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FACTORS INFLUENCING PAIN AND ANXIETY BEFORE ENDODONTIC TREATMENT: A CROSS-SECTIONAL STUDY

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Abstract

Background: Dental anxiety is a prevalent issue that can significantly impact patients' willingness to seek necessary dental care, particularly for invasive procedures like endodontic treatment. Factors influencing dental anxiety include previous negative experiences, fear of pain, and the nature of the treatment itself. This study aims to explore the levels of pain and anxiety among Saudi patients prior to root canal treatment and identify variables influencing these levels.

Objective: This study aimed to assess preoperative pain and anxiety levels in Saudi patients undergoing root canal treatment and to identify demographic and experiential factors that may affect these levels, ultimately providing recommendations for better management.

Methods: A cross-sectional study was conducted from July to November 2024, involving 664 Saudi citizens aged over 18 who were scheduled for non-surgical root canal treatment. Participants were recruited through social media platforms. A structured questionnaire was administered to assess demographic information, pain and anxiety levels, and factors influencing these experiences. Pain and anxiety were scored on a scale of 1 to 10.

Results: The average age of participants was 39.8 years, with a majority being married and well-educated. The median pain and anxiety scores were both 6, with 80.3% and 73.8% of respondents, respectively, rating their pain and anxiety levels above 4. Notably, 62.8% of patients reported using pain medication prior to treatment, while 75.5% had not used anxiety-relief medication. A significant proportion (51.4%) demonstrated low levels of awareness regarding the factors affecting pain and anxiety, suggesting a need for improved patient education.

Conclusion: The study highlights the multifaceted nature of dental anxiety and pain perception among Saudi patients before endodontic treatment. Key findings indicate that while many patients experience

ISSN:1624-1940
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significant anxiety and pain, a lack of awareness regarding the factors influencing these feelings persists. Enhanced educational interventions targeting these factors may improve patient experiences and treatment adherence, ultimately contributing to better oral health outcomes.

Keywords: Dental Anxiety, Dental Pain, Endodontic treatment, Saudi individual.

Introduction

Anxiety has been explained as the normal physiological response to stress (1)**.**
This condition can be manifested as dental anxiety, or in its severe form dental phobia, which is a common disorder marked by fear and anxiousness related to dental care (2,3). Direct personal experience (cognitive conditions) often constitutes a primary factor in dental anxiety, it is a multifactored disorder influenced by various factors, including gender, age, and the nature of dental procedures (4). Women, for instance, reported consistently higher levels than men (5). Certain dental procedures, especially the more intrusive ones, such as root canal treatments and extractions, are often perceived as highly stressful (1)**.** Stress in turn leads to exacerbating anticipatory anxiety, and pain (6). Consequently, dental anxiety can hinder treatment adherence and, lead to poorer oral health outcomes (4). Effective management of dental anxiety necessitates a comprehensive understanding of its multifaceted nature, including its impact on pain perception during treatment (7). While there is not a comprehensive history readily available for anxiety specifically before endodontic treatment, dental anxiety itself is a well-documented phenomenon. Studies suggest a significant portion of the population experiences dental anxiety, with estimates ranging from 10% to 80% of adults (8,9).This anxiety can lead to avoidance of necessary dental care, potentially impacting oral health (10). Possible Reasons for Anxiety: Fear of pain: Dental procedures, including root canals, are often associated with potential discomfort despite advancements in pain management (11). Negative past experiences: People who have had unpleasant dental experiences in the past may be more likely to feel anxious about future visits . Loss of control: Some patients experience anxiety due to the perceived lack of control during dental procedures. Fear of needles: Injections used for anesthesia can trigger anxiety in some individuals (12).

The experience of pain and anxiety in patients undergoing root canal treatment (RCT) has been extensively studied due to its significant impact on patient compliance and treatment outcomes. Several studies have identified key factors influencing these experiences, including demographic variables, psychological traits, and clinical history. Research has consistently shown that demographic variables such as gender and age significantly influence pain and anxiety levels before endodontic treatment. A study done in Riyadh by Alroomy (13) found that anxiety associated with root canal treatment is prevalent, particularly among young females presenting for new treatment. Moreover, Trait anxiety and fear of pain are significant predictors of pre-treatment anxiety. Paloma Frigo Busatto et al., reported that endodontic patients who express a general dislike for visiting the dentist exhibit higher anxiety levels, indicating a psychological predisposition to dental fear. Most of the existing research is concentrated in Western populations (14). Cultural differences in the perception of pain and anxiety have not been thoroughly explored, highlighting the need for Saudi population studies. Dental anxiety is a prevalent issue that significantly impacts patient compliance and oral health outcomes. Root canal treatment is often associated with high levels of anxiety and pain, which can deter individuals from seeking necessary care. This study aims to fill the knowledge gap regarding the specific factors that influence anxiety and pain in patients awaiting endodontic treatment.

