



Caries Prevention in Adults- Knowledge, Attitude and Practices among Indian Dental Professionals

**Abdulelah Sameer Sindi¹, Sumaya Yousuf Jeri^{2*}, Sarika Sharma³,
Renuka G. Nagrale⁴, Amit Kumar⁵, Moazzam Jawaid⁵
and Kumar Gaurav Chhabra⁶**

¹Department of Restorative Dental Sciences, King Khalid University College of Dentistry, Abha, Kingdom of Saudi Arabia.

²Department of Orthodontics and Dentofacial orthopedics, ITS-CDSR, Muradnagar, Ghaziabad, Uttar Pradesh, India.

³Department of Dentistry, Government Medical College and Hospital, Ratlam, Madhya Pradesh, India.

⁴Department of Public Health Dentistry, M A Rangoonwala College of Dental Sciences and Research Centre, Azam Campus 2390 B, K.B, Hidayatulla Rd, Camp, Pune, Maharashtra, India.

⁵Department of Oral and Maxillofacial Surgery, Sarjung Dental College and Hospital, Darbhanga, Bihar, India.

⁶Department of Public Health Dentistry, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi, (Meghe)Wardha, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i38B32103

Editor(s):

(1) Dr. Asmaa Fathi Moustafa Hamouda, Jazan University, Saudi Arabia.

Reviewers:

(1) Nicola Marchili, Università degli Studi dell'Aquila, Italy.

(2) Firas Abd Kati, Middle Technical University, Iraq.

(3) Edson Aparecido Liberti, University of Sao Paulo, Brazil.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/71148>

Original Research Article

**Received 17 May 2021
Accepted 21 July 2021
Published 27 July 2021**

ABSTRACT

Background: Dentists must have accurate knowledge and affirmative attitudes about dental care in order to prevent dental caries. Therefore, the present was conducted with aim to find out knowledge, attitude and actual practices (KAP) for caries prevention in adults on Indian dentist
Material and Methods: This cross-sectional questionnaire study was conducted on private dental practitioners of Ghaziabad city. Knowledge on preventive dentistry was assessed by 16 questions

*Corresponding author: E-mail: jeri786786@gmail.com;

with true/false or multiple choice pattern. A total of 8 questions each were utilized for attitude and practices, respectively on a 5-point likert scale. Student's t-test and One way ANOVA followed by post hoc test was applied to determine the relationship between mean scores of KAP and demographic variables. The significance level was set at below 0.05.

Results: Slightly better scores for KAP was found in participants belonging to ≤ 30 years of age. The total mean KAP scores of dentists were 8.9 ± 2.2 , 26.1 ± 1.7 , 21.1 ± 1.9 , respectively. Approximately 37% dentist agreed or strongly agreed that fluoride application can prevent dental caries in adults. And 31.5% dentist never advised/performed fluoride application in high caries patients.

Conclusion: Strategies to update dentists' knowledge and practices of primary preventive measures for dental caries may be beneficial in promoting oral health. Findings help in emphasizing the inception and initiation of preventive oral health policies and services in the Indian scenario.

Keywords: Dental caries; dentist; preventive dentistry.

1. INTRODUCTION

Recent epidemiological data trend shows an increase in the occurrence of oral diseases principally in low and middle-income countries. The graveness of the situation increases by the fact that oral health is not considered as a health priority by the policy makers [1]. Dental caries is a chronic, infectious, multi-factorial disease and prevalent oral health problem and one of the leading causes of tooth loss that can happen all through a person's life span [2,3]. Recent reports stated that as high as 61% of 6-years-old children had experienced dental caries, and the DMFT (decayed, missing, and filled teeth) index was 2.58 for 12 years old in 2006 [4]. Nevertheless, the appropriate use of preventive dentistry could prevent such vast prevalence of the disease.

All efforts to avoid dental diseases and disorders, or to avert the squeal of an individual's dental diseases and disorders are components of Preventive dentistry [5]. Secular trends of most developed countries of the recent decades show the decline in the prevalence of dental caries. This has been recommended owing to influence of multiple factors ranging from use of fluoride, improved oral hygiene practices, dietary changes, to specific procedure performed in dentist's office fluoride applications, and sealants [6].

Dentists must have accurate knowledge and affirmative attitudes about dental care in order to prevent dental caries [7]. Although studies have been conducted to assess knowledge attitude and practices of dental professionals regarding caries prevention [7-9]. not many studies have been conducted in India focusing on caries. In

India at present dental services focuses mainly on the conservative treatment of existing diseases and not much importance is given to primary preventive measures [10].

