



Original Article

Evaluation of the Effect of Patient Related Factors on Periodontal Condition in a Sample of Iraqi Population: A Retrospective Study

Abdulkareem Hussain Alwan^{1*} , Basma Fathi Alanbari² , Maha Waleed Alghazali³ ,
Afnan Abdulkareem Hussain⁴ , Farah Abdul_Razzak Mahmood Al_Bazaz⁵

¹Department of Periodontics, Department of Dentistry, Al-Rafidain University College, Baghdad, Iraq

²Department of Periodontics, Department of Dentistry, Al-Rafidain University College, Baghdad, Iraq

³Assistant Lecturer Department of Dentistry, Al-Rafidain University College, Baghdad, Iraq

⁴Assistant Lecturer (Periodontist), Specialized Dental Center, Baghdad Health Directorate Ministry of Health, Iraq

⁵Lecturer Department of Prevention, Al-Rafidain University College, Baghdad, Iraq

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ABSTRACT

Background: Chronic infections of the periodontium brought on by harmful bacteria are known as periodontal diseases. Several factors, both local and systemic, contribute to the onset and development of periodontal infections. Dental plaque and plaque retentive areas, such as dental calculus, and faulty restorations, are examples of the local variables. Neglected diabetes mellitus and chronic cigarette use are examples of the systemic risk factors.

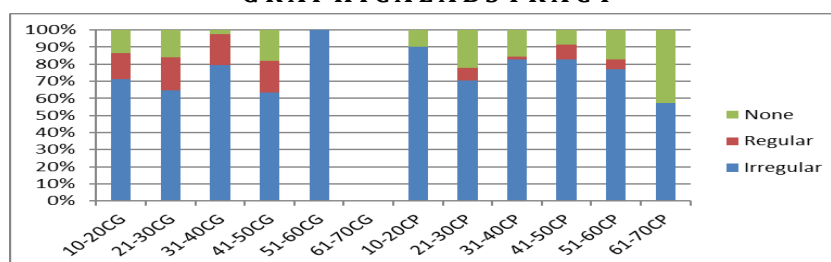
Objectives: The aim of this study was to evaluate the effect of patient related factors on periodontal condition.

Methodology: The accessible periodontal records were reviewed retrospectively for this cross-sectional investigation. Name, occupation, and primary complaint (C/P) are only some of personal and demographic details that could be gleaned from these files. Dentist visits; tooth brushing, tooth brushing technique, brushing frequency, health records, tooth mobility, routines, and additional clinical parameters such as clinical attachment loss (CAL), probing pocket depth (PPD), and the gingival index (GI) are all measures of how much gum tissue has been lost. Both chronic gingivitis (CG) and chronic periodontitis (CP) were noted as diagnoses.

Results: There were variations in the clinical parameters, chief complain, and occupation of males and females according to the age groups. There was an increasing of periodontal diseases in old age. Periodontal diseases are more common in males more than females. The mobility of teeth and furcation involvement increase in sever periodontitis in old age.

Conclusion: There are many local patient related factors that affect the periodontal condition. Periodontal diseases were found more in males than females. In addition, there were more periodontal diseases in old than young patients.

GRAPHICAL ABSTRACT



* Corresponding author: Abdulkareem Hussain Alwan

✉ E-mail: Email: dr_alsady@yahoo.co.uk

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Introduction

Periodontal disease (PD) is an inflammation/infection of the tissues that surround and support teeth [1] and affects people of all ages. Periodontal diseases (PD) are a collection of infections of the periodontium brought on by harmful microorganisms. Its infections can be triggered and advanced by a number of factors, both local and systemic. Dental plaque and plaque retentive areas, such as dental calculus and faulty restorations, are some examples of the local variables. Neglected diabetes mellitus and chronic cigarette use are examples of the systemic risk factors. The important risk factors include neutropenia, AIDS/HIV infection, and other systemic conditions associated with an immunodeficiency state. Numerous risk factors for periodontal disease have been identified through research. Conditions like stress, the use of coping mechanisms, and the bone loss that results from an absence of estrogen, fall into this category. Gender and genetics are just two of the socioeconomic factors linked to periodontal disease [2].

Gingivitis is the initial stage of periodontal disease. Failure to treat gingivitis can lead to periodontitis, which in turn destroys supporting the connective tissue and alveolar bone [3]. Cardiovascular, metabolic, cognitive, and autoimmune diseases, as well as respiratory infections and some cancers, have all been linked to periodontitis epidemiologically [4]. In addition, research has linked periodontal disease to other health problems in infants, including premature birth and low birth weight [5]. Patients with poorly managed diabetes mellitus, in particular, have an increased risk of developing periodontitis, which increases both its prevalence and severity over time [6]. The presence of a risk factor increases the likelihood of a disease happening, while its absence or removal decreases this likelihood. Risk factors can be environmental, behavioral, or biological in nature, and its temporal sequence can be established in longitudinal research [7]. Factors associated with each individual tooth including bruxism and high occlusal stress [8] have been

postulated to affect an individual's likelihood of developing the advanced periodontal disease. In addition, about 30% of people on pharmacological therapy including nifedipine, phenytoin, and cyclosporine develop gingival overgrowth [9]. When it comes to the periodontal health, basic oral hygiene has traditionally been seen as a cornerstone [10]. Keeping up with both at-home and professional dental hygiene routines is recommended [11]. Preventing periodontal disease requires a combination of factors, including patient motivation, education, empowerment, oral hygiene teaching, oral hygiene device type, and dexterity [12]. The best and the most widely-recommended strategy for keeping teeth clean and gums healthy is mechanical plaque control using methods like brushing and flossing [13]. Tooth brushing, frequency, duration, and method, occupation, medical history, tooth mobility, furcation involvement, and habits are only few of the patient-related factors that might affect the periodontal health. The purpose of this research is to assess how various patient-related factors influence periodontal health in a cross-section of the Iraqi population.

The purpose of this study is to determine the impact that patient-related factors have on the periodontal health of a representative sample of the Iraqi population.

Materials and Methods

Diagnostic criteria and measurement methods

Gingival inflammation can be quantified using a number of different indices [14]. More objective means of gauging the level of gingival inflammation were utilized. However, these include diagnostic criteria and indices that evaluate the presence, extent, or severity of bleeding from the gums [15]. The index evaluates disease severity based on measures of attachment loss and probing depth. Only the genuine pocket depth (i.e. probing depth apical to cemento-enamel junction) is indicated by the measurement of the probing depth [16].

Study design

The periodontal records of the patients from September 2020 to June 2021 were analyzed in this cross-sectional retrospective study conducted at the Department of Periodontics in the Dentistry Department at Al-Rafidian University College in Baghdad, Iraq. Patients' records from the Periodontics and Dentistry divisions at Al-Rafidian University College were used to compile a sample of 564 cases of chronic gingivitis and chronic periodontitis (240 females and 324 males). Participants with chronic periodontitis were given the custom-made questionnaire of the study. Name, age, sex, education, smoking, general health, brushing, flossing, a clinical examination to assess clinical attachment loss, periodontal pocket depth, and tooth mobility are all part of the questionnaire. Based on age and gender, the sample was broken down into the following categories: (within the sample): 10-20 years old, 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, and 61-70 years old;

Study population

The following criteria were used to the 563 periodontal records that were accessible during the aforementioned time period: Patients having gingivitis or periodontitis according to the 1999 classification of periodontal diseases [17] and patients aged 10 and up seeking periodontal treatment. Inflamed gingiva with a probing pocket depth (PPD) of less than 4 mm was considered to be suffering from gingivitis. At least two interproximal sites with probing pocket depths (PPDs) of less than 4 mm, or a single site with a PPD of more than 5 mm, as mentioned in reference [18], constitutes periodontitis. Each patient's details were recorded after they were checked against the inclusion/exclusion criteria. The patient data includes demographics (age, gender, and CC), medical and dental history, smoking status, employment, and diagnosis, and then the clinical measures like plaque index and gingival index were collected using a Williams periodontal probe marked at (1-2-3-5-7-8-9-10 mm).