ISSN:1624-1940
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Previous research has largely focused on dental anxiety related to general dental treatments rather than specifically addressing anxiety associated with endodontic procedures. Understanding the factors that contribute to anxiety and pain can help endodontists develop better strategies to manage and reduce these feelings, ultimately improving patient experiences and outcomes.
This study aimed to Assess preoperative levels of Saudi patient pain and anxiety before root canal treatment to identify variables that may affect these levels and to provide recommendations for managing it.

Methodology:

Study design and Setting:
This is a cross-sectional study design conducted between July-November 2024 in Saudi Arabia, aiming to assess pain and anxiety levels among Saudi Arabian citizens before root canal treatment. A social media recruitment campaign was conducted on platforms such as (Twitter, Snapchat, Instagram, WhatsApp, and Facebook) to maximize participant recruitment from across Saudi Arabia.

Sample size:
Data collection for this study began in July 2024 and continued through December of the same year. A target sample of 384 patients was determined to be necessary for a 95% confidence level and a 5% margin of error. This sample size was calculated using a standard formula in which the desired confidence level and acceptable error rate are key factors. n = P(1-P) * Zα 2 / d 2 with a 95% confidence level. n: Calculated sample size. Z: The z-value for the selected level of confidence (1- a) = 1.96. P: An estimated prevalence of knowledge. Q: (1 – 0.50) = 50%, i.e., 0.50. D: The maximum acceptable error = 0.05. Therefore, the calculated minimum sample size was: n = (1.96)2 X 0.50 X 0.50/(0.05) 2 = 384 Based on these parameters, a minimum sample size of 384 participants was established.

Inclusion and Exclusion criteria:
Male and female Saudi citizens over the age of eighteen who agreed to participate in the study, answer the questionnaire, and have appointment for initiating or continuation of non-surgical root canal treatment were included. Patients with cognitive impairment, pregnant females, and those under the age of eighteen and either not living in Saudi Arabia or does not agree to participate were excluded.

Method for data collection, instrument, and score system:
Data collection was done using the participants' answers to the survey questions. The questionnaire consists of three parts. Part 1 starts with briefly describing the study and the consent question. Part 2 includes demographic features such as age, gender, residential area, educational qualifications, and income. Part 3, The participants was asked about the Factors Influencing Pain and Anxiety Before Endodontic Treatment With the author's permission, some of the survey questions were relied upon from their questionnaire form. Patients attending the Department of Endodontics for an endodontic visit were recruited in the study. Study investigators asked the patient if he/she was willing to participate in the study (15).

Scoring system:
In all, 24 statements served to assess the participants' attitudes and degree of knowledge. 9 statements for demographics, 10 for knowledge, and 5 for awareness. One point is given for correct answers, and

ISSN:1624-1940
http://magellanes.com/

zero points are given for incorrect answers or "I don't know". For scoring, we utilized Likert scales (Dichotomous, Three-Point, and Quality Scales) The maximum score was 37 and divided as follows: The original Bloom's cut-off points, 80.0%-100.0%, 60.0%-70%, and 59.0%, The participants were divided into three groups based on their scores.
knowledge score varied from 0 to 25 points and was classified into three levels as follows: those with a score of 14 or below (≤ 14) were classified as having a **low level of knowledge**, those with scores between 15 and 19 as having a **moderate level of knowledge**, and those with scores 20 or above (≥ 20) as a **high level of knowledge.**
Awareness scores varied from 0 to 25 points and were classified into three levels as follows: those with a score of 14 or below (≤ 14) were classified as having a **low level of awareness**, those with scores between 15 and 19 as having a **moderate level of awareness**, and those with scores 20 or above (≥ 20) as having a **high level of awareness**.

Pilot test:
Once the questionnaires were sent out, 20 participants were asked to fill them out. This was done in order to assess the feasibility of the study and the ease of use of the questionnaire.

