

Knowledge And Awareness On Various Dental Care Applications Available In Recent Times

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ABSTRACT

BACKGROUND

Mobile apps/ Mobile based applications was developed and made available on application store and play store .This application provided all essential information to parents on child dental health. Mobile apps software programmes that run on smartphones and other mobile devices which can help people manage their own health and wellness. The aim of the study was to assess knowledge and awareness on dental care applications available in recent times.

MATERIALS AND METHODS

A cross-sectional survey was conducted online among dental students using google forms . The questionnaire containing 11 questions was thoroughly verified and all the responses that were received were tabulated. The frequencies and percentages were calculated . Based on these calculations, the results were represented using SPSS software.

RESULTS Of the 138 participants surveyed, 33.05% are in the age group of 15-30, majority of participants

were females (35.59%) compared to male (13.56%), majority of participants were higher secondary (30.51%), 54.24% said they never got tested from dental care applications, 55.45% said whether dental care applications are better than direct visits. Interpretation was based on a p value less than 0.05, which was considered to be statistically significant.

CONCLUSION

From present study we conclude that most of the people don't have awareness about dental care applications available in recent times. To bring awareness among people about Dental care applications we should explain the benefits of its use like how it can easily record a patient's history along with details of diagnosis and prior treatment.

KEYWORDS: dental care , mobile applications, dental health, dentists, innovative technique

INTRODUCTION

A mobile based applications was developed and made available on application store and play store. This application provided all essential information to parents on child dental health prepartum and from infants to adolescents(1). The development of mobile applications has represented a challenge and opportunity for companies to market their brands and products through a new channel; however, the branded mobile applications (branded apps) currently available in the market are from perfect and existing app designs do not yet have well - established mobile and social features(2).

Mobile apps are software programmes that run on mobile phones and other mobile devices. Mobile health applications can help people manage their own health, wellness and promote healthy living and gain access to useful information when and where they need it.(3–6) In 2014, a paper summarising orthodontic- related applications found that 70 applications were available (7). In 2017, this number had increased to 354; 62 of these applications were aimed directly at patients and focused on a variety of areas included(8,9) improving oral health and minimising the risk of treatment(8,9) For most people, dental visits are unpleasant, takes more time, cost money and often accompanied by discomfort or pain. In addition, the introduction of sharp instruments and splashing water in mouths(10). Now we are in the midst of an urgent public health crisis(11) .

The COVID-19 virus disease has become a global pandemic and it is necessary to follow social distancing and hand hygiene and reduce contact with people (3–6). Israel , the serve of well being has precluded non crisis dental treatments(12). The national well being protections framework embraced by the government offers comprehensive free service health benefits(13)

Many studies were conducted to assess the knowledge and awareness of dental care applications amongst dentists but none of these studies included dental students, to the best of our knowledge. To inculcate the knowledge and practices about dental care applications in future generation dentists it is crucial to assess the awareness of the present dental students. Hence the present study was conducted among dental students. Our team has extensive knowledge and research experience that has translated into high quality publications.

(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30),(31),(32),(33) The aim of the study is to assess knowledge and awareness on dental care applications available in recent times.

MATERIALS AND METHODS

The cross-sectional survey was designed using google forms. Study participants were recruited among dental college students. Initially, they shared the survey link in Whatsapp and through emails to their primary contacts (aged 18 and above). The primary participants were requested to roll out the survey further. On receiving and clicking the link, participants got auto directed to the informed consent page, followed by the survey questionnaires. Prior to the start of the study, ethical clearance was obtained from the Institution Ethical Committee of Saveetha university.

Study Sample

From the previous literature review of vaccine hesitancy in the community, it is estimated that about 15% of the study participants showed hesitancy towards dental care applications. We estimate that a sample size of 140 should give us 80% power at a confidence level of 95%. Accounting for non-response, dropout and subgroup analyses our final sample size was planned to be 150 completed questionnaires from participants. The survey was stopped when we received 138 completed questionnaires. All those who were willing to participate were included in the study. Those who were not willing and those who had a language barrier in answering the English version of the questionnaire were excluded from the study.

Questionnaire Development

We conducted a literature review 24–26 questions to identify key areas, and a draft questionnaire was devised. The draft questionnaire consists of sections on sociodemographic, knowledge and perception towards COVID-19, trust in the health system, and participants' willingness to accept the COVID-19 vaccine if it is available in future. We tried to keep the questionnaire as short in length so that it can be

quick to complete, and easy to follow. Questionnaire's content and clarity was assessed by the public health experts working at saveetha dental college, Chennai . The questionnaire was self-administered. The participants were instructed to select one option from the list of responses. (Yes /no)

Statistical analysis

Descriptive statistics were conducted to generate summary tables for study variables. A cross-tabulation analysis was performed to examine the distribution of intention to uptake COVID-19 vaccine with respondents' sociodemographic characteristics using chi-squared tests. All data analysis was performed using SPSS 23.0 .p-value <0.05 was considered statistically significant.

The questionnaire comprised a series of questions including their demographic characteristics like age and gender. The other questions are as follows:

- 1) Level of education of participants
- 2) When was the last time you got oral health check up done
- 3) What was the main reason for your last visit to dental care center
- 4) How often during last year, have you had discomfort in your teeth and gums
- 5) If you were unable to get dental check up in recently what was the reason
- 6) Did you ever done oral health check up from dental care applications
- 7) If yes, on which app you got your check up
- 8) Do you think dental care applications are better than directly visiting dentist
- 9) Do you have awareness on mobile applications which gave your dental application

RESULTS

Of the responses from general population across chennai who participated in the present study About 35.59% said something is wrong with their teeth and went to visit dental care center (figure 1), About 46.61% said occasionally discomfort in gums and teeth (figure 2)

About 37.29% said the dental care center is too far to visit for check up (figure 3). About 54.24% said no if asked to get a check up from dental care applications (figure 4). About 55.45%

Said they never got tested from dental applications (figure 5). About 45.76% said No if asked

Dental care applications are better than directly visiting dentists (figure 6). About majority of females were visiting dental care centers compared to males. Pearson's chi square test shows p-value is 0.294 (p value > 0.05) hence, statistically not significant (figure 7). About majority of females had discomfort

in gums and teeth compared to males Pearson's chi square test shows p- value is 0.499 (p value > 0.05) hence, statistically not significant (figure 8). About The majority of responses were that the dental care center is too far. Pearson's chi square test shows p- value is 0.252 (p value > 0.05) hence, statistically not significant(figure9). About majority of responses were never tested from dental care applications. Pearson's chi square test shows p- value is 0.709 (p value > 0.05) hence, statistically not significant(figure 10). About majority of responses were No. Pearson's chi square test shows p- value is 0.407 (p value > 0.05) hence, statistically not significant(figure 11). About Majority of responses were No. Pearson's chi square test shows p- value is 0.827 (p value > 0.05) hence, statistically not significant (figure 12)

