ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 8, Issue – 1, January – 2025, Page No. : 81 - 91

Association between Coffee Consumption and Anxiety Levels With Periodontal Disease -A Cross Sectional Study

[1]Tumati Prasanna, Undergraduate Student, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

[2]Polumatlaaishwarya, Postgraduate Student, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

[3]Srihita Amirneni, UG Student, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

[4]Jahnavi Valiveti, UG Student, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

[5]Syeda Naahiya, Under Graduate Student, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

[6]Kishore Kumar Katuri, Professor, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

Corresponding Author: Kishore Kumar Katuri, Professor, Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur

Citation of this Article: Tumati Prasanna, Polumatlaaishwarya, Srihita Amirneni, Jahnavi Valiveti, Syeda Naahiya, Kishore Kumar Katuri, "Association between Coffee Consumption and Anxiety Levels With Periodontal Disease -A Cross Sectional Study", IJDSIR- January – 2025, Volume – 8, Issue – 1, P. No. 81 – 91.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Introduction

Coffee is a highly used caffeine-containing beverage globally. Studies have revealed that coffee consumption may be linked to various health benefits, but it has also historically been associated with negative health impacts.[1] Positive effects of coffee drinking on human health were reported by Bae JH et al in 2014.[2]

Caffeine, or 1,3,7-trimethyl xanthine, is found in coffee and is the most concentrated form of the alkaloid. It is a white, crystalline powder with a bitter flavor and strong anti-inflammatory and antioxidant properties. Other ingredients, such as caffeic acid (3,4-Dihydroconnamic acid), hydroxyhydroquinone (1,2,4-Trihydroxybenzene), and chlorogenic acid (3-3,4-Dihydroxycinnamoyl quinic acid), were also essential to health care. These ingredients are strong antioxidants that have a number of positive health impacts, including defending the body against the damaging effects of free radicals.[3] Additionally, Tsou SH et al. (2019) have proposed that coffee's chlorogenic acid possesses strong chemopreventive properties.[4]

Many foods, drinks, dietary supplements, and medications contain caffeine, which has pharmacological activity. It is also used to treat critically unwell newborns with apnea. In healthy adults, consuming up to 400 mg of caffeine per day did not

cause any negative side effects.[5] In addition to regulating intracellular signaling for growth, proliferation, and death, caffeine and phenolic substances exhibit antioxidant qualities.[6]

There are numerous more bioactive compounds in coffee that have a variety of physiological effects. They include lactones, diterpenes (like cafestol and kahweol), phenols (including chlorogenic and caffeic acid), niacin, and the precursor of vitamin B3 trigonelline. Additionally, coffee has high levels of potassium, magnesium, and vitamin B3.[7,8] Coffee is said to have health advantages for a number of ailments, including Parkinson's disease, Alzheimer's disease, cardiovascular disease, and type 2 diabetes.[9]

Conversely, it has been noted that coffee can also be detrimental because it raises blood pressure, induces restlessness, and insomnia.[10,11] According to epidemiological research, drinking boiled coffee was linked to a higher risk of cardiovascular disease.[12]

Stress can cause the immune system to become dysregulated, which can result in periodontitis. According to Genco et al., there are two mechanisms that achieve this, both of which are based on physiological responses mediated by the hypothalamus-pituitary (HPA) axis. Following HPA axis activation brought on by stress, there is an increase in corticotropin-releasing hormone concentration from the hypothalamus. This hormone then acts on the adrenal cortex to release cortisol into the bloodstream, which causes the secretion of pro-inflammatory cytokines that cause periodontal tissue destruction.[13]

Immunosuppressive host defenses resulting from psychological and physical factors might make an individual more susceptible to illness.[14,15] The anxiogenic impact of coffee has been proven in animal models of anxiety. Anxiety symptoms can be brought on by high quantities of coffee, while modest levels normally do not have this effect.[16]. Previous studies elucidated the benefits and drawbacks of caffeine usage, with a daily dosage linked to an increased risk of anxiety and depression in the general population.[17]

