

Knowledge, Awareness and Practice of Dental Notation systems among Dental Practitioners- A cross-sectional survey

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ABSTRACT

Background: Tooth Numbering System (TNS) uniquely identifies each tooth by number for charting and communication purposes. Historically, different methods of designating and encoding teeth have been used.

Aim: To assess the knowledge, awareness and practice of dental notation systems by the dental professionals.

Materials and Methods: A descriptive cross-sectional survey was conducted among 100 study participants. Data collection was done by means of online google survey form. Data was entered in Microsoft excel sheet after collection and was analysed using SPSS software. Descriptive statistics were expressed by means of number, frequency, and percentage. Chi-Square test was used to find the association between variables. The level of statistical significance is at $p < 0.05$. Statistical software used was SPSS version 23.

Result: The most easiest tooth numbering system chosen by participants was FDI by 78.79%, followed by Universal (14.14%) and least was palmer that is only 7.07%. The tooth numbering system used for primary dentition chosen by majority of the participants were FDI (85.86%) followed by Universal (11.11%) and least was Palmer that was chosen by only 3.03% of the participants. 84.85% of practitioners felt the FDI system was most used in supernumerary teeth. 49% of the 15-25 yrs age group, 21% of 26-35 yrs and 9% of the 35-45 yrs age group had chosen the FDI system as the easy to comprehend tooth notation system (p -value=6.219). 56% of dental assistants, 11% of practicing dentist/dental student and 2% of dental technician felt the wrong tooth extraction was the most important problem due to wrong notations of the teeth (p -value=17.183).

Conclusion: Based on the result of the study we can conclude that the majority of the Dental practitioners are aware of the different types of Dental Notation. The FDI system was the most preferred, practised and easily understood method of dental notation by various dental professionals.

KEYWORDS: Cross-sectional survey, Dental Notations, Dental practitioners, Tooth Numbering System, Palmer notation.

INTRODUCTION

The tooth numbering system allows dental patients to be identified, recorded, and managed(1). It uses numbers or alphabets to precisely identify the teeth for charting and

communication purposes(2). Incisors, canines, premolars, and molars are the dental terminology for all human teeth used around the world.(3) Miscommunication among dentists in defining the tooth during referral cases may lead to serious misinterpretation.

To prevent these mishaps, the dentist must employ a tooth numbering scheme that allows for precise tooth recognition. (4). For charting and correspondence purposes, the Tooth Numbering System (TNS) assigns a unique number to each tooth . Various methods of designating and encoding teeth have been used in history.Universal numbering system, Federation Dentaire Internationale (FDI), and Palmer are the most common tooth numbering systems.(5)

Dental surgeons often use the Universal Numbering Scheme, Federation Dentaire Internationale (FDI), (6) and Palmer notation, (7) whereas dental hygienists may use either system for detecting and transmitting dental information to others. 6 FDI is a two-digit numbering system that is commonly used in the world. Among the participants in this scheme are two numbers The first number (1-4) corresponds to the quadrant (upper right, upper left, lower left, and lower right), while the second number corresponds to the tooth (1).

In the universal numbering System, dentitions are divided into two phases in humans. There are 20 teeth in the main dentition and 32 teeth in the permanent dentition. Because of the age-related differences in tooth presence and position,(8) each tooth requires its own numbering and encoding system. (9) The aim of the present study is to assess the knowledge, awareness and practice of dental notation systems by the dental professionals.

MATERIALS AND METHODS

A descriptive cross-Sectional survey was conducted among dental professionals in Chennai including dentists, dental hygienist, dental assistant, dental technician .Sample size was calculated using the manual formula ($N = Z\alpha^2Pq/L^2$) based on the study done by (10)and the total sample size arrived was 100.Ethical approval was obtained from the Institutional Review Board in Saveetha University.The first part of the questionnaire consists of demographic details which includes Age, gender, level of education. The second part of the questionnaire consists of questions related to knowledge, awareness about the tooth numbering system. Independent variables were age, gender and dependent variables were level of knowledge, awareness, about the Dental notation . Data collection was done by means of online google survey form. Simple random sampling technique was followed to minimize the sampling bias. Data was entered in Microsoft Excel sheet after collection and was analysed using SPSS software. Descriptive statistics were expressed by means of number, frequency, and percentage. Chi- Square test was used to find the association between variables. The level of statistical significance is at $p < 0.05$. Statistical software was SPSS version 23.

RESULTS

A total of 100 participants from various dental professions were recruited in the study. In our study, 65% participants were female and 33% were male (Fig.1). Based on Age, 62% were in the 15-25 years age group, 24% in the 26-34 years age group and 14% were in the 35-45 years age group (Fig. 2). Majority (70%) of the people who had participated in the study were Dental assistants, 24% of the population were Dental technicians and 6% of the population were Practising dentists or dental students (Fig. 3).

