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Original research article

Self-care tendencies and their pain-relieving effects in patients with endodontic pain: a descriptive survey

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Abstract

Objective: This paper aims to search for sociodemographic/dental models predicting the self-care orientations in endodontic patients and to explore the effectiveness of the applied methods in relieving pain.

Materials and Method: Patients with a history of endodontic pain presenting at the endodontic clinic of Gazi University were subjected to a survey. Their sociodemographic and clinical data were obtained. They were asked to select from a structured list whether they had used any self- or formal care methods. Pain relief was measured using a 5-point standard Likert scale. Statistical analyses were done using multivariate logistic regression, Wilcoxon and Kruskal-Wallis tests, and Benjamini-Hochberg correction.

Results: Among 356 patients, 90% applied self-care alone or in combination with formal care. Maximum pain level, age, and pattern of dental clinic attendance were the variables that predicted orientations to various subcategories of self-care behaviors, with the first two variables remaining statistically or marginally significant in all tested conditions ($P < .05$ or $< .10$). Among the home remedies, drinking or local application of alcohol and intraoral cold treatment by the patient provided significantly greater pain relief than the others ($P = .001$). Medication under the guidance of a professional was more effective than self-medication ($P < .001$; except for NSAIDs, which were similarly effective in both cases).

Conclusion: Before applying to the dental school hospital, most of the patients used various self-care methods for relieving toothache. Maximum pain and age were the common covariates of various self-care orientations. Overall, formal care relieved pain better than self-care. Home remedies generally displayed little effectiveness.

Keywords: Drug misuse; endodontics; home treatment; public health; toothache; traditional medicine

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[Abstract in Turkish is at the end of the manuscript]

Introduction

Tooth pain is a sign that warns the patient that something is wrong with the tooth and that they should take care of the situation. The accepted standard of care for tooth pain is obviously professional dental treatment. However, patients may tend to apply non-professional methods (self-care) solely or before eventually consulting a professional (formal care),[1-4] possibly due to their socio-cultural backgrounds, the intensity of their complaint, concerns about dental treatment, access to healthcare systems, *etc.*, Self-care is a universally recognized practice that often has beneficial effects and encompasses interpretation and treatment of symptoms, as well as disease prevention.[5] Practices such as using home remedies, self-medication, speaking with a relative/friend (non-professionals), alternative healthcare, *etc.*, are considered among self-care behaviors.[1-3,6]

Among the self-care applications, home remedies are therapies that can be carried out at home, typically using everyday products and ingredients to treat illnesses or enhance health. They are very popular among people,[2-9] and an online search (*e.g.*, Google, Yahoo) inquiring "How to relieve tooth pain OR toothache?" returns predominantly with various home remedy recommendations (*e.g.*, salt water rinse, clove oil, garlic, *etc.*).

Self-medication is regarded by many dental pain sufferers as first-aid, and it can indeed be useful.[1-3,5-7,10-13] However, inappropriate self-medication can do more harm than good (*e.g.*, development of bacterial resistance against antibiotics, gastrointestinal complications with NSAID use, *etc.*). However, with previous experiences or recommendations from non-professionals, self-medication is often used by endodontic patients.

Studies have been done concerning self-care applications in oral or dental problems.[1-3,5,6,9] However, there are limited studies that have focused particularly on endodontic patients.[10-12] Also, there is little knowledge about how self-care strategies relieve dental pain.[1,3] To this end, the aims of this study were:

1) to determine whether patients with endodontic pain refer to any care method before applying to the dental school hospital (self-care or formal care), determine the varieties and frequencies of the methods used by these patients, and search for sociodemographic and dental models explaining endodontic patients' self-care practice behavior (primary aim),

2) to examine the effectiveness of the applied methods in relieving the pain (secondary aim).

Materials and Method

This is a descriptive study in which endodontic patients' self- or formal care practice behaviors were recorded via a survey, and their pain relief was analyzed exploratively with clinically relevant comparisons. This study was approved by the Clinical Research Ethics Committee of Gazi University Faculty of Dentistry (decision no: GUDHKAEK. 2022.19/2; 06.10.2022) and was carried out according to the STROBE checklist for observational studies.[14]

Establishing the list of self-care applications

Categorized lists of self-care behaviors for dental pain were taken as templates.[2,3] Following translation into the Turkish language and cultural adaptation, the categorized items were presented to 115 endodontic patients, and the patients were asked whether they applied any of these items or any other unlisted application for pain relief. Other applications reported by the patients were added to the draft list (provided that an item was reported by at least 2 different patients). How a new item would be placed in the categorization was discussed and decided by two investigators (H.B. and G.K.). Otherwise, existing items that were not selected by at least two patients were removed from the draft list. The final version of the applications list is shown in Figure 1.

The questionnaire

The data were collected standardized for all patients and were based on patients' self-reports, dental/medical charts, and clinical examination findings. The questionnaire consisted mainly of 3 parts:

1) sociodemographic and clinical data,

2) the categorized list of self- and formal care methods,

3) a rating scale for measuring the effectiveness of the care method: (5-point standard Likert scale containing the following ordinal gradations: 0 = no pain relief, 1 = a little pain relief, 2 = moderate pain relief, 3 = a lot of pain relief, and 4 = complete pain relief).[15]

Study design

This study was carried out at the general endodontic training clinic of the Faculty of Dentistry, Gazi University. Patients with a history of spontaneous pain requiring primary endodontic treatment of a tooth (the exposure) were included in the study between November 2022 and July 2023. The exclusion criteria and the flowchart of the study are shown in Figure 2. To avoid interviewer bias toward selecting a patient with a greater intensity of pain, any patient with a previous pain intensity ≥ 1 (0-10; NRS) was included in the study.

Using convenience sampling, the investigators questioned all scheduled patients successively. An informed consent was obtained, and the contents of the form were shown and read aloud to the patient. Some items like 'spoke to a relative, friend or neighbor' (mostly resulted in recommendations for seeing a dentist) or 'professional services' (mostly resulted in prescription or referral to dental school hospital) could not be rated. Also, to reduce recall bias, patients were told not to rate the pain relief if they could not remember. Missing data that occurred this way or due to improper data collection by the investigator were neglected, and the analyses were conducted with the available data.

Diagnostics included routine radiographical and clinical examination (*e.g.*, inspection, palpation, percussion, *etc.*). The patients' preoperative indefinite pulpal diagnoses were confirmed upon endodontic access by observing the bleeding coming from the pulp chamber. Partially necrotic teeth (pulp necrobiosis) were considered necrotic.