The recorded clinical parametres include:

Plaque Index (PLI): By utilizing the plaque index [19].

Gingival index (GI): By using gingival index [20].

Bleeding on probing (BoP): By using a Williams periodontal probe and passing it to the base of the probable pocket (Gingival Sulcus Bleeding Index) for four surfaces of all teeth [21], in BOP score "I" is given in case of bleeding emerges within 15 seconds after probing (the presence of bleeding and score "0" for the absence of bleeding.

Probing pocket depth (PPD): Williams periodontal probe was used to measure the distance in millimeters between the gingival margin, the base of the gingival sulcus, or pocket at four surfaces of each tooth.

Method of measurement of clinical attachment level (CAL)

The distance between the cemento-enamel junction (CEJ) and the base of the pocket can be measured to the closest millimeter with a Williams graduated periodontal probe.

Measurement of teeth mobility

The researchers in this study measured tooth mobility with 2 instruments such as dental mirror and probe.

Ethical approval

This study was conducted in compliance with the Declaration of Helsinki for human research and was authorized by the Ethics Committee of the Department of Dentistry at Al-Rafidian University College in Baghdad, Iraq.

Statistical analysis

The data was analysed using SPSS (Version 22.0). Software version of the Statistical Package for the Social Science (developed in Chicago, Illinois, USA).

The following statistical information was used in this investigation:

1. Descriptive statistics including frequency and percentages for qualitative variables, means, and standard errors (SE) for quantitative data 1.

2. Inferential statistics including the following categories:

- a) One-way analysis of variance: To compare the measured variables between more than two groups and make use of the Hochberg GT2 posthoc test.
- b) Pearson's correlation coefficient test (r): To assess the relation between the measured variables in each group to determine whether or not they are related.
- c) Two independent samples T-test: This test compared two groups statistically and measures the degree of difference.
- d) The Levene test examines whether or not the variance varies consistently across groups.
- e) Pearson Chi square: A relationship between two categorical variables where the estimated cell count is less than five and does not surpass twenty percent.
- f) Fisher exact: A relationship between two categorical variables if the predicted cell count is less than 5 and the percentage of excess cells exceeds 20%.

The following levels of statistical significance were used in the analysis of the statistics.

Non-significant NS $P > 0.05$

Significant S $0.05 \geq P > 0.01$

Results and Discussion

The association between males and females showed that there was a significant difference in the sample according to age groups and gender (as shown in Table 1 and Figure 1) Chi square p-value=0.001. In addition, the distribution of sample was according to the age group, gender, and diagnosis p-value= 0.000 (as indicated in Table 2). The distribution of sample was according to the age groups, gender, and diagnosis in males (as depicted in Figure 2A). The distribution of sample was according to the age groups, gender, and diagnosis in Females (as shown in Figure 2B), and the distribution of sample was according to the age groups, gender, and diagnosis in the total sample (males and females) (as shown in Figure 2C). Moreover, there were significant differences in the visit to dentist (regular, irregular, and no visit) and diagnosis according to the age group in the total sample p-value=0.000 (as demonstrated in Table 3 and Figure 3). Furthermore, the correlation between clinical parameters was with dental visits of males and females according to the age group (as indicated in Table 4). The distributions of chief complain was according to the age group in total sample (males and females) (as illustrated in Table 5 and Figure 5).

Table 1: The correlation between males and females of the sample stratified by age groups and gender

Age (years)	Gender				Chi square p-value	Total	
	M		F			N.	%
	N.	%	N.	%			
10-20 years old	36	11.08	40	16.81	0.001 Sig.	76	13.50
21-30 years old	190	58.46	99	41.60		289	51.33
31-40 years old	54	16.62	43	18.07		97	17.23
41-50 years old	26	8.00	32	13.45		58	10.30
51-60 years old	14	4.31	22	9.24		36	6.39
61-70 years old	5	1.54	2	.84		7	1.24
Total	325	57.73	238	42.27		563	100.00

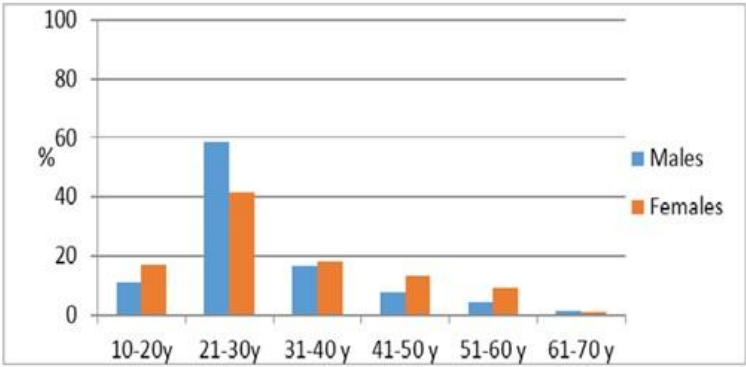


Figure 1: The correlation between males and females of the sample stratified by age groups and gender

Table 2: The distribution of sample according to age groups, gender, and diagnosis

Sex			Diagnosis					Total	
			CG		CP				
			N.	%	N.	%	P-value	N.	%
M	Age	10-20 years old	30	15.71	6	4.48	0.000	36	11.08
		21-30 years old	136	71.20	54	40.30		190	58.46
		31-40 years old	20	10.47	34	25.37		54	16.62
		41-50 years old	5	2.62	21	15.67		26	8.00
		51-60 years old	0	0.00	14	10.45		14	4.31
		61-70 years old	0	0.00	5	3.73		5	1.54
	Total		191	58.8	134	41.20		325	100.00
F	Age	10-20 years old	36	24.49	4	4.4	0.000	40	16.81
		21-30 years old	85	57.82	14	15.38		99	41.60
		31-40 years old	19	12.93	24	26.37		43	18.07
		41-50 years old	6	4.08	26	28.57		32	13.45
		51-60 years old	1	0.68	21	23.08		22	9.24
		61-70 years old	0	0.00	2	2.20		2	.84
	Total		147	61.76	91	38.24		238	100.00
Total	Age	10-20 years old	66	19.53	10	4.44	0.000	76	13.50
		21-30 years old	221	65.38	68	30.22		289	51.33
		31-40 years old	39	11.54	58	25.78		97	17.23
		41-50 years old	11	3.25	47	20.89		58	10.30
		51-60 years old	1	0.30	35	15.56		36	6.39
		61-70 years old	0	0.00	7	3.11		7	1.24
	Total		338	100.00	225	100.00		563	100.00

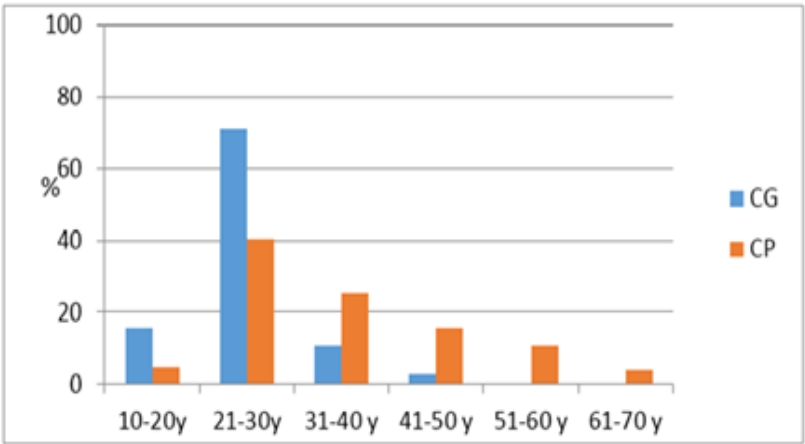


Figure 2A: The distribution of sample according to age groups, gender, and diagnosis in Males

