sup> Furthermore, patients may not be able to predict the state of pain under the influence of fear and anxiety.<sup>5</sup> Although unconsciously, if a patient is anxious or in extreme dental fear, he/she may avoid treatment by expressing a state of pain. The dentist actually explains it as fear rather than pain. Therefore, at the dental office, pain and anxiety are usually in association.<sup>13,14,15</sup>

Patient education in oral health settings is known to have various benefits. It can help in maximizing the importance of preventive oral habits and in determining the best treatment. Patient education can also help in minimizing fear and anxiety associated with a procedure,<sup>16</sup> which has been demonstrated in our study as well. This is particularly helpful in highly anxious groups, where prior knowledge about the steps of a procedure may be beneficial in reducing anxiety.<sup>17</sup> Dr. Sorrell in a study performed in 2009 about knowledge transfer to endodontic patients stated that a five-minute video can provide great precious knowledge for endodontic patients.<sup>10</sup>

### Conclusion

The results of this experimental study show that proper education prior to a feared dental procedure can decrease the level of anxiety amongst patients.

Consequently, this will enhance the patients' oral health, the quality of oral healthcare as well as saving precious clinical time.

Despite the fact that this study was conducted in the field of Endodontics, the results can be applied to different dental procedures.

Patient education is a well-known necessity and its beneficial effect on patients' anxiety accentuates this need even more.

### Recommendations

Increasing the sample size and including more male participants could further enhance & strengthen the results of this study. In addition, conducting the study on first experience patients will help in excluding the previous experience factor and in assessing the effect of education alone. Furthermore, this kind of study may also be performed within other specialties in the dental/medical field where anxiety reduction plays a vital role in patient cooperation such as oral surgery & cardiology.

### Acknowledgment

This research was part of Research Summer School in King Abdullah International Medical Research Center ( KAIMRC). With IRB approval RSS15/015.

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