The easiest tooth numbering system chosen by study participants was FDI (79%), followed by Universal (14%) and Palmer (only 7%) (Fig. 4). The tooth numbering system used for primary dentition chosen by majority of the participants were FDI 85%, followed by Universal (11%) and the Palmer system chosen by 3% of the participants (Fig. 5). Majority of the study participants (84%) had preferred the FDI system compared to other 13% and 3% of participants who had preferred the universal and the Palmer system for identification of supernumerary teeth (Fig.6).

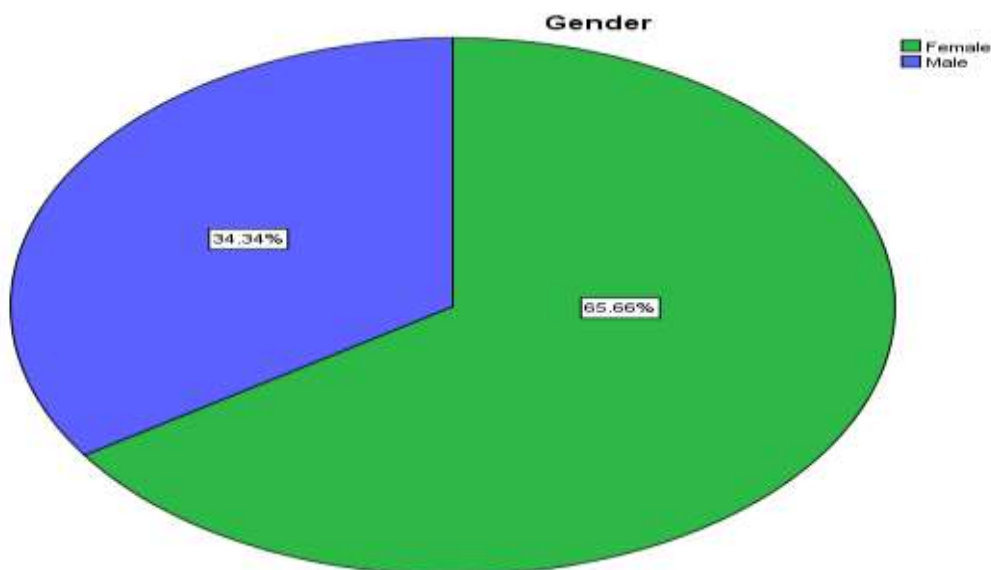


Figure 1 : Pie chart depicting the gender distribution among the participants of the study. Green denotes Female and Blue denotes male. Majority of the study participants were female (66%) compared to those of male (34%).

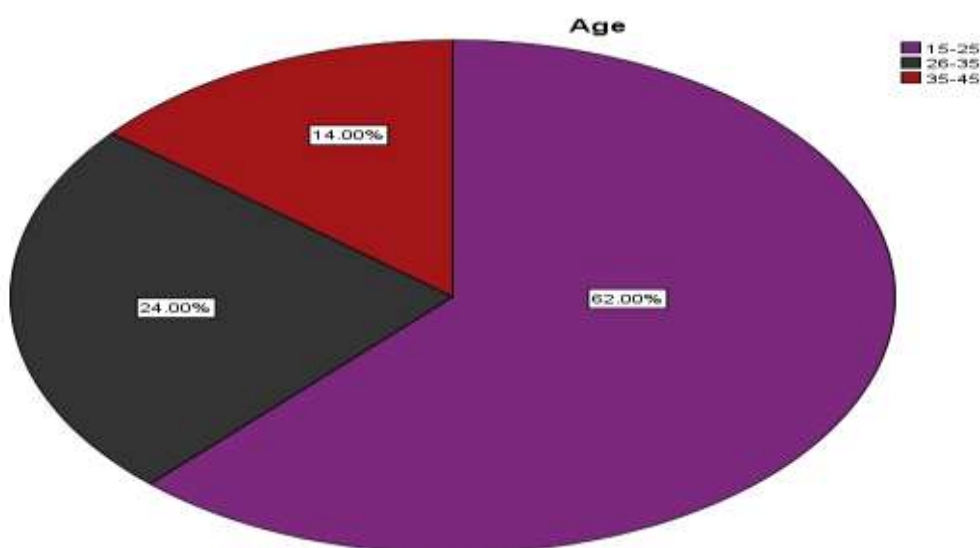


Figure 2 : Pie chart depicting age group distribution among the participants of the study. Violet colour denotes age group from 15 - 25 years, Grey colour denotes age group from 26 - 35 years and Red colour denotes age group from 35 - 45 years. Majority of the participants were in the age group from

15 - 25 years (62%), whereas 24% of the population belonged to the age group from 26 - 35 years and 14% of the population belonged to the age group from 35 - 45 years.

