BJOS
Brazilian Journal of Oral Sciences

Volume 17
2018
e18220

Original Article

The impact of dental anxiety and dental fear on the periodontal status and quality of life among dental patients

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Aim: The aim of the study was to investigate levels of Dental Fear (DF) and Dental Anxiety (DA) among individuals awaiting appointments at the clinics of two courses in dentistry and determine the impact on oral health status and quality of life. **Methods:** An observational study was conducted with a sample of adult dental patients. Levels of DF and DA and the perception of quality of life were determined using questionnaires and periodontal data. **Results:** Among the 287 subjects, 71.4% were female, 7.3% were classified as very anxious and 16% were classified as anxious. Gender was significantly associated with DA (p = 0.001); 20% of the female volunteers and 6.1% of the males were classified as anxious. The frequency of moderate and extreme fear was 42.9% and was not significantly correlated with gender (p = 0.071). The prevalence of a negative impact from oral health status on quality of life (measured using the OHIP-14 scale) was 38.3% and income was significantly associated with this outcome (p = 0.000). **Conclusion:** Levels of DA and DF were substantial among the individuals analyzed. Women with a lower education were susceptible to anxiety. DA and DF were associated with periodontal status or impact on quality of life.

Keywords: Dental anxiety. Dental fear. Quality of life. Oral health.

The authors declare no conflicts of interest

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Received: February 12, 2018
Accepted: September 21, 2018

Introduction

The term dental fear is conceived as a unique phobia with special psychosomatic components that exerts an impact on oral health[1] Studies conducted in Singapore, Japan, China, Denmark, Iceland, Australia, the Netherlands and Brazil, demonstrate that individuals experience high levels of fear with regard to dental procedures, with respective prevalence rates of 30%, 42.1%, 15%, 10%, 16.1%, 24.3% and 44%[2-8].

Dental fear and anxiety constitute complications for both the patient and dental care provider[9]. Such feelings of anguish often lead to the evasion of dental appointments[10-12]. Indeed, delaying or avoiding appointments is a behavior that is well known to dentists who have treated patients with high levels of dental fear[8,13].

Dental anxiety has been associated with previous traumatic experiences during dental care[8,14]. This phenomenon is not restricted to a group of individuals, specific population or specific place[2,6]. Individuals with high levels of dental fear tend to seek treatment only when they are afflicted with a problem and want only to resolve the specific symptom that led them to make the appointment[6,15,16].

Depending on the target population and data collection instruments employed, 2.5% to 20% of patients may have high dental anxiety[2,6,8,17-23]. Anxiety has often been associated with the female gender[12,23,24] and is reported to diminish with age[8]. Moreover, individuals with a higher level of schooling have lower levels of anxiety during dental procedures[6,8,23].

Another relevant aspect associated with dental fear and anxiety is the fact that delaying treatment leads to a worse oral health status in comparison to individuals without dental fear or anxiety[25]. Oral health exerts a direct influence on quality of life[26], affecting perceptions, feelings and behaviors during activities of daily living[27]. Mehrstedt et al.[28] (2004) found that dental fear was negatively associated with quality of life in terms of psychological wellbeing, social functioning and vitality. This discovery indicates the multifaceted link between dental fear and a negative impact on quality of life[13].

The aim of the present study was to investigate the level of dental anxiety and dental fear among patients waiting appointments at the clinics of two dentistry courses (one public and one private) in the city of Maceió, Brazil, as well as determine the impact on periodontal status and quality of life.

Materials and Methods

The present observational study received approval from the Human Research Ethics Committee of the Cesmac University Center under process number 54605416.9.0000.0039 and certificate number 1.539.879. The population was a census sample composed of two hundred eighty-seven individuals, distributed among male and female adults aged 18 years or older who received care between July and October 2016 at the dental clinics of the undergraduate courses in dentistry of the Cesmac University Center and Federal University of Alagoas, which are located in the city of Maceió, state of Alagoas, Brazil.

All individuals who freely agreed to participate were included in the study. Individuals who were unable to provide information for the questionnaires (e.g., those with panic syndrome or cognitive impairment that impeded the understanding of the questions) were excluded from the study.

Data collection

Questionnaires were used to determine levels of fear and anxiety related to dental treatment and investigate associations with demographic and socioeconomic factors. A clinical periodontal examination was also performed to determine whether periodontal status exerted an influence on the perception of quality of life. The questionnaires were administered prior to the dental appointment by a trained researcher. The training exercise involved the importance of exhibiting a permissive, friendly attitude, following the determined sequence of questions and using a standardized tone of voice[29].