Analyzes and entry method:
Data from the research were coded and entered to an Excel spreadsheet, and subsequently double-checked to verify their accuracy. The analysis of data was carried out using Statistical Package for Social Sciences Computer Software (SPSS 21.0, Inc., Chicago, USA). Descriptive statistics such as frequency and percentage were used to describe the sociodemographic variable. Chi-square tests were used to compare study variables, a probability value of less than 0.05 was regarded as statistically significant.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (664). Overall participants average in age is 39.8 years. With a standard deviation of 13.5 which is relatively mature cohort mostly 25 to 50 years old provide over half of sample. The points show the gender distribution is very high at 57.1% as this could point to some gender specific trends in the data collected. The most prominent social dynamic between the study context and marital status is that more than half, 57.8%, are married. The localized nature of the sample appears from the overwhelming representation of Saudi nationals (93.2%), while the regional distribution, which appears from 50.3% for Eastern nationals, suggests its concentration in that region. Regarding the participants' educational level, a major 61.1% possess a bachelor's degree, meaning they have a well-educated pool. Additionally, a large portion of the sample (18.7 percent unemployed, 20.0 percent retired) may also have economic instability or engagement in the study context.

Table (1): Sociodemographic characteristics of participants (n=664)

Parameter		***No.***	***Percent (%)***
Age	25 or less	134	20.2
(Mean:39.8, STD:13.5)	26 to 30	110	16.6

ISSN:1624-1940
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	31 to 40	112	16.9
	41 to 50	125	18.8
	51 to 55	81	12.2
	More than 55	102	15.4
Gender	Female	379	57.1
	Male	285	42.9
Marital status	Single	229	34.5
	Married	384	57.8
	Divorced	37	5.6
	Widowed	14	2.1
Nationality	Saudi	619	93.2
	Non-Saudi	45	6.8
Region	Northern region	32	4.8
	Southern region	150	22.6
	Central region	117	17.6
	Eastern region	334	50.3
	Western region	31	4.7
Monthly income	Less than 1000 SAR	90	13.6
	1000 to 5000 SAR	151	22.7
	5001 to 10000 SAR	147	22.1
	10001 to 15000 SAR	117	17.6
	More than 15000 SAR	159	23.9
Educational level	Middle school	14	2.1
	High school	83	12.5
	Diploma	50	7.5
	Bachelor's	406	61.1
	Higher education	111	16.7
Employment status	Student	90	13.6
	Part-time employee	2	.3
	Full-time employee	12	1.8
	Business	33	5.0
	Employee	270	40.7
	Unemployed	124	18.7
	Retired	133	20.0

As shown in figure 1, It turns out there is a pattern for how often people get dental checked based on a total sample of 664 individuals that we pulled. 13.8% (92 participants) follow the recommended guideline of visiting the dentist once every six months, and a greater group of 23.9% (159 participants) visit every six or twelve months. On the other hand, a substantial proportion numbered 28.0% (186 participants) tend to attend their dentist less frequently than once a year. Unsurprisingly, the greatest number of respondents, or 34.2 percent (227), reported that they never go to regular dental checkups.

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Figure (1): Rate of visiting the dentist for a regular checkup among participants.