Periodontal disease negatively impacts a person's ability to obtain adequate nutrition as well as their quality of life due to negative consequences on eating choices and physical, psychological, and social relationships.[18]

Caffeine has the ability to inhibit human neutrophil and monocyte chemotaxis as well as the inflammatory cytokine tumor necrosis factor (TNF)-alpha production. Additionally, it was shown that caffeine inhibits the activity of human lymphocytes, as demonstrated by decreased T-cell proliferation and a decrease in the production of Th1 (interleukin [IL]-2 and interferon [IFN]-gamma), Th2 (IL-4, IL-5), and Th3 (IL-10) cytokines.[19]

High dosages of caffeine have been demonstrated to enhance alveolar bone loss in rats with ligature-induced periodontitis, despite the fact that some systemic variables have been identified as a risk factor for periodontal disorders. But the amount administered was the same as 16 cups of coffee a day for humans.[20]

Although there have been several studies[21-23] were carried out examining the relationship between coffee intake and periodontal disease, no study was done in Indian population analysing the relationship between the quantity of coffee intake and anxiety levels with periodontal disease. Thus, the aim of the present study was to evaluate the association of coffee consumption and anxiety levels with periodontal disease.

Materials and methods

Study population**:** Subjects aged between 35 to 55 years reporting to the outpatient Department of Periodontics, SIBAR Institute of Dental Sciences, Guntur were

observed. Based on the consumption of coffee per day were divided into three groups. Anxiety levels were recorded by using a questionnaire. The study was approved by institutional ethical committee (Pr.136/IEC/SIBAR/2022) and was registered in clinical trial registry in India (CTRI-No: CTRI/2022/09/045684). An informed consent was taken from the subjects who were willing to participate in the study.

Sample size calculation: G power 3.1.9.2 software version used to calculate sample size.

Effect size 1.7, α error – 0.05. Power - 80% a total of sample size of 200 subjects was considered for the study

Inclusion Criteria

1. Age between 35-55years.
2. Apparently healthy individuals.
3. Patients with Chronic periodontitis.
4. Patients with minimum of 20 teeth.

Exclusion Criteria

1. Patients with history of cigarette smoking, alcohol intake and chewing tobacoo habits.
2. Previous history of any periodontal treatment before 6 months.
3. Pregnancy and lactating women
4. Under any medication that affect the periodontal status and lipid profile.

A total of 200 Subjects of both genders based on the frequency (no of cups/ day) of coffee consumption, subjects were divided into Group I (0-2 cups/day), Group II (3-6 cups/day) and Group III (7≥ cups/day). Study flow chart was shown in figure-1.

Data was collected by recording the following parameters. Plaque Index (PI), Gingival Index (GI), Probing Pocket Depth (PPD), Clinical Attachment Level (CAL), and Generalized Anxiety Disorder-7 (GAD-7) from all the subjects.

Evaluation criteria

Plaque Index according to Silness and Loe (1964):[24] plaque index was measured by examining soft debris and mineralized deposits on the teeth with the help of the explorer. Missing teeth will not be substituted. Each of the four surfaces of the teeth (buccal, lingual, mesial and distal) will be given a score from 0-3. the scores from the four areas will be added and divided by four in order to give the plaque index for the tooth.

Gingival Index according to Loe and Silness (1963):[24] Each of the four gingival areas of the tooth (buccal, lingual, mesial and distal) will be given a score from 0 to 3. The scores from the four areas of the tooth will be added and divided by four in order to give the gingival index for the tooth.