Demographic and socioeconomic characteristics

The demographic-socioeconomic questionnaire was the same employed by Nascimento[8] (2011) and addressed age (in years), gender, approximate monthly income in the Brazilian currency (R$), marital status and schooling. Schooling was classified on a scale of 0 to 7: 0 = illiterate; 1 = incomplete elementary school; 2 = complete elementary school; 3 = incomplete high school; 4 = complete high school; 5 = incomplete university; 6 = complete university; and 7 = postgraduate degree.

Dental anxiety and fear

The Dental Anxiety Scale (DAS) described by Corah[30] (1969) has been employed and validated in different studies[30-33]. The DAS has four items scored on a five-point scale that address circumstances related to specific dental situations. The patient chooses the response option that best represents his/her behavior in each situation[34]. The original version did not have an item related to local anesthesia, which was added to the scale by Humphris et al.[35] (1995), leading to the scale denominated the modified Dental Anxiety Scale (MDAS). Level of fear were evaluated based on the Gatchel scale (Gatchel[36], 1989), which enables a quantitative classification of this feeling on a scale ranging from 1 (absence of fear) to 10 (extreme fear) points. The scores are interpreted as follows: 1 to 4 points = absence of fear; 5 to 7 points = moderate fear; and 8 to 10 points = extreme fear[8]. Both scales were administered based on the model validated for Portuguese by Hu et al.[37] (2007).

Quality of life

Self-perceived quality of life was evaluated using the Oral Health Impact Profile (OHIP) (Slade and Spencer[38], 1994). The original questionnaire was composed of 49 items and has been employed in various studies that have confirmed its good psychometric properties and efficiency[39-41]. The simplified version of the questionnaire (OHIP-14)[42] demonstrates similar properties to those of the original version, but requires less time to administer, which favors its use in studies involving large samples and evaluations

of oral health and quality of life[43]. The OHIP-14 has been validated for Portuguese by Silva[44] (2000) and Oliveira and Nadanovsky[45] (2005).

The OHIP-14 is composed of 14 items. The respondent is instructed to indicate on a five-point scale the frequency of occurrence of each problem presented in the previous 12 months[46]. In the present study, the items and response options were read to individuals who were unable to read and write. The results were analyzed using the additive method, which has considerable discriminatory power[47]. With this method, the scores of each item were summed (total ranging from 0 to 56 points). The individual totals were then summed to calculate the mean OHIP-14 of the overall sample. Subsequently, individuals with a total score above the mean were classified as having a self-perception of a negative impact on quality of life and those with a score below the mean were classified as not having a self-perception of impact[41,48].

Periodontal status

Periodontal status was determined based on clinical periodontal examination performed by a periodontist (LAMP) that involved all teeth, except third molars[49]. Six sites per tooth were probed (disto-vestibular, medio-vestibular, mesio-vestibular, disto-lingual, medio-lingual and mesio-lingual) for the determination of the gingival margin position, probing depth, clinical attachment loss, and bleeding on probing. The latter of which was recorded dichotomously as presence (scored 1) or absence (scored 0) of bleeding, with a score of 1 recorded when bleeding occurred up to 30 seconds after the investigation of probing depth[50]. Periodontal disease was classified as gingivitis (25% or more of sites with bleeding on probing and no site with clinical insertion loss > 2 mm) or periodontitis, following the classification criteria recommended by the American Academy of Periodontology (AAP[51], 2000).

Statistical analysis

The data were expressed as mean, standard deviation, absolute frequency and relative frequency. Continuous variables demonstrated non-normal distribution and were compared using the nonparametric Mann-Whitney test. The likelihood ratio test was used for the comparison of proportions, since the conditions for using the chi-square test were not met. The level of significance was set to 5% (p-value < 0.05). The SPSS 20.0 program was used for the statistical analysis and the data were entered into the Microsoft Excel program.

Results

Two hundred eighty-seven individuals participated in the present study. Mean age was 44.4 ± 15.4 years (range: 18 to 86 years) and mean monthly income was R$ 1127.28 ± 808.82 (range: 0 to R$ 6000). The female gender accounted for 71.4% of the sample; 46% of the individuals were single and 39.7% were married; 46.0% had a low level of schooling (35.2% with an incomplete elementary school education, 8.4% with a complete elementary school education and 2.4% illiterate or unable to provide information). Regarding periodontal status, the prevalence rates of gingivitis and periodontitis were 44.6% and 42.5%, respectively (Table 1).