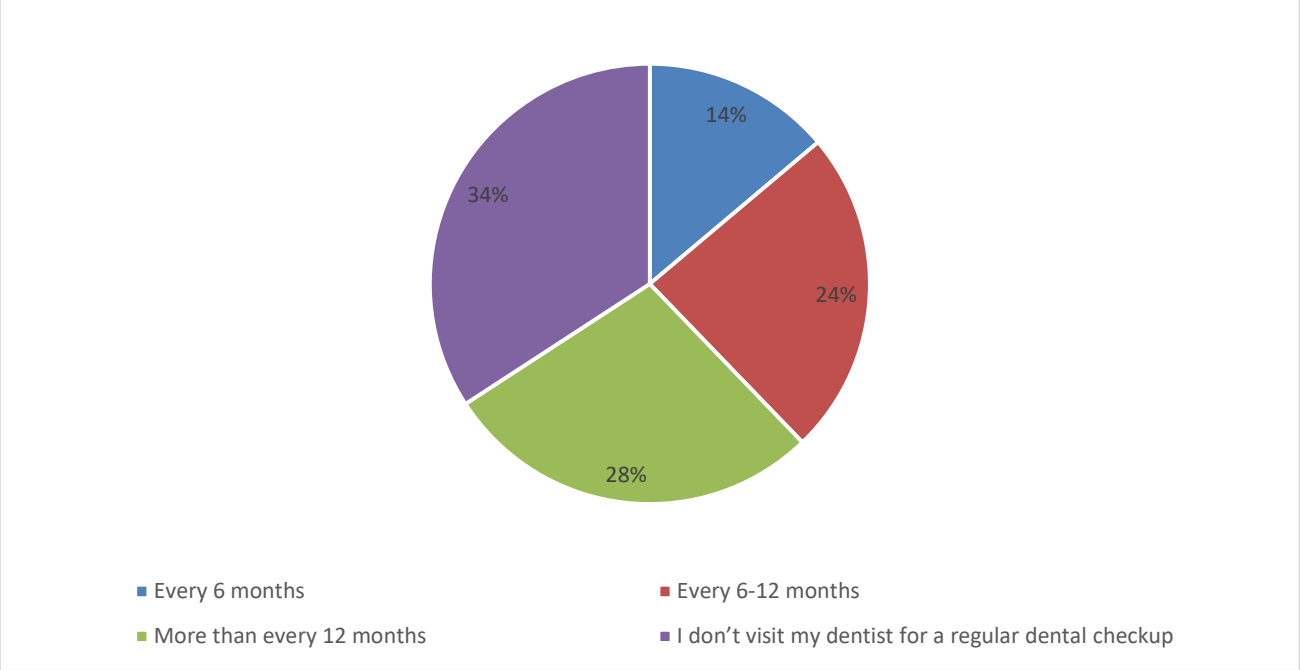

Table 2 gives some interesting information as regards the parameters of the patients' perceptions and experiences associated to the pain and anxiety prior to treatment resulting from endodontic treatment in a sample of 664 individuals. 74.2 percent of these patients surveyed said that the cost of treatment was not a concern, and thus, financial factors seem to be only a secondary obstacle encountered when patients seek necessary dental care. Despite this, 34.2% reported infrequent dental visits, and a median pain score of 6 and anxiety score of 6, with 80.3% and 73.8% of respondents respectively rating their pain and anxiety above 4. Meanwhile the data shows that more than a large portion of patients (62.8%) had been on medication to treat pain prior to going in to be treated, and a higher proportion (75.5%) had not been on medication to ease anxiety.

Table (2): Parameters related to knowledge about factors infusing pain and anxiety before endodontic treatment score results. (n=664).

Parameter		***No.***	***Percent (%)***
Is the cost of this treatment a concern?	Yes	109	16.4
	No	493	74.2
	I don't know	62	9.3
How often do you visit your dentist for a regular checkup?	Every 6 months	92	13.9
	Every 6-12 months	159	23.9
	More than every 12 months	186	28.0
	I don't visit my	227	34.2

ISSN:1624-1940
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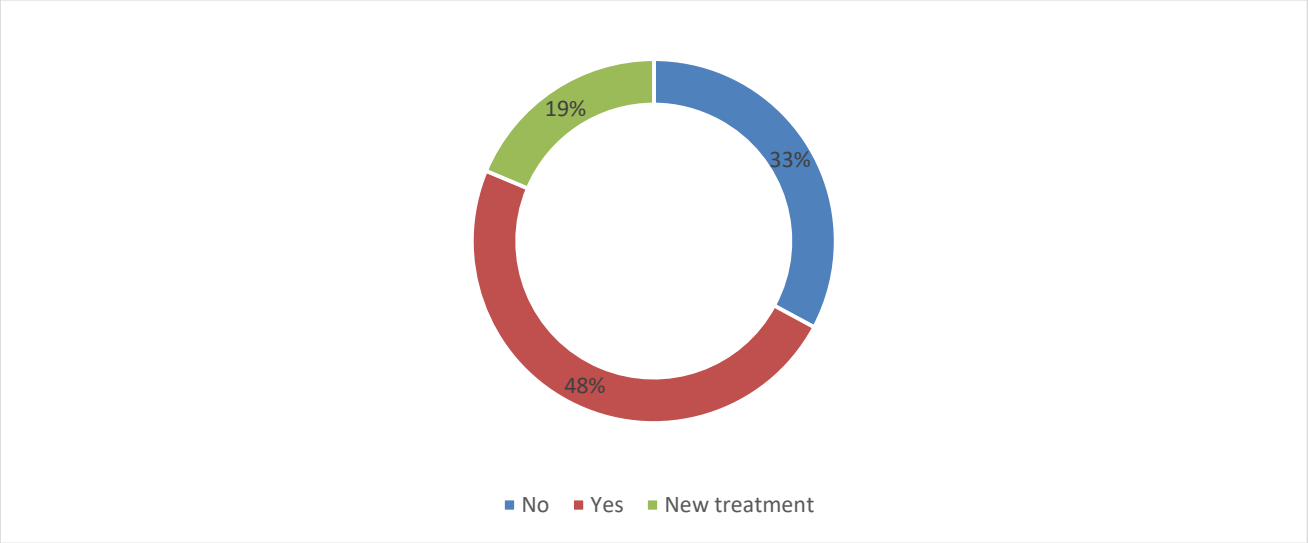
	dentist for a regular dental checkup		
How long have you been waiting today for your root canal treatment?	Less than 15 minutes	187	28.2
	More than 15 minutes	477	71.8
Please identify the level of pain you felt before starting the treatment in a scale from 0 to 10 (giving that 0 being no pain felt and 10 being the most intense pain you have ever experienced) (Median:6)	Not in pain ≤3	131	19.7
	In pain ≥4	533	80.3
Have you taken any medication to reduce your pain in the last 4 hours?	No	247	37.2
	Yes	417	62.8
Please identify the level of anxiety you've experienced before starting the treatment in a scale from 0 to 10 (giving that 0 being not anxious and 10 being the most anxious you have ever been) (Median: 6)	Not anxious ≤3	174	26.2
	Anxious ≥4	490	73.8
Have you taken any medication to reduce your anxiety in the last 4 hours?	No	501	75.5
	Yes	163	24.5