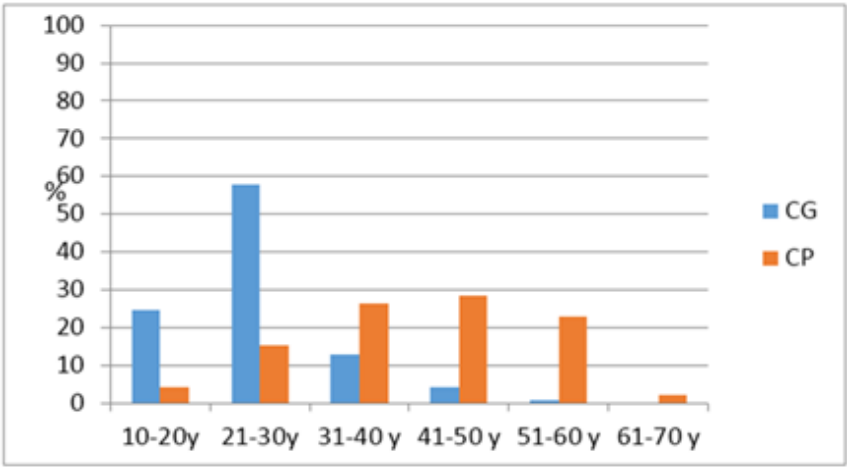


Figure 2B: The distribution of sample according to age groups, gender, and diagnosis in Females

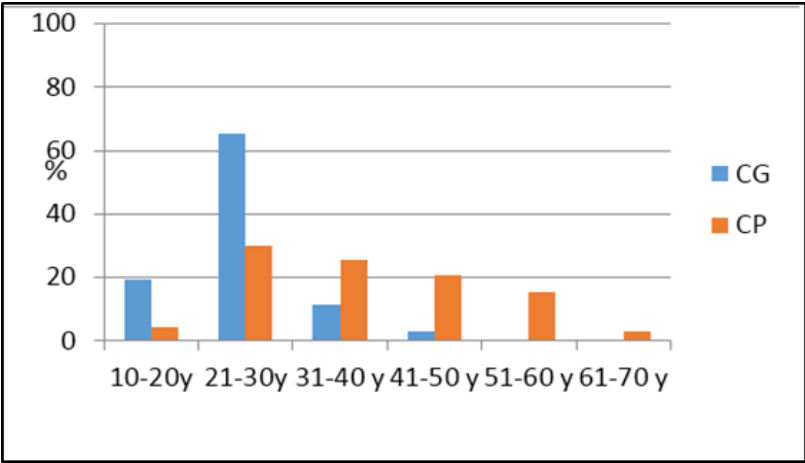


Figure 2C: The distribution of sample according to age groups, gender, and diagnosis in the total sample (Males and Females)

Table 3: The visit to dentist (regular, irregular, and no visit) and diagnosis according to age group

		CG		CP		P-value		
		N.	%	N.	%		N.	%
10-20 years old	Irregular	47	71.21	9	90.00	0.635	56	73.68
	Regular	10	15.15	0	0.00		10	13.16
	None	9	13.64	1	10.00		10	13.16
21-30 years old	Irregular	143	64.71	48	70.59	0.039	191	66.09
	Regular	43	19.46	5	7.35		48	16.61
	None	35	15.84	15	22.06		50	17.30
31-40 years old	Irregular	31	79.49	48	82.76	0.003	79	81.44
	Regular	7	17.95	1	1.72		8	8.25
	None	1	2.56	9	15.52		10	10.31
41-50 years old	Irregular	7	63.64	39	82.98	0.203	46	79.31
	Regular	2	18.18	4	8.51		6	10.34
	None	2	18.18	4	8.51		6	10.34
51-60 years old	Irregular	1	100.0	27	77.14	1	28	77.78
	Regular	0	0	2	5.71		2	5.56
	None	0	0	6	17.14		6	16.67
61-70 years old	Irregular	0	0	4	57.14		4	57.14
	None	0	0	3	42.86		3	42.86
Total	Irregular	229	67.75	175	77.78	0.000	404	71.76
	Regular	62	18.34	12	5.33		74	13.14
	None	47	13.91	38	16.89		85	15.10

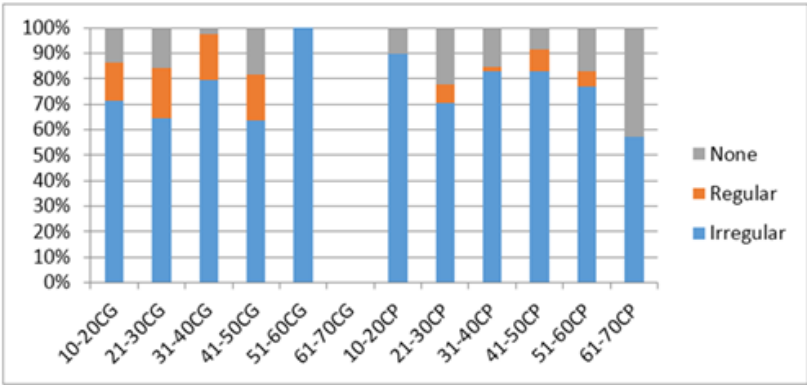


Figure 3: The visit to dentist (regular, irregular, and no visit) and diagnosis according to the age group

Table 4: Correlation of clinical parameters with dental visits by gender (male and female) and age group

Age	Sex		Clinical parameters					
			PI		PPD		CAL	
			r	p	r	p	r	p
10-20 years old	M		0.011	0.951	0.296	0.080	0.007	0.968
	F		0.157	0.334	0.045	0.784	0.142	0.382
21-30 years old	M		0.036	0.626	0.146	0.045	0.206	0.004
	F		0.008	0.941	0.161	0.111	0.086	0.396
31-40 years old	M		0.098	0.482	0.204	0.139	0.172	0.213
	F		0.109	0.488	0.100	0.522	0.403	0.007
41-50 years old	M		0.089	0.667	0.356	0.074	0.274	0.176
	F		0.139	0.449	0.337	0.059	0.142	0.440
51-60 years old	M		0.447	0.109	0.466	0.093	0.310	0.281
	F		0.306	0.166	0.080	0.724	0.156	0.487
61-70 years old	M		0.577	0.308	0.289	0.638	0.866	0.058

Table 5. Distribution of chief complain according to age group in total sample (males and females)

		Sex					Total	
		M		F				
		N.	%	N.	%	P value	N.	%
	Bleeding	55	16.92	54	22.69	0.098	109	19.36
	Calculus	74	22.77	63	26.47		137	24.33
	Check up	55	16.92	26	10.92		81	14.39
	Dry mouth	2	0.62	0	0.00		2	0.36
	Esthetic	71	21.85	39	16.39		110	19.54
	Gingival swelling	13	4.00	13	5.46		26	4.62
	Halitosis	30	9.23	19	7.98		49	8.70
	Hypersensitivity	14	4.31	12	5.04		26	4.62
	Mobility of teeth	2	.62	6	2.52		8	1.42
	Pain	9	2.77	6	2.52		15	2.66