Table 1. Distribution of variables of interest

Variables	N	%
Gender		
Male	82	28.6
Female	205	71.4
Marital status		
Married/in stable union	114	39.7
Single	132	46.0
Separated/divorced	22	7.7
Widowed	19	6.6
Schooling		
Illiterate/does not know	7	2.4
Incomplete elementary school	101	35.2
Complete elementary school	24	8.4
Incomplete high school	30	10.5
Complete high school	89	31.0
Incomplete university	15	5.2
Complete university	18	6.3
Postgraduate degree	2	0.7
Not informed	1	0.3
Periodontal status		
Not informed/did not authorize	4	1.4
Healthy	26	9.1
Gingivitis	128	44.6
Periodontitis	122	42.5
Other (ex.: acute periodontal disease)	7	2.4

On the day of the interview, the specialty with the greatest frequency of appointments was periodontics (40.4%), followed by dentistry (28.6%), endodontics (12.2%), prosthetics (8.7%), surgery (7.3%) and others (2.6%).

Table 2 displays the classification of anxiety using the MDAS. The prevalence of anxious and very anxious patients was 16% and 7.3%, respectively. Gender was significantly associated with dental anxiety ($p = 0.001$); 20% and 8.8% of the women were anxious and very anxious, respectively, whereas these rates were 6.1% and 3.7% among the men. Having a previous traumatic dental experience was significantly associated with anxiety ($p = 0.008$); among those with a traumatic experience, 24.7% were anxious and 11.7% were very anxious, whereas, among those without a traumatic experience, only 13% were anxious and 5.8% were very anxious. Neither of the other variables (marital status and periodontal status) were significantly associated with dental anxiety ($p = 0.357$ and $p = 0.813$, respectively).

Table 2. Distribution of anxiety (MDAS) according to variables of interest

Variables	MDAS						Total		p-value[1]
	Non-anxious		Anxious		Very anxious (phobia)				
	N	%	N	%	N	%	N	%	
Gender									
Male	74	90.2	5	6.1	3	3.7	82	100.0	0.001
Female	146	71.2	41	20.0	18	8.8	205	100.0	
Total	220	76.7	46	16.0	21	7.3	287	100.0	
Marital status									
Married/in stable union	92	80.7	16	14.0	6	5.3	114	100.0	0.357
Single	102	77.3	21	15.9	9	6.8	132	100.0	
Separated/divorced	15	68.2	5	22.7	2	9.1	22	100.0	
Widowed	11	57.9	4	21.1	4	21.1	19	100.0	
Total	220	76.7	46	16.0	21	7.3	287	100.0	
Periodontal status									
Healthy	22	84.6	2	7.7	2	7.7	26	100.0	0.813
Gingivitis	95	74.2	22	17.2	11	8.6	128	100.0	
Periodontitis	95	77.9	20	16.4	7	5.7	122	100.0	
Other (ex.: acute periodontal disease)	5	71.4	1	14.3	1	14.3	7	100.0	
Total	217	76.7	45	15.9	21	7.4	283[(a)]	100.0	
Previous traumatic experience with dental care									
Yes	49	63.6	19	24.7	9	11.7	77	100.0	0.008
No	169	81.3	27	13.0	12	5.8	208	100.0	
Total	218	76.5	46	16.1	21	7.4	285[(b)]	100.0	

Likelihood ratio test
Four missing periodontal records (listed in Table 1 as "did not authorize")
Two responses missing (individuals did not want to answer.)

Regarding the Gatchel fear scale, five patients did not answer the questionnaire; among the respondents (n = 282), 42.9% exhibited fear (25.2% exhibited moderate fear and 17.7% exhibited extreme fear. A previous traumatic dental experience was significantly associated with fear (p = 0.000), as 32.4% of individuals with a traumatic experience had extreme fear, whereas 12.5% of those with no traumatic experience had extreme fear. Fear was not significantly associated with gender (p = 0.071), marital status (p = 0.139) or periodontal status (p = 0.070) (Table 3).

Regarding self-perceptions of the impact on quality of life using the OHIP-14, the prevalence of negative impact was 38.3%. A statistically significant difference between genders was found, with a greater number of women (42.4%) reporting a negative impact (p = 0.022). No statistically significant associations were found with regard to marital status (p = 0.141) or periodontal status (p = 0.113) (Table 4).