Probing Pocket Depth is the distance between the base of the pocket and the gingival margin and clinical attachment level will be measured from cementoenamel junction (CEJ) to base of the pocket. Both measurements were recorded by a University of North Carolina -15 (UNC-15) periodontal probe. Each tooth was scored in six areas: distofacial, midfacial, mesiofacial and distolingual, midlingual, and mesiolingual surfaces. The score was obtained by adding all the values and dividing it by the number of teeth examined for the individual.[25]

Generalized anxiety disorder screener (GAD-7) was measured according to the scale of 0 to 3 consisting of seven questions with score 0 to 7 is considered as none and 8+score is considered as probable anxiety disorder (figure-1).[26]

Statistical analysis

Statistical analysis was performed using SPSS version 20 software (IBM SPSS statistics for Windows version 20, Armonk, NY, USA). Descriptive statistics, one way analyses of variance with Tukey's post hoc tests and pearson's correlation tests were done to analyze the

study data. 95% Confidence Interval has been computed to find the significant features. All statistical parameters performed using a statistical software package. Statistical significance was accepted at p≤0.05.

Results: The present study was conducted to Correlate the association between coffee consumption and anxiety in relation with periodontal disease. The study was conducted in a total of 200 patients belonging to the both genders, were divided into 3 groups based on number of cups coffee consumption per day by the patient.

The mean value of age in each group of patients was shown in Table -1. Group I patients was 39.75±7.84, Group II patients was 41.60±6.94, and in Group III patients was 42.45±7.50. The mean value of clinical Parameters such as Probing Depth (PD), Clinical Attachment Loss (CAL), Plaque Index (PI), Gingival Index (GI), and GAD-7 in 3 groups were shown in Table -2

The mean values of Plaque Index (PI) in Group I was 1.13±0.47, in Group II was 2.15±2.25, and in Group III was 2.26±2.41. on comparison with the groups, a statistically significant (P<.022*) difference was observed in Group II and Group III than Group I (Table -2)

The mean values of Gingival Index (GI) in Group I was 0.91±0.46, in Group II was 1.36±0.48, and in Group III was 1.83±0.40. when comparison was done between the groups, a statistically significant (P<.001*) difference was observed in Group II and Group III than Group I (Table -2)

The mean values of Probing Depth (PD) in Group I was 4.09±0.57, in Group II was 4.65±0.69, and in Group III was 5.27±0.83. when comparison was done between the groups, a statistically significant (P<.001*) difference was observed in Group II and Group III than Group I (Table -2)

The mean values of clinical attachment level (CAL) in Group I was 4.88±0.92, in Group II was 5.04±0.80, and in Group III was 5.92±1.03. when comparison was done between the groups, a statistically significant (P<.001*) difference was observed in Group II and Group III than Group I (Table -2)

The mean values of GAD-7 scores in Group I was 4.50±2.77, in Group II was 6.09±3.65, and in Group III was 9.47±2.10. when comparison was done between the groups, a statistically significant (P<.001*) difference was observed in Group III than Group II and Group I (Table -2)

Correlation coefficient between the parameters in all the 3 groups showed that a significant positive correlation with PI, GI, PPD, CAL and GAD-7 were found (Table-3).

In the stratified analysis, between the groups in correlation with all the parameters found that GI, PPD and CAL showed a significant difference in Group I when correlated with other two groups. Group III exhibited significant difference compared with Group I and Group II (P<.001*) (Table-4).

Discussion

While caffeine makes up a significant portion of coffee, the amount varies greatly—a cup (150 mL) can contain anywhere from 30 mg to 175 mg of caffeine. The most popular psychoactive substance in the world, caffeine seems to primarily affect biological processes via antagonistically binding to the adenosine receptor. Since adenosine is an endogenous inhibitory neuromodulator that causes sensations of tiredness, caffeine causes actions on the central nervous system that are generally stimulatory.[27]

Coffee oil contains two diterpenes: cafestol and kahwoel. The primary substances in coffee that raise cholesterol are called diterpenes, although paper filters

largely eliminate them. Thus, whereas drinking filtered coffee causes very little increase in blood cholesterol, unfiltered coffee is a considerable source of diterpenes.[28]