Statistical analyses

Model search

The factors affecting the self-care practice were evaluated by constructing multivariate models. The dependent variable was the self-care use by the patient. A two-valued dependent variable was formed by coding a patient applying self-care as 1 and coding others as 0. Below, three tested self-care conditions are shown (behavioral outcomes):

1) Self-medication (Sa); if applied (code 1), otherwise (code 0)

2) Home remedies (Sb); if applied (code 1), otherwise (code 0)

3) Home remedies (Sb) OR spoke with a relative, friend, or neighbor (Sc) OR alternate healthcare (Sd): if at least one applied (code 1), otherwise (code 0)

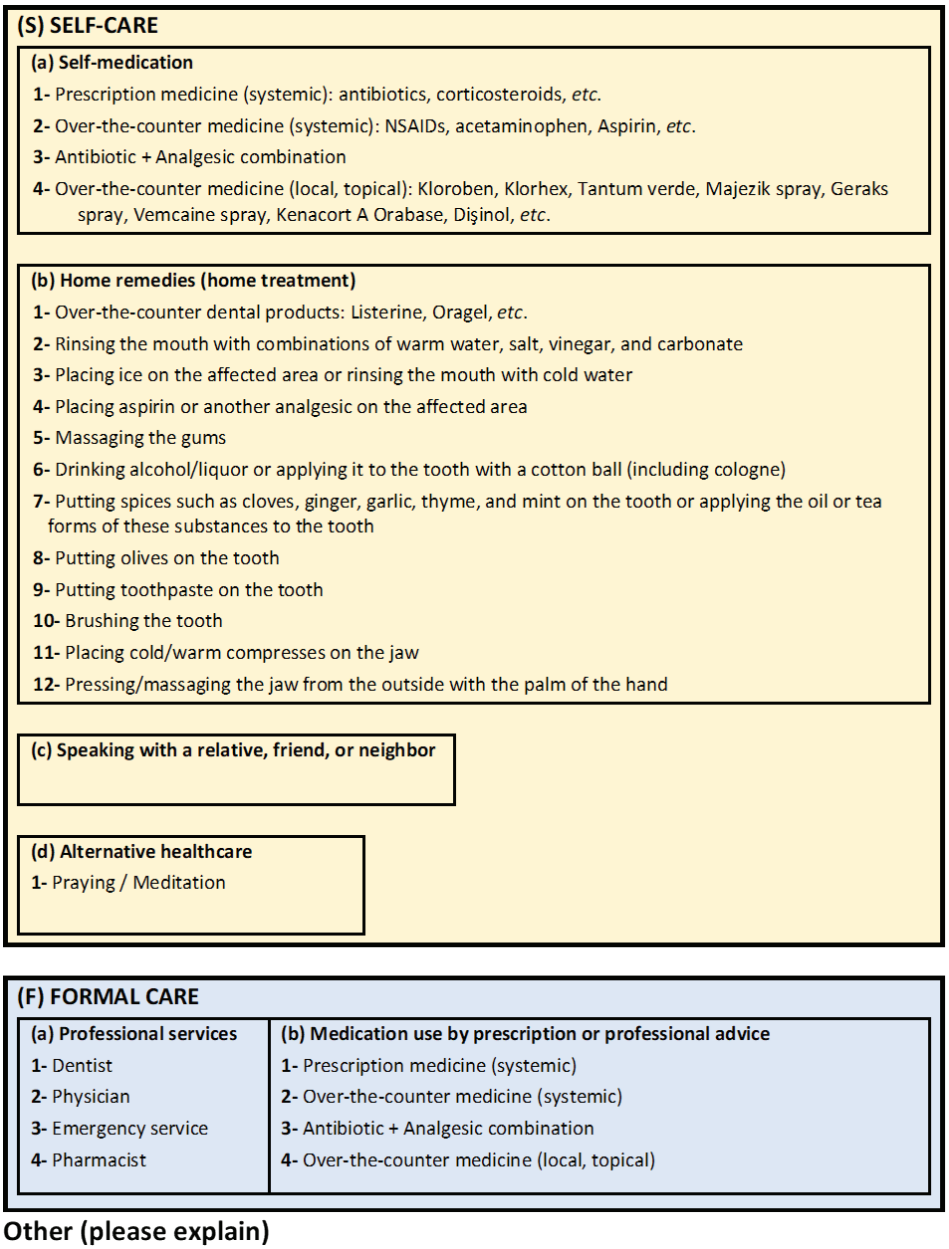

Figure 1. *The final version of the applications list*

For each condition, models were sought in 2 separate contexts: dental and sociodemographic. The dental context included the independent variables: sex, age (years), ASA health status,[16] tooth type, jaw, duration of pain (days), AAE pulpal and periapical status,[17] maximum and minimum pain levels (NRS; 0-10, each), whereas the sociodemographic context included: sex, age, ASA health status, education level, household income, marital status, residence, and pattern of dental clinic attendance. Sex, age, and health status as potential confounders were common in both contexts and included in statistical analyses for control. No categorization was done for the numerical variables, age, duration of pain, and pain levels. These were analyzed as continuous data.

First, univariate analyses were performed using logistic regression and correlation tests (Kendall's; between the binary dependent variable and continuous independent variables), and variable selection was performed ($P \leq .10$, as default). Additional dummy variables were tested for education level, marital status, and periapical status. Significant (candidate) variables were entered into a multivariate analysis, so a saturated model was obtained. A final reduced model was established (statistically significant: $P < .05$ or marginally significant: $.05 < P < .10$) with a backward stepwise regression approach, eliminating the insignificant variables one by one, and deleting the one with the greatest p-value each time. A combined model was also tested. Analyses were done using R Statistical Software (v4.2.1).[18]

Pain relief

The pain relief analysis included the data of all patients, regardless of their pulpal status. Non-parametric Wilcoxon rank sum test was used for the comparison of the two groups. Non-parametric Kruskal-Wallis test was used for the comparison of more than two groups and post-hoc pairwise comparisons were done using the Benjamini-Hochberg correction. Relevant statistical comparisons were made between and among self-care and formal care applications (comparisons designated №1-8). If the observation number was less than 10, it was not included in the statistical analysis. Statistical significance was set at $P < .05$. An analysis of pain relief restricted to patients with symptomatic irreversible pulpitis was also performed.

Sample size calculation

In calculating the sample size for logistic regression models, Peduzzi's approach was used.[19] This approach calculates the sample size as n=10(k)/p, where k represents the number of independent variables, and p represents the smallest probability of dependent variable levels. The k value was 10 for the dental model (the model with the greatest number of independent variables). According to the pilot test findings [p=min (0.34,0.66)], p was 0.34. Thus, the minimum required number of patients was n=10(10)/0.34=295.