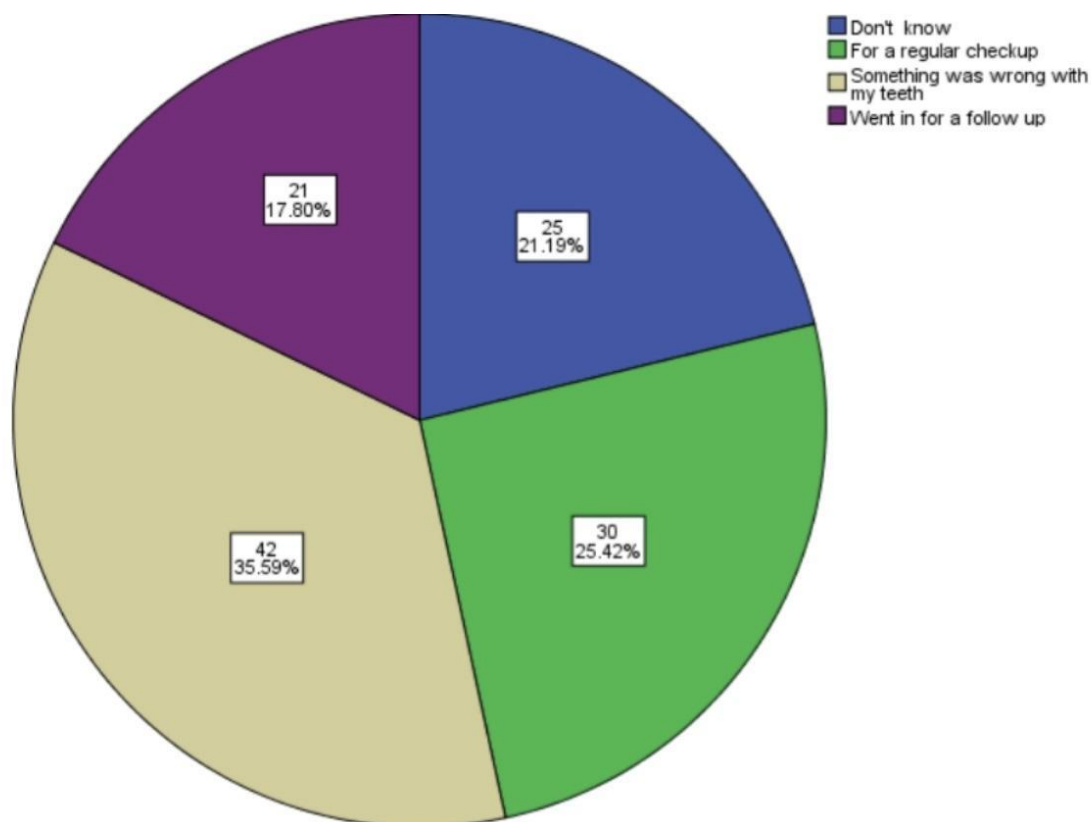


FIGURE 1: The above pie chart represents the responses of main reason for visit to dental care centre. Green denotes for regular check up (25.42%), blue denotes don't know(21.19%), purple denotes went in for a follow up(17.8%) ,beige denotes something was wrong with teeth (35.59%) Majority of responses were something was wrong with teeth.

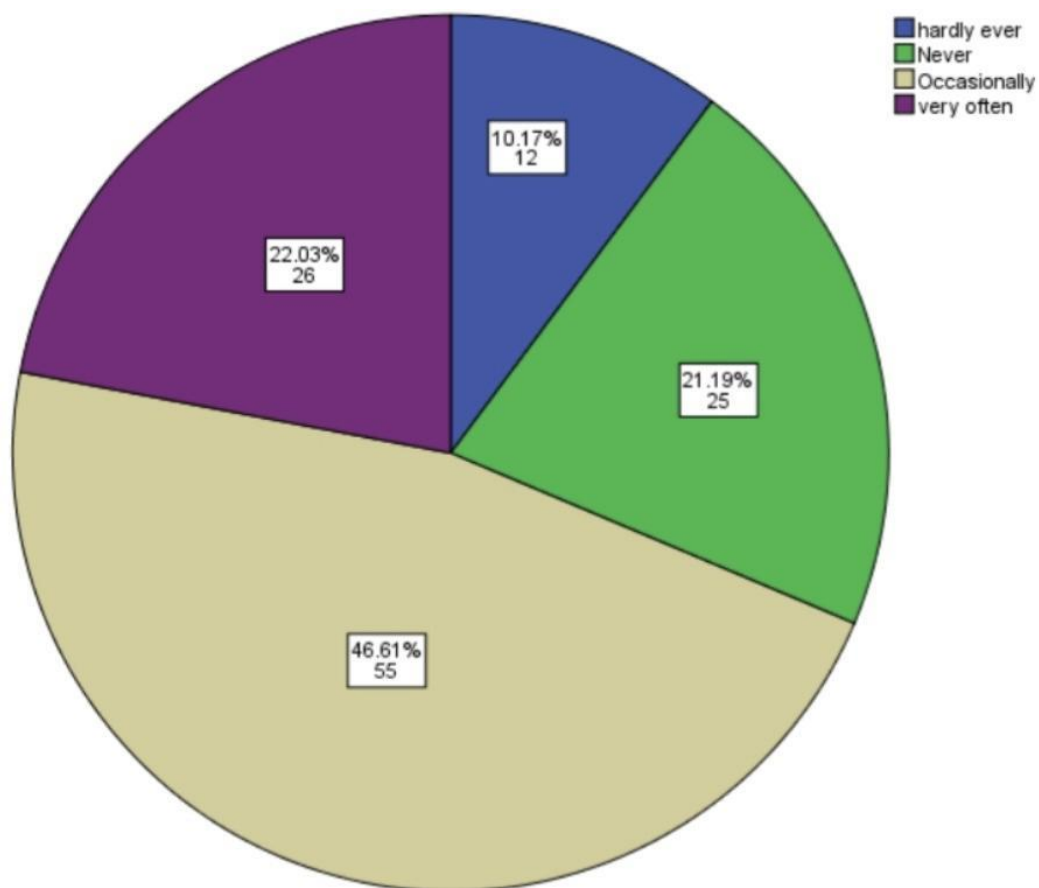


FIGURE 2: The above pie chart represents responses of whether they had any discomfort in teeth. Beige denotes occasionally(46.61%) , Green denotes never(21.19%), Purple denotes very often(22.03%), Blue denotes hardly ever(10.17%). Majority of the participants occasionally had discomfort in their teeth.