There is a strong dose-dependent correlation between long-term coffee drinking and lower risk of type 2 diabetes. Additionally, studies have shown a correlation between increased coffee intake and decreased insulin resistance, inflammation, and diabetes risk.[29]

Higher coffee consumption is linked to lower grades of metabolic syndrome, liver cancer, nonalcoholic fatty liver disease, and a lower incidence of cancers of the mouth, throat, and esophagus, according to epidemiological research. Additionally, it has been shown that coffee consumption is negatively correlated with endothelial dysfunction and inflammatory indicators. [30-32]

Common psychiatric illnesses, emotional problems are brought on by a variety of environmental and hereditary factors. There are two main forms of anxiety and depression disorders. Anxiety disorders are thought to affect between 0.9 and 29.8% of people globally, and in recent decades, the prevalence of emotional difficulties among teenagers has sharply grown. [33]

There have been reports of potential connections between emotional disorders and periodontal disease. Studies on both clinical and epidemiological populations have demonstrated a high correlation between stress and anxiety and periodontitis. Patients with high state anxiety scale scores were also more likely to develop periodontitis, according to earlier cross-sectional research by Ababneh et al. (2010), Delgado-angulo et al. (2015), and Karimi et al. (2017)..[34]

The current study's anxiety levels are consistent with other research that shown a positive link between higher GAD-7 scores and CAL levels.

Coffee has been linked to a lower incidence of numerous cancer types and may help avoid disorders linked to inflammation and oxidative stress, such as obesity, metabolic syndrome, and type 2 diabetes.[35]. Given that caffeine is thought to be the most psychoactive drug in the world, its presence in coffee may be the cause of this [36]

It has been shown that caffeine affects bone metabolism in a number of ways, which increases the severity of periodontal disease.[12]. In this study, the periodontal status was evaluated using PD and CAL. Patients in Group III who drank six or more cups of coffee a day, or a high intake, demonstrated higher PD and CAL than those who drank less cups. Similar findings were made in a prior study conducted by Nathan G. et al. (2015), wherein PD, BOP, radiographic alveolar bone loss measured with intraoral periapical radiographs, and the total number of tooth loss were recorded. It was discovered that a higher coffee intake was linked to a marginally but significantly lower number of teeth with periodontal bone loss.[20]

Drinking coffee may help prevent periodontal bone loss, according to a study by Machida et al.[37] Another study conducted by Sakamoto et al. found that coffee did not stimulate bone loss in rats.[38]

In contrast, a research by Zuccarello et al. found that coffee drinking was a prevalent risk factor for periodontitis.[39] An increase in coffee consumption was found to have a substantial positive association with the inflammatory cytokines IL-1, IL-8, and TNF-α, according to a cross-sectional study by Yamashita K et al.[40]

The research conducted by the Tanaka group demonstrated a correlation between coffee drinking and a higher incidence of tooth loss.[41] Daily consumption of strong coffee was found to cause a delay in the process

of alveolar bone repair following tooth extraction, according to Acedo R M et al.[42] Consistent with the previously mentioned findings, the current investigation demonstrated a positive correlation between the severity of periodontitis and gingivitis and the amount of coffee consumed.

Individuals in this study who consumed more than four cups of coffee a day either had moderate periodontitis or gingivitis. These results are consistent with other cross-sectional studies by Brezera JP et al.[21] and Struppek J et al.[43], where participants who consumed large amounts of coffee had a considerably higher risk of periodontitis than those who consumed little amounts. Conversely, compared to low coffee intake, moderate (3–6 cups/day) coffee consumption did not correlate with periodontitis.

Limitations of the study were a small sample size and evaluation of the type of coffee consumption related to filtered or non-filtered form were not measured. coffee consumption was also measured with number of cups without taking into consideration of cup size. Only anxiety levels were evaluated without taking consideration of stress levels.

Further longitudinal studies with large sample size and evaluation of quality of coffee consumption as well as other risk factors involving periodontitis was suggested.