Results

From 999 patients examined for eligibility, 643 were excluded, so the final dataset included 356 patients (see Figure 2 for exclusions and the flowchart). The descriptive sociodemographic and dental data are shown in Table 1. Most patients had applied self-and/or formal care before presenting to the observation setting (n=339). Furthermore, 89.9% of the patients applied self-care alone or in combination with formal care (Table 1).

Model search

Univariate findings are shown in Table 2 (here, only of patients who applied at least one of Sb, Sc, or Sd; data not shown for the other conditions). Among the tested models, the combination model performed better than the separate dental or sociodemographic models (included more statistically significant variables and had greater accuracy, sensitivity, and specificity values). For the three models, the Hosmer-Lemeshow goodness-of-fit test indicated no evidence of poor fit ($P > .10$). The coefficients and performances of the multivariate models are given in Table 3. Note that maximum pain was the strongest predictor variable, and results in Table 3 were adjusted for possible confounders of age and pattern of dental clinic attendance since these were found to be marginally or statistically significant in the saturated models ($P < .10$).

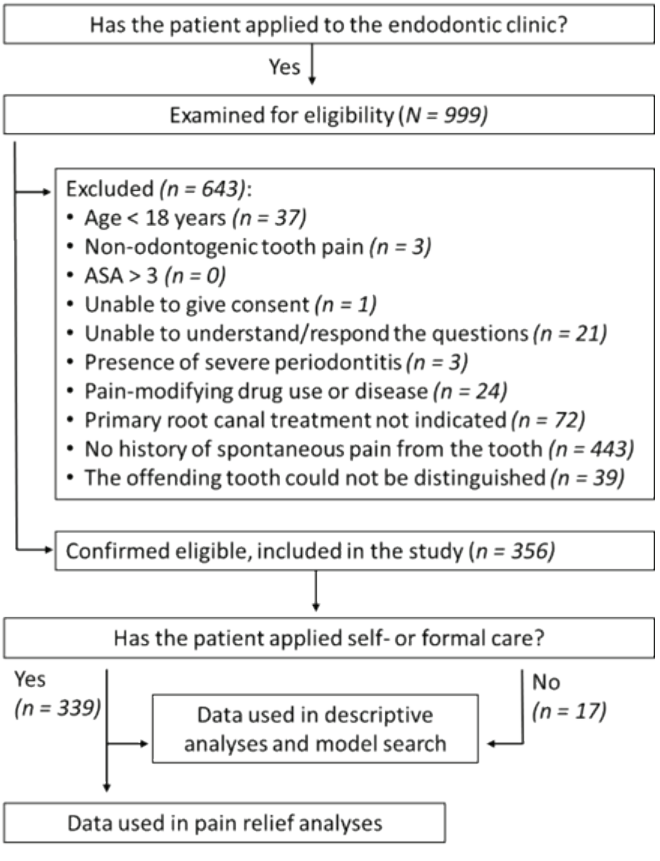

Figure 2. *The flowchart of the study*

Table 1. *Descriptive sociodemographic and dental variables are presented as n (%), if not mentioned otherwise. Frequencies of patients who applied self-care, formal care, or none are shown at the end of the table.*

Sex and age male: 134 (mean age ± standard deviation: 38.4 ± 14.5 years; range: 18–79 years) female: 222 (mean age ± standard deviation: 35.0 ± 13.3 years; range: 18–73 years) total: 356 (mean age ± standard deviation: 36.3 ± 13.8 years; range: 18–79 years)
Jaw mandible: 184 (51.8) maxilla: 171 (48.2) missing data: 1
Tooth type posterior: 324 (91.3) anterior: 31 (8.7) missing data: 1
ASA 1: 121 (34) 2: 228 (64) 3: 7 (2)
Education level none: 1 (0.3) primary school: 47 (13.2) middle school: 35 (9.8) high school: 151 (42.4) associate degree: 24 (6.7) bachelor's degree: 86 (24.2) postgraduate degree: 12 (3.4)
Household income below minimum wage: 26 (7.3) minimum wage: 97 (27.2) above minimum wage: 233 (65.4)
Marital status married: 211 (59.3) separated: 0 (0) divorced: 9 (2.5) widowed: 4 (1.1) never married: 132 (37.1)
Residence urban: 173 (48.6) suburban: 180 (50.6) rural: 3 (0.8)
Pattern of dental clinic attendance goes when has a problem: 301 (84.6) goes occasionally: 28 (7.9) goes regularly: 27 (7.6)
Duration of pain: average: 84.4 days (standard deviation: 155.8 days; range: 1-1095 days)
Pulpal status symptomatic irreversible pulpitis: 224 (62.9) necrosis: 132 (37.1)
Periapical status normal apical tissue: 59 (16.6) symptomatic apical periodontitis: 247 (69.4) asymptomatic apical periodontitis: 26 (7.3) chronic apical abscess: 5 (1.4) acute apical abscess: 19 (5.3)
Maximum pain (NRS; 0-10): mean: 8.1 (standard deviation: 1.9, range: 1-10)
Minimum pain (NRS; 0-10): mean: 2.9 (standard deviation: 1.6, range: 0-10) missing data: 1
Frequency of patients applying methods (in general) Self-care only: 151 (42.4) Formal care only: 19 (5.3) Both: 169 (47.5) None: 17 (4.8)
Frequency of patients applying methods (specific)† Sa: 244 (68.5) Sb: 230 (64.6) Sc: 76 (21.3) Sd: 12 (3.4) Sb OR Sc OR Sd: 250 (70.2) Fa: 189 (53.1) Fb: 144 (40.4)

†Because a patient may have applied more than 1 method, the sum can exceed 100%. Abbreviations; Sa: self-medication, Sb: home remedies, Sc: Speaking with a relative, friend, or neighbor, Sd: alternative healthcare, Fa: professional services, Fb: medication use by prescription or professional advice, ASA: American Society of Anesthesiologists Physical Status Classification System, NRS: numerical rating scale,

Table 2. *Univariate statistical results using logistic regression tests (dependent variable is the application of 'home remedies' (Sb) OR 'speaking with a relative, friend, or neighbor' (Sc) OR application of 'alternate healthcare' (Sd); (code 1: if applied, code 0: otherwise)*