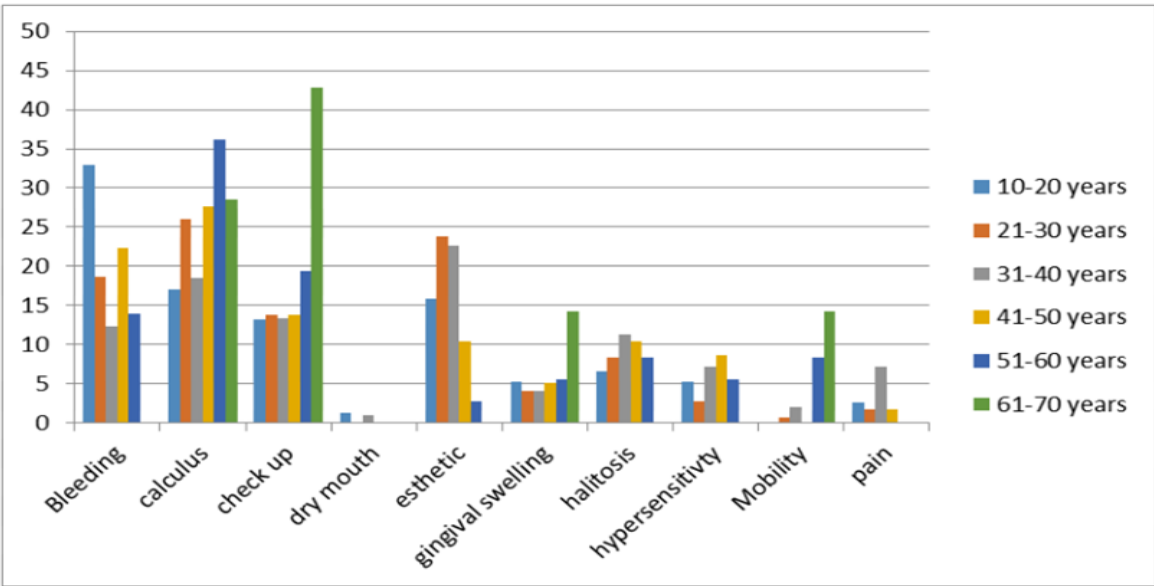


Figure 5: Distribution of chief complain according to age group in total sample (males and females)

The distribution of the most common complaints was reported by age group (as presented in [Table 6](#)). [Table 7](#) and [Figure 7](#) displayed the distribution of the various types of occupation and diagnosis based on age group in the total sample. [Table 8](#) and [Figure 8](#) showed the distribution systemic diseases according to age groups in the total sample males and females.

[Table 9](#) and [Figure 9](#) displayed the distribution of method of brushing and diagnosis according to the age group in total sample (males and females). [Table 10](#) and [Figure 10](#) showed the distribution of habits and diagnosis according to age group in the total sample (males and females). According to the age group of the total sample (males and females).

Table 6: Distribution of chief complain according to age group

Age			Diagnosis					Total	
			CG		CP				
			N.	%	N.	%	P value	N.	%
10-20 years old	Bleeding	21	31.82	4	40.00	0.181	25	32.89	
	calculus	10	15.15	3	30.00		13	17.11	
	check up	10	15.15	0	0.00		10	13.16	
	dry mouth	0	.00	1	10.00		1	1.32	

		esthetic	11	16.67	1	10.00		12	15.79
		gingival swelling	4	6.06	0	0.00		4	5.26
		halitosis	4	6.06	1	10.00		5	6.58
		hypersensitivty	4	6.06	0	0.00		4	5.26
21-30 years old		pain	2	3.03	0	0.00		2	2.63
		Bleeding	41	18.55	13	19.12	0.010	54	18.69
		calculus	58	26.24	17	25.00		75	25.95
		check up	33	14.93	7	10.29		40	13.84
		esthetic	56	25.34	13	19.12		69	23.88
		gingival swelling	5	2.26	7	10.29		12	4.15
		halitosis	20	9.05	4	5.88		24	8.30
		hypersensitivty	4	1.81	4	5.88		8	2.77
31-40 years old		mobility	0	.00	2	2.94		2	.69
		pain	4	1.81	1	1.47		5	1.73
		Bleeding	4	10.26	8	13.79	0.560	12	12.37
		calculus	7	17.95	11	18.97		18	18.56
		check up	5	12.82	8	13.79		13	13.40
		dry mouth	0	.00	1	1.72		1	1.03
		esthetic	13	33.33	9	15.52		22	22.68
		gingival swelling	2	5.13	2	3.45		4	4.12
41-50 years old		halitosis	4	10.26	7	12.07		11	11.34
		hypersensitivty	3	7.69	4	6.90		7	7.22
		mobility	0	0.00	2	3.45		2	2.06
		pain	1	2.56	6	10.34		7	7.22
		Bleeding	2	18.18	11	23.40	0.832	13	22.41
		calculus	3	27.27	13	27.66		16	27.59
		check up	1	9.09	7	14.89		8	13.79
		esthetic	2	18.18	4	8.51		6	10.34
51-60 years old		gingival swelling	0	0.00	3	6.38		3	5.17
		halitosis	1	9.09	5	10.64		6	10.34
		hypersensitivty	2	18.18	3	6.38		5	8.62
		pain	0	0.00	1	2.13		1	1.72
		Bleeding	0	0.00	5	14.29	0.015	5	13.89
		calculus	0	0.00	13	37.14		13	36.11
		check up	0	0.00	7	20.00		7	19.44
		esthetic	0	0.00	1	2.86		1	2.78
61-70 years old		gingival swelling	0	0.00	2	5.71		2	5.56
		halitosis	0	0.00	3	8.57		3	8.33
		hypersensitivty	1	100.00	1	2.86		2	5.56
		mobility	0	0.00	3	8.57		3	8.33
		calculus			2	28.57		2	28.57
		check up			3	42.86		3	42.86
		gingival swelling			1	14.29		1	14.29
		mobility			1	14.29		1	14.29
Total		Bleeding	68	20.12	41	18.22		109	19.36
		calculus	78	23.08	59	26.22		137	24.33
		check up	49	14.50	32	14.22	0.000	81	14.39
		dry mouth	0	0.00	2	0.89		2	.36
		esthetic	82	24.26	28	12.44		110	19.54
		gingival swelling	11	3.25	15	6.67		26	4.62
		halitosis	29	8.58	20	8.89		49	8.70
		hypersensitivty	14	4.14	12	5.33		26	4.62
		mobility	0	.00	8	3.56		8	1.42
		pain	7	2.07	8	3.56		15	2.66

Table 7: Distribution occupation and diagnosis according to age group in total sample (males and females)

Age		Diagnosis					Total
		CG		CP			
		N.	%	N.	%	P value	N.
10-20 years old	housewife	1	100.00	0	0.00	1.000	1
	student	64	86.49	10	13.51		74
	worker	1	100.00	0	0.00		1
21-30 years old	doctor	3	100.00	0	0.00	0.169	3
	employee	29	76.32	9	23.68		38
	engineer	9	90.00	1	10.00		10
	housewife	19	76.00	6	24.00		25
	officer	9	81.82	2	18.18		11
	student	125	78.62	34	21.38		159
	teacher	7	87.50	1	12.50		8
	worker	20	57.14	15	42.86		35
31-40 years old	employee	8	36.36	14	63.64		22
	engineer	1	100.00	0	0.00	0.252	1
	housewife	11	36.67	19	63.33		30
	officer	1	100.00	0	0.00		1
	student	3	100.00	0	0.00		3
	teacher	5	50.00	5	50.00		10
	worker	10	33.33	20	66.67		30
41-50 years old	doctor	1	100.00	0	0.00	1.000	1
	employee	1	10.00	9	90.00		10
	engineer	0	.00	1	100.00		1
	housewife	3	20.00	12	80.00		15
	officer	0	0.00	7	100.00		7
	teacher	2	40.00	3	60.00		5
	worker	4	21.05	15	78.95		19
51-60 years old	employee	0	.00	3	100.00		3
	housewife	1	5.00	19	95.00	1.00	20
	officer	0	0.00	2	100.00		2
	retired	0	0.00	3	100.00		3
	teacher	0	0.00	2	100.00		2
	worker	0	0.00	6	100.00		6
61-70 years old	housewife	0	0	2	100.00		2
	retired	0	0	2	100.00		2
	teacher	0	0	1	100.00		1
	worker	0	0	2	100.00		2
Total	doctor	4	100.00	0	0.00		4
	employee	38	52.05	35	47.95		73
	engineer	10	83.33	2	16.67		12
	housewife	35	37.63	58	62.37		93
	officer	10	47.62	11	52.38	0.000	21
	retired	0	0.00	5	100.00		5
	student	192	81.36	44	18.64		236
	teacher	14	53.85	12	46.15		26
	worker	35	37.63	58	62.37		93