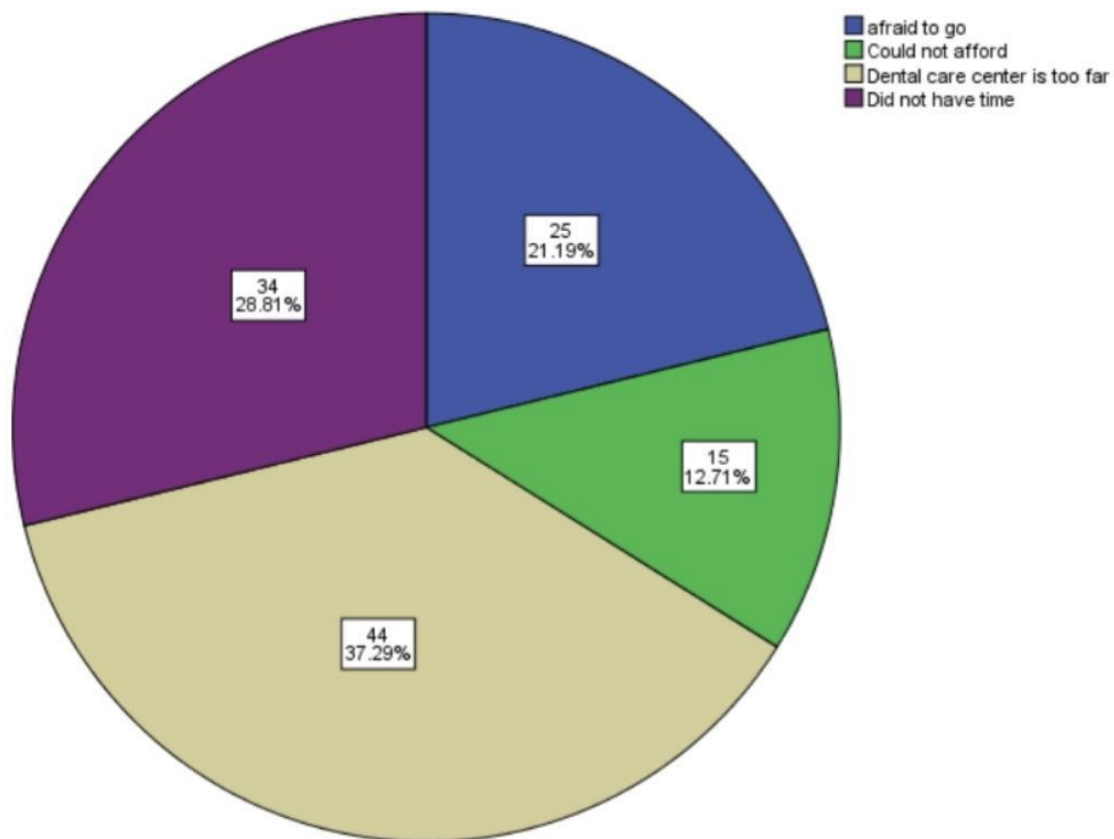


FIGURE 3 : The above piechart represents responses of reasons for unable to get dental checkup. Beige denotes dental care center is too far(37.29%), Green denotes could not afford(12.71%), Blue denotes afraid to go(21.19%), Purple denotes don't have time (28.81%), Majority of participants said dental care center is too far.

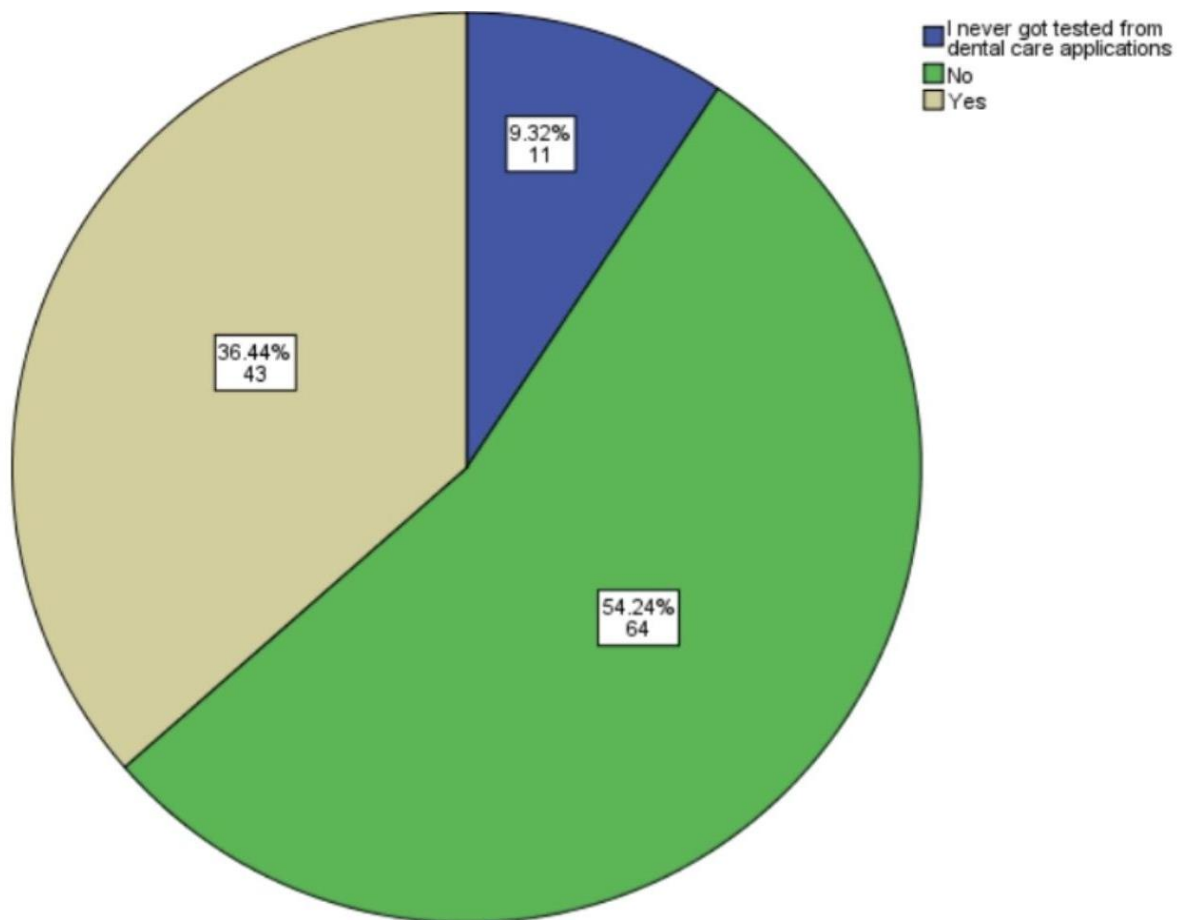


FIGURE 4 : The above piechart represents responses of ever done oral check up from Dental care applications Green denotes No (54.24%), blue denotes never tested(9.32%) , beige denotes Yes (36.44%). Majority of the participants have not done oral checkup from dental care applications. .