Variable	Code 0; n (%)	Code 1; n (%)	Odds ratio (90% CI)	P value
Education level				
Other (n=273)	75 (27.47)	198 (72.53)	1	
Middle school or less (n=83)	31 (32.53)	52 (62.65)	0.635 (0.412-0.986)	.086 *
Marital status				
Other (n=224)	74 (33.04)	150 (66.96)	1	
Never married (n=132)	32 (24.24)	100 (75.76)	1.542 (1.03-2.332)	.081 *
Household income				
Other (n=123)	38 (30.89)	85 (69.11)	1	
>Minimum wage (n=233)	68 (29.18)	165 (70.82)	1.085 (0.725-1.613)	.737
Residence				
Other (n=183)	59 (32.24)	124 (67.76)	1	
Urban (n=173)	47 (27.17)	126 (72.83)	1.276 (0.87-1.874)	.296
Pattern of dental clinic attendance				
Other (n=55)	9 (16.36)	46 (83.64)	1	
Goes when has a problem (n=301)	97 (32.23)	204 (67.77)	0.411 (0.21-0.751)	.021 **
Sex				
Male (n=134)	47 (35.07)	87 (64.93)	1	
Female (n=222)	59 (26.58)	163 (73.42)	1.492 (1.011-2.201)	.09 *
Age (cont. data)			0.977 (0.964-0.991)	.005 **
ASA				
Other (n=235)	69 (29.36)	166 (70.64)	1	
ASA1 (n=121)	37 (30.58)	84 (69.42)	0.944 (0.636-1.415)	.812
Jaw				
Mandible (n=184)	51 (27.72)	133 (72.28)	1	
Maxilla (n=171)	55 (32.16)	116 (67.84)	0.809 (0.551-1.185)	.361
Tooth type				
Anterior (n=31)	8 (25.81)	23 (74.19)	1	
Posterior (n=324)	98 (30.25)	226 (69.75)	0.802 (0.381-1.577)	.606
Duration of pain (cont. data)			1.000 (0.999-1.001)	.999
Pulpal status				
Necrosis (n=132)	34 (25.76)	98 (74.24)	1	
SIP (n=224)	72 (32.14)	152 (67.86)	0.732 (0.487-1.092)	.204
Periapical status				
Other (n=297)	87 (29.29)	210 (70.71)	1	
Normal (n=59)	19 (32.20)	40 (67.80)	0.872 (0.531-1.461)	.655
Max pain (cont. data)			1.354 (1.222-1.507)	< .001 **
Min pain (cont. data)			1.171 (1.03-1.341)	.049 **

Statistically significant variables are marked with asterisk (P ≤ .10, ** P <.05). Abbreviations; ASA: American Society of Anesthesiologists Physical Status Classification System, SIP: symptomatic irreversible pulpitis*

Table 3. *The final (reduced) multivariate combined models for the 3 tested self-care conditions, and their accuracy performances at different threshold values*

Sa	Estimate	Std. Error	z value	P value	Odds ratio (90% CI)	(Threshold) accuracy, sensitivity, specificity
H-L test, P = .469						
(Intercept)	-0.973	0.605	-1.607	.108	0.378 (0.138, 1.017)	(0.6) 0.70, 0.84, 0.38
Age	-0.015	0.008	-1.768	.077	0.985 (0.972, 0.999)	(0.65) 0.68, 0.77, 0.48
Max pain	0.291	0.063	4.590	<.001	1.338 (1.207, 1.488)	(0.685)§ 0.63, 0.66, 0.54
Sb						
H-L test, P = .374						
(Intercept)	-0.599	0.656	-0.913	.361	0.549 (0.186, 1.618)	(0.5) 0.66, 0.89, 0.25
Age	-0.019	0.008	-2.296	.022	0.981 (0.968, 0.995)	(0.6), 0.65, 0.77, 0.44
Pattern of dental clinic attendance	-0.637	0.350	-1.822	.068	0.529 (0.291, 0.925)	(0.65)§ 0.65, 0.68, 0.60
Max pain	0.309	0.064	4.817	<.001	1.362 (1.228, 1.517)	
Sb OR Sc OR Sd						
H-L test, P = .280						
(Intercept)	0.066	0.692	0.095	.924	1.068 (0.344, 3.384)	(0.6) 0.71, 0.86, 0.36
Age	-0.021	0.009	-2.396	.017	0.979 (0.966, 0.993)	(0.65) 0.69, 0.79, 0.46
Pattern of dental clinic attendance	-1.004	0.404	-2.486	.013	0.367 (0.181, 0.690)	(0.7)§ 0.67, 0.70, 0.59
Max pain	0.309	0.066	4.696	<.001	1.362 (1.225, 1.522)	

§Mean; Abbreviations; CI: Confidence Interval, H-L test: Hosmer-Lemeshow test, Sa: self-medication, Sb: home remedies, Sc: speaking with a relative, friend, or neighbor, Sd: alternative healthcare (i.e., praying/meditation)

Pain relief analysis

The descriptive pain relief data and the statistical comparisons between/among the groups are shown in Table 4 (data from all patients, regardless of the pulpal status) and Figure 3, respectively. The statistical outcomes were mostly similar even when the input data was restricted to patients with symptomatic irreversible pulpitis (Figure 3). Differently, in patients with symptomatic irreversible pulpitis, no statistically significant difference was found between formal use of prescription medicine (systemic; i.e., antibiotic [Fb1]) and formal use of antibiotic + analgesic combination ([Fb3]; $P > .05$) [№5], and both revealed significantly greater scores compared to the formal use of over-the-counter (OTC) medicine (systemic [Fb2], and local/topical [Fb4]) ($P = .026$) (Figure 3).

Table 4. *Number of patients applying a specific care method, and their descriptive pain relief scores (5-point scale; 0-4). All patients' data are presented here regardless of the pulpal status.*