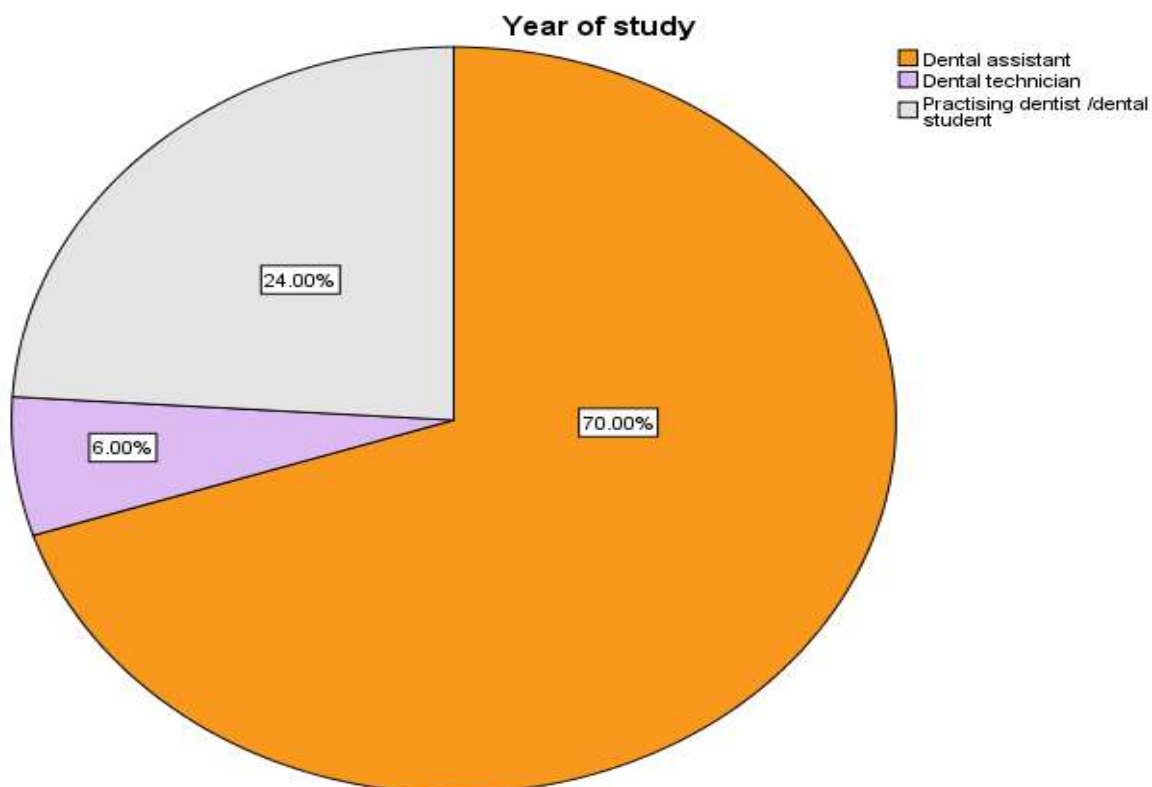


Figure 3 : Pie chart depicting the different categories of dental professionals who participated in the study. Orange colour denotes Dental assistant, Lavender colour denotes Dental technician and Grey colour denotes Practising dentist or dental students. Majority (70%) of the population were Dental assistants whereas 24% of the population were Dental technicians and 6% of the population were Practising dentists or dental students.

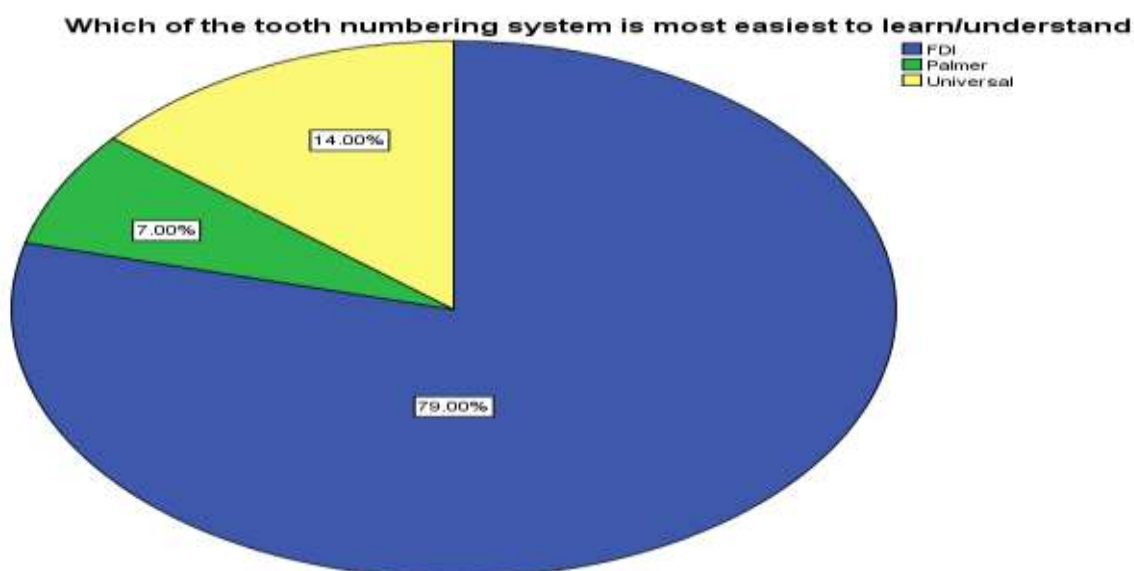


Figure 4 : Pie chart showing the percentage of responses for identification of tooth numbering systems which was easier to learn. Here, Blue colour denotes FDI system, Green colour denotes Palmer system

and Yellow colour denotes Universal system. Majority (79%) of the respondents had preferred the FDI system as the most easy to learn dental notation system. 14% of respondents had preferred the Universal system and 7% of the respondents had preferred the Palmer system as the most easy to comprehend dental notation system for learning.