Table 3. Distribution of fear (Gatchel scale) according to variables of interest

Variable	Fear (Gatchel scale)						Total		p-value[1]
	Absence of fear		Moderate fear		Extreme fear				
	N	%	N	%	N	%	N	%	
Gender									
Male	51	63.0	22	27.2	8	9.9	81	100.0	0.071
Female	110	54.7	49	24.4	42	20.9	201	100.0	
Total	161	57.1	71	25.2	50	17.7	282	100.0	
Marital status									
Married/in stable union	68	61.8	26	23.6	16	14.5	110	100.0	0.139
Single	74	56.1	34	25.8	24	18.2	132	100.0	
Separated/divorced	11	52.4	8	38.1	2	9.5	21	100.0	
Widowed	8	42.1	3	15.8	8	42.1	19	100.0	
Total	161	57.1	71	25.2	50	17.7	282	100.0	
Periodontal status									
Healthy	18	69.2	5	19.2	3	11.5	26	100.0	0.070
Gingivitis	60	47.6	39	31.0	27	21.4	126	100.0	
Periodontitis	77	64.2	25	20.8	18	15.0	120	100.0	
Other (ex.: acute periodontal disease)	5	83.3	1	16.7	-	-	6	100.0	
Total	160	57.6	70	25.2	48	17.3	278[(a)]	100.0	
Previous traumatic experience with dental care									
Yes	26	35.1	24	32.4	24	32.4	74	100.0	0.000
No	135	64.9	47	22.6	26	12.5	208	100.0	
Total	161	57.1	71	25.2	50	17.7	282	100.0	

Likelihood ratio test
Four missing periodontal records (listed in Table 1 as "did not authorize")

Table 4. Distribution of impact on quality of life (OHIP-14) according to variables of interest

Variables	No impact on quality of life (OHIP < 15)		Impact on quality of life (OHIP > 15)		Total		p-value[1]
	N	%	N	%	N	%	
Gender							
Male	59	72.0	23	28.0	82	100.0	0.022
Female	118	57.6	87	42.4	205	100.0	
Total	177	61.7	110	38.3	287	100.0	
Marital status							
Married/in stable union	78	68.4	36	31.6	114	100.0	0.141
Single	72	54.5	60	45.5	132	100.0	
Separated/divorced	15	68.2	7	31.8	22	100.0	
Widowed	12	63.2	7	36.8	19	100.0	
Total	177	61.7	110	38.3	287	100.0	
Periodontal status							
Healthy	18	69.2	8	30.8	26	100.0	0.113
Gingivitis	85	66.4	43	33.6	128	100.0	
Periodontitis	70	57.4	52	42.6	122	100.0	
Other (ex.: acute periodontal disease)	2	28.6	5	71.4	7	100.0	
Total	175	61.8	108	38.2	283[(a)]	100.0	

Likelihood ratio test
Four missing periodontal records (listed in Table 1 as "did not authorize")

Table 5 displays the inferential statistics of the continuous variables (age, income and schooling) according to the OHIP-14, MDAS and Gatchel classifications. A significant association was found between the OHIP-14 score and income (p = 0.000): mean monthly income was R$ 933.4 ± 589.1 among individuals who reported a negative

Table 5. Measures of continuous variables (age, income and schooling) according to impact on quality of life, fear and anxiety

	Variables	N	Mean	Standard deviation	p-value[1]
OHIP-14	**AGE:**				
	No impact on quality of life (OHIP < 15)	175	43.9	16.1	0.410
	Impact on quality of life (OHIP > 15)	110	45.0	14.1	
	MONTHLY INCOME (R$):				
	No impact on quality of life (OHIP < 15)	133	1270.2	914.5	0.000
	Impact on quality of life (OHIP > 15)	98	933.4	589.1	
	SCHOOLING				
	No impact on quality of life (OHIP < 15)	176	2.9	1.7	0.131
	Impact on quality of life (OHIP > 15)	110	2.6	1.7	
Fear (Gatchel scale)	**AGE:**				
	Absence of fear	159	43.9	14.8	0.283
	Moderate fear	71	42.4	15.0	
	Extreme fear	50	47.4	17.5	
	MONTHLY INCOME (R$):				
	Absence of fear	126	1163.8	801.4	0.623
	Moderate fear	59	1090.3	655.1	
	Extreme fear	42	948.5	694.8	
	SCHOOLING				
	Absence of fear	161	2.9	1.7	0.375
	Moderate fear	71	2.6	1.7	
	Extreme fear	49	2.5	1.4	
MDAS	**AGE:**				
	Non-anxious	219	44.6	15.1	0.097
	Anxious	45	40.4	15.5	
	Very anxious (phobia)	21	49.7	16.3	
	MONTHLY INCOME (R$):				
	Non-anxious	178	1165.6	829.6	0.114
	Anxious	34	1084.4	782.2	
	Very anxious (phobia)	19	844.7	606.7	
	SCHOOLING				
	Non-anxious	219	2.9	1.7	0.021
	Anxious	46	2.8	1.6	
	Very anxious (phobia)	21	1.8	1.3	

1- Mann-Whitney nonparametric test

Table 6. Distribution of impact on quality of life (OHIP-14) according to anxiety (MDAS) and fear (Gatchel scale)