Furthermore, in Indian context few studies have been conducted targeting specifically children [11]. To our best knowledge no studies have been conducted to assess knowledge and self-perceived proficiency and actual practices for caries prevention in adults on Indian dentist. Therefore, the present study was conducted with aim to find out the same.

2. MATERIAL AND METHODS

The study was conduct from 1st August 2019 to 30th December 2019. Data was collected from private dental practitioners practicing in the Ghaziabad city regarding knowledge, attitudes, and practices of caries prevention in adult patients. A single investigator approached all dental clinics and explained the purpose of the study and informed consent was obtained from the willing participants. In case the practitioner was busy at the time of visit, appointment was taken and investigator revisited the clinic.

A closed ended self-administered, study proforma consisting of informed consent, demographics details and questionnaire was distributed to each participant with the allotted time of 35-40 minutes to fill and return. The items for the questionnaire were adapted from 4 sources - theory, observation, expert opinion and previous researches [1,7,8,12]. Before the main survey, the questionnaire was pretested for the feasibility and reliability in 20 dental practitioners. The modified version suiting the present study population with Cronbach's alpha and split-half

reliability values were 0.82 and 0.84 for knowledge; 0.79 and 0.81 for attitude; and 0.86 and 0.91 for practice respectively, was finally circulated to the respondents.

Knowledge on preventive dentistry was assessed by a total of 16 questions. Few questions were on true or false basis like “decreased salivary flow increases the risk of developing caries, levels of salivary microorganisms may indicate levels of caries risk or activity, root caries can be prevented by topical fluoride”. Questions were also asked in multiple choice formats like “the correct time for application of APF gel, steps for pit and fissure sealant application, procedure for varnish application” etc. All correct answers were scored as 1 and wrong answers scored as 0.

The opinion about caries preventive measures was assessed by a total of 8 questions like, “do you think using fluoridated toothpaste is more important than the brushing technique to prevent caries, the frequency of sugar-consumption has a greater role than the total amount of sugar consumed in causing caries, manual removal of plaque (flossing and brushing) is more valuable for maintaining gingival health than for preventing canes”. Responses for questions were on a 5-point Likert scale ranging from strongly agree to strongly disagree scoring from 5 to 1 and reverse coding was given to the negatively based question indicating higher scores had positive attitude and vice-versa.

Questions for practices included items like how often you advise patients about diet which prevent caries, how often you assess caries index of patient, how often do you advise/perform fluoride application in high caries patient, advise/perform preventive measures in a patient with xerostomia/undergoing radiation, advise/perform sealant in caries patient. Practices were again evaluated on a 5-point Likert scale ranging from “always to never” scoring 5 to 1 for positive and overturn for negative based question.

2.1 Statistical Analysis

After entering data into a Microsoft Excel spreadsheet version 7.0 (Microsoft, Redmond, Washington USA); statistical analysis was performed using Statistical Package for the Social Sciences version 16.0 (IBM, Armonk, New York, USA). Descriptive statistics was applied to determine frequencies, percentages, mean \pm standard deviation (SD). Student’s t-test and One

way ANOVA followed by post hoc test was applied to determine the relationship between mean scores of KAP and demographic variables. The significance level was set at below 0.05.

3. RESULTS

A total of 327 dental practitioners participated in the study. Maximum of them were males (n=188) and belonging to age group of 31-40 years. Slightly more Bachelor of Dental Surgery (BDS) (52.6%) practiced than Master of Dental Surgery (MDS) (47.4%) (Table 1).

Table 1. Demographic distribution of the study population

Demographic variables	n	%
Gender	Male	188 57.49
	Female	139 42.51
Age (in years)	≤ 30	66 20.18
	31-40	103 31.50
	41-50	87 26.61
	> 50	71 21.71
Academic qualification	BDS	172 52.60
	MDS	155 47.40

The total mean knowledge, attitude and practices (KAP) scores of dentists were 8.9 ± 2.2 , 26.1 ± 1.7 , 21.1 ± 1.9 , respectively. Slightly better scores for knowledge and attitude was found in participants belonging to ≤ 30 years of age and poor scores of practices was observed in practitioners of > 50 years. The difference was found statistically significant for all the three variables for age ($p < 0.05$) by One way ANOVA. The further post-hoc analysis to know the pairwise difference revealed significant difference in between ≤ 30 years and 41-50 and > 50 years for knowledge and attitude whereas for practices the difference was significant only for the pair of ≤ 30 years and > 50 years. No significant difference was found between the KAP scores when compared in between gender as well as academic qualification ($p > 0.05$). (Table 2).

When the opinion about caries prevention was assessed in dentist it was noted that approximately 37% dentist agreed or strongly agreed that fluoride application can prevent dental caries in adults. Similarly, only 19.6% strongly agreed and 24.8% agreed that frequency of sugar intake is more important than the amount of sugar intake. Likewise even for opinion about community water fluoridation not many dentist had a positive attitude (22.3%

and 19.9%; agreed and strongly agreed, respectively) (Table 3).