Conclusion

The results of the present study revealed that there was a positive correlation between the number of coffee cups consumption per day with severity of periodontitis. The anxiety score was also high with increase in coffee consumption. So, it can be concluded that excess consumption of coffee consumption has resulted in greater anxiety levels and increased periodontal parameters.

References

1. Gonzalez de Mejia E, Ramirez-Mares MV. Impact of caffeine and coffee on our health. Trends Endocrinol Metab. 2014; 25: 489–492.
2. Bae J-H, Park J-H, Im S-S, Song D-K. Cofee and health. Integr Med Res. 2014;3(4):189–91.
3. Butt MS, Sultan MT. Coffee and its consumption: benefts and risks. Crit Rev Food Sci Nutr. 2011;51(4):363–73.
4. Tsou S-H, Hu S-W, Yang J-J, Yan M, Lin Y-Y. Potential oral health care agent from cofee against virulence factor of periodontitis. Nutrients. 2019;11(9):2235
5. Wikoff D, Welsh BT, Henderson R, Brorby GP, Britt J, Myers E, Goldberger J, Lieberman HR, O'Brien C, Peck J, Tenenbein M, Weaver C, Harvey S, Urban J, Doepker C. Systematic review of the potential adverse effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. Food Chem Toxicol. 2017 Nov;109(Pt 1):585-648
6. Stefanello N, Spanevello RM, Passamonti S, Porciúncula L, Bonan CD, Ola- biyi AA, Teixeira da Rocha JB, Assmann CE, Morsch VM, Schetinger MRC: cofee, cafeine, chlorogenic acid, and the purinergic system. Food Chem Toxicol 2019, 123:298–313.
7. Spiller MA. The chemical components of coffee. In: Spiller GA, editor. Caffeine. Boca Raton: CRC Press; 1998. p. 97–161
8. Gómez-Ruiz JA, Leake DS, Ames JM. In vitro antioxidant activity of coffee compounds and their metabolites. Journal of Agricultural and Food Chemistry 2007; 55:6962–9.
9. van Dam RM, Hu FB, Willett WC. Cofee, cafeine, and health. N Engl J Med. 2020;383(4):369–78.