Variables	No impact on quality of life (OHIP < 15)		Impact on quality of life (OHIP > 15)		Total		p-value
	N	%	N	%	N	%	
Anxiety (MDAS)							
Non-anxious	151	68.6	69	31.4	220	100.0	0.000
Anxious	22	47.8	24	52.2	46	100.0	
Very anxious (phobia)	4	19.0	17	81.0	21	100.0	
Total	177	61.7	110	38.3	287	100.0	
Fear (Gatchel scale)							
Absence of fear	105	65.2	56	34.8	161	100.0	0.368
Moderate fear	41	57.7	30	42.3	71	100.0	
Extreme fear	28	56.0	22	44.0	50	100.0	
Total	174	61.7	108	38.3	282	100.0	

1- Pearson's chi-square test

impact on quality of life and 1270.2 ± 914.5 among those who reported no impact on quality of life. A significant association was found between the MDAS classification and schooling (p = 0.021): mean schooling was 1.8 ± 1.3 (on seven-point scale; equal to nearly complete elementary school education) among those classified as very anxious, 2.8 ± 1.6 (incomplete high school education) among those classified as anxious and 2.9 ± 1.7 (incomplete high school education) among those classified as non-anxious. No statistically significant associations with fear (Gatchel scale) were found.

A statistically significant association was found between the level of anxiety (MDAS) and impact on quality of life: 81% of very anxious patients reported a negative impact of oral/periodontal status on quality of life (OHIP-14) and only 31.4% of non-anxious individuals reported an impact on quality of life (p < 0.001). In contrast, no statistically significant associations were found between the classification of fear (Gatchel scale) and self-perceptions of impact of oral/periodontal status on quality of life (OHIP-14) (p = 0.368). The findings demonstrate that anxiety exerts an influence on quality of life, whereas fear does not demonstrate this potential (Table 6).

Discussion

Despite technological and scientific advances that have improved dental procedures over the years, anxiety with regard to dental treatment still affects the population and seems to be perpetuated over time. In the present study, 23.3% of the patients interviewed exhibited some degree of dental anxiety.

Previous Brazilian scientific investigations involving male and female adults report similar findings to those described herein. Kanegane et al.[20] (2003) analyzed 252 patients in the city of São Paulo and found that 28.2% had some degree of dental anxiety. Ferreira et al.[21] (2004) analyzed 300 individuals in the city of Fortaleza and found an 18%

prevalence rate of dental anxiety. Nascimento et al.[8] (2011) analyzed 400 patients in the city of Recife and found a 23% prevalence rate of dental anxiety (13.5% of patients were classified as anxious and 9.5% were classified as very anxious).

In the literature, the female gender is commonly associated with dental anxiety[13,23,24]. In the present investigation, dental anxiety was significantly higher among the women, which is agreement with data described in previous studies. Nascimento et al.[8] (2011) found anxiety rates of 26.7% for women and 11.3% for men. Kaenagane et al.[20] (2003) also found a significantly greater number of women with dental anxiety. One may pose a probable hypothesis for why anxiety is more associated with the female gender: from the cultural-social standpoint, women in Brazil are more open and honest about their feelings, including anxiety and fear, than men. Despite the likelihood of this hypothesis, some studies have found similar frequencies of these feelings in men and women. Ferreira et al.[21] (2004) report dental anxiety prevalence rates of 11.8% for women and 11.5% for men, which is similar to figures reported in other studies[52,53].

Socioeconomic factors, such as schooling and income, have also been investigated in terms of associations with dental anxiety. While Kanegane et al.[20] (2003) and Ferreira et al.[21] (2004) found no such associations, Nascimento et al.[8] (2011) found that schooling was significantly associated with dental anxiety, as a greater percentage of anxious individuals had lower levels of education. In the present study, schooling was also the only socioeconomic factor associated with dental anxiety.

The literature reports that dental anxiety is associated with previous traumatic experiences during dental procedures[8,14]. This finding was confirmed in the present investigation.

Fear of dental treatment is a phenomenon that has been known for many years and science has advanced along with technology to reduce the pain and discomfort perceived by patients (Kanegane et al.[20], 2003). Nonetheless, this feeling in perpetuated in diverse populations and it is imperative to continue studying it to gain an increasingly better understanding of its nuances.

Using the Gatchel Fear Scale, 42.9% of the individuals surveyed exhibited some level of fear, which is a substantial figure. Considerable variation in this emotion is found throughout the world, running from 10% in Iceland (Rangnarsson[5], 1998) to 42.1% in Japan (Weinstein et al.[3], 1992). In previous studies conducted in Brazil, Nascimento et al.[8] (2011) found a prevalence rate of 44% in a sample from the same geographic region as that of the present investigation (northeast). In a study conducted in the southeastern region of the country, Kenagane et al.[20] (2003) found a rate of 34.1% using the Gatchel Fear Scale.

