

PREVALENCE AND CORRELATES OF NICOTINE DEPENDENCE AMONG PATIENTS VISITING DENTAL HOSPITAL: A CROSS SECTIONAL STUDY IN CHENNAI.

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ABSTRACT:

Background: Tobacco smoking leads to a greater mortality rate of the population. This factor has been unnoticed by the population of our country and they are being addicted to the deadly tobacco. **Aim:** To study the prevalence of nicotine dependence among patients visiting dental hospitals. **Materials and methods:** A questionnaire based cross sectional survey was conducted among 150 tobacco users visiting dental hospitals in Chennai. The observed data was statistically analysed in SPSS software version 23. Pearson chi square test was done to

assess the association between Gender and Nicotine dependence score. **Results:** Majority of the tobacco users preferred cigarettes. Both smoking and non-smoking dependency was moderate among the tobacco users. Pearson chi square test value shows p value is 0.320 (p value >0.05). Hence, it is not statistically significant. **Discussion:** Males have high smoking dependency, while the females have higher dependency on smokeless tobacco than males. The population between the category of 18-25 are moderately dependent on smoking tobacco users. 18-25 age groups are highly dependent among smokeless dependent, and below 18 are moderately smokeless dependent. **Conclusion:** From the present study results, most of the participants used a smoking form of tobacco whereas smokeless users were comparatively less.

KEYWORDS: Chew, Cigarette, Innovative technique, Nicotine, Novel method, Smokeless, Smokers, Tobacco

INTRODUCTION

Tobacco smoking leads to a greater mortality rate of the population((1)) . This factor has been unnoticed by the population of our country and they are being addicted to the deadly tobacco. This mortality cannot be prevented due to the dependence on nicotine(2). It is said that reduced or elimination levels of nicotine in tobacco are reduced. ((3),(4)) It is noted that high levels of nicotine consumption may lead to cardiovascular disorders, respiratory disorders, and cancers ((3),(5)).

The dependence on nicotine has increased with the increase in age. The ratio of quitting tobacco between the age group of 20-30 years is greater than the age group of 50-60 years. Studies which have been done earlier in South Korea((6))and China((7))showed that dependence on nicotine has an inverse relationship with age at 50 years of age as a peak of the dependence.

However, tobacco remains the largest cause for many non-communicable diseases like heart stroke and other heart related diseases(8). The number of studies on nicotine dependence is very much limited. Nicotine dependence affects both the physical and mental health. As it is a mental dependence, the younger smokers have the habit of smoking for less years, so that when they are educated they may quit smoking easier than the older smokers(9).

In the current study, the Fagerstrom test for nicotine dependence(FTND) was used to find the nicotine dependence among smoking tobacco users and non-smoking tobacco users, which will provide enough information for tobacco cessation. Our team has extensive knowledge and research experience that has translate into high quality publications(10–18),(19),(20),(21,22),(23),(24),(25–29)

MATERIALS AND METHODS

A questionnaire based cross-sectional study was conducted among tobacco users in Chennai, Tamilnadu from February first week to third week. This study was done through E-Questionnaire through Google Forms. Sample size was calculated as 150 nicotine users in reference with the study(30) .

Informed consent was collected from the participants who agreed to participate in the study prior to the start of the study.

Participants who agreed to participate and who were current users of tobacco were included in the study. Participants who were former smokers, edentulous and who were suffering from systemic diseases were excluded from the study.

Fagerstrom test for nicotine dependence - Smoking and Fagerstrom test for nicotine dependence- Smokeless , a validated questionnaire was used to collect the responses. Patient's level of nicotine dependence was assessed using the Fagerstrom test for nicotine dependence (FTND) scale which measured psychological tobacco dependence. This FTND consists of six items. The total scores range from 0 to 10 with higher scores showing greater dependence, 0-2 score interprets low dependence ; 3-5 score interprets medium dependence; 6-7 score interprets high dependence ; >8 score interprets very high dependence. Data was analyzed using Statistical Packages for Social Sciences (SPSS) version 23. Descriptive statistics were used and were represented in graphical form. Pearson chi square test was done to assess the association between Gender and Nicotine dependence score.