As shown in figure (2), Results based on the sample of 664 respondents help shed light on the continuity of dental treatment delivered under the same practitioner. 322 participants (or about 48.4%) confirmed that their ongoing treatment was performed by a dentist same as who started their care. About 32.8 percent (218 respondents) said their current dentist didn't start their journey of treatment. Further, a significant proportion of the population, with 124 subjects (18.6%) each receiving new treatment from potentially other providers.

Figure (2): Illustrates if the dentist is the same person that initiated the treatment among participants.



ISSN:1624-1940
http://magellanes.com/

Table 3 presents the data which gives a lot of insight into the awareness and perception of those involved in endodontic treatment as to what factors contribute to pain and anxiety prior to treatment in a sample of 664 patients. Importantly, a large percentage of participants (57.1%) did know the dentist who had carried out their root canal treatment, and this may be related to the fact that familiarity helps to engender trust and comfort. In addition, more than half (56.3 percent) of respondents indicated they were on a new treatment, referring to an active approach to dental health. Strangely enough, a large 48.5% of those that continued previous treatment were under the care of the same dentist who could impact their comfort and anxiety. They found that among dentists, there was a prevalent gendered majority of male practitioners (67.3%), and that the gendered composition of the profession might affect patient perceptions and to some extent experiences. Despite inherent anxieties associated with dental procedures, both the rate for root canal experiences (7 out of 10) and the overall dental experience (7 out of 10) received overall high median ratings.

Table (3): participants' awareness about factors infusing pain and anxiety before endodontic treatment score results. (n=664).

Parameter		***No.***	***Percent (%)***
Have you met the dentist who is going to perform the root canal treatment?	No	285	42.9
	Yes	379	57.1
At today's session, are you having a new treatment initiated or a continuation of a treatment that was previously initiated?	New treatment	374	56.3
	Previously initiated	290	43.7
If you are continuing previously initiated treatment, is the dentist the same person that initiated the treatment?	No	218	32.8
	Yes	322	48.5
	New treatment	124	18.7
What was the gender of the dentist who performed your last treatment?	Female	217	32.7
	Male	447	67.3
When did you have your last dental (other than root canal) treatment?	Within the last 6 months	107	16.1
	Between 6-12 months ago	98	14.8
	Over 1 Year ago	240	36.1
	I don't remember	166	25.0
	I have never had root canal treatment	53	8.0
Please rate your latest root canal treatment experience in a scale from 0 to 10 (giving that 0 is the worst and 10 is the best dental experience you have ever had) (Median:7)	Bad ≤3	117	17.6
	Good ≥4	547	82.4
Please rate your latest dental experience (despite root canal treatment) in a scale from 0 to 10 (giving that 0 is the worst and 10 is the best dental experience you have ever had) (Median:7)	Bad ≤3	117	17.6
	Good ≥4	547	82.4

ISSN:1624-1940
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As shown in Table 4, significant trends are illustrated regarding patients' understanding of risk factors that contribute to pain and anxiety before endodontic treatment. Low patient education and preparation is highlighted as 51.4% of surveyed individuals showed low level of knowledge on this critical subject. At the same time, 17.6 percent of those with high knowledge and 31 percent in the moderate knowledge category.