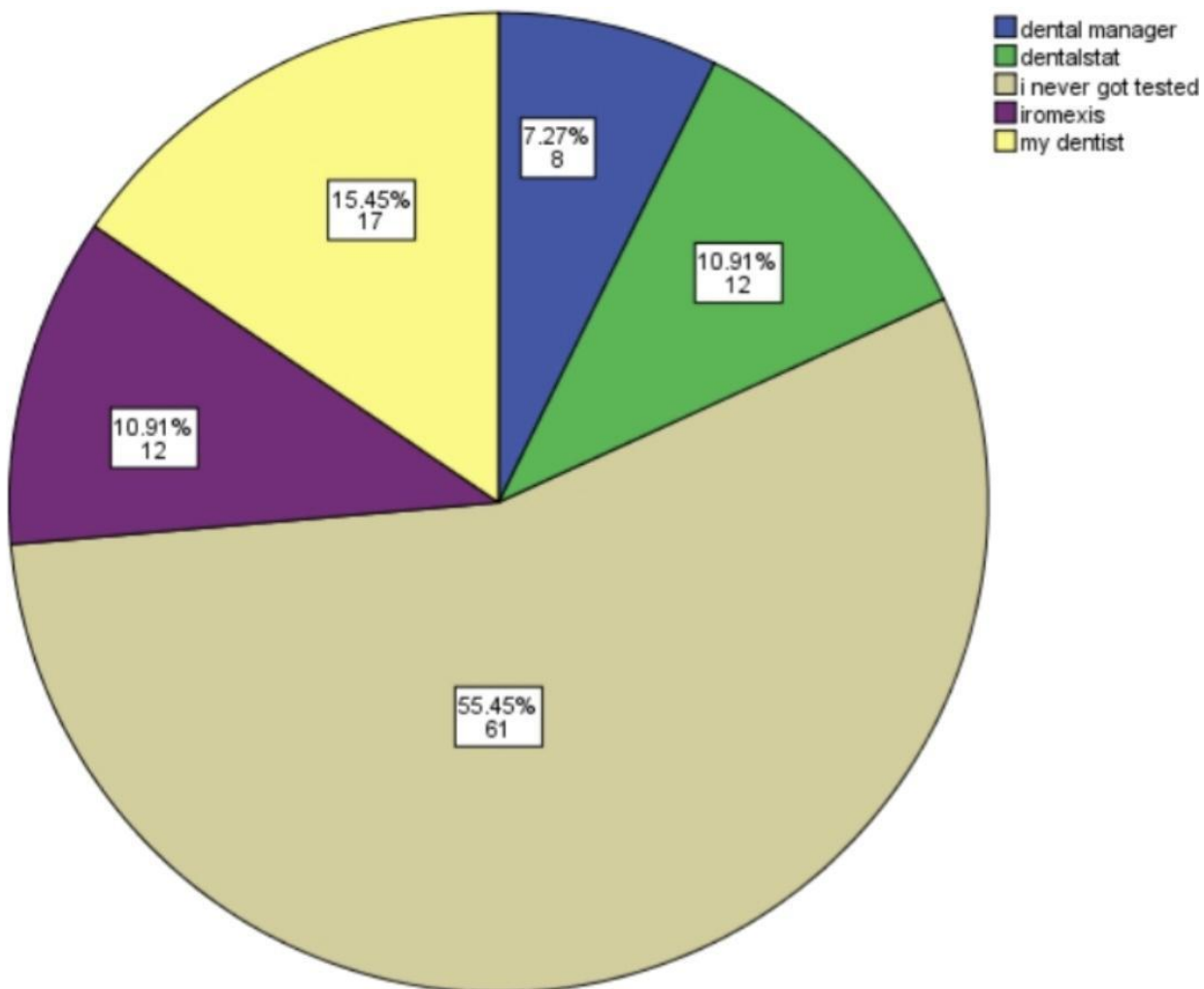


FIGURE 5 : The above piechart represents responses of which app you got check up
Beige denotes never got tested, Purple denotes iromexis(10.91%), yellow denotes my dentist(15.45%), Blue denotes dental manager(7.27%), Green denotes dentalstat(10.91%), Majority of the participants never got tested.

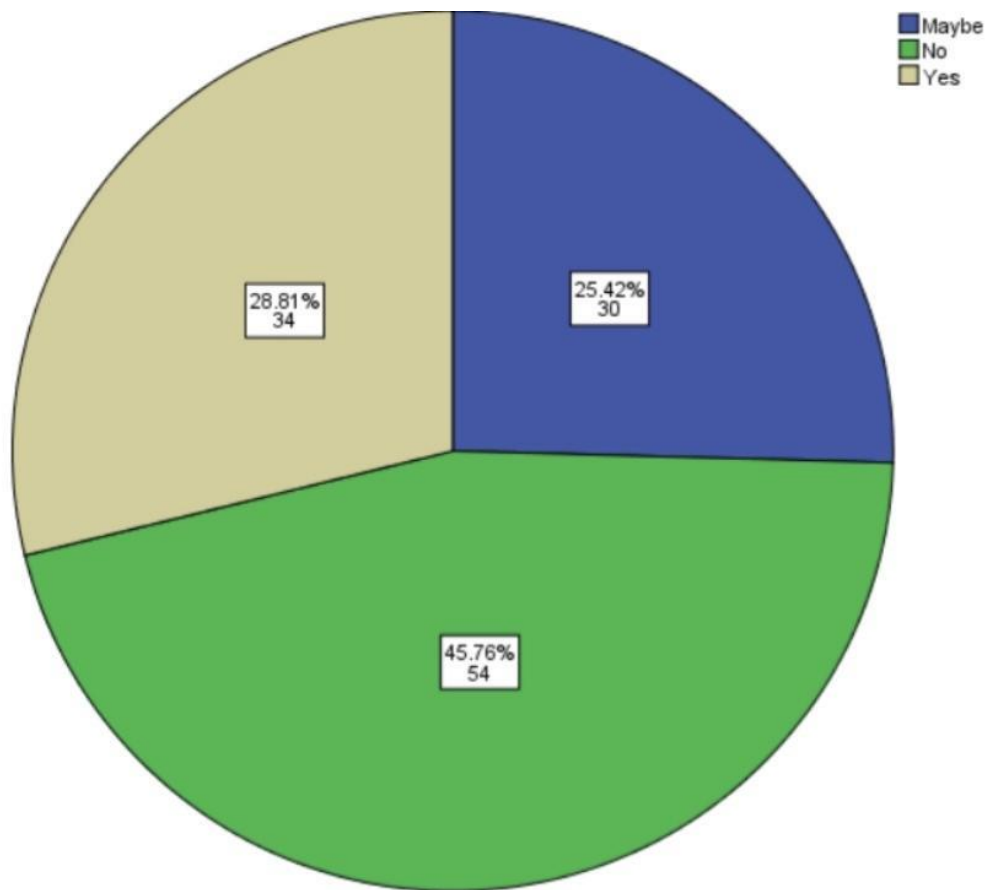


FIGURE 6 :The above piechart represents responses of whether dental care applications are better than directly visiting the dentist. Green denotes No(45.76%), blue denotes may be (25.42%), beige denotes Yes(28.81%). Majority of participants disagreed that dental care applications are better than directly visiting the dentist.