10. Clark I, Landolt HP. Cofee, cafeine, and sleep: a systematic review of epidemiological studies and randomized controlled trials. Sleep Med Rev. 2017;31:70–8.
11. Wachamo HL. Review on health beneft and risk of cofee consumption. Med Aromat Plants. 2017;6(4):1–12.
12. Han K, Ko Y, Park YG, Park JB. Associations Between the Periodontal Disease in Women Before Menopause and Menstrual Cycle Irregularity: The 2010–2012 Korea National Health and Nutrition Examination Survey. Medicine (Baltimore), 2016; 95: e2791.
13. Boyapati L, Wang HL. The role of stress in periodontal disease and wound healing. Periodontol 2000 2007; 44:195-210.
14. M.V. Vettore; A.T.T. Leão; A.M. Monteiro da Silva; R.S. Quintanilha; G.A. Lamarca (2003). The relationship of stress and anxiety with chronic periodontitis. , 30(5), 394–402.
15. DATelgado-Angulo EK, Sabbah W, Suominen AL, Vehkalahti MM, Knuuttila M, Partonen T, Nordblad A, Sheiham A, Watt RG, Tsakos G. The association of depression and anxiety with dental caries and periodontal disease among Finnish adults. Community dentistry and oral epidemiology. 2015 Dec;43(6):540-9.
16. Fredholm BB, Bättig K, Holmén J, et al. Actions of caffeine in the brain with special reference to factors that contribute to its widespread use. Pharmacol Rev 1999; 51:83–133.
17. Smith JE, Lawrence AD, Diukova A, et al. Storm in a coffee cup: caffeine modifies brain activation to social signals of threat. Soc Cogn Affect Neurosci 2012;7:831–40.
18. Rogers PJ, Hohoff C, Heatherley SV, Mullings EL, Maxfield PJ, Evershed RP, Deckert J, Nutt DJ. Association of the anxiogenic and alerting effects of caffeine with ADORA2A and ADORA1 polymorphisms and habitual level of caffeine consumption. Neuropsychopharmacology. 2010 Aug;35(9):1973-83.
19. Jepsen, S.; Blanco, J.; Buchalla,W.; Carvalho, J.C.; Dietrich, T.; Dörfer, C.; Eaton, K.A.; Figuero, E.; Frencken, J.E.; Graziani, F.; et al. Prevention and control of dental caries and periodontal diseases at individual and population level: Consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. J. Clin. Periodontol. **2017**, 44, 85–93.
20. Ng N, Kaye EK, Garcia RI. Coffee consumption and periodontal disease in males. J Periodontol. 2014 Aug;85(8):1042-9.
21. Bezerra JP, da Silva LR, de Alvarenga Lemos VA, Duarte PM, Bastos MF. Administration of high doses of caffeine increases alveolar bone loss in ligature induced periodontitis in rats. J Periodontol 2008;79: 2356-2360.
22. Kim YR, Nam SH. Comparison of Periodontal Status According to the Additives of Coffee: Evidence from Korean National Health and Nutrition Examination Survey (2013-2015). Int J Environ Res Public Health. 2019 Oct 31;16(21):4219.
23. Rhee Y, Choi Y, Park J, Park HR, Kim K, Kim YH. Association between coffee consumption and periodontal diseases: a systematic review and meta-analysis. BMC Oral Health. 2022 Jul 5;22(1):272.
24. Loe H: The Gingival Index, the Plaque Index and the Retention Index System. J Periodontol. 1967; 38:610-6.

25. Pihlstrom BL. Measurement of attachment level in clinical trials: probing methods. Journal of periodontology. 1992 Dec; 63:1072-7.
26. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine. May 22 2006;166(10):1092- 1097.
27. Angel Mary, Pragathi R Bhat, Anirudh B Acharya, Vijay A Trasad. (2019). Association of coffee with severity of periodontal disease - A comparative cross-sectional clinical study. 4(1), 14-19.
28. Nawrot P, Jordan S, Eastwood J, Rotstein J, Hugenholtz A, Feeley M. Effects of caffeine on human health. Food Addit Contam 2003;20:1–30.
29. van Dam RM, Willett WC, Manson JE, Hu FB. Coffee, caffeine, and risk of type 2 diabetes: a prospective cohort study in younger and middle-aged U.S. women. Diabetes Care. 2006; 29(2):398–403.
30. Bae JH, Park JH, Im SS, Song DK. Coffee and health. Integr Med Res. 2014 Dec;3(4):189-191.
31. Buscemi S, Verga S, Batsis JA, Donatelli M, Tranchina MR, Belmonte S, Mattina A, Re A, Cerasola G. Acute effects of coffee on endothelial function in healthy subjects. Eur J Clin Nutr. 2010 May;64(5):483-9.
32. Chan L, Hong CT, Bai CH. Coffee consumption and the risk of cerebrovascular disease: a meta-analysis of prospective cohort studies. BMC Neurol. 2021 Oct 2;21(1):380.
33. Liu F, Wen YF, Zhou Y, Lei G, Guo QY, Dang YH. A meta-analysis of emotional disorders as possible risk factors for chronic periodontitis. Medicine (Baltimore). 2018 Jul;97(28):e11434.
34. Zheng DX, Kang XN, Wang YX, Huang YN, Pang CF, Chen YX, Kuang ZL, Peng Y. Periodontal disease and emotional disorders: A meta-analysis. J Clin Periodontol. 2021 Feb;48(2):180-204.
35. Barrea L, Pugliese G, Frias-Toral E, El Ghoch M, Castellucci B, Chapela SP, Carignano MLA, Laudisio D, Savastano S, Colao A, Muscogiuri G. Coffee consumption, health benefits and side effects: a narrative review and update for dietitians and nutritionists. Crit Rev Food Sci Nutr. 2023;63(9):1238-1261.
36. Broderick P, Benjamin AB. Caffeine and psychiatric symptoms: a review. J Okla State Med Assoc. 2004;97:538-42.
37. Machida T, Tomofuji T, Ekuni D, Azuma T, Takeuchi N, Maruyama T, et al. Severe Periodontitis Is Inversely Associated with Coffee Consumption in the Maintenance Phase of Periodontal Treatment. Nutrients. 2014 Oct; 6(10): 4476– 4490.
38. Sakamoto W, Nishihira J, Fujie K, Iizuka T, Handa H, Ozaki M, Yukawa S. Effect of coffee consumption on bone metabolism. Bone. 2001; 28. 332-336.
39. Zuccarello D, Bazzato MF, Ferlin A, Pengo M, Frigo AC, Favero G, Foresta C, Stellini E. Role of familiarity versus interleukin-1 genes cluster polymorphisms in chronic periodontitis. Gene. 2014 Feb 10;535(2):286-9.
40. Yamashita K, Yatsuya H, Muramatsu T, Toyoshima H, Murohara T, Tamakoshi K. Association of coffee consumption with serum adiponectin, leptin, inflammation and metabolic markers in Japanese workers: a cross-sectional study. Nutr Diabetes. 2012 Apr 2;2(4):e33.
41. Tanaka K1, Miyake Y, Sasaki S, Ohya Y, Matsunaga I, Yoshida T, Hirota Y et al. Beverage consumption and the prevalence of tooth loss in pregnant Japanese women: the Osaka Maternal and