Table (4): Shows knowledge about factors infusing pain and anxiety before endodontic treatment score results.

	Frequency	**Percent**
High knowledge Level	117	17.6
Moderate knowledge	206	31.0
Low knowledge level	341	51.4
Total	664	100.0

Table 5 shows the differing levels of awareness of the pain and anxiety associated factors preceding endodontic treatment between the population surveyed. Importantly, 38.7% of respondents were at a critical level of awareness which points to an obvious lag in patient education and communication strategy from a dental practice. On the contrary, only 27.1% of the population found themselves at a high level of awareness, indicating that although a part of the population is educated, a majority is not sufficiently educated about the possible psychosomatic factors linked to the endodontic procedure.

Table (5): Shows awareness about factors infusing pain and anxiety before endodontic treatment score results.

	Frequency	**Percent**
High awareness level	180	27.1
Moderate awareness level	227	34.2
Low awareness level	257	38.7
Total	664	100.0

Table (6) shows that knowledge about factors infusing pain and anxiety before endodontic treatment has statistically significant relation to age (P value=0.030), marital status (P value=0.004), and nationality (P value=0.015). It also shows statistically insignificant relation to gender, region of residence, monthly income, educational level, employment status.

ISSN:1624-1940
http://magellanes.com/

Table (6): Relation between knowledge about factors infusing pain and anxiety before endodontic treatment and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=664)***	***P value****
		High or moderate knowledge	**Low knowledge level**		
Age	25 or less	58	76	134	0.030
		18.0%	22.3%	20.2%	
	26 to 30	44	66	110	
		13.6%	19.4%	16.6%	
	31 to 40	64	48	112	
		19.8%	14.1%	16.9%	
	41 to 50	71	54	125	
		22.0%	15.8%	18.8%	
	51 to 55	41	40	81	
		12.7%	11.7%	12.2%	
	More than 55	45	57	102	
		13.9%	16.7%	15.4%	
Gender	Female	195	184	379	0.095
		60.4%	54.0%	57.1%	
	Male	128	157	285	
		39.6%	46.0%	42.9%	
Marital status	Single	93	136	229	0.004
		28.8%	39.9%	34.5%	
	Married	196	188	384	
		60.7%	55.1%	57.8%	
	Divorced	25	12	37	
		7.7%	3.5%	5.6%	
	Widowed	9	5	14	
		2.8%	1.5%	2.1%	
Nationality	Saudi	309	310	619	0.015
		95.7%	90.9%	93.2%	
	Non-Saudi	14	31	45	
		4.3%	9.1%	6.8%	
Region of residence	Northern region	12	20	32	0.431
		3.7%	5.9%	4.8%	
	Southern region	67	83	150	
		20.7%	24.3%	22.6%	
	Central region	58	59	117	
		18.0%	17.3%	17.6%	
	Eastern region	172	162	334	
		53.3%	47.5%	50.3%	
	Western region	14	17	31	
		4.3%	5.0%	4.7%	

ISSN:1624-1940
http://magellanes.com/

Monthly income	Less than 1000 SAR	42	48	90	0.995
		13.0%	14.1%	13.6%	
	1000 to 5000 SAR	73	78	151	
		22.6%	22.9%	22.7%	
	5001 to 10000 SAR	72	75	147	
		22.3%	22.0%	22.1%	
	10001 to 15000 SAR	58	59	117	
		18.0%	17.3%	17.6%	
	More than 15000 SAR	78	81	159	
		24.1%	23.8%	23.9%	
Educational level	Middle school	6	8	14	0.862
		1.9%	2.3%	2.1%	
	High school	40	43	83	
		12.4%	12.6%	12.5%	
	Diploma	27	23	50	
		8.4%	6.7%	7.5%	
	Bachelor's	193	213	406	
		59.8%	62.5%	61.1%	
	Higher education	57	54	111	
		17.6%	15.8%	16.7%	
Employment status	Student	39	51	90	0.936
		12.1%	15.0%	13.6%	
	Part-time employee	1	1	2	
		0.3%	0.3%	0.3%	
	Full-time employee	6	6	12	
		1.9%	1.8%	1.8%	
	Business	137	133	270	
		42.4%	39.0%	40.7%	
	Employee	16	17	33	
		5.0%	5.0%	5.0%	
	Unemployed	62	62	124	
		19.2%	18.2%	18.7%	
	Retired	62	71	133	
		19.2%	20.8%	20.0%	

****P value was considered significant if ≤ 0.05.***

Table (7) shows that awareness about factors infusing pain and anxiety before endodontic treatment has statistically significant relation to region of residence (P value=0.029), and educational level (P value=0.023). It also shows statistically insignificant relation to age, gender, marital status, nationality, monthly income, and employment status.