RESULTS:

In this study, the observed results were that ,majority(47%) of the population use cigarettes/bidi as their daily habit of nicotine dependence(Figure 1). The nicotine dependence among the smoking tobacco users is moderate (59.35%) which shows that they are moderately dependent on smoking(Figure 2), whereas the nicotine dependence among the smokeless tobacco users are moderate (47.10%)(Figure 3),but they are highly dependent on smokeless tobacco(10.32%) than smoking tobacco (5.16%). In the association graph between gender and the Fagerstrom nicotine dependence score among smoking tobacco users, it is observed that both males and females are moderately dependent, Pearson chi square test value shows p value is 0.320(p value >0.05). Hence, it is not statistically significant (Figure 6).

Figure 1: Distribution of pattern of tobacco users among patients visiting dental hospitals.

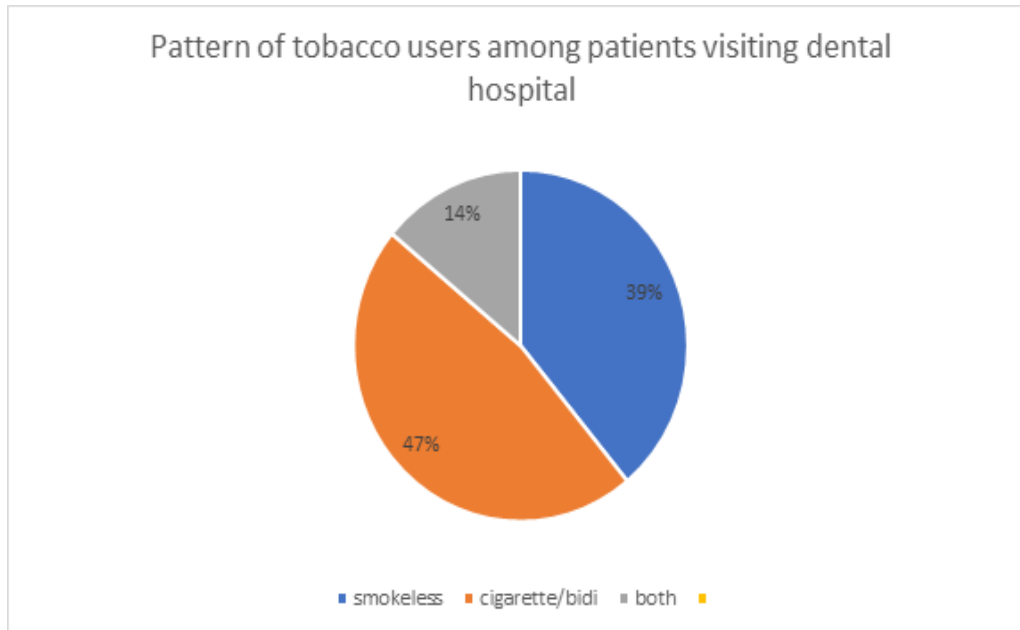


Figure 1 shows the pattern of tobacco use among patients visiting dental hospitals. Orange represents users who prefer ‘cigarettes’, Blue represents users who prefer ‘smokeless tobacco’ and grey represents users who prefer ‘both’. Majority(47%) of the population use cigarettes/bidi, 39% smokeless tobacco, 14% use both types of tobacco.

Figure 2: Nicotine dependence level among smokers in the study Population

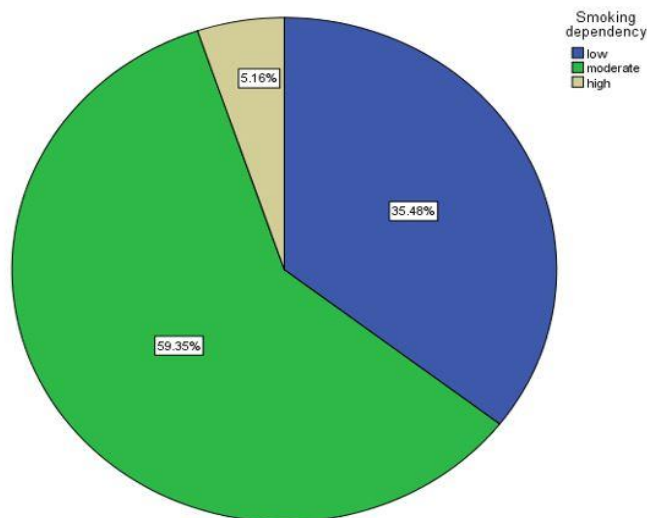


Figure 2 shows the smoking dependency among patients visiting dental hospitals. Blue represents ‘low’, Green represents ‘moderate’, and Sandal represents ‘high’. Majority(35.46%) are low dependent, 9.35% are moderately dependent, 5.16% are highly dependent,