Child Health Study. Fukuoka Igaku Zasshi. 2008 Apr;99(4):80

42. Macedo RM, Brentegani LG and Lacerda SA. "Effects of coffee intake and intraperitonial caffeine on bone repair process – a histologic and histometric study. Braz Dent J. 2015;26:175-180.
43. Struppek J, Walther C, Bunte K, Zyriax BC, Wenzel JP, Senftinger J, Nikorowitsch J, Heydecke G, Seedorf U, Beikler T, Borof K, Mayer C, Aarabi G. The association between coffee consumption and periodontitis: a cross-sectional study of a northern German population. Clin Oral Investig. 2022 Mar;26(3):2421-2427.

Legend Tables

Table 1: Gad-7 Scale

Over the last 2 weeks, how often have you beenbothered by the following problems?	Not at all	Several Days	More than half the days	Nearly every day
1 Feeling nervous, anxious or on edge	0	1	2	3
2 Not being able to stop or control worrying	0	1	2	3
3 Worrying too much about different things	0	1	2	3
4 Trouble relaxing	0	1	2	3
5 Being so restless that it is hard to sit still	0	1	2	3
6 Becoming easily annoyed or irritated	0	1	2	3
7 Feeling afraid as if something awful mighthappen	0	1	2	3
	Total Score			

Table 2: Mean values of age in 3 Groups

Group	Number of subjects	Mean age with standard deviation
I	68	39.75±7.84
II	65	41.60±6.94
III	67	42.45±7.50

Table 3: Comparison of study parameters between the groups

Parameter	Group	N	Mean	Std. Deviation	95% Confidence Interval for Mean		F value	P value
					Lower Bound	Upper Bound		
GAD-7	I	68	4.50	2.773	2.13	5.87	2.093	<.001*
	II	65	6.09	3.654	4.88	7.29		
	III	67	9.47	2.100	7.27	7.67		