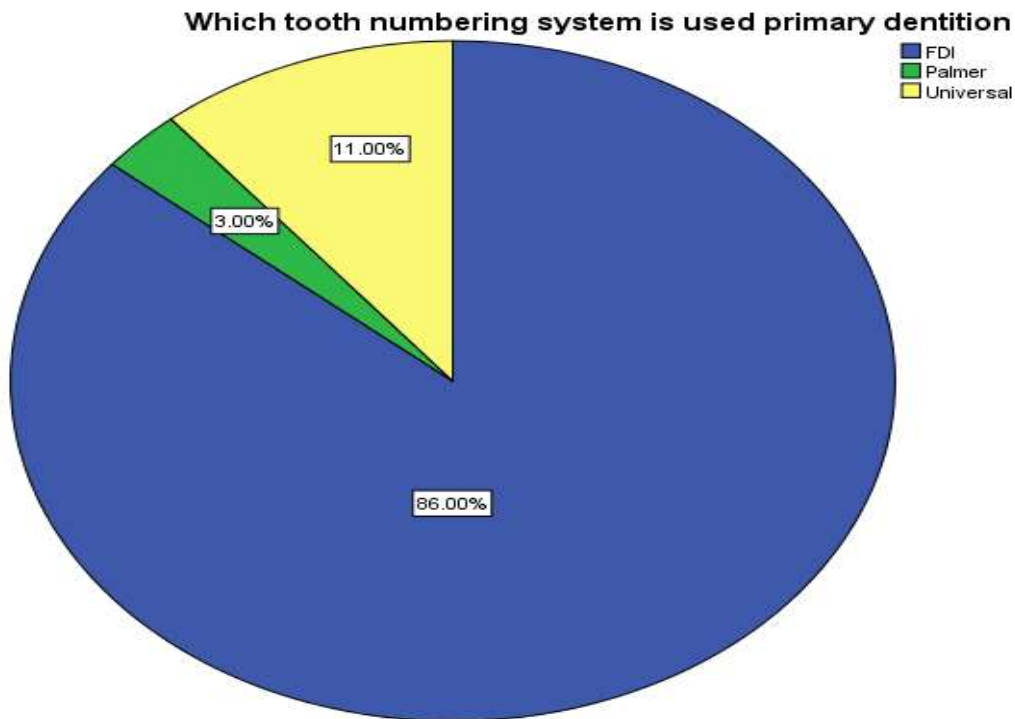


Figure 5 : Pie chart depicting the tooth numbering system used by study participants for identification of primary dentition. Blue colour denotes FDI system, Green colour denotes Palmer system and Yellow colour denotes Universal system. Majority of the respondents (86%) had preferred the FDI system for identification of primary dentition. Remaining 11% and 3% of the study participants had chosen the Universal system and the Palmer system respectively as the preferred system for identification of primary dentition.

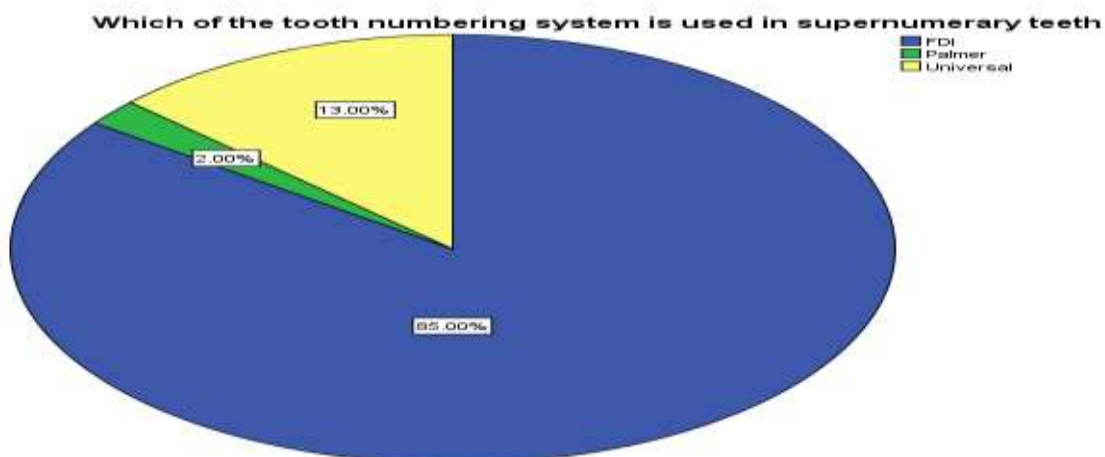


Figure 6 : Pie chart depicting the tooth numbering system used by study participants for identification of Supernumerary teeth. Blue colour denotes the FDI system, Green colour denotes the Palmer

system and Yellow colour denotes the Universal system. Majority of the respondents (85%) had preferred the FDI system for identification of Supernumerary teeth. Remaining 13% and 2% of the study participants had chosen the Universal system and the Palmer system respectively as the preferred system for identification of Supernumerary teeth.