	n	mode	median	min-max
SELF CARE (TOTAL)	874 [n(available score)=790]‡	1	1	0-4
Sa (Self-medication)	320 [n(available score)=315]	2	2	0-4
Sa1 (prescription medicine; systemic)	4	N/A†	N/A	0-4
Sa1 (antibiotic)	3	N/A	N/A	0-4
Sa1 (corticosteroid)	0	-	-	-
Sa1 (opiate)	1	3	3	3-3
Sa2 (OTC medicine; systemic)	257 [n(available score)=252]	2	2	0-4
Sa2 (NSAID)	150 [n(available score)=148]	4	3	0-4
Sa2 (acetaminophen)	100 [n(available score)=97]	1	2	0-4
Sa2 (NSAID + acetaminophen)	2	N/A	2.5	2-3
Sa2 (Aspirin; API: acetylsalicylic acid)	1	4	4	4-4
Sa2 (unknown analgesic)	4	4	3.5	1-4
Sa3 (antibiotic +analgesic combination)	9	1	1	0-4
Sa4 (OTC medicine; local, topical)	50	0	2	0-4
Sa4 (Kloroben, Andorex; API: chlorhexidine gluconate, benzydamine HCl)	18	2	1	0-4
Sa4 (Klorhex; API: chlorhexidine gluconate)	1	2	2	2-2
Sa4 (Majezik spray/mouthwash; API: flurbiprofen)	8	N/A	2	0-4
Sa4 (Vemcaine spray; API: lidocaine)	4	4	4	0-4
Sa4 (Dişinol; API: clove oil, phenol, chlorobutanol)	9	2	2	0-4
Sa4 (unknown spray/mouthwash)	10	0	0.5	0-4
Sb (Home remedies)	466 [n(available score)=463]	0	1	0-4
Sb1 (OTC dental products; Listerine)	19	0	0	0-3
Sb2 (Rinsing the mouth w/ warm water…)	123 [n(available score)=122]	0	1	0-4
Sb2 (salt + vinegar)	11	1	1	0-4
Sb2 (vinegar)	11	0	0	0-4
Sb2 (warm water)	6	1	1.5	1-3
Sb2 (salt + warm water)	82 [n(available score)=81]	0	1	0-4
Sb2 (carbonate + warm water)	7	1	1	0-3
Sb2 (vinegar + carbonate + salt)	1	0	0	0-0
Sb2 (vinegar + carbonate)	1	2	2	2-2
Sb2 (carbonate + salt + warm water)	4	0	0.5	0-1
Sb3 (Placing ice on the affected area…)	13	2	2	0-3
Sb4 (Placing Aspirin or...)	4	1	1	0-3
Sb5 (Massaging the gums)	13	0 & 1	1	0-3
Sb6 (Drinking/applying alcohol…)	19	4	3	0-4
Sb6 (Drinking alcohol/liquor)	3	N/A	2	0-3
Sb6 (Applying alcohol/liquor/cologne to the tooth…)	16	4	3	0-4

Sb7 (Putting spices…)	95 [n(available score)=94]	0	1	0-4
Sb7 (clove)	65 [n(available score)=64]	0	1	0-4
Sb7 (garlic)	16	0	1	0-3
Sb7 (thyme)	9	1	1	0-4
Sb7 (ginger)	3	0	0	0-1
Sb7 (mint oil)	1	2	2	2-2
Sb7 (sage)	1	0	0	0-0
Sb8 (olive)	25	0	0	0-2
Sb9 (toothpaste)	6	2	2	0-4
Sb10 (brushing the tooth)	97 [n(available score)=96]	0	1	0-4
Sb11 (Placing cold/warm compress…)	37	1	1	0-4
Sb11 (cold compress)	32	1	1	0-4
Sb11 (warm compress)	5	2	2	0-3
Sb12 (Pressing/massaging the jaw...)	4	1	1	0-2
Sb.Marginals	11	0	1	0-2
Sc (Speaking with a relative…)	76 [n(available score)=0]	-	-	-
Sd (Alternative healthcare: praying…)	12	1	1	0-3
FORMAL CARE (TOTAL)	373 [n(available score)=177]	4	3	0-4
Fa (Professional services)	200 [n(available score)=6]	2 & 4	2.5	0-4
Fa1 (dentist)	149 [n(available score)=5]	2 & 4	2	0-4
Fa2 (physician)	25 [n(available score)=0]	-	-	-
Fa3 (emergency service)	14 [n(available score)=1]	3	3	3-3
Fa4 (pharmacist)	12[n(available score)=0]	-	-	-
Fb (Medication use by prescription…)	173 [n(available score)=171]	4	3	0-4
Fb1 (Prescription medicine; systemic)	25 [n(available score)=24]	4	4	0-4
Fb1(antibiotic)	25 [n(available score)=24]	4	4	0-4
Fb1 (corticosteroid)	0	-	-	-
Fb1 (opiate)	0	-	-	-
Fb2 (OTC medicine; systemic)	40 [n(available score)=39]	3 & 4	3	0-4
Fb2 (NSAID)	32	4	3	0-4
Fb2 (acetaminophen)	3	2	2	1-2
Fb2 (Aspirin; API: acetylsalicylic acid)	0	-	-	-
Fb2 (unknown analgesic)	5 [n(available score)=4]	3	3	2-3
Fb3 (antibiotic + analgesic combination)	86	4	3	0-4
Fb4 (OTC medicine; local, topical)	22	1	2	0-4
Fb4 (Kloroben, Andorex; API: chlorhexidine gluconate, benzydamine HCl)	8	1	1	0-3
Fb4 (Klorhex; API: chlorhexidine gluconate)	3	1	2	1-3
Fb4 (Benzydamine HCl)	1	3	3	3-3
Fb4 (Majezik spray/mouthwash; API: flurbiprofen)	2	N/A	1.5	1-2
Fb4 (Vemcaine spray; API: lidocaine)	2	N/A	2.5	2-3
Fb4 (Dişinol; API: clove oil, phenol, chlorobutanol)	1	4	4	4-4
Fb4 (unknown spray/mouthwash)	5	0	2	0-4

†N/A: Not applicable. There were not many observations in a specific score to reliably report these summary statistics. ‡Scoring was not always possible for various reasons (e.g., the patient could not remember the pain relief, actions such as referral to a hospital, recommendations to see a dentist, prescription/suggestion of a drug were not scorable). Abbreviations; S: self-care, F: formal care, Sa: self-medication, Sb: home remedies, Sc: Speaking with a relative, friend, or neighbor, Sd: alternative healthcare, Fa: professional services, Fb: medication use by prescription or professional advice, Sa1: self-medication with prescription medicine (systemic), Sa2: self-medication with over-the-counter medicine (systemic), Sa3: self-medication with antibiotic + analgesic combination, Sa4: self-medication with over-the-counter medicine (local, topical), Sb1: over-the-counter dental products (Listerine was the only product used by the patients; active pharmaceutical ingredients: eucalyptol, menthol, methyl salicylate, thymol), Sb2: rinsing the mouth with combinations of warm water, salt, vinegar and carbonate, Sb3: placing ice on the affected area or rinsing the mouth with cold water, Sb4: placing aspirin or another analgesic on the affected area, Sb5: massaging the gums, Sb6: drinking alcohol/liquor or applying it to the tooth with a cotton ball, Sb7: putting spices such as cloves, ginger, garlic, thyme and mint on the tooth or applying the oil or tea forms of these substances to the tooth, Sb8: putting olives on the tooth, Sb9: putting toothpaste on the tooth, Sb10: brushing the tooth, Sb11: placing cold/warm compresses on the jaw, Sb12: pressing/massaging the jaw from the outside with the palm of the hand, Fb1: formal use of prescription medicine (systemic), Fb2: formal use of over-the-counter medicine (systemic), Fb3: formal use of antibiotic + analgesic combination, Fb4: formal use of over-the-counter medicine (local, topical), NSAID: nonsteroidal anti-inflammatory drug, API: active pharmaceutical ingredient