Figure 3: Nicotine dependence level among smokeless tobacco users among study participants

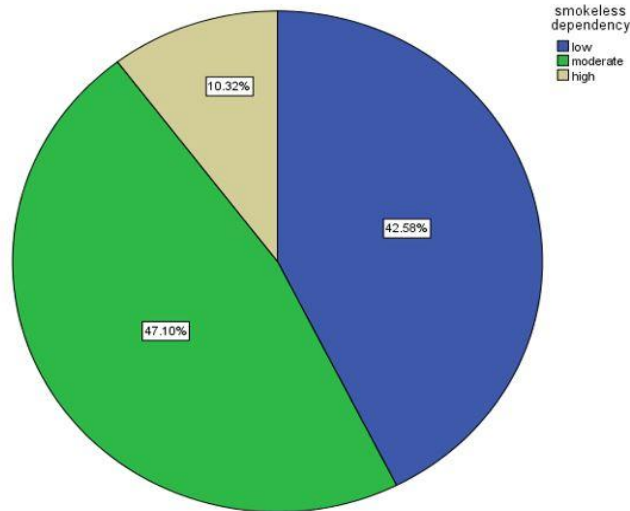


Figure 3 represents Nicotine dependence among smokeless tobacco users. Blue represents ‘low’, Green represents ‘moderate’, and Sandal represents ‘high’. Majority(47.10%) are moderately dependent on smokeless tobacco, 10.32% of the population are highly dependent on smokeless tobacco, and 42.58% are low dependent.

Figure 4: Fagerstrom nicotine dependence test among smoking tobacco users

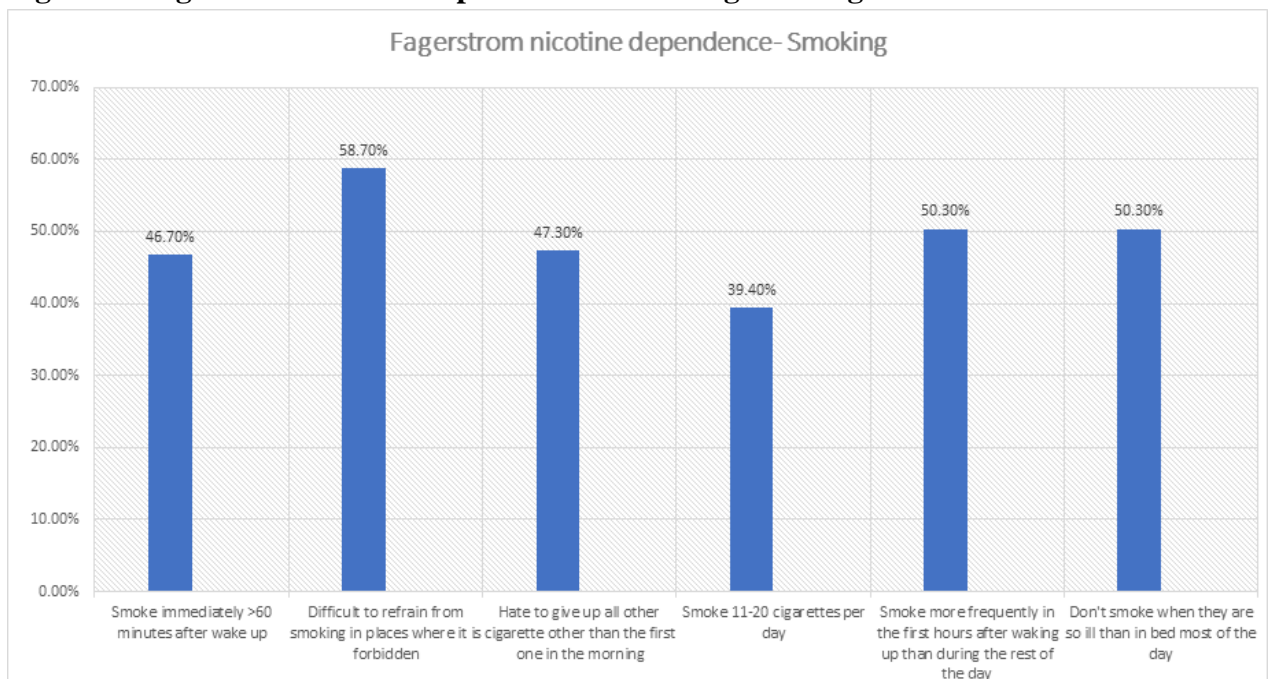


Figure 4 represents the responses for the Fagerstrom nicotine dependence test for smoking tobacco users. 46.70% of the people after they wake up, above 60 minutes they smoke their first cigarette. About 58.70% of people find it difficult to refrain from smoking in places where it is forbidden. 47.30% of people hate to give up cigarettes other than the one that smokes the first one in the morning. 39.40% of the people smoke 11-20 cigarettes per day. 50.30% of the people do not smoke when they are ill.