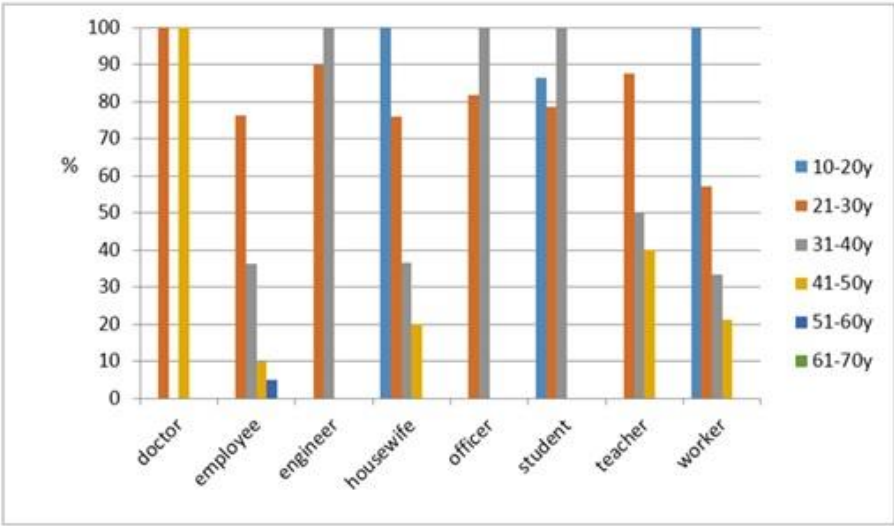


Figure 7: Distribution occupation and diagnosis according to age group in total sample (males and females)

Table 8: Distribution systemic diseases according to age groups in total sample males and females

Systemic condition		Sex				Total	
		M		F			
		N.	%	N.	%	N.	%
	Healthy	296	91.08	196	82.35	492	87.39
	anemia	2	0.62	0	0.00	2	0.36
	asthma	0	0.00	2	0.84	2	0.36
	DM	3	0.92	5	2.10	8	1.42
	epilepsy	1	0.31	1	0.42	2	0.36
	heart disease	2	0.62	3	1.26	5	0.89
	hypertension	9	2.77	19	7.98	28	4.97
	ID	2	.62	2	0.84	4	0.71
	kidney	8	2.46	6	2.52	14	2.49
	paralysis	1	0.31	0	0.00	1	0.18
	psoriasis	1	0.31	0	0.00	1	0.18
	RA	0	0.00	1	0.42	1	0.18
	thyroid	0	0.00	3	1.26	3	0.53
Total		325	100.00	238	100.00	563	100.00

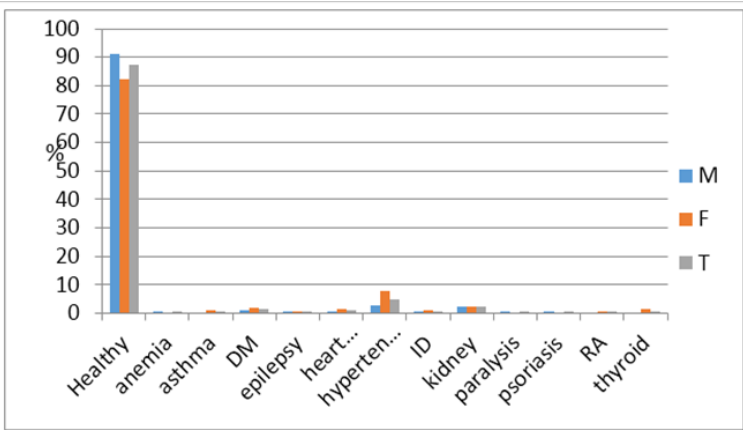


Figure 8: Distribution systemic diseases according to age groups in total sample males and females

Table 9: Distribution of method of brushing and diagnosis according to age group in total sample (males and females)

Age	Method of brushing	Diagnosis					Total	
		CG		CP				
		N.	%	N.	%	P value	N.	%
10-20 years old	circular	12	18.75	2	20.00	0.898	14	18.92
	horizontal	40	62.50	7	70.00		47	63.51
	vertical	12	18.75	1	10.00		13	17.57
21-30 years old	circular	28	12.96	11	17.19	0.695	39	13.93
	horizontal	132	61.11	37	57.81		169	60.36
	vertical	56	25.93	16	25.00		72	25.71
31-40 years old	circular	3	7.89	8	14.04	0.664	11	11.58
	horizontal	28	73.68	41	71.93		69	72.63
	vertical	7	18.42	8	14.04		15	15.79
41-50 years old	circular	0	.00	1	2.27	0.602	1	1.82
	horizontal	8	72.73	25	56.82		33	60.00
	vertical	3	27.27	18	40.91		21	38.18
51-60 years old	circular	1	100.00	5	16.67		6	19.35
	horizontal	0	.00	17	56.67	0.191	17	54.84
	vertical	0	.00	8	26.67		8	25.81
61-70 years old	horizontal	0	0	4	100.00		4	100.00
Total	circular	44	13.33	27	12.92	0.975	71	13.17
	horizontal	208	63.03	131	62.68		339	62.89
	vertical	78	23.64	51	24.40		129	23.93

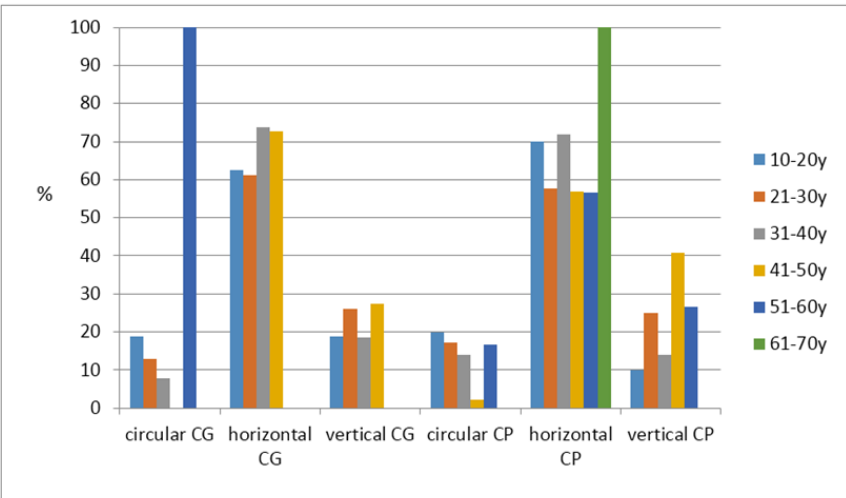


Figure 9: Distribution of method of brushing and diagnosis according to age group in total sample (males and females)