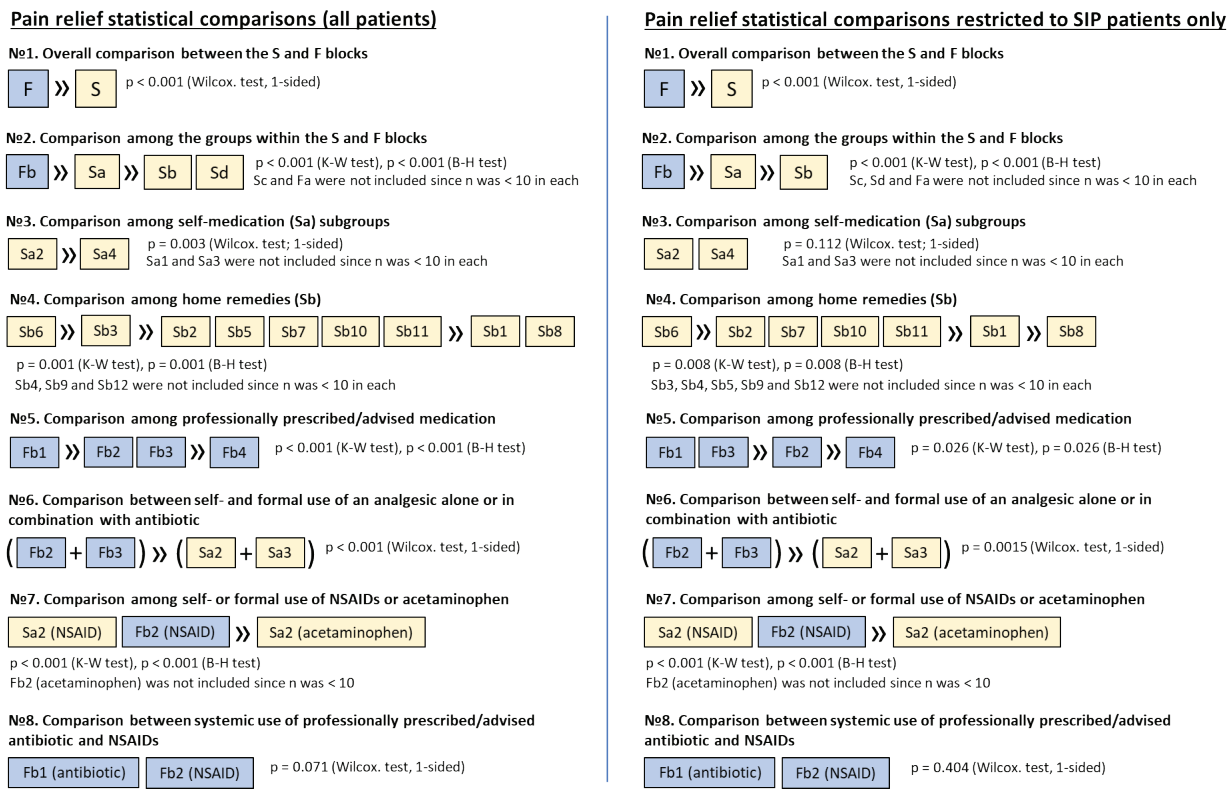

Figure 3. *Statistical comparisons of pain relief (left panel: regardless of the pulpal status, right panel: only of the SIP patients). The symbol "»" designates the presence and direction of the statistical significance (α = 0.05 for all analyses). Abbreviations; S: self-care, F: formal care, Sa: self-medication, Sb: home remedies, Sc: Speaking with a relative, friend, or neighbor, Sd: alternative healthcare, Fa: professional services, Fb: medication use by prescription or professional advice, Sa1: self-medication with prescription medicine (systemic), Sa2: self-medication with OTC medicine (systemic), Sa3: self-medication with antibiotic + analgesic combination, Sa4: self-medication with OTC medicine (local, topical), Sb1: OTC dental products (Listerine was the only product used by the patients), Sb2: rinsing the mouth with combinations of warm water, salt, vinegar and carbonate, Sb3: placing ice on the affected area or rinsing the mouth with cold water, Sb4: placing aspirin or another analgesic on the affected area, Sb5: massaging the gums, Sb6: drinking alcohol/liquor or applying it to the tooth with a cotton ball, Sb7: putting spices such as cloves, ginger, garlic, thyme and mint on the tooth or applying the oil or tea forms of these substances to the tooth, Sb8: putting olives on the tooth, Sb9: putting toothpaste on the tooth, Sb10: brushing the tooth, Sb11: placing cold/warm compresses on the jaw, Sb12: pressing/massaging the jaw from the outside with the palm of the hand, Fb1: formal use of prescription medicine (systemic; antibiotics were the only medicine prescribed), Fb2: formal use of OTC medicine (systemic), Fb3: formal use of antibiotic + analgesic combination, Fb4: formal use of OTC medicine (local, topical), NSAID: non-steroidal anti-inflammatory drug, Wilcox. test: Wilcoxon rank sum test with continuity correction, K-W test: Kruskal-Wallis test, B-H test: Benjamini-Hochberg Correction for post-hoc pairwise comparisons*

Discussion

Maximum pain level, age, and pattern of dental clinic attendance were the variables that predicted the home remedy use. The statistical significance of these three variables increased when the dependent variables were extended to include speaking with a relative, friend, or neighbor and alternative healthcare in addition to home remedies. Further, when we looked at variables affecting self-medication, two of these variables (maximum pain and age) remained in the models, suggesting maximum pain and age as the common predictors of self-care.

As expected, the frequency of self-care increased as the maximum pain score increased. This finding is similar to the findings of a previous study in which dental pain sufferers reported increased use of OTC medication and home remedies parallel to an increase in their pain intensity.[9] Also, in line with our findings, among a variety of oral health problems, oral pain was associated with greater odds of self-use of OTC medicine in dentate rural older adults.[6]

The younger-aged patients resorted to self-care more frequently than the older patients. One explanation may be that younger patients were more familiar with the internet and could easily obtain self-care information from there. A previous study reported that looking for information about home remedies in the media, including the internet, was a typical behavior among patients,[8] and patients even share their dental problems and seek advice on online social platforms.[7] Our finding contrasts with a previous study where the elderly more often applied self-care methods for dental pain.[9] In another study concerning toothache, age had no significant effect on using a self-care method.[3] These disparate findings may be due to socio-cultural and economic differences among the study populations.