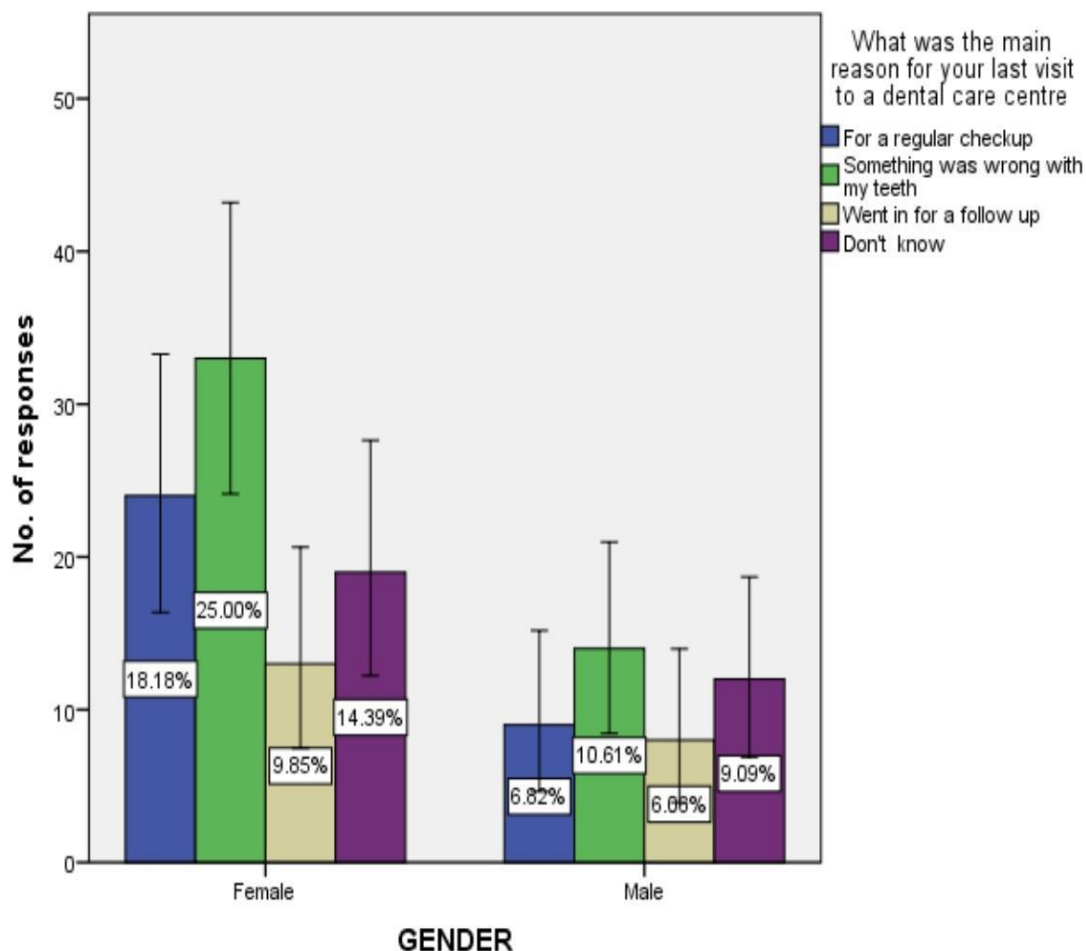


FIGURE 7 : The bar graph represents the association between gender and what was the reason for the last visit to the dental care center. x- axis represent gender and y-axis represent the percentage of responses for overall activity. Green(25.00% and 10.61%) denotes for something was wrong with my teeth, blue (18.18% and 6.82%) denotes for a regular checkup , purple(14.39% and 9.09%)denotes Don't know ,beige(9.85% and 6.06%)denotes went in for a follow up. Majority of females were visiting dental care centers compared to males and the majority of females visited dental care centres because something was wrong with their teeth . Pearson's chi square test shows p- value is 0.294 (p value > 0.05) hence, statistically not significant.

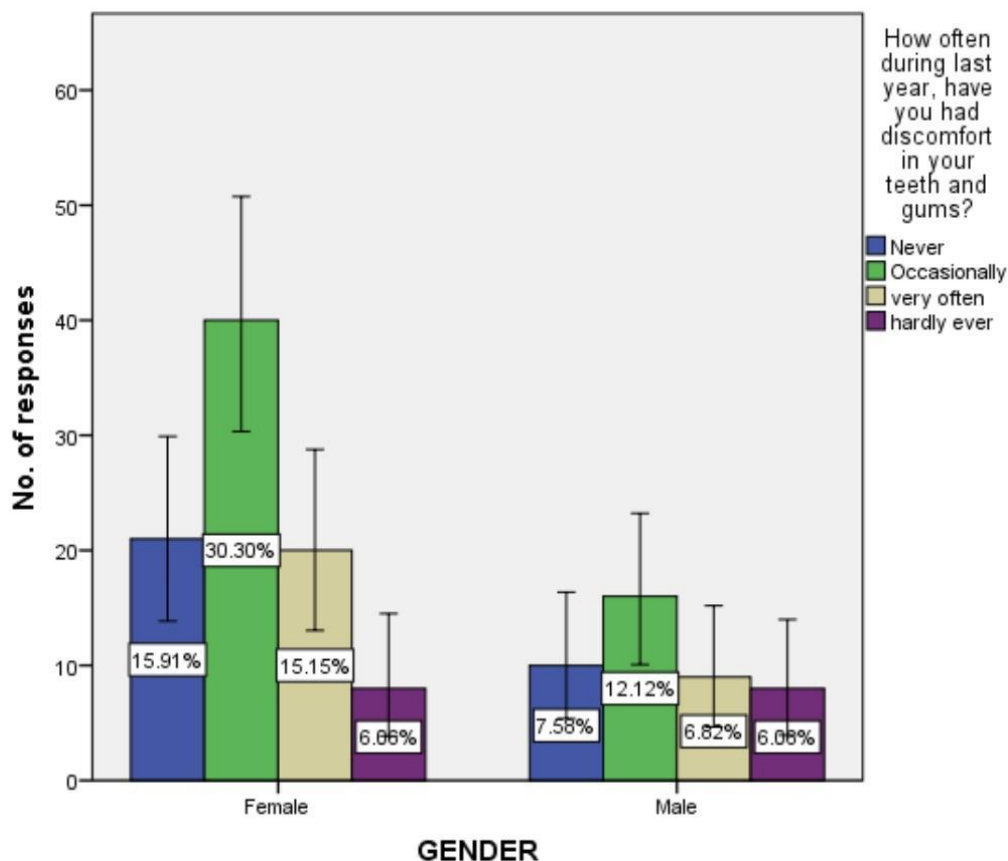


FIGURE 8 : The bar graph represents the association between gender and how often had discomfort in gums and teeth. x-axis represent gender and y-axis represent the percentage of responses for overall activity. Green (30.30% and 12.12%) denotes occasionally, blue (15.91% and 7.58%) denotes never, purple (6.06% and 6.08%) denotes hardly ever, beige (15.15% and 6.82%) denotes very often. Majority of females had discomfort occasionally in gums and teeth compared to males. Pearson's chi square test shows p-value is 0.499 (p value > 0.05) hence, statistically not significant