It is interesting to note that frequencies of fear were higher than frequencies of anxiety in the present investigation as well as the studies conducted by Nascimento et al.[8] (2011) and Kenagane et al.[20] (2003). Despite being aware of the theoretical difference between these sensations or emotions, the hypothesis at the onset of the study was that the prevalence rates of dental anxiety and fear would be similar. This unexpected behavior may be explained by the type of data collection instrument. Anxiety was measured based on questions following by structured responses on the modified Dental Anxiety Scale, whereas fear was measured in a more direct, objective manner on a single 10-point scale. Taking into consideration these different assessment tools

and the similar socioeconomic characteristics of the populations in the present investigation and the study conducted by Nascimento et al.[8] (2011), there is the possibility of an increase in the detection sensitivity between the MDAS and Gatchel scale.

Considering only the group with extreme fear, similar frequencies were found in the present investigation (17.7%) and the studies conducted by Kenagane et al.[20] (2003) and Nascimento et al.[8] (2011), who found rates of 14.3% (36/252) and 13.5%, respectively.

In the present study, no statistically significant association was found between fear and gender, marital status, age, income or schooling. Kanegane et al.[20] (2003) also found no significant associations between fear and age or schooling. However, Nascimento et al.[8] (2011) found significant associations between fear and both gender and schooling; extreme fear was more frequent among women and individuals with a lower education level.

Individuals with dental anxiety and fear tend to postpone seeking treatment and commonly have a worse oral health status than those who do not have this feeling (Esa et al.[25], 2010). Oral health can exert a direct influence on quality of life, affecting perceptions, feelings and behaviors during the performance of activities of daily living (Alvarenga et al.[27], 2011). This indicates the multifaceted link between dental fear and quality of life (Carter et al.[13], 2014).

In the present study, self-perceptions regarding a negative impact from oral health status on quality of life (measured using the OHIP-14) were prevalent among just over 1/3 of the patients analyzed. Moreover, a statistically significant difference was found between genders regarding the impact on quality of life, with a greater number of women reporting such an impact.

A full-mouth examination was employed in the present study, but no association was found between a negative impact on quality of life and periodontal problems, even with the progression from gingivitis to periodontitis. An evaluation of the different levels of periodontitis severity, classified based on the criteria of the AAP[51] (2000), also revealed no association with a greater perception of impact.

Statistically significant results were found with regard to income. Individuals who reported an impact on quality of life had a lower monthly income than those who did not perceive an impact.

Considering the socioeconomic and cultural profile of the population studied as well as the lack of health education offered to this population with regard to periodontal disease, the individuals in the present study may not perceive the actual impact of this disease or its evolution on quality of life, especially given its chronic nature and its slow, silent progression. Thus, the perceptions of negative impact felt by the individuals in the present study may be related to other oral conditions rather than specific periodontal issues, such as dental caries, missing teeth, filled teeth, temporomandibular disorders, the need for prosthetics, etc.

Our results corroborate those of Lopes et al.[54] (2009) and Meusel et al.[55] (2015), all of whom reported that periodontal disease severity was inversely associated with Quality of Life.

In conclusion, levels of dental anxiety and dental fear were substantial among the individuals analyzed. Women with a lower education level were more susceptible to anxiety. However, dental anxiety and fear were not associated with periodontal status or impact on quality of life.