Figure 5: Fagerstrom nicotine dependence test for smokeless tobacco users.

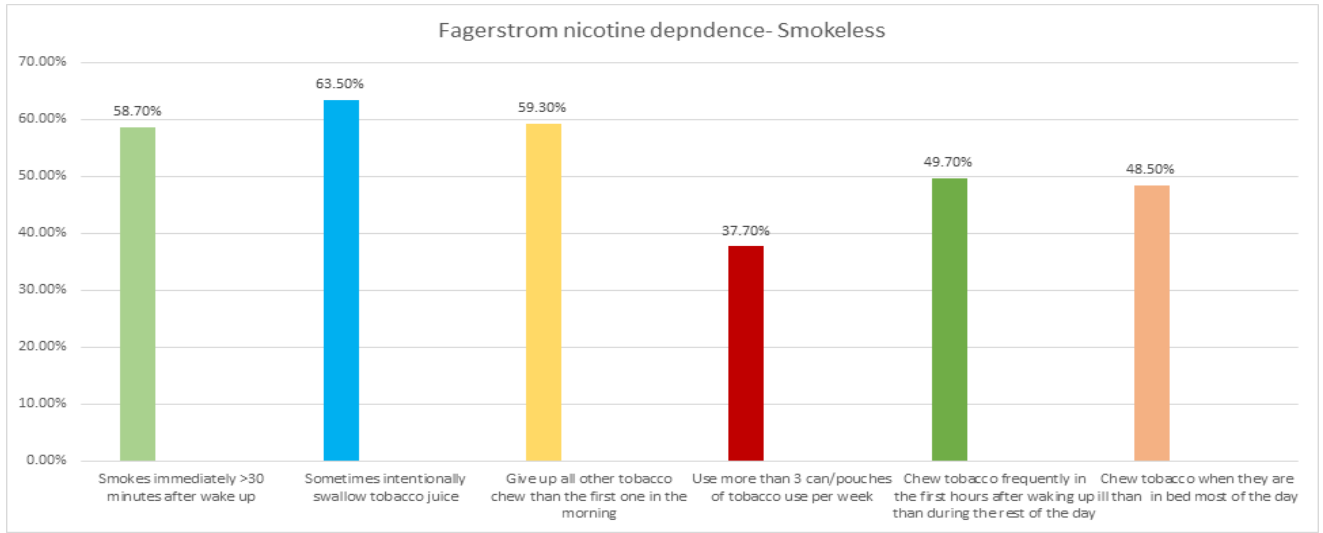


Figure 5 represents the responses for the Fagerstrom nicotine dependence test for smokeless tobacco users. 58.70% of the people after they wake only after 31-60 minutes use their first chew. 63.50% of the population, sometimes intentionally swallow tobacco juice. 59.30% of the population hate to give up all other chewing than the first one in the morning. 37.70% of people use 3 cans/pouches of tobacco per week. 48.50% of the people chew tobacco.

Figure 6: Bar chart representing association between Gender and Nicotine dependence score.