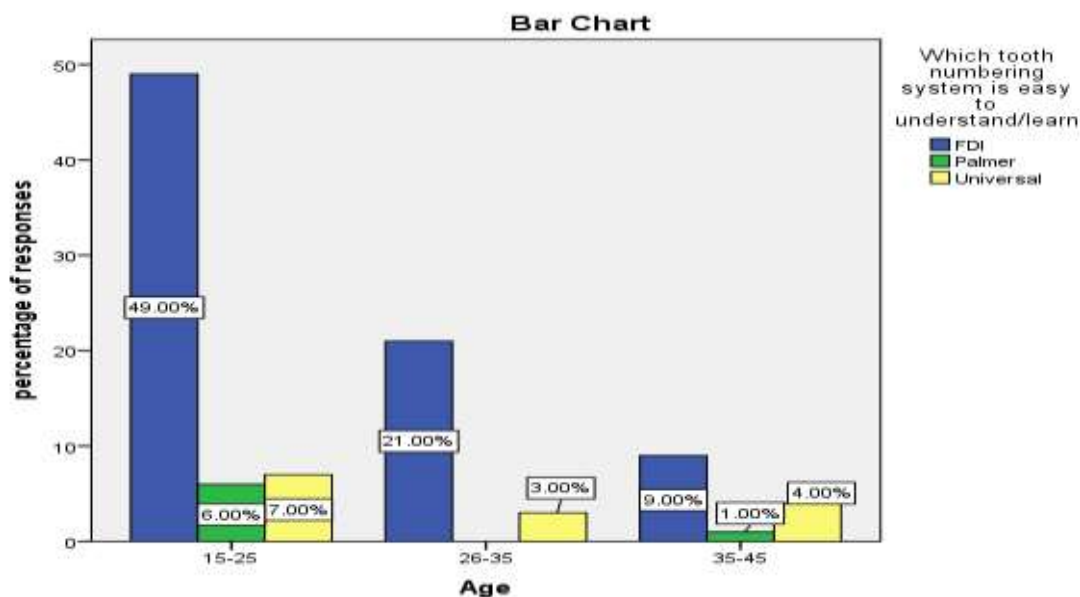


Figure 7 : Bar graph represents the association between the different age groups participated in the study and their preference regarding the most easy to comprehend tooth numbering system. X-axis represents gender and the Y-axis represents percentage of responses. Blue colour denotes FDI system, Green colour denotes Palmer system and Yellow colour denotes Universal system. 49% of 15-25 yrs age group, 21% of 26-35 yrs and 9% of 35-45 yrs age group had chosen the FDI system as the easy to comprehend tooth notation system. The differences between the groups were insignificant (chi-square, p-value=6.219)