Unexpectedly, those who occasionally or regularly made dental visits more frequently applied at least one of the following self-care methods: home remedies, speaking with a relative, friend, or neighbor, and alternate healthcare. This finding can be explained by the possible motivation of regular dental attenders to take a more active interest and role in their health.[8]

Regarding sex, previous studies have found in univariate analyses that females more often applied various forms of self-care strategies.[6,8-10] This trend was seen in our study, too. However, when controlled with the other variables, sex was not statistically significant. In another multivariate modeling study, sex and income, similar to our study, were not significant variables when tested for various self-care applications.[3]

Greater pain relief scores were found with the use of formally prescribed medicine compared to the self-use of medicine [№2]. When analyzed further in detail, formally prescribed analgesics alone or in combination with antibiotics still revealed greater pain relief scores compared to the self-use of the same [№6]. However, pain relief was comparable between the formal and self-use of NSAIDs, and greater for these two groups compared to the self-use of acetaminophen [№7]. Thus, one reason for the significant difference between the formal- and self-medication groups may be the greater number of acetaminophen use in the self-medication group (97 versus 3 observations), which decreases the group's median score.

Consistent with the findings of a previous study,[20] dentists preferred the prescription of NSAIDs to acetaminophen. The finding that pain relief with NSAIDs was greater than with acetaminophen is consistent with the findings of previous studies in which acute postoperative pain after third molar surgery or endodontic treatment was evaluated.[21,22]

Unexpectedly, among the prescribed medicines, antibiotics (alone) revealed greater pain relief scores compared to antibiotic + analgesic combinations when all patients' data were analyzed [№5]. Interestingly, a similar finding was reported in another study, where penicillin alone controlled postoperative endodontic pain more effectively than penicillin and ibuprofen combination.[21] Incompatibility of the combination may be the reason for the unexpected finding. Conversely, when the data was restricted to include only the patients with symptomatic irreversible pulpitis, no significant difference existed between the two [№5].

Among the home remedies, drinking alcohol or applying it to the tooth was the most effective pain relief method [№4]. Alcohol, when taken systemically, elevates the pain threshold and provides analgesia in a dose-response relationship, probably by anxiolytic and central NMDA-receptor blocking mechanisms.[23] Locally, ethanol, being a TRPV1 (capsaicin receptor) agonist, activates the TRPV1 receptors when tested on isolated neurons of the peripheral nervous system and potentiates responses to capsaicin and other agonists (*e.g.*, heat, protons).[24] Following the initial excitation, a so-called 'capsaicin desensitization' occurs as the neuron transitions to a lasting refractory state, other types of sensory receptors are also cross-desensitized, and so the neuron becomes reversibly inactivated.[25]

Placing ice on the affected area or rinsing the mouth with cold water was the second most effective self-applied pain relief method [№4]. Cold tests are often used clinically to identify the diseased tooth by provoking hypersensitivity; but ironically, here, intraoral cold applications provided moderate pain relief. The relief mechanisms can be explained by the vasoconstriction of pulpal blood vessels or the outward hydrodynamic movement of the tubular fluid in response to the cold stimulus, resulting in intrapulpal pressure decrease.[26] Patients who reported relief from intraoral cold application in this study were likely in the earliest stages of irreversible pulpitis.

The remaining home remedies (except OTC dental products and putting olives on the tooth, which ranked as the least effective) ranked after intraoral cold applications in terms of pain relief, had similar effects among each other and provided mostly non to minimum pain relief [№4].

The limitations of this study include recall bias since the obtained pain relief scores relied on the patient's memory. However, this risk is diminished as it is assumed that dental pain is not quickly forgotten,[27] and research reveals that postoperative pain relief (24 hours) correlates highly with recalled relief (6 weeks) in emergency endodontic patients.[28] Another limitation was the inability to know the actual pulpal/periapical status of the tooth at the time the patient sought relief. The possibility of their change over time should be considered when interpreting the results. Another bias is that this study was carried out on patients who applied to our clinic for definitive treatment. Therefore, this study lacks the information of those who did not seek such treatment. Speculatively, these non-observed patients may be quite satisfied with whatever pain-coping method they are using, and their inclusion could change, at least, the pain relief findings in this study.

Regarding the generalizability of the findings, although patients with a wide age range were included over a relatively long time, the setting in which this study was conducted was an urban location. Therefore, the rural population was underrepresented in this study. Again, generalizability in this study is limited considering the lack of patients who did not seek or did not have access to dental care in some way and so could not be interviewed.

Conclusion

Before applying to the dental school hospital, most patients used various self-care methods to relieve their toothache. Maximum pain level and age were the common covariates of various self-care orientations. Overall, formal care relieved pain better than self-care. Medication under the guidance of a professional was more effective than self-use (except for NSAIDs, which provided relief equally either way). Home remedies generally provided little relief, while few of them provided moderate to much relief.

Acknowledgments

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References

1. Stoller EP, Gilbert GH, Pyle MA, Duncan RP. Coping with tooth pain: a qualitative study of lay management strategies and professional consultation. Spec Care Dentist. 2001;21:208-15.

2. Cohen LA, Harris SL, Bonito AJ, Manski RJ, Macek MD, Edwards RR, *et al.* Coping with toothache pain: a qualitative study of low-income persons and minorities. J Public Health Dent. 2007;67:28-35.

3. Cohen LA, Bonito AJ, Akin DR, Manski RJ, Macek MD, Edwards RR, *et al.* Toothache pain: behavioral impact and self-care strategies. Spec Care Dentist. 2009;29:85-95.

4. Anwar M, Green JA, Norris P, Bukhari NI. Self-medication, home remedies, and spiritual healing: common responses to everyday symptoms in Pakistan. Health Psychology and Behavioral Medicine. 2015;3:281-95.

5. Gilbert GH, Stoller EP, Duncan RP, Earls JL, Campbell AM. Dental self-care among dentate adults: contrasting problem-oriented dental attenders and regular dental attenders. Spec Care Dentist. 2000;20:155-63.

6. Arcury TA, Bell RA, Anderson AM, Chen H, Savoca MR, Kohrman T, *et al.* Oral health self-care behaviors of rural older adults. J Public Health Dent. 2009;69:182-9.

7. Heaivilin N, Gerbert B, Page JE, Gibbs JL. Public health surveillance of dental pain via Twitter. J Dent Res. 2011;90:1047-51.

8. Parisius LM, Stock-Schröer B, Berger S, Hermann K, Joos S. Use of home remedies: a cross-sectional survey of patients in Germany. BMC Fam Pract. 2014;15:116.