Table (7): Awareness about factors infusing pain and anxiety before endodontic treatment in association with sociodemographic characteristics.

ISSN:1624-1940
http://magellanes.com/

Parameters		***Awareness level***		***Total (N=664)***	***P value****
		High or moderate level	**Low awareness level**		
Age	25 or less	75	59	134	0.142
		18.4%	23.0%	20.2%	
	26 to 30	70	40	110	
		17.2%	15.6%	16.6%	
	31 to 40	78	34	112	
		19.2%	13.2%	16.9%	
	41 to 50	81	44	125	
		19.9%	17.1%	18.8%	
	51 to 55	48	33	81	
		11.8%	12.8%	12.2%	
	More than 55	55	47	102	
		13.5%	18.3%	15.4%	
Gender	Female	243	136	379	0.085
		59.7%	52.9%	57.1%	
	Male	164	121	285	
		40.3%	47.1%	42.9%	
Marital status	Single	138	91	229	0.335
		33.9%	35.4%	34.5%	
	Married	237	147	384	
		58.2%	57.2%	57.8%	
	Divorced	26	11	37	
		6.4%	4.3%	5.6%	
	Widowed	6	8	14	
		1.5%	3.1%	2.1%	
Nationality	Saudi	376	243	619	0.279
		92.4%	94.6%	93.2%	
	Non-Saudi	31	14	45	
		7.6%	5.4%	6.8%	
Region of residence	Northern region	24	8	32	0.029
		5.9%	3.1%	4.8%	
	Southern region	84	66	150	
		20.6%	25.7%	22.6%	
	Central region	61	56	117	
		15.0%	21.8%	17.6%	
	Eastern region	218	116	334	
		53.6%	45.1%	50.3%	
	Western region	20	11	31	
		4.9%	4.3%	4.7%	
Monthly income	Less than 1000 SAR	57	33	90	0.338
		14.0%	12.8%	13.6%	
	1000 to 5000 SAR	82	69	151	
		20.1%	26.8%	22.7%	
	5001 to 10000 SAR	94	53	147	
		23.1%	20.6%	22.1%	

ISSN:1624-1940
http://magellanes.com/

	10001 to 15000 SAR	71	46	117	
		17.4%	17.9%	17.6%	
	More than 15000 SAR	103	56	159	
		25.3%	21.8%	23.9%	
Educational level	Middle school	4	10	14	0.023
		1.0%	3.9%	2.1%	
	High school	46	37	83	
		11.3%	14.4%	12.5%	
	Diploma	30	20	50	
		7.4%	7.8%	7.5%	
	Bachelor's	249	157	406	
		61.2%	61.1%	61.1%	
	Higher education	78	33	111	
		19.2%	12.8%	16.7%	
Employment status	Student	49	41	90	0.149
		12.0%	16.0%	13.6%	
	Part-time employee	2	0	2	
		0.5%	0.0%	0.3%	
	Full-time employee	7	5	12	
		1.7%	1.9%	1.8%	
	Business	21	12	33	
		5.2%	4.7%	5.0%	
	Employee	174	96	270	
		42.8%	37.4%	40.7%	
	Unemployed	83	41	124	
		20.4%	16.0%	18.7%	
	Retired	71	62	133	
		17.4%	24.1%	20.0%	

P value was considered significant if ≤ 0.05.