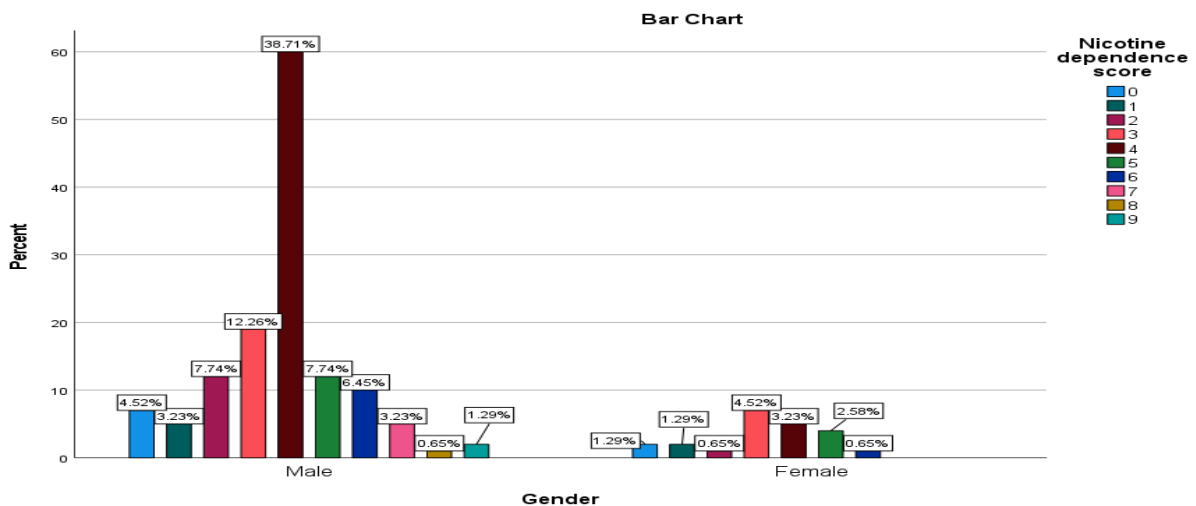


Figure 6 represents the association between gender and the nicotine dependence score for smoking tobacco users. X-axis represents the 'Gender' and Y-axis represents the 'percent' of the responses. Blue represents score '0', Green represents score '1', Deep pink represents score '2', Orange represents score '3', Brown represents score '4', Light green represents Score '5', Dark blue presents score '6', Pink represents score '7', Yellow represents score '8', and Aqua represents score '9'. Majority (38.71%) of the male participants were moderately dependent on nicotine, 1.29% of the male participants were highly dependent on nicotine. In female participants only 4.52% were moderately dependent on nicotine. Pearson chi square test value shows p value is 0.320(p value >0.05). Hence, it is not statistically significant.

DISCUSSION:

Majority of the participants were tobacco users and the prevalence of smoking was 56% and prevalence of tobacco chewing was 44%. Since nicotine dependence has complex factors like socioeconomic status, alcohol use, peer pressure may alter the results.

In our study 85.81% were males and 14.19% females. Fagerstrom nicotine dependence scale was the most commonly used measure for dependence among smoking and tobacco uses(30). From the study results, 47% of the population use cigarettes/bidi, 39% smokeless tobacco, 14% use both types of tobacco.

Males have higher smoking dependency, while the females have higher dependency on smokeless tobacco than males. The population between the category of 18-25 are moderately dependent on smoking tobacco users.18-25 age groups are highly dependent among smokeless dependent, and below 18 are moderately smokeless dependent. As the young generation have more access to tobacco and lack of awareness about the ill-effects , 18-25 years have high nicotine dependence. According to a previous study, the prevalence of tobacco use in Allahabad district was 85.9% and the prevalence of smoking and tobacco chewing was found to be 62.28% and 66.07%.(4)

From the present study, 46.70% of the people after they wake up, above 60 minutes they smoke their first cigarette. About 58.70% of people find it difficult to refrain from smoking in places where it is forbidden. 47.30% of people hate to give up cigarettes other than the ones that smoke the first one in the morning. 39.40% of the people smoke 11-20 cigarettes per day. 50.30% of the people do not smoke when they are ill.(31)

From the study results,58.70% of the people after they wake only after 31-60 minutes use their first chew. 63.50% of the population, sometimes intentionally swallow tobacco juice. 59.30% of the population hate to give up all other chewing than the first one in the morning. 37.70% of people use 3 cans/pouches of tobacco per week. 48.50% of the people chew tobacco.

The reasons for this dependence could be due to the easy availability of smokeless tobacco and the fact that it's usage is not banned at public places. The other factor could be due to the ignorance regarding the harmful effect of smokeless tobacco.

Though the study provides much useful information, it may have some limitations. The survey was done in online form, and limited sample size. The cross-sectional nature of our study and self-reported rates of tobacco use are the major limitations of the study. Moreover, due to the social taboo about tobacco usage, all of them might not have participated in the survey. In spite of these limitations, we believe that the findings of the study have not been significantly affected. Our team has extensive knowledge and research experience that has translate into high quality publications

CONCLUSION:

From the present study results, most of the participants used a smoking form of tobacco whereas smokeless users were comparatively less. Both in smoking and smokeless form of tobacco, moderate nicotine dependency was found. But smokeless users have high nicotine dependency when compared with smoking forms of tobacco.