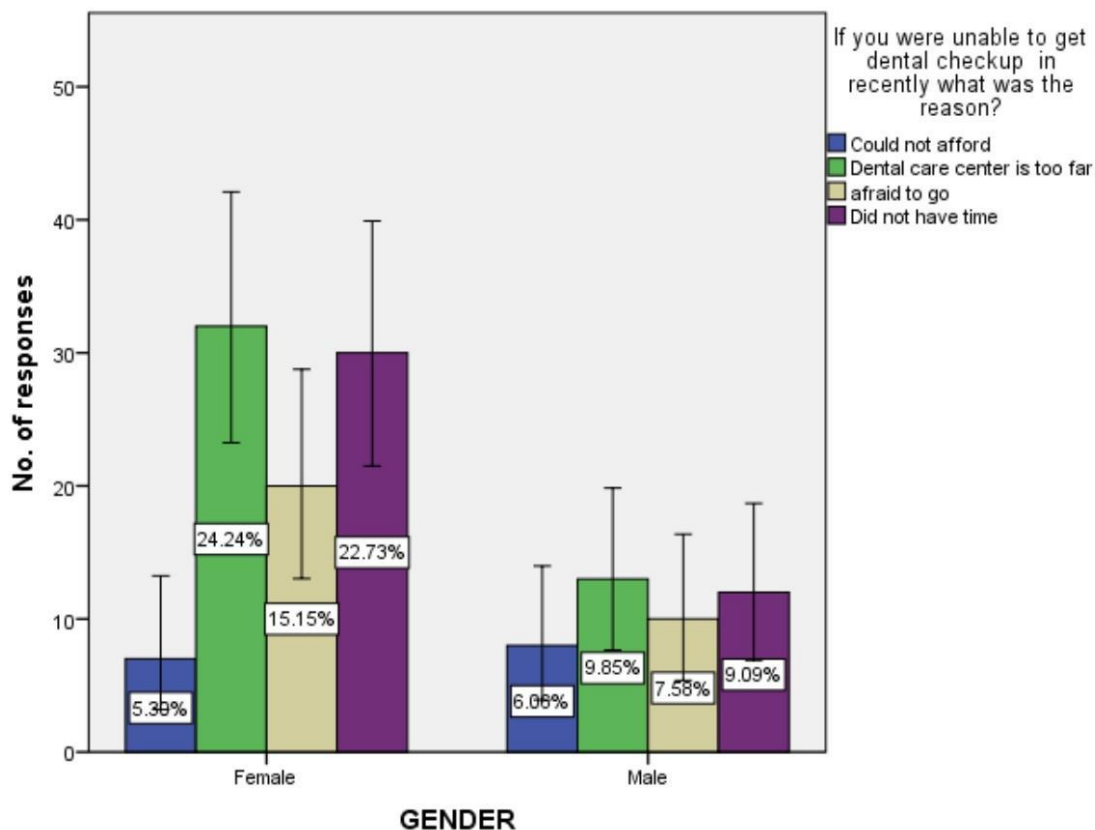
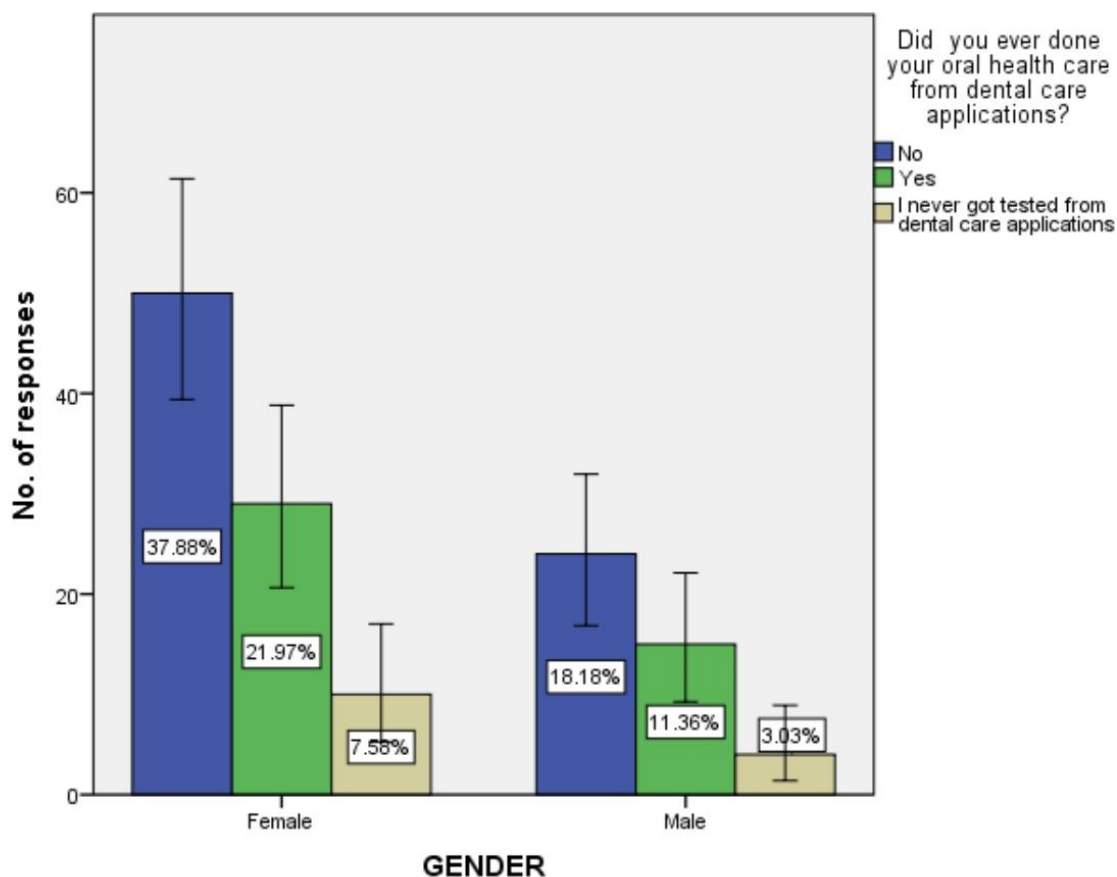


FIGURE 9 :The bar graph represents the association between gender and the reason for inability to get a dental check up. X-axis represents gender and the Y-axis represents the percentage of responses for overall activity. Green(24.24%and 9.85%) denotes dental care centre is too far, blue(5.39%and 6.06%) denotes could not afford, purple(22.73% and 9.09%) denotes did not have time, beige(15.15% and 7.58%) denotes afraid to go. Majority of females and males responded that the dental care center is too far. Pearson's chi square test shows p- value is 0.252 (p value > 0.05) hence, statistically not significant