Discussion:

For some patients, visiting the dentist can be an extremely stressful experience that may result in a perceived lack of coping skills. This has been reported to be a major reason for patients to delay or cancel dental appointments and therefore for avoidance of dental care as a consequence. This may result in a significant deterioration of oral and dental health. Patients who need endodontic treatment are often burdened by two main concerns, the length of the procedure and pain (16). Endodontic treatment is often accompanied by negative connotations caused by the patient's unfounded perceptions. Many patients who have not experienced endodontic treatment would rather undergo a tooth extraction, however, of the patients who actually underwent endodontic treatment, only 17% described it as an extremely painful experience, and 96.3% agreed to the re-intervention (17). The behaviour that is shaped by painful experience can be conditioned and unconditioned. Dental anxiety is caused by a specific stressful situation in a dental office. Fear usually begins after traumatic experiences in childhood or by adopting phobic behaviour learned from parents (18). Anxiety can be caused by the expectation of a threatening situation, perception of which involves the cognitive processes. One of the parameters that have a major impact on the cognitive processes is fear of dental pain, and also knowledge, feelings, and beliefs (19). Dental fear is a

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reaction to a known danger because it occurs in people who have already had a number of negative dental experiences and who expect the bad experience to be repeated. The most intense form of the fear of dentist is dental phobia (20). Thus, we aimed in this study to assess preoperative levels of Saudi patient pain and anxiety before root canal treatment to identify variables that may affect these levels and to provide recommendations for managing it.

In our study, we explored the perceptions and experiences of 664 patients regarding pain and anxiety before undergoing endodontic treatment, yielding findings that both align with and diverge from previous research. Notably, while 74.2% of our participants did not regard treatment costs as a significant concern, contrasting findings from an Australian study indicated that anxiety and fear in endodontics were influenced by ethnicity (21). However, ethnicity did not emerge as a significant factor in our analysis, potentially due to the differing ethnic compositions of the patient populations studied. Additionally, we found that 34.2% of participants reported infrequent dental visits, yet this variable, along with employment status, educational level, and anxiety medications, did not correlate significantly with pretreatment pain or anxiety in our cohort. This is in contrast to earlier findings where patients who infrequently visited the dentist exhibited heightened anxiety, particularly among those with higher educational attainment (22). Moreover, our study revealed that 62.8% of patients had taken medication for pain prior to treatment, while 75.5% had not used medication to manage anxiety. This aligns with findings from a Brazilian study that indicated an inverse relationship between anxiety and knowledge regarding root canal treatment (23). The low levels of patient education observed in our study, where 51.4% demonstrated insufficient knowledge about pain and anxiety factors, suggest a need for improved educational interventions in endodontic care. Interestingly, while a previous study (24) noted that longer waiting times in the reception area correlated with increased anxiety, we did not observe this effect, likely due to the differing patient demographics, as our participants were not uniformly anxious or referred for sedation. Notably, a recent systematic review has established that factors such as age, sex, and ethnicity significantly contribute to dental anxiety levels, alongside previous experiences of non-surgical endodontic treatment (25). This suggests the multifaceted nature of patient anxiety, which may partially explain the elevated median pain and anxiety scores of 6 identified in our cohort. Furthermore, our findings support the observation that certain dental procedures, particularly root canal treatment, are notorious for inducing anxiety and discomfort among patients. The American Association of Endodontics (26) corroborates this perception, revealing that negative public views regarding root canal treatment are predominantly linked to anticipated pain associated with these procedures. This sentiment aligns with our study, as 62.8% of patients reported having taken medication for pain prior to their treatment, indicating a direct response to their anticipatory anxiety or experiences of prior discomfort. Additionally, Wali et al. (27) identified that 13% of patients in their study canceled endodontic appointments due to fears related to pain. This finding echoes our data, where we noted that despite the majority of participants (74.2%) did not express treatment costs as a significant concern, there remains a considerable proportion (34.2%) who infrequently visit the dentist. The correlation between infrequent dental visits and anxiety, as suggested in previous studies, could indicate a cycle of avoidance stemming from fear, thereby necessitating interventions that address both education and anxiety management.

Conclusion:

In conclusion, our cross-sectional study highlights significant factors influencing pain and anxiety levels among Saudi patients prior to endodontic treatment. With a median pain score of 6 and an anxiety score

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of 6, a substantial majority of participants reported elevated levels of both pain and anxiety, indicating the need for targeted interventions. Notably, the study revealed a concerning gap in patient education, with over half of the respondents demonstrating low awareness of factors contributing to their anxiety and pain. Familiarity with the treating dentist appeared to mitigate anxiety, suggesting that building patient-dentist relationships could enhance comfort levels. Furthermore, while financial concerns were not deemed significant by most participants, the correlation between infrequent dental visits and heightened anxiety underscores the necessity for proactive educational strategies. Overall, addressing these multifaceted influences through improved communication, education, and anxiety management techniques is crucial for enhancing patient experiences and promoting adherence to necessary dental treatments.

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Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability

All data associated with this study are present in the paper.

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