References

1. Moore R, Birn H. [Phenomenon of dental fear]. Tandlaegebladet. 1990 Jan;94(2):34-41. Danish.
2. Chellappah NK, Vignehsa H, Milgrom P, Lam LG. Prevalence of dental anxiety and fear in children in Singapore. Community Dent Oral Epidemiol. 1990 Oct;18(5):269-71.
3. Weinstein P, Shimono T, Domoto P, Wohlers K, Matsumura S, Ohmura M, et al. Dental fear in Japan: Okayama Prefecture school study of adolescents and adults. Anesth Prog. 1992;39(6):215-20.
4. Schwarz E, Birn H. Dental anxiety in Danish and Chinese adults—a cross-cultural perspective. Soc Sci Med. 1995 Jul;41(1):123-30.
5. Ragnarsson E. Dental fear and anxiety in an adult Icelandic population. Acta Odontol Scand. 1998 Apr;56(2):100-4.
6. Armfield JM, Spencer AJ, Stewart JF. Dental fear in Australia: who's afraid of the dentist? Aust Dent J. 2006 Mar;51(1):78-85.]
7. Oosterink FM, de Jongh A, Hoogstraten J. Prevalence of dental fear and phobia relative to other fear and phobia subtypes. Eur J Oral Sci. 2009 Apr;117(2):135-43. doi: 10.1111/j.1600-0722.2008.00602.x.
8. do Nascimento DL, da Silva Araújo AC, Gusmão ES, Cimões R. Anxiety and fear of dental treatment among users of public health services. Oral Health Prev Dent. 2011;9(4):329-37.
9. Saatchi M, Abtahi M, Mohammadi G, Mirdamadi M, Binandeh ES. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. Dent Res J (Isfahan). 2015 May-Jun;12(3):248-53.
10. Moore R, Brødsgaard I. Differential diagnosis of odontophobic patients using the DSM-IV. Eur J Oral Sci. 1995 Apr;103(2 (Pt 1)):121-6.
11. Quteish Taani DS. Dental anxiety and regularity of dental attendance in younger adults. J Oral Rehabil. 2002 Jun;29(6):604-8.
12. Erten H, Akarslan ZZ, Bodrumlu E. Dental fear and anxiety levels of patients attending a dental clinic. Quintessence Int. 2006 Apr;37(4):304-10.
13. Carter AE, Carter G, Boschen M, AlShwaimi E, George R. Pathways of fear and anxiety in dentistry: A review. World J Clin Cases. 2014 Nov 16;2(11):642-53. doi: 10.12998/wjcc.v2.i11.642.]
14. Lundgren J, Berggren U, Carlsson SG. Psychophysiological reactions in dental phobic patients with direct vs. indirect fear acquisition. J Behav Ther Exp Psychiatry. 2004 Mar;35(1):3-12.
15. Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health. 2007 Jan 14;7:1.
16. Armfield JM. What goes around comes around: revisiting the hypothesized vicious cycle of dental fear and avoidance. Community Dent Oral Epidemiol. 2013 Jun;41(3):279-87. doi: 10.1111/cdoe.12005.
17. Vassend O. Anxiety, pain and discomfort associated with dental treatment. Behav Res Ther. 1993 Sep;31(7):659-66.

18. Ragnarsson E. Dental fear and anxiety in an adult Icelandic population. Acta Odontol Scand. 1998 Apr;56(2):100-4.

19. Quteish Taani DS. Dental anxiety and regularity of dental attendance in younger adults. J Oral Rehabil. 2002 Jun;29(6):604-8.

20. Kanegane K, Penha SS, Borsatti MA, Rocha RG. [Dental anxiety in an emergency dental service]. Rev Saude Publica. 2003 Dec;37(6):786-92. Portuguese.

21. Ferreira CM, Gurgel-Filho ED, Bönecker-Valverde G, Moura EH, De Deus G, Coutinho-Filho T. [Dental anxiety: score, prevalence and behavior]. RBPS. 2004;17(2):51-5. Portuguese.

22. Sohn W, Ismail AI. Regular dental visits and dental anxiety in an adult dentate population. J Am Dent Assoc. 2005 Jan;136(1):58-66; quiz 90-1.

23. Humphris GM, Dyer TA, Robinson PG. The modified dental anxiety scale: UK general public population norms in 2008 with further psychometrics and effects of age. BMC Oral Health. 2009 Aug 26;9:20. doi: 10.1186/1472-6831-9-20.

24. Arslan S, Erta E, Ülker M. The relationship between dental fear and sociodemographic variables. Erciyes Med J. 2011 Jan;33(4):295–300.

25. Esa R, Savithri V, Humphris G, Freeman R. The relationship between dental anxiety and dental decay experience in antenatal mothers. Eur J Oral Sci. 2010 Feb;118(1):59-65. doi: 10.1111/j.1600-0722.2009.00701.x.

26. Leão ATT, Sheiham A. The dental impact on daily living. In: Slade GD, editor. Measuring oral health and quality of live. Chapel Hill, NC: University of North Carolina; 1997.

27. Alvarenga FAS, Henriques C, Takatsui F, Montandon AAB, Telarolli Júnior R, Monteiro ALCC, et al. Oral health impact profile in the quality of life of patients over 50 years old of two public institutions of Araraquara city]. Rev Odontol UNESP. 2011;40(3):118-24.

28. Mehrstedt M, Tönnies S, Eisentraut I. Dental fears, health status, and quality of life. Anesth Prog. 2004;51(3):90-4.

29. Bowling A. Mode of questionnaire administration can have serious effects on data quality. J Public Health (Oxf). 2005 Sep;27(3):281-91..

30. Corah NL. Development of a dental anxiety scale. J Dent Res. 1969 Jul-Aug;48(4):596.

31. Rosa AL, Ferreira CM. [Dental anxiety: the anxiety level, prevalence and behaviour of anxious individuals]. Rev Bras Odontol. 1997;54(3):171-4. Portuguese.