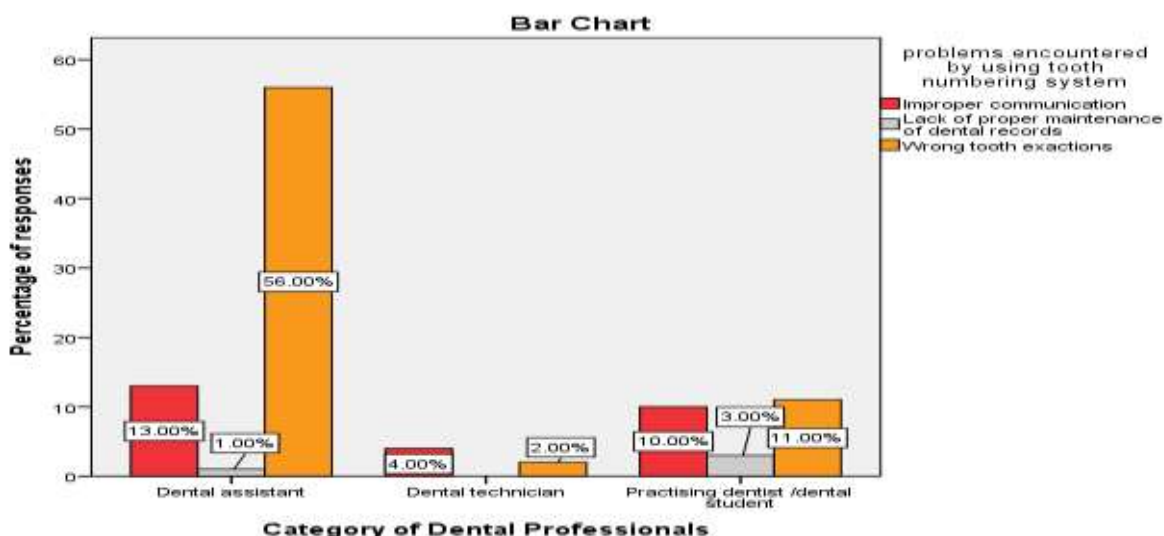
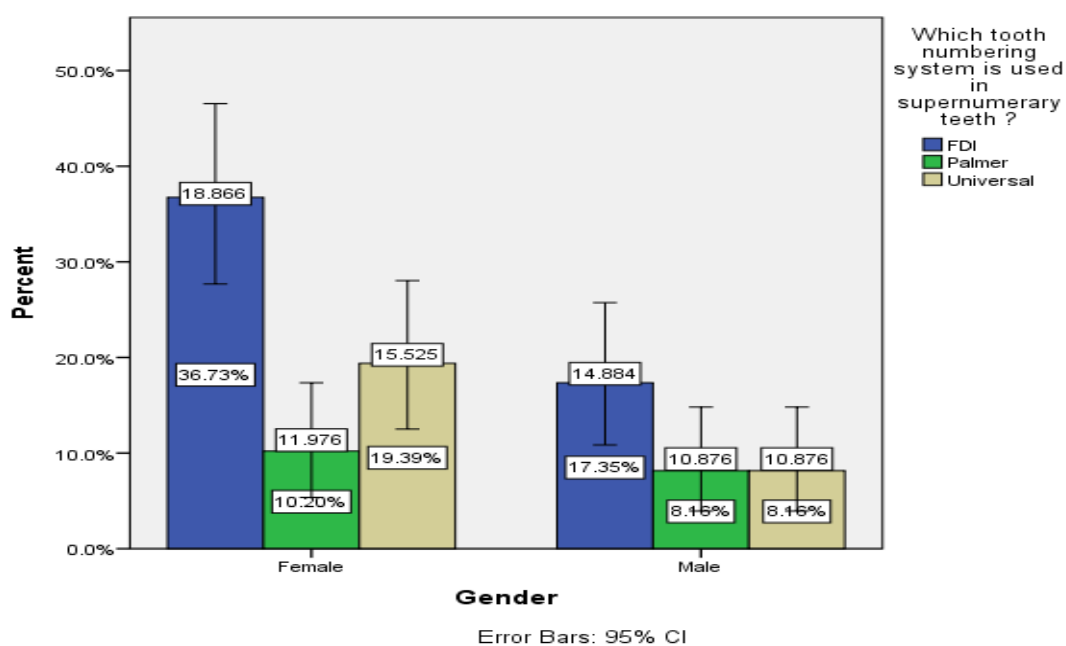
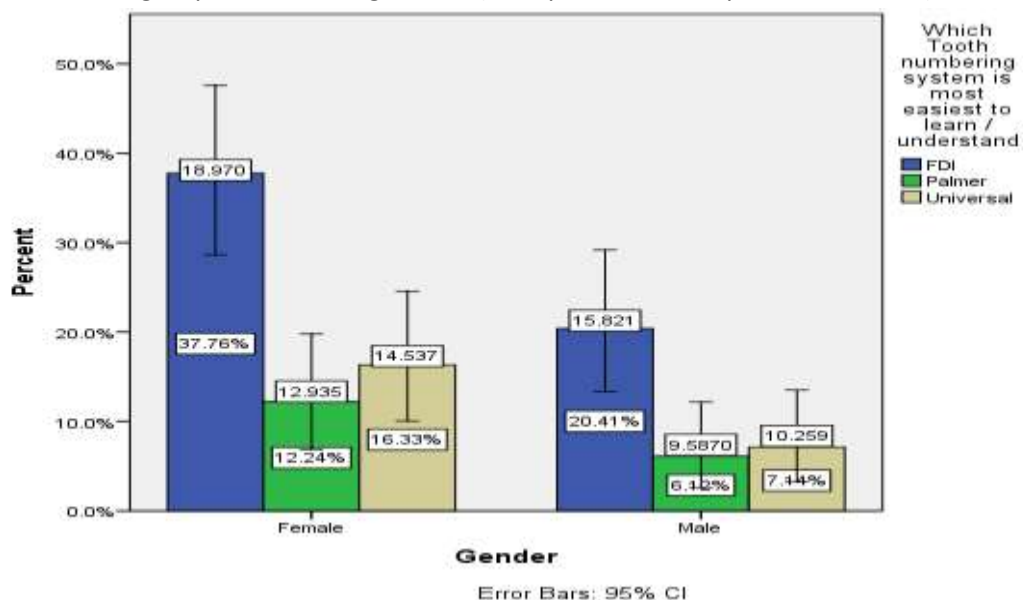