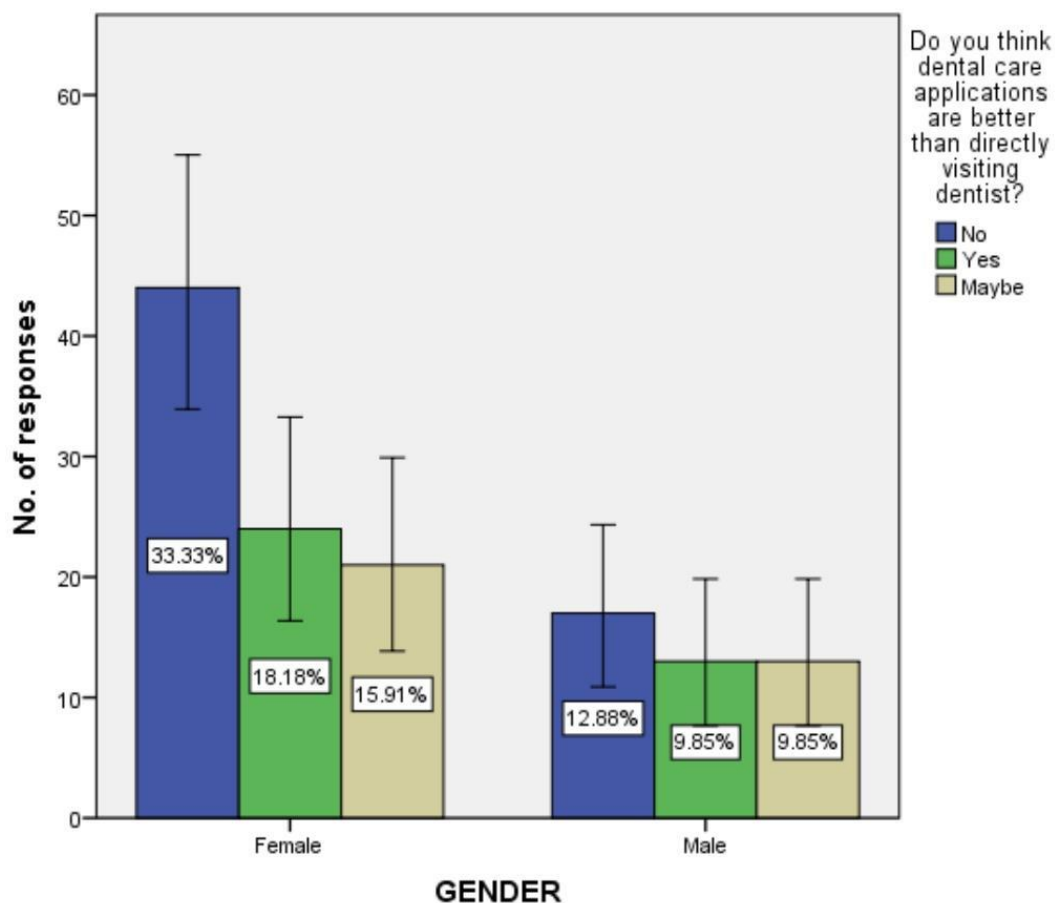


FIGURE 11 :The bar graph represents the association between gender and dental care applications better than directly visiting a dentist.x- axis represents gender and y-axis represents the percentage of responses for overall activity. Green(18.18% and 9.85%) denotes Yes, blue (33.33%and12.88%) denotes No ,beige(15.91%and9.85%) denotes Maybe. Majority of females responded that dental care applications are not better than directly visiting the dentist. . Pearson's chi square test shows p- value is 0.407 (p value > 0.05) hence, statistically not significant.

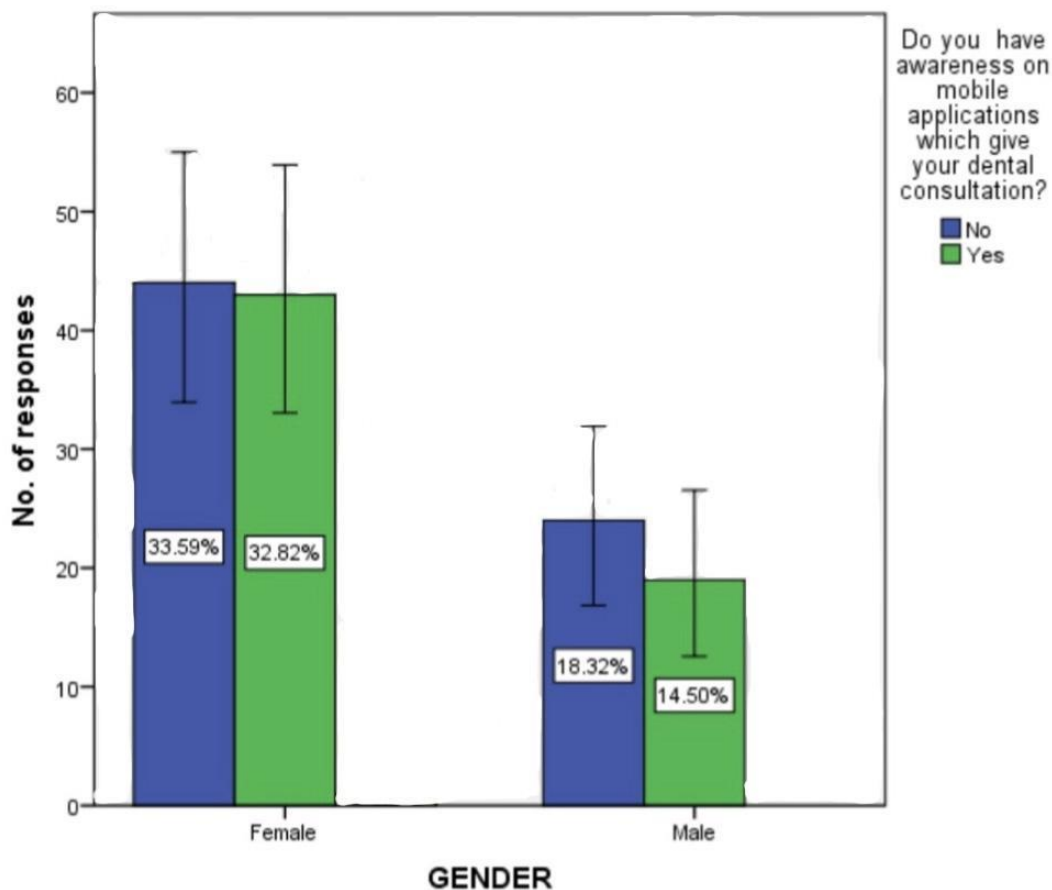


FIGURE 12 :The bar graph represents the association between gender and awareness on mobile dental care applications .x- axis represents gender and y-axis represents the number of responses for overall activity. Green(32.82% and 14.50%) denotes Yes, blue(33.59 and 18.32%) denotes No.The majority of responses were No. Pearson’s chi square test shows p- value is 0.827 (p value > 0.05) hence, statistically not significant.

DISCUSSION

In the present study 32.82% of females and 14.50% of male population have awareness on mobile applications about dental consultation.In a previous study conducted by Dejmali , it was found that very few percent of population have awareness on mobile applications .

In the present study Majority of females were visiting dental care centers compared to males ,whereas in the study conducted by Gupta, the majority of males were visiting dental care centers compared to females.

Smartphones have very strong computing capabilities and have become involved in our daily life as no apps of this nature are currently available. We went to dental clinics and observed dentist-patient interactions. Digital technology is widely used in dental clinics and there is evidence that dentists appreciate the benefits of digital tools in their practices. These tools enhance communication with peers and are perceived as useful in improving patient-dentist communication, management. As expected, dental caries are the most common reason for extraction of primary teeth among children, therefore, malocclusion as a result of early loss of teeth (8,12) Mobile applications have been used to help people manage their own health and wellness, promote healthy living, gain access to useful information limitations of our present study are it was done in a small population of dental students and within a limited age group. In the future an extensive study can be done with a large population sample in a different group to get better interventions in the results.

CONCLUSION

From present study we conclude that most of the people don't have awareness about dental care applications available in recent times. In spite of limitations of the study, we were able to record the obvious lack of awareness among people on dental care applications. To bring awareness among people about dental care applications we should explain the benefits of its use like how it can easily record a patient's history along with details of diagnosis and prior treatment.