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CONFLICT OF INTEREST:

The authors declare no conflict of interest.

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REFERENCES:

1. Jacobs EJ, Newton CC, Carter BD, Feskanich D, Freedman ND, Prentice RL, et al. What proportion of cancer deaths in the contemporary United States is attributable to cigarette smoking? *Ann Epidemiol.* 2015 Mar;25(3):179–82.e1.
2. Carroll DM, Lindgren BR, Dermody SS, Denlinger-Apte R, Egbert A, Cassidy RN, et al. Impact of nicotine reduction in cigarettes on smoking behavior and exposure: Are there differences by race/ethnicity, educational attainment, or gender? *Drug Alcohol Depend.* 2021 May 21;225:108756.
3. Benowitz NL, Henningfield JE. Establishing a nicotine threshold for addiction. The implications for tobacco regulation. *N Engl J Med.* 1994 Jul 14;331(2):123–5.

4. Henningfield JE, Benowitz NL, Slade J, Houston TP, Davis RM, Deitchman SD. Reducing the addictiveness of cigarettes. Council on Scientific Affairs, American Medical Association. *Tob Control*. 1998 Autumn;7(3):281–93.
5. Nilsson S. Mortality among male and female smokers in Sweden: a 33 year follow up [Internet]. Vol. 55, *Journal of Epidemiology & Community Health*. 2001. p. 825–30. Available from: <http://dx.doi.org/10.1136/jech.55.11.825>
6. Park S, Lee J-Y, Song T-M, Cho S-I. Age-associated changes in nicotine dependence. *Public Health*. 2012 Jun;126(6):482–9.
7. Wei J, Chu C, Wang Y, Yang Y, Wang Q, Li T, et al. Association study of 45 candidate genes in nicotine dependence in Han Chinese [Internet]. Vol. 37, *Addictive Behaviors*. 2012. p. 622–6. Available from: <http://dx.doi.org/10.1016/j.addbeh.2012.01.009>
8. Madden BJ, Fogger SA. Implementing Clinical Practice Guidelines for Tobacco Cessation in a Women’s Residential Substance Use Treatment Facility. *J Addict Nurs*. 2021;32(2):159–64.
9. Andreas S, Pankow W. [Smoking cessation - achievable and effective]. *Dtsch Med Wochenschr*. 2021 Jun;146(11):748–51.
10. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clin Oral Investig*. 2020 Sep;24(9):3275–80.
11. Samuel SR. Can 5-year-olds sensibly self-report the impact of developmental enamel defects on their quality of life? *Int J Paediatr Dent*. 2021 Mar;31(2):285–6.
12. Samuel SR, Kuduruthullah S, Khair AMB, Al Shayeb M, Elkaseh A, Varma SR, et al. Impact of pain, psychological-distress, SARS-CoV2 fear on adults’ OHRQOL during COVID-19 pandemic. *Saudi J Biol Sci*. 2021 Jan;28(1):492–4.
13. Samuel SR, Kuduruthullah S, Khair AMB, Shayeb MA, Elkaseh A, Varma SR. Dental pain, parental SARS-CoV-2 fear and distress on quality of life of 2 to 6 year-old children during COVID-19. *Int J Paediatr Dent*. 2021 May;31(3):436–41.
14. Samuel SR, Acharya S, Rao JC. School Interventions-based Prevention of Early-Childhood Caries among 3-5-year-old children from very low socioeconomic status: Two-year randomized trial. *J Public Health Dent*. 2020 Jan;80(1):51–60.
15. Vikneshan M, Saravanakumar R, Mangaiyarkarasi R, Rajeshkumar S, Samuel SR, Suganya M, et al. Algal biomass as a source for novel oral nano-antimicrobial agent.