Figure 8 : Bar graph represents the association between the different categories of dental professionals that had participated in the study and their responses regarding problems encountered by wrong usage of tooth notations in their practice. The X-axis represents categories of dental

professionals and the Y-axis represents percentage of responses. Blue colour denotes Improper communication, Green colour denotes Lack of maintenance of proper dental records and Yellow colour denotes wrong tooth extractions. 56% of dental assistants, 11% of practicing dentist/dental student and 2% of dental technician felt the wrong tooth extraction was the most important problem due to wrong notations of the teeth.13% of dental assistants, 10% of practising dentist/dental students and 4% of dental technicians felt the improper communication was the major problem encountered due to wrong usage of tooth numbering system. Only 3% of practising dentists/dental students and 1% of dental assistants felt that Lack of proper maintenance of dental record was the major problem faced due to incorrect usage of dental tooth numbering system. The differences between the groups were not significant (chi square test, The p value is 17.183)



DISCUSSION

In our study, 65.66% participants were female and 33% of the study participants were male. Based on Age, 62.5% were in the 15-25 age group, 23.% were in the 26-34 age group and 35-45 age

group were 14.14%. The most easiest tooth numbering system chosen by participants was FDI by 78.79%, followed by Universal (14.%and least was Palmer that is only 7.07% The tooth numbering system used for primary dentition chosen by majority of the participants were FDI (85.86%) followed by Universal 11.% and least was Palmer that was chosen by only 3.03% of the participants.

These findings are consistent with Sharma and Wadhwa's(13), which found that 79 percent of dental students preferred FDI over other notation systems, 19% Palmer system being quite easy to understand and record manually and tends to denote primary teeth. In identifying supernumerary teeth, the FDI system was used more compared to the universal system. Zsigmondy/Palmer assists in the resolution of misunderstanding and enhances coordination between dental professionals. In the current report, 45 percent of final year students described the Universal system as a way to reflect extra teeth, while 38 percent of dental students were unaware of the tooth numbering system.

In this study of both permanent and primary dentitions, the FDI TNS was cited as the most commonly used TNS (for permanent and for primary), followed by the Palmer TNS, and finally, the Universal system. These results are in agreement with other studies performed worldwide, especially those conducted in developing countries. The FDI TNS has been introduced in almost all developing countries and health services research in most industrial countries . FDI in TNS has also been adopted by publishers and by a number of dental colleges and health insurance companies (4). However, as of the mid-late 1990s, the Palmer TNS was still widely used in the UK (Elderton, 1989, Blinkhorn et al., , the USA (Peck and Peck, 1996) and Japan . The USA also reported using the Universal TNS (14).

In our study, the majority (95%) of participants agreed that the use of different TNS leads to problems and misunderstandings, especially for communication between clinicians at different dental clinics. (15)A miscommunication could result in the wrong tooth being extracted (16). In fact, 14% of reported malpractice cases involved wrong tooth extraction (Lee et al., 2007). It is therefore generally agreed that one common TNS should be implemented throughout the country.(17)

In this study DCP was surveyed and strongly supported the TNS they currently use, indicating that implementing a change in TNS would be difficult.(18) Prior studies in the UK and USA found that there was great resistance to adopting new TNS . Clinicians have cited the following arguments against adopting the FDI TNS: not accepted in general practice, difficult for older staff to learn, satisfaction with current system used, confusion for multiple tooth extractions, lack of pressure to change, and no clinical advantage (19). Peck and Peck (1993) in their study recommended using the Canadians as a model for change in adopt.In this study, adequate knowledge of tooth numbering systems is essential in performing adequate clinical practice of dentistry at both undergraduate and postgraduate level and dental practitioners.(20) It will not only help in making the correct diagnosis but also helps during treatment planning sessions and in case of referring patients to dental specialists. FDI was found to be the most easily understood tooth numbering scheme by 57 percent of the participants in this study.(21)

So that relationship between properties and the benefits associated with the tooth numbering system is specifically demonstrated in the current study .The present study possesses limitations such as small sample size ,homogenous population and the study deals only with one parameter. Further studies with large samples size focus on details concerned with parameter like compressive strength analysis ,colour stability analysis,colour stability

Analysis ,surface roughness analysis should be done to significantly demonstrate the effectiveness and benefits associated with the usage of the tooth numbering system.

The study was conducted with a limited number of respondents due to the short time frame of the study. Further studies have to be conducted with large sample sizes to understand the practice and Preferences of dental notation systems by different dental professionals. The Regular practice of international collaborative dental notation systems can help in prompt and accurate dental recording of individuals. Thus helping to achieve appropriate treatment and antemortem record of the patients.