Table 10: Distribution of habits and diagnosis according to age group in total sample (males and females)

Age								Total
			CG		CP			
			N.	%	N.	%	P value	N.
	10-20 years old	None	26	81.25	6	18.75	0.372	32
		bruxism	7	100.00	0	0.00		7
		Lip biting	3	75.00	1	25.00		4
		Mouth breathing	17	94.44	1	5.56		18
		Nail biting	1	50.00	1	50.00		2

		smoking	5	100.00	0	.00		5
		Unilateral chewing	7	87.50	1	12.50		8
21-30 years old		None	106	79.10	28	20.90		134
		bruxism	14	70.00	6	30.00	0.855	20
		Cheek biting	1	50.00	1	50.00		2
		Lip biting	6	85.71	1	14.29		7
		Mouth breathing	40	75.47	13	24.53		53
		Nail biting	2	100.00	0	0.00		2
		smoking	30	75.00	10	25.00		40
		Unilateral chewing	22	70.97	9	29.03		31
31-40 years old		None	16	36.36	28	63.64	0.643	44
		bruxism	2	33.33	4	66.67		6
		Mouth breathing	5	29.41	12	70.59		17
		Nail biting	1	50.00	1	50.00		2
		smoking	8	53.33	7	46.67		15
		Unilateral chewing	7	53.85	6	46.15		13
41-50 years old		None	5	23.81	16	76.19		21
		bruxism	0	0.00	1	100.00	0.677	1
		Cheek biting	0	0.00	1	100.00		1
		Lip biting	0	0.00	1	100.00		1
		Mouth breathing	4	36.36	7	63.64		11
		Nail biting	0	0.00	1	100.00		1
		smoking	1	11.11	8	88.89		9
		Unilateral chewing	1	7.69	12	92.31		13
51-60 years old		None	0	0.00	18	100.00		18
		bruxism	0	0.00	3	100.00		3
		Mouth breathing	1	16.67	5	83.33		6
		smoking	0	0.00	5	100.00	0.273	5
		Unilateral chewing	0	0.00	4	100.00		4
61-70 years old		None	0	0	6	100.00		6
		Unilateral chewing	0	0	1	100.00		1
Total		None	153	60.00	102	40.00		255
		bruxism	23	62.16	14	37.84		37
		Cheek biting	1	33.33	2	66.67	0.577	3
		Lip biting	9	75.00	3	25.00		12
		Mouth breathing	67	63.81	38	36.19		105
		Nail biting	4	57.14	3	42.86		7
		smoking	44	59.46	30	40.54		74
		Unilateral chewing	37	52.86	33	47.14		70

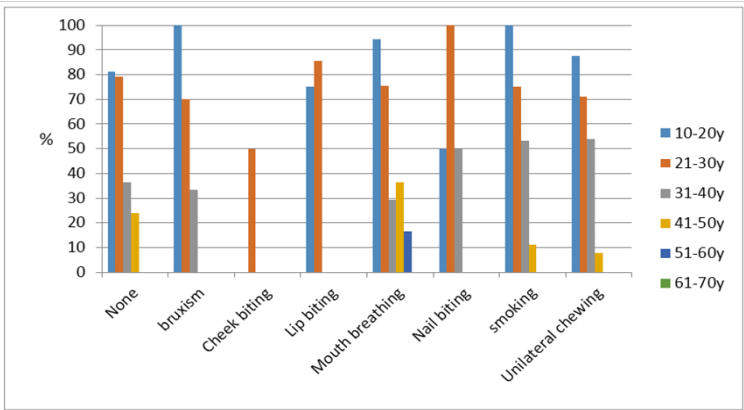


Figure 10: Distribution of habits and diagnosis according to age group in total sample (males and females)

Table 11 and Figure 11 displayed the distribution of frequency of brushing teeth and diagnosis. Table 12 and Figure 12 displayed the distribution of clinical parameters according to the age groups and gender, there were increasing of periodontal diseases with increase age in males more than females. Table 13 and Figure 13 showed the distribution of clinical parameters and diagnosis according to the age groups and gender, there were more periodontal diseases in old age than in young age patients and in male more than females. Table 14 and Figure 14 showed the distribution of different brushing methods,

clinical parameters, and diagnosis (chronic gingivitis and chronic periodontitis). Table 15 and Figure 15 showed the statistical differences between brushing frequency, clinical parameters, and diagnosis (CG and CP). Table 16 and Figure 16 displayed the relationship between mobility of teeth, furcation involvement, and diagnosis. Table 17 revealed the relationship between clinical parameters, diagnosis (CG and CP), mobility of teeth, and furcation involvement. It was found that patients with chronic periodontitis had a greater amount of tooth mobility.

Table 11: Distribution of frequency of brushing teeth and diagnosis according to age group of the total sample (males and females)

Age				Diagnosis					Total
				CG		CP			
				N.	%	N.	%	P value	N.
10-20 years old		irregular	11	91.67	1	8.33	0.673	12	
		once/day	27	84.38	5	15.63		32	
		twice/day	20	83.33	4	16.67		24	
		three/day	6	100.00	0	0.00		6	
21-30 years old		irregular	30	69.77	13	30.23	0.341	43	
		once/day	87	76.32	27	23.68		114	
		twice/day	99	80.49	24	19.51		123	
31-40 years old		irregular	4	17.39	19	82.61		23	
		once/day	23	50.00	23	50.00	0.028	46	
		twice/day	11	42.31	15	57.69		26	
41-50 years old		irregular	1	7.14	13	92.86		14	
		once/day	8	26.67	22	73.33	0.539	30	
		twice/day	2	20.00	8	80.00		10	
		three/day	0	.00	1	100.00		1	
51-60 years old		irregular	0	.00	6	100.00		6	
		once/day	0	.00	15	100.00	0.034	15	
		twice/day	0	.00	9	100.00		9	
		three/day	1	100.00	0	0.00		1	
61-70 years old		irregular	0	0	1	100.00		1	
		once/day	0	0	3	100.00		3	
Total		irregular	46	46.46	53	53.54		99	
		once/day	145	60.42	95	39.58	0.001	240	
		twice/day	132	68.75	60	31.25		192	
		three/day	7	87.50	1	12.50		8	

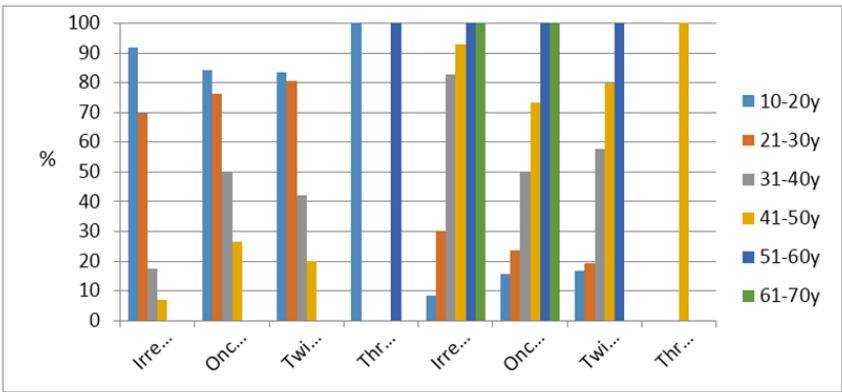


Figure 11: Distribution of frequency of brushing teeth and diagnosis according to age group of the total sample (males and females)