32. Kaakko T, Getz T, Martin MD. Dental anxiety among new patients attending a dental school emergency clinic. J Dent Educ. 1999 Oct;63(10):748-52.

33. Haugejorden O, Klock KS. Avoidance of dental visits: the predictive validity of three dental anxiety scales. Acta Odontol Scand. 2000 Dec;58(6):255-9.

34. Kleinknecht AR, Medeiros JA, Pereira A, Ponciano E, Lopes PN. [Dental anxiety psychometrics: evaluation of the psychometric characteristics of a Portuguese version of the Dental Fear Survey]. Rev Port Estomatol Med Dent Cirur Maxilofacial. 2004;45(3):133-46. Portuguese.

35. Humphris GM, Morrison T, Lindsay SJ. The Modified Dental Anxiety Scale: validation and United Kingdom norms. Community Dent Health. 1995 Sep;12(3):143-50.

36. Gatchel RJ. The prevalence of dental fear and avoidance: expanded adult and recent adolescent surveys. J Am Dent Assoc. 1989 May;118(5):591-3.

37. Hu LW, Gorenstein C, Fuentes D. Portuguese version of Corah's Dental Anxiety Scale: transcultural adaptation and reliability analysis. Depress Anxiety. 2007;24(7):467-71..

38. Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. Community Dent Health. 1994 Mar;11(1):3-11.

39. Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. J Clin Periodontol. 2004 Jun;31(6):454-7.

40. Ng SK, Leung WK. Oral health-related quality of life and periodontal status. Community Dent Oral Epidemiol. 2006 Apr;34(2):114-22.

41. Araújo AC, Gusmão ES, Batista JE, Cimões R. Impact of periodontal disease on quality of life. Quintessence Int. 2010 Jun;41(6):e111-8.

42. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol. 1997 Aug;25(4):284-90.

43. Wong MC, Lo EC, McMillan AS. Validation of a Chinese version of the Oral Health Impact Profile (OHIP). Community Dent Oral Epidemiol. 2002 Dec;30(6):423-30.

44. Silva PSB. Oral health and quality of life an elderly group of Araçatuba - SP: use Oral Health Impact Profile (OHIP-14), and characterization of the social-economic of interviewees. Araçatuba Dental School, UNESP; 2000.

45. Oliveira BH, Nadanovsky P. Psychometric properties of the Brazilian version of the Oral Health Impact Profile-short form. Community Dent Oral Epidemiol. 2005 Aug;33(4):307-14.

46. Lima ALO, Albuquerque VWTA, Silvam JIBW, Peixoto FB, Ferreira SMS. [Perception on oral health of women living with HIV/AIDS]. Rev Semente. 2011;6(6):117-30. Portuguese.

47. Biazevic MG, Rissotto RR, Michel-Crosato E, Mendes LA, Mendes MO. Relationship between oral health and its impact on quality of life among adolescents. Braz Oral Res. 2008 Jan-Mar;22(1):36-42.

48. Allen PF, Locker D. Do item weights matter? An assessment using the oral health impact profile. Community Dent Health. 1997 Sep;14(3):133-8.

49. Figueiredo A, Soares S, Lopes H, dos Santos JN, Ramalho LM, Cangussu MC, et al. Destructive periodontal disease in adult Indians from Northeast Brazil: cross-sectional study of prevalence and risk indicators. J Clin Periodontol. 2013 Nov;40(11):1001-6. doi: 10.1111/jcpe.12147.

50. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. Int Dent J. 1975 Dec;25(4):229-35.

51. American Academy of Periodontology (AAP). Parameters of care. J.Periodontol. 2000 May;71(5 Suppl):847-83.

52. Peretz B, Moshonov J. Dental anxiety among patients undergoing endodontic treatment. J Endod. 1998 Jun;24(6):435-7.

53. Tunc EP, Firat D, Onur OD, Sar V. Reliability and validity of the Modified Dental Anxiety Scale (MDAS) in a Turkish population. Community Dent Oral Epidemiol. 2005 Oct;33(5):357-62.

54. Lopes MWF, Gusmão ES, de Vasconcelos Alves R, Cimões R. The impact of chronic periodontitis on quality of life in Brazilian subjects. Acta Stomatol Croat. 2009 Jan;43(2):89-98.

55. Meusel DR, Ramacciato JC, Motta RH, Brito Júnior RB, Flório FM. Impact of the severity of chronic periodontal disease on quality of life. J Oral Sci. 2015 Jun;57(2):87-94. doi: 10.2334/josnusd.57.87.