CONCLUSION

This study clearly highlights that different methods for tooth numbering will be used continually by dental professionals. Realistic approach is to make sure that dental professionals have sufficient knowledge regarding the most commonly used numbering systems and are responsive towards the pitfalls in each system but still there should be a common Dental Notation system to avoid confusion and mishaps in the treatment.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported

REFERENCES

1. Grace M. Dental notation [Internet]. Vol. 188, British Dental Journal. 2000. p. 229–229. Available from: <http://dx.doi.org/10.1038/sj.bdj.4800438>
2. (Phulari) R. Tooth Notation Systems [Internet]. Textbook of Dental Anatomy, Physiology and Occlusion. 2014. p. 22–22. Available from: http://dx.doi.org/10.5005/jp/books/11986_2
3. Khan U, Bahria Medical and Dental College, Alam BF, Nayab T, Inayat A, Fahim MF, et al. Knowledge of Dental Notation System in a Dental Teaching Hospital of Karachi [Internet]. Vol. 29, Journal of the Pakistan Dental Association. 2020. p. 151–5. Available from: <http://dx.doi.org/10.25301/jpda.293.151>
4. Flynn DD. Tooth Numbering System [Internet]. Vol. 82, The Journal of the American Dental Association. 1971. p. 1266. Available from: <http://dx.doi.org/10.14219/jada.archive.1971.0215>
5. Al-Johany SS. Tooth Numbering System in Saudi Arabia: Survey [Internet]. Vol. 28, The Saudi Dental Journal. 2016. p. 183–8. Available from: <http://dx.doi.org/10.1016/j.sdentj.2016.08.004>
6. Federation Dentaire Internationale (FDI) tooth-numbering system [Internet]. Vol. 120, American Journal of Orthodontics and Dentofacial Orthopedics. 2001. p. 465. Available from: [http://dx.doi.org/10.1016/s0889-5406\(01\)70033-9](http://dx.doi.org/10.1016/s0889-5406(01)70033-9)
7. Committee A, A01 Committee. Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS) [Internet]. Available from: <http://dx.doi.org/10.1520/e0527-07>

8. Website [Internet]. [cited 2021 Mar 14]. Available from: Akram A, Akram A, Hamid AH, Razak J, Hock TT. MICAP-anovel system for identification and communication of dental problems. *Int Dent J*. 2011;61:31-6. <https://doi.org/10.1111/j.1875-595X.2011.00006.x>
9. Kannan D, Gurunathan D. Comparison of two systems of tooth numbering among undergraduate dental students. *Indian J Dent Res*. 2016 Jul;27(4):378–82.
10. Cowper A. What the law says about PPE responsibility [Internet]. *BMJ*. 2020. p. m1718. Available from: <http://dx.doi.org/10.1136/bmj.m1718>
11. Havale R, Sheetal BS, Patil R, Hemant Kumar R, Anegundi RT, Inushekar KR. Dental notation for primary teeth: a review and suggestion of a novel system. *Eur J Paediatr Dent*. 2015 Jun;16(2):163–6.
12. Bass NM. Tooth notations. *Br Dent J*. 2001 Jun 23;190(12):632.
13. Chandran J, Wadhwa N, Madhu SV, Kumar R, Sharma S. Monocyte CD36 expression associates with atherosclerotic burden in diabetes mellitus [Internet]. Vol. 163, *Diabetes Research and Clinical Practice*. 2020. p. 108156. Available from: <http://dx.doi.org/10.1016/j.diabres.2020.108156>
14. Kumaraswamy J. Dental Formula and Tooth Numbering Systems [Internet]. *Textbook of Dental Anatomy: A Practical Approach*. 2014. p. 9–9. Available from: http://dx.doi.org/10.5005/jp/books/12354_2
15. Pemberton MN, Ashley M. The use and understanding of dental notation systems in UK and Irish dental hospitals. *Br Dent J*. 2017 Oct;223(6):429–34.
16. Bs M, Manjunatha BS. Chapter-03 Tooth Numbering Systems [Internet]. *Textbook of Dental Anatomy and Oral Physiology*. 2013. p. 24–9. Available from: http://dx.doi.org/10.5005/jp/books/11841_3
17. Mollin AD. Tooth Numbering [Internet]. Vol. 83, *The Journal of the American Dental Association*. 1971. p. 749–50. Available from: <http://dx.doi.org/10.14219/jada.archive.1971.0384>
18. Costa JMR. Dental notation: A case of the craftsman. *Br Dent J*. 2017 Dec 15;223(11):800.
19. Peck S, Peck L. A time for change of tooth numbering systems [Internet]. Vol. 57, *Journal of Dental Education*. 1993. p. 643–7. Available from: <http://dx.doi.org/10.1002/j.0022-0337.1993.57.8.tb02785.x>
20. Jadun S, Ashley M, Pemberton MN. Trends in referral format and dental notation used in primary care referrals to dental specialists. *Br Dent J* [Internet]. 2018 Nov 16; Available from: <http://dx.doi.org/10.1038/sj.bdj.2018.1027>
21. Tuzoff DV, Tuzova LN, Bornstein MM, Krasnov AS, Kharchenko MA, Nikolenko SI, et al. Tooth

detection and numbering in panoramic radiographs using convolutional neural networks.
Dentomaxillofac Radiol. 2019 May;48(4):20180051.