GI	I	68	.913421	.4650445	.760565	1.066277	34.463	<.001*
	II	65	1.361429	.4865735	1.194285	1.528572		
	III	67	1.835000	.4010138	1.685259	1.984741		
PI	I	68	1.130789	.4705798	.976114	1.285465	3.987	.022*
	II	65	2.150000	2.2514100	1.376614	2.923386		
	III	67	2.269667	2.4176199	1.366913	3.172421		
PPD	I	68	4.095526	.5772849	3.905778	4.285275	23.772	<.001*
	II	65	4.658000	.6989101	4.417916	4.898084		
	III	67	5.272667	.8307036	4.962477	5.582856		
CAL	I	68	4.882368	.9297702	4.576761	5.187976	12.006	<.001*
	II	65	5.042000	.8062105	4.765057	5.318943		
	III	67	5.929333	1.0378390	5.541798	6.316869		

One way analysis of variance; p≤0.05 considered statistically significant; * denotes statistical significance.

Table 4: Correlation between the study parameters

Parameter	Measure	GAD-7	GI	PI	PPD	CAL
GAD-7	Pearson Correlation	1	.107	.267**	.110	.149
	Sig. (2-tailed)		.283	.006	.267	.133
GI	Pearson Correlation	.107	1	.229*	.575**	.341**
	Sig. (2-tailed)	.283		.020	.000	.000
PI	Pearson Correlation	.267**	.229*	1	.041	.128
	Sig. (2-tailed)	.006	.020		.683	.199
PPD	Pearson Correlation	.110	.575**	.041	1	.369**
	Sig. (2-tailed)	.267	.000	.683		.000
CAL	Pearson Correlation	.149	.341**	.128	.369**	1
	Sig. (2-tailed)	.133	.000	.199	.000	

Pearson's correlation coefficient test; p≤0.05 considered statistically significant; * denotes statistical significance

Table 5: Correlation between study parameters stratified by group

Group	Parameter	Measure	GAD-7	GI	PI	PPD	CAL
I	GAD-7	Pearson Correlation	1	-.125	-.105	.056	.066
		Sig. (2-tailed)		.453	.529	.740	.694
	GI	Pearson Correlation	-.125	1	-.049	.462**	.430**
		Sig. (2-tailed)	.453		.772	.003	.007
	PI	Pearson Correlation	-.105	-.049	1	-.075	.182
		Sig. (2-tailed)	.529	.772		.653	.274
	PPD	Pearson Correlation	.056	.462**	-.075	1	.394*

		Sig. (2-tailed)	.740	.003	.653		.014
	CAL	Pearson Correlation	.066	.430**	.182	.394*	1
		Sig. (2-tailed)	.694	.007	.274	.014	
II	GAD-7	Pearson Correlation	1	-.238	.318	-.171	.126
		Sig. (2-tailed)		.169	.063	.327	.469
	GI	Pearson Correlation	-.238	1	.011	.353*	-.181
		Sig. (2-tailed)	.169		.952	.037	.299
	PI	Pearson Correlation	.318	.011	1	-.220	.259
		Sig. (2-tailed)	.063	.952		.205	.133
	PPD	Pearson Correlation	-.171	.353*	-.220	1	-.252
		Sig. (2-tailed)	.327	.037	.205		.144
	CAL	Pearson Correlation	.126	-.181	.259	-.252	1
		Sig. (2-tailed)	.469	.299	.133	.144	
III	GAD-7	Pearson Correlation	1	-.177	.066	-.290	-.087
		Sig. (2-tailed)		.350	.730	.120	.647
	GI	Pearson Correlation	-.177	1	.293	.208	.034
		Sig. (2-tailed)	.350		.116	.270	.857
	PI	Pearson Correlation	.066	.293	1	-.064	-.135
		Sig. (2-tailed)	.730	.116		.736	.477
	PPD	Pearson Correlation	-.290	.208	-.064	1	.355
		Sig. (2-tailed)	.120	.270	.736		.054
	CAL	Pearson Correlation	-.087	.034	-.135	.355	1
		Sig. (2-tailed)	.647	.857	.477	.054	

Pearson's correlation coefficient test; $p \leq 0.05$ considered statistically significant; * denotes statistics