9. Jaiswal AK, Pachava S, Sanikommu S, Rawlani SS, Pydi S, Ghanta B. Dental pain and self-care: a cross-sectional study of people with low socio-economic status residing in rural India. Int Dent J. 2015;65:256-60.

10. Nusstein JM, Beck M. Comparison of preoperative pain and medication use in emergency patients presenting with irreversible pulpitis or teeth with necrotic pulps. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2003;96:207-14.

11. Touré B, Kane AW, Diouf A, Faye B, Boucher Y. Preoperative pain and medications used in emergency patients with irreversible acute pulpitis or acute apical periodontitis: a prospective comparative study. J Orofac Pain. 2007;21:303-8.

12. Emad S, Abedi S, Dehghani Z, Ghahramani Y. Prevalence of Self-Medication with Antibiotics amongst Clients Referred to Outpatient University Dental Clinics in Iranian Population: A Questionnaire-Based Study. Iran Endod J. 2020;15:1-5.

13. De-Paula KB, Silveira LS, Fagundes GX, Ferreira MB, Montagner F. Patient automedication and professional prescription pattern in an urgency service in Brazil. Braz Oral Res. 2014;28:S1806-83242014000100250.

14. Vandenbroucke JP, von Elm E, Altman DG, Gøtzsche PC, Mulrow CD, Pocock SJ, *et al.* Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. Epidemiology. 2007;18:805-35.

15. Bernstein SL, Bijur PE, Gallagher EJ. Relationship between intensity and relief in patients with acute severe pain. Am J Emerg Med. 2006;24:162-6.

16. American Society of Anesthesiologists (ASA). Physical Status Classification System. Available at https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system. Accessed March 16, 2024.

17. American Association of Endodontists (AAE). Glossary of Endodontic Terms https://www.aae.org/specialty/clinical-resources/glossary-endodontic-terms/. Accessed March 16, 2024.

18. R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

19. Peduzzi P, Concato J, Kemper E, Holford TR, Feinstein AR. A simulation study of the number of events per variable in logistic regression analysis. J Clin Epidemiol. 1996;49:1373-9.

20. Mickel AK, Wright AP, Chogle S, Jones JJ, Kantorovich I, Curd F. An analysis of current analgesic preferences for endodontic pain management. J Endod. 2006;32:1146-54.

21. Torabinejad M, Cymerman JJ, Frankson M, Lemon RR, Maggio JD, Schilder H. Effectiveness of various medications on postoperative pain following complete instrumentation. J Endod. 1994;20:345-54.

22. Chou R, Wagner J, Ahmed AY, Blazina I, Brodt E, Buckley DI, *et al.* Treatments for Acute Pain: A Systematic Review [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2020 Dec. Report No.: 20(21)-EHC006. PMID: 33411426.

23. Thompson T, Oram C, Correll CU, Tsermentseli S, Stubbs B. Analgesic Effects of Alcohol: A Systematic Review and Meta-Analysis of Controlled Experimental Studies in Healthy Participants. J Pain. 2017;18:499-510.

24. Trevisani M, Smart D, Gunthorpe MJ, Tognetto M, Barbieri M, Campi B, *et al.* Ethanol elicits and potentiates nociceptor responses via the vanilloid receptor-1. Nat Neurosci. 2002;5:546-51.

25. Fischer MJM, Ciotu CI, Szallasi A. The Mysteries of Capsaicin-Sensitive Afferents. Front Physiol. 2020;11:554195.

26. Cecic PA, Hartwell GR, Bellizzi R. Cold as a diagnostic aid in cases of irreversible pulpitis. Report of two cases. Oral Surg Oral Med Oral Pathol. 1983;56:647-50.

27. Cohen LA, Bonito AJ, Akin DR, Manski RJ, Macek MD, Edwards RR, *et al.* Toothache pain: a comparison of visits to physicians, emergency departments and dentists. J Am Dent Assoc. 2008;139:1205-16.

28. Wu LT, Lin CS, Yang SF. Association between pain, anxiety, and pain relief in patients receiving emergent endodontic treatment. Clin Oral Investig. 2022;26:275-85.

Endodontik ağrılı hastalarda öz-bakım eğilimleri ve bunların ağrıyı rahatlatma etkinlikleri

Özet

Amaç: Endodontik hastalarda öz bakım yönelimlerini öngören sosyodemografik/dental modelleri araştırmak ve uygulanan yöntemlerin ağrıyı gidermedeki etkinliğini araştırmaktı.

Gereç ve Yöntem: Gazi Üniversitesi endodonti kliniğine başvuran, endodontik ağrı öyküsü olan hastalara anket uygulandı. Hastaların sosyodemografik ve klinik verileri alındı. Öz-bakım veya formal bakım yöntemlerinden hangisine başvurduklarını yapılandırılmış bir listeden seçmeleri istendi. Ağrı rahatlaması 5 noktalı standart Likert ölçeği kullanılarak ölçüldü. İstatistiksel analizler çok değişkenli lojistik regresyon, Wilcoxon ve Kruskal-Wallis testleri ve Benjamini-Hochberg düzeltmesi kullanılarak yapıldı.

Bulgular: Toplam 356 hastanın %90'ı öz-bakımı tek başına veya formal bakımla birlikte uyguladı. Maksimum ağrı düzeyi, yaş ve diş hekimine gitme düzeni, öz-bakım yönelimlerini öngören değişkenlerdi; bunların ilk ikisi, test edilen tüm koşullarda istatistiksel veya marjinal olarak anlamlı bulundu (*P* < .05 veya < .10). Ev tedavileri arasında, alkol içmek veya yerel olarak alkol uygulamak ve hasta tarafından yapılan ağız içi soğuk tedavisi, ağrıyı diğer yöntemlere göre anlamlı olarak daha fazla rahatlattı

(*P* = .001). Bir sağlık profesyonelinin rehberliğinde ilaç tedavisi, kendi kendine ilaç tedavisinden daha etkiliydi (*P* < .001; her iki durumda da benzer şekilde etkili olan non-steroidal anti-inflamatuar ilaçlar hariç).

Sonuç: Hastaların çoğu diş hekimliği fakültesi hastanesine başvurmadan önce diş ağrısını hafifletmek için çeşitli öz-bakım yöntemlerini kullandılar. Maksimum ağrı ve yaş, çeşitli öz-bakım yönelimlerinin ortak değişkenleriydi. Genel olarak formal bakım, öz-bakımdan daha iyi rahatlama sağladı. Ev tedavileri genellikle çok az işe yaradı.

Anahtar Kelimeler: Diş ağrısı; endodonti; ev tedavisi; geleneksel tıp; halk sağlığı; uygunsuz ilaç kullanımı