- Saudi J Biol Sci. 2020 Dec;27(12):3753–8.
16. Chellapa LR, Rajeshkumar S, Arumugham MI, Samuel SR. Biogenic Nanoselenium Synthesis and Evaluation of its antimicrobial, Antioxidant Activity and Toxicity. *Bioinspired Biomim Nanobiomaterials*. 2020 Jul 23;1–6.
 17. Samuel SR, Mathew MG, Suresh SG, Varma SR, Elsubeihi ES, Arshad F, et al. Pediatric dental emergency management and parental treatment preferences during COVID-19 pandemic as compared to 2019. *Saudi J Biol Sci*. 2021 Apr;28(4):2591–7.
 18. Barma MD, Muthupandiyani I, Samuel SR, Amaechi BT. Inhibition of *Streptococcus mutans*, antioxidant property and cytotoxicity of novel nano-zinc oxide varnish. *Arch Oral Biol*. 2021 Jun;126:105132.
 19. Muthukrishnan L. Nanotechnology for cleaner leather production: a review. *Environ Chem Lett*. 2021 Jun 1;19(3):2527–49.
 20. Muthukrishnan L. Multidrug resistant tuberculosis - Diagnostic challenges and its conquering by nanotechnology approach - An overview. *Chem Biol Interact*. 2021 Mar 1;337:109397.
 21. Sekar D, Auxzilia PK. Letter to the Editor: H19 Promotes HCC Bone Metastasis by Reducing Osteoprotegerin Expression in a PPP1CA/p38MAPK- Dependent Manner and Sponging miR- 200b- 3p [Internet]. *Hepatology*. 2021. Available from: <http://dx.doi.org/10.1002/hep.31719>
 22. GowhariShabgah A, Amir A, Gardanova ZR, OlegovnaZekiy A, Thangavelu L, Ebrahimi Nik M, et al. Interleukin-25: New perspective and state-of-the-art in cancer prognosis and treatment approaches. *Cancer Med*. 2021 Aug;10(15):5191–202.
 23. Kamala K, Sivaperumal P, Paray BA, Al-Sadoon MK. Author response for “Identification of haloarchaea during fermentation of *Sardinella longiceps* for being the starter culture to accelerate fish sauce production” [Internet]. Wiley; 2021. Available from: <https://publons.com/publon/47375106>
 24. Ezhilarasan D, Lakshmi T, Subha M, Deepak Nallasamy V, Raghunandhakumar S. The ambiguous role of sirtuins in head and neck squamous cell carcinoma. *Oral Dis* [Internet]. 2021 Feb 11; Available from: <http://dx.doi.org/10.1111/odi.13798>
 25. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. *J Oral Pathol Med*. 2019 Apr;48(4):299–306.
 26. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9

- polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene [Internet]. Vol. 130, Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2020. p. 306–12. Available from: <http://dx.doi.org/10.1016/j.oooo.2020.06.021>
27. J PC, Pradeep CJ, Marimuthu T, Krithika C, Devadoss P, Kumar SM. Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study [Internet]. Vol. 20, Clinical Implant Dentistry and Related Research. 2018. p. 531–4. Available from: <http://dx.doi.org/10.1111/cid.12609>
 28. Wahab PUA, Abdul Wahab PU, Madhulaxmi M, Senthilnathan P, Muthusekhar MR, Vohra Y, et al. Scalpel Versus Diathermy in Wound Healing After Mucosal Incisions: A Split-Mouth Study [Internet]. Vol. 76, Journal of Oral and Maxillofacial Surgery. 2018. p. 1160–4. Available from: <http://dx.doi.org/10.1016/j.joms.2017.12.020>
 29. Sehgal.P, Kumar.B, Sharma.M, Salameh A.A, Kumar.S, Asha.P (2022), Role of IoT In Transformation Of Marketing: A Quantitative Study Of Opportunities and Challenges, Webology, Vol. 18, no.3, pp 1-11
 30. Nandal, Nisha and Malik, Dr. Ritika and Nandal, Dr. Naveen, Review on India's Baby Care Market (June 19, 2020). International Journal of Management, 11 (5), 2020, pp. 838-845, Available at SSRN: <https://ssrn.com/abstract=3631068>
 31. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja VB. Non-suturing microvascular anastomosis in maxillofacial reconstruction- a comparative study. Journal of Cranio-Maxillofacial Surgery. 2020 Jun 1;48(6):599–606.
 32. Bashar MD. Methodological issues in article titled, “Prevalence and correlates of nicotine dependence among construction site workers: A cross-sectional study in Delhi” [Internet]. Vol. 34, Lung India. 2017. p. 218. Available from: <http://dx.doi.org/10.4103/0970-2113.201307>
 33. Dalack GW, Healy DJ, Meador-Woodruff JH. Nicotine dependence in schizophrenia: clinical phenomena and laboratory findings. Am J Psychiatry. 1998 Nov;155(11):1490–501.