Table 12: Distribution of clinical parameters according to age groups and gender

Age		Sex					
		M		F			
		Mean	±SE	Mean	±SE	T test	P value
10-20 years old	PI	1.207	0.100	1.025	0.052	1.616	0.112
	GI	1.058	0.085	1.225	0.075	1.467	0.147
	PPD	0.771	0.315	0.550	0.237	0.561	0.577
	CAL	0.507	0.221	0.512	0.191	0.019	0.985
21-30 years old	PI	1.209	0.039	1.088	0.042	2.122	0.035
	GI	2.321	2.105	1.084	0.056	1.062	0.289
	PPD	1.012	0.140	0.945	0.204	.272	0.786
	CAL	4.342	1.602	0.630	0.148	1.006	0.316
31-40 years old	PI	1.347	0.069	1.179	0.072	1.678	0.097
	GI	1.280	0.078	2.222	947	1.000	0.323
	PPD	1.178	0.248	1.237	0.300	0.152	0.879
	CAL	4.749	1.931	1.627	0.285	1.015	0.315
41-50 years old	PI	0.492	0.155	1.164	0.094	3.710	0.001
	GI	1.680	0.333	1.385	0.086	1.000	0.327
	PPD	2.025	0.424	1.976	0.384	0.086	0.932
	CAL	2.638	0.349	2.742	0.321	0.220	0.827
51-60 years old	PI	1.659	0.161	1.308	0.112	1.787	0.086
	GI	1.576	0.112	1.222	0.125	2.112	0.042
	PPD	2.398	0.643	2.130	0.468	0.337	0.739
	CAL	5.005	54.770	2.845	0.309	1.007	0.332
61-70 years old	PI	1.337	0.259	2.049	0.876	0.780	0.562
	GI	1.414	0.173	1.029	0.029	2.197	0.090
	PPD	4.100	1.470	1.500	1.500	1.238	0.301
	CAL	4.025	0.509	2.156	.281	3.217	0.024

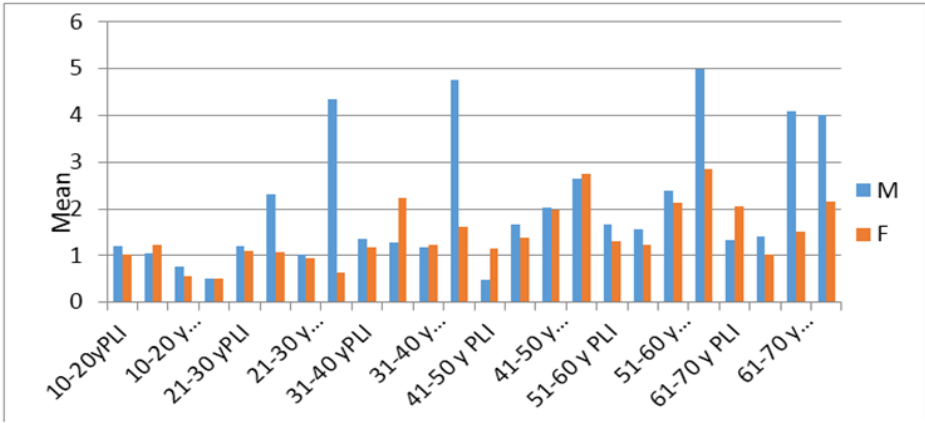


Figure 12: Scatterplot graph of MMP-9 enzyme level with TIMP-1 enzyme level in septic patients who passed away during observation

Table 13: Distribution of clinical parameters and diagnosis according to age groups and gender

Sex		Diagnosis					
		CG		CP			
		Mean	±SE	Mean	±SE	T test	P value
M	PI	1.241	0.040	1.131	0.057	1.567	0.118
	GI	1.115	0.037	1.431	0.055	4.752	0.000
	PPD	0.279	0.084	2.492	0.192	10.547	0.000
	CAL	0.127	0.050	2.813	0.132	19.002	0.000
F	PI	1.071	0.033	1.232	0.055	2.496	0.014
	GI	1.153	0.044	1.264	0.055	1.577	0.116
	PPD	0.603	0.138	2.114	0.226	5.704	0.000
	CAL	0.247	0.083	2.958	0.148	16.002	0.000
Total	PI	1.167	0.027	1.172	0.041	0.096	0.924
	GI	1.132	0.028	1.364	0.040	4.730	0.000
	PPD	0.420	0.077	2.339	0.147	11.584	0.000
	CAL	0.179	0.046	2.872	0.099	24.730	0.000

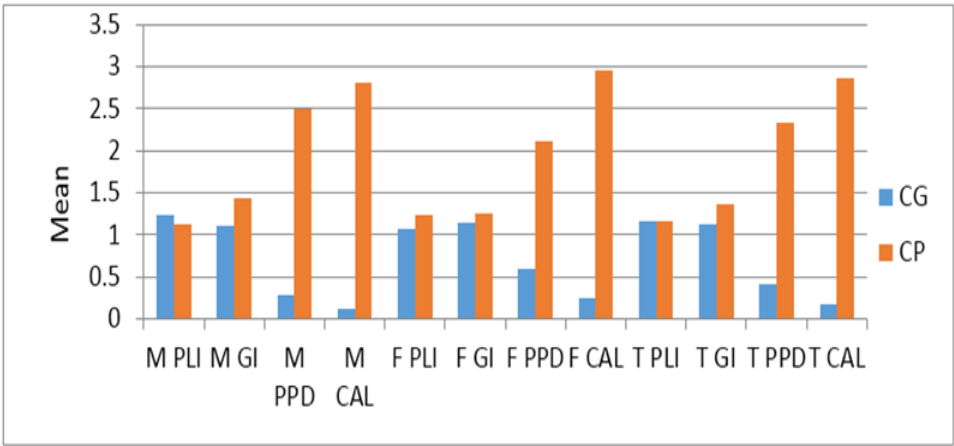


Figure 13: Distribution of clinical parameters and diagnosis according to age groups and gender

Table 14: Distribution of brushing method, clinical parameters, and diagnosis (CG and CP)

Brushing Method		Diagnosis					
		CG		CP			
		Mean	SE	Mean	SE	T test	P value
Horizontal	PI	1.1854	0.0358	1.2108	0.0485	0.422	0.673
	GI	1.1214	0.0359	1.3690	0.0543	3.804	0.000
	PPD	0.3411	0.0841	2.2884	0.1836	9.643	0.000
	CAL	0.1466	0.0538	2.7706	0.1316	18.461	0.000
Vertical	PI	1.1469	0.0560	1.0961	0.1011	0.440	0.661
	GI	1.1410	0.0609	1.3575	0.0793	2.167	0.033
	PPD	0.5547	0.1924	2.4897	0.3416	4.936	0.000
	CAL	0.2002	0.0913	3.3684	0.2080	13.949	0.000
Circular	PI	1.1416	0.0732	1.1421	0.1176	0.004	0.997
	GI	1.2075	0.0763	1.2362	0.0978	0.231	0.818
	PPD	0.5399	0.2608	2.0264	0.4183	3.016	0.004
	CAL	0.3250	0.1840	2.3489	0.2271	6.924	0.000
PLI	P value	0.783		0.498			
GI	P value	0.608		0.570			
PPD	P value	0.436		0.670			
CAL	P value	0.445		0.008			