AUTHOR CONTRIBUTIONS

Soumyasri .S: Study Design, Data collection, Data Analysis, manuscript writing

Lakshmi.T.A: Study Concept, Data verification, Data Analysis, manuscript drafting and correction

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CONFLICT OF INTEREST

The authors reported the conflict of interest while performing this study to be nil

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REFERENCE

1. Alqarni A, Alfaifi H, Aseeri N, Gadah T, Togoo R. Efficacy of a self-designed mobile application to improve child dental health knowledge among parents [Internet]. Vol. 8, Journal of International Society of Preventive and Community Dentistry. 2018. p. 424. Available from: http://dx.doi.org/10.4103/jispcd.jispcd_195_18
2. Hodgson T. Book Review: Dental and Craniofacial Applications of Platelet-Rich Plasma [Internet]. Vol. os13, Primary Dental Care. 2006. p. 91–91. Available from: <http://dx.doi.org/10.1308/13557610677795518>
3. Gupte S. Dental Plaque and Dental Caries [Internet]. The Short Textbook of Medical Microbiology for Dental Students. 2012. p. 199–199. Available from: http://dx.doi.org/10.5005/jp/books/11710_33
4. Al-Hatalani, Al-Hatalani, Ali A-H. Medical, Dental, and Nursing Students' Knowledge about Early Childhood Oral Health Care [Internet]. Vol. 6, Children. 2019. p. 97. Available from: <http://dx.doi.org/10.3390/children6090097>
5. Salama, Salama, AlHammad. Effectiveness of an infant oral health care educational intervention on knowledge of dental students [Internet]. Advances in Medical Education and Practice. 2011. p. 193. Available from: <http://dx.doi.org/10.2147/amep.s19415>
6. Skelly AM, Fleming GJP. Perceptions of a Dental Career among Successful Applicants for Dentistry Compared with those of Fifth-Year Dental Students [Internet]. Vol. os9, Primary Dental Care. 2002. p. 41–6. Available from: <http://dx.doi.org/10.1308/135576102322527766>
7. Baheti MJ, Gharat NV, Toshniwal NG. Simple and cost-effective approach for maxillary bilateral posterior intrusion: Nandlal Toshniwal Rural Dental College double intrusion arch [Internet]. Vol. 5, APOS Trends in Orthodontics. 2015. p. 225–8. Available from: <http://dx.doi.org/10.4103/2321->

1407.163431

8. Djemal S, Singh P. Smartphones and dental trauma: the current availability of apps for managing traumatic dental injuries [Internet]. Vol. 32, Dental Traumatology. 2016. p. 52–7. Available from: <http://dx.doi.org/10.1111/edt.12217>
9. Federation FWD, FDI World Dental Federation. Dentistry and oral health related apps [Internet]. Vol. 69, International Dental Journal. 2019. p. 9–10. Available from: <http://dx.doi.org/10.1111/idj.12465>
10. Awareness of Dental Care amongst People Visiting Dentist [Internet]. Vol. 5, International Journal of Science and Research (IJSR). 2016. p. 2069–72. Available from: <http://dx.doi.org/10.21275/v5i3.nov162422>
11. Masri R, Driscoll CF. Clinical Applications of Digital Dental Technology. John Wiley & Sons; 2015. 272 p.
12. Tobias G. Dental Emergencies during the COVID-19 No Aversion Therapy Centers [Internet]. Vol. 5, Open Access Journal of Dental Sciences. 2020. Available from: <http://dx.doi.org/10.23880/oajds-16000265>
13. Jurczyk M. Bionanomaterials for Dental Applications. CRC Press; 2012. 428 p.
14. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. Eur J Dent. 2020 Dec;14(S 01):S105–9.
15. 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.
16. 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.
17. 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>
18. Antony JVM, Ramani P, Ramasubramanian A, Sukumaran G. Particle size penetration rate and effects of smoke and smokeless tobacco products - An invitro analysis. *Heliyon*. 2021 Mar 1;7(3):e06455.
 19. Sarode SC, Gondivkar S, Sarode GS, Gadbail A, Yuwanati M. Hybrid oral potentially malignant disorder: A neglected fact in oral submucous fibrosis. *Oral Oncol*. 2021 Jun 16;105390.
 20. Hannah R, Ramani P, WM Tilakaratne, Sukumaran G, Ramasubramanian A, Krishnan RP. Author response for “Critical appraisal of different triggering pathways for the pathobiology of pemphigus vulgaris—A review” [Internet]. Wiley; 2021. Available from: <https://publons.com/publon/47643844>
 21. Chandrasekar R, Chandrasekhar S, Sundari KKS, Ravi P. Development and validation of a formula for objective assessment of cervical vertebral bone age. *Prog Orthod*. 2020 Oct 12;21(1):38.
 22. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. *Eur J Dent*. 2018 Jan;12(1):67–70.
 23. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study. *Eur J Dent*. 2018 Jan;12(1):21–6.
 24. Ponnulakshmi R, Shyamaladevi B, Vijayalakshmi P, Selvaraj J. In silico and in vivo analysis to identify the antidiabetic activity of beta sitosterol in adipose tissue of high fat diet and sucrose induced type-2 diabetic experimental rats. *Toxicol Mech Methods*. 2019 May;29(4):276–90.
 25. Sundaram R, Nandhakumar E, Haseena Banu H. Hesperidin, a citrus flavonoid ameliorates hyperglycemia by regulating key enzymes of carbohydrate metabolism in streptozotocin-induced diabetic rats. *Toxicol Mech Methods*. 2019 Nov;29(9):644–53.
 26. Alsawalha M, Rao CV, Al-Subaie AM, Haque SKM, Veeraraghavan VP, Surapaneni KM. Novel mathematical modelling of Saudi Arabian natural diatomite clay. *Mater Res Express*. 2019 Sep

4;6(10):105531.

27. Yu J, Li M, Zhan D, Shi C, Fang L, Ban C, et al. Inhibitory effects of triterpenoid betulin on inflammatory mediators inducible nitric oxide synthase, cyclooxygenase-2, tumor necrosis factor- α , interleukin-6, and proliferating cell nuclear antigen in 1, 2-dimethylhydrazine-induced rat colon carcinogenesis. *Pharmacogn Mag.* 2020;16(72):836.
28. Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis [Internet]. Vol. 25, Pathology & Oncology Research. 2019. p. 447–53. Available from: <http://dx.doi.org/10.1007/s12253-019-00588-2>
29. Zafar A, Sherlin HJ, Jayaraj G, Ramani P, Don KR, Santhanam A. Diagnostic utility of touch imprint cytology for intraoperative assessment of surgical margins and sentinel lymph nodes in oral squamous cell carcinoma patients using four different cytological stains. *Diagn Cytopathol.* 2020 Feb;48(2):101–10.
30. Karunagaran M, Murali P, Palaniappan V, Sivapathasundharam B. Expression and distribution pattern of podoplanin in oral submucous fibrosis with varying degrees of dysplasia – an immunohistochemical study [Internet]. Vol. 42, Journal of Histotechnology. 2019. p. 80–6. Available from: <http://dx.doi.org/10.1080/01478885.2019.1594543>
31. Sarode SC, Gondivkar S, Gadbail A, Sarode GS, Yuwanati M. Oral submucous fibrosis and heterogeneity in outcome measures: a critical viewpoint. *Future Oncol.* 2021 Jun;17(17):2123–6.
32. Raj Preeth D, Saravanan S, Shairam M, Selvakumar N, Selestina Raja I, Dhanasekaran A, et al. Bioactive Zinc(II) complex incorporated PCL/gelatin electrospun nanofiber enhanced bone tissue regeneration. *Eur J Pharm Sci.* 2021 May 1;160:105768.
33. Prithiviraj N, Yang GE, Thangavelu L, Yan J. Anticancer Compounds From Starfish Regenerating Tissues and Their Antioxidant Properties on Human Oral Epidermoid Carcinoma KB Cells. In: PANCREAS. LIPPINCOTT WILLIAMS & WILKINS TWO COMMERCE SQ, 2001 MARKET ST, PHILADELPHIA ...; 2020. p. 155–6.