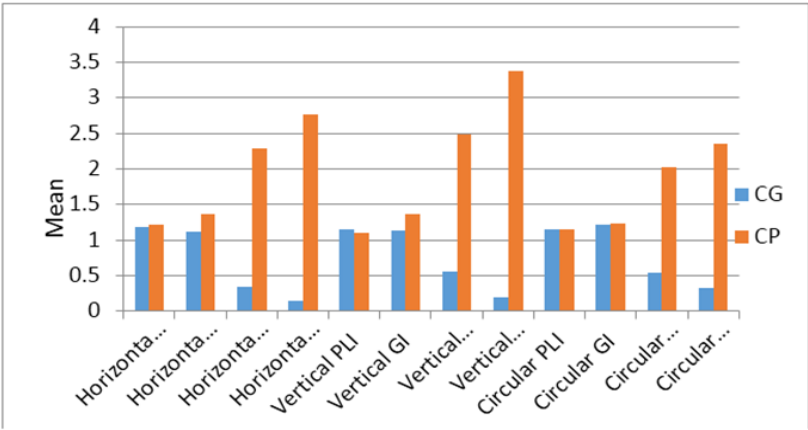


Figure 14: Distribution of brushing method, clinical parameters, and diagnosis (CG and CP)

Table 15: Statistical differences between brushing frequency, clinical parameters, and diagnosis (CG and CP)

Brushing frequency		Diagnosis					
		CG		CP			
		Mean	±SE	Mean	±SE	T test	P value
Irregular	PI	1.287	0.064	1.276	0.094	0.102	0.919
	GI	1.041	0.082	1.353	0.081	2.710	0.008
	PPD	0.239	0.136	1.999	0.284	5.585	0.000
	CAL	0.000	0.000	2.752	0.183	15.001	0.000
Once	PI	1.092	0.042	1.122	0.063	0.398	0.691
	GI	1.170	0.041	1.345	0.064	2.318	0.022
	PPD	0.407	0.115	2.326	0.235	7.341	0.000
	CAL	0.211	0.072	2.869	0.154	15.623	0.000
2+	PI	1.214	0.044	1.167	0.066	0.596	0.553
	GI	1.136	0.046	1.353	0.072	2.534	0.013
	PPD	0.489	0.134	2.534	0.274	6.707	0.000
	CAL	0.215	0.083	2.946	0.207	12.279	0.000
PLI	P value	0.051		0.335			
GI	P value	0.342		0.995			
PPD	P value	0.581		0.429			
CAL	P value	0.293		0.788			

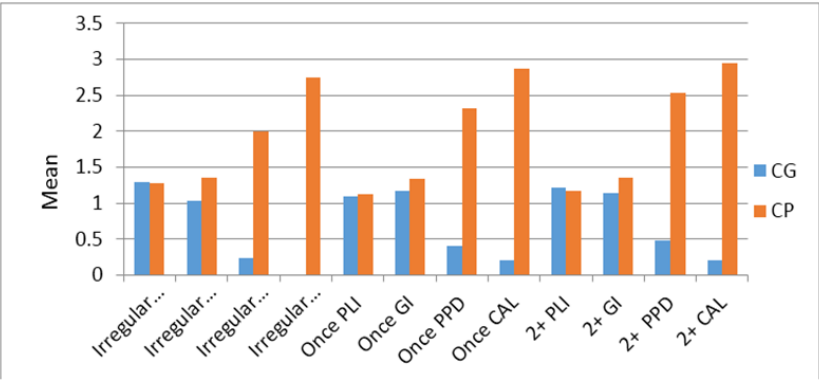


Figure 15: Statistical differences between brushing frequency, clinical parameters, and diagnosis (CG and CP)

Table 16: Relationship between mobility of teeth, furcation involvement, and diagnosis

Index1		Diagnosis					Total	
		CG		CP				
		N.	%	N.	%	P value	N.	%
Mobility	None	335	99.11	157	69.78	0.000	492	87.39
	Yes	3	0.89	68	30.22		71	12.61
Furcation	None	338	100.00	193	85.78	0.000	531	94.32
	Yes	0	0z.00	32	14.22		32	5.68

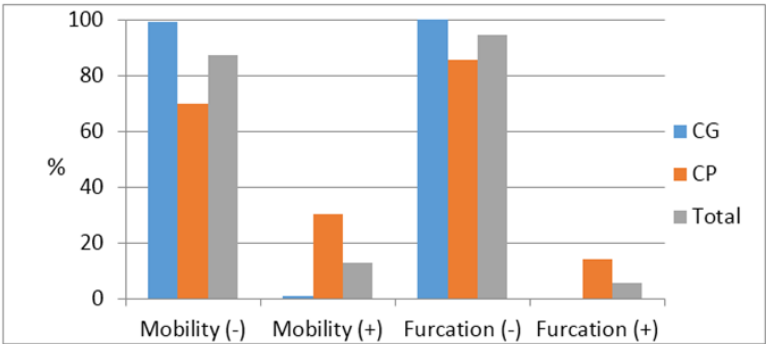


Figure 16: Relationship between mobility of teeth, furcation involvement, and diagnosis

Table 17: Relationship between clinical parameters, diagnosis (CG and CP), mobility of teeth, and furcation involvement

Diagnosis			Clinic al param ters	r	P-value	No. of Fur.involved		Mobile teeth. No.	
						r	p value	r	p value
CG			PI	1				0.014	0.804
			GI	0.095	0.080			0.014	0.798
			PPD	0.060	0.275			0.105	0.054
			CAL	0.056	0.301			0.020	0.713
CP			PI	1		0.096	0.152	0.037	0.580
			GI	0.013	0.841	0.162	0.015	0.198	0.003
			PPD	0.056	0.406	0.054	0.419	0.139	0.037
			CAL	0.022	0.743	0.147	0.027	0.299	0.000

The total of (563) patients were included in the study (234 females and 334 males) in the age ranges of (10) to (70). Patients' own actions and routines, such as how often they clean their teeth, how hard, and outside influences like smoking can all have an impact on their periodontal health. The purpose of this study was to examine patient-related characteristics and their impact on periodontal health in a representative sample of the Iraqi population. According to the results of this investigation, the prevalence of periodontal disorders increased with age. This disparity may be due to more lifetime tissue degradation than to any inherent increase in periodontal vulnerability with advancing age [22]. Furthermore, this study found that men had a higher prevalence and severity of periodontal damage than women. These findings were comparable with [23] who discovered the same thing. The gender-specific genetic predispositions [24] or the other social-behavioral factors may be at play in this observation. In addition, this gender-related finding has repeatedly been documented by numerous studies, with the explanation being that females are generally more concerned with their oral health and overall beauty [25]. Likewise, only 30.22 percent of patients with chronic periodontitis had mobile teeth, which is consistent with the findings of study [26] that revealed that tooth mobility is commonly present in the most advanced stages of the disease. Moreover, self-care refers to individual self-directed behaviors that a person engages in to maintain and improve their health as well as to prevent and minimize illness. The initial step in assisting patients in better controlling their condition is to improve self-care behaviors, which emphasizes the significance of efficient elements for the patient self-treatment. Self-care also enhances the effectiveness of the illness's therapy and declines the likelihood of complications [27-35].

Conclusion

Periodontal diseases were found less in females than males. Also, there were less periodontal diseases in young patients than in old patients.

Abbreviations

M=Male, F=Female, CG=Chronic Gingivitis, CP=Chronic Periodontitis, N=Number, Sig.=Significant, GI=Gingival index, PI=Plaque index, PPD=Probing pocket, r=correlation coefficient depth, CAL= Clinical attachment loss, P= P-value.

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Authors' contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

The author declared that they have no conflict of interest.

ORCID:

Abdulkareem Hussain Alwan

<https://www.orcid.org/0000-0002-4674-2275>

Basma Fathi Alanabri

<https://www.orcid.org/0000-0002-3165-2453>

Maha Waleed Alghazali

<https://www.orcid.org/0000-0003-3653-6096>

Afnan Abdulkareem Hussain

<https://www.orcid.org/0000-0002-9093-5031>

Farah Abdul_Razzak Mahmood Al_Bazaz

<https://orcid.org/0000-0003-2185-3881>

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