The evaluation of practices in dentist with respect caries prevention procedures showed that maximum dentist never practices any such

measures in their dental practice. It was found that 34.9 %, 31.5% and 30.3 % never assessed caries index of patient, advised/performed fluoride application in high caries patient, advised/performed preventive measures in a patient with xerostomia, respectively. (Table 4).

Table 2. Comparison of knowledge, attitude and practices of study participants based on demographic variables

Demographic variables		Knowledge		Attitude		Practices	
		Mean	SD	Mean	SD	Mean	SD
Gender	Male	8.72	2.91	26.19	1.28	21.45	1.92
	Female	9.14	1.46	25.92	2.13	20.83	1.81
	p-value (unpaired t-test)	0.557		0.637		0.671	
Age	≤30	11.19	2.94	34.19	1.54	25.22	1.79
	31-40	10.03	1.76	26.63	1.12	22.34	1.28
	41-50	8.17	1.98	22.12	2.1	20.14	1.63
	>50	6.34	2.04	21.25	2.07	16.86	2.77
	p-value (One way ANOVA)	0.032*		0.02*		0.04*	
Academic qualification	BDS	8.84	2.13	25.82	1.78	21.09	1.75
	MDS	9.02	2.23	26.29	1.62	21.2	1.97
	p-value (unpaired t test)	0.714		0.649		0.826	
Total		8.9	2.2	26.1	1.7	21.1	1.9

*p<0.05; significant

Table 3. Response analysis for attitude by study participants

Do you think	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Applying topical fluoride reduces caries levels in adults	17.4	21.1	23.9	22.0	15.6
Use of fluoridated toothpaste is more valuable than the brushing technique to prevent caries,	22.6	23.5	18.7	20.2	15.0
In causing caries, the sugar-consumption frequency is more important than amount of sugar consumed.	16.8	18.3	20.5	24.8	19.6
Plaque removal has no role in preventing caries.	25.4	22.9	19.3	18.3	14.1
Community water fluoridation should be done to done in areas with low fluoride	19.6	21.1	17.1	22.3	19.9
Free/concession rates should be done for caries preventive measures in government/insurance policies	18.0	20.8	16.5	24.2	20.5
Additional efforts should be taken to educate communities for caries prevention	14.7	16.5	17.4	29.4	22.0
Additional efforts should be taken to implement for caries prevention procedures among dentist	14.4	17.1	17.1	28.7	22.6

Table 4. Response analysis for practices by study participants

How often you	Never	Sometimes	Often	Very often	Always
advise patients about diet which prevent caries,	29.7	20.8	19.3	15.9	14.4
how often you assess caries index of patient,	34.9	20.5	17.1	14.7	12.8
how often do you advise/perform fluoride application in high caries patient,	31.5	22.0	16.8	15.6	14.1
advise/perform preventive measures in a patient with xerostomia	30.3	22.3	17.7	16.5	13.1
advise/perform preventive measures in a patient planned for radiation,	35.5	19.3	16.5	15.3	13.5
Advise/perform sealant in caries patient.	37.6	18.7	15.6	14.7	13.5
Read articles/research about recent advancement in caries prevention	22.9	25.1	18.0	17.4	16.5
Attend CDE/Seminars about recent advancement in caries prevention	23.9	27.2	17.7	16.2	15.0

4. DISCUSSION

Growing prevalence of dental caries amounts for better practices of preventive measures. The practices of dental professionals are largely prejudiced by their knowledge and beliefs. To take informed decisions pertaining to utilize or to suggest any preventive procedures or agents, dentist should have exact information regarding the etiology and prevention of caries. Dentists have the potential to impact on habits of their patients, staff members, family, and community being the leaders of the dental care team.

Our results showed that the knowledge levels were low. Similarly the findings from previous study also suggest practicing dentist had paucity in the knowledge regarding causes or prevention of dental caries and moreover their concepts were not up to date [1,7,8]. The insufficient knowledge about the caries risk factors/prevention or the effects of fluorides have been reported in dental students and the laymen as well [13,14]. There is abundant scientific literature which proves the role of fluoride in prevention of dental caries [15,16]. But this theory holds no value if the concept is not applied or accepted by the dentists, policy-makers, or public.

Present study revealed that knowledge score were slightly better in dentist belonging to the age group of below 30 years as compared to dentist of older age groups. The scores reduced as the age increased. This might be due to loss

of retention of knowledge with time [17]. In Korean dentists also, number of years from the time of graduation and knowledge had negative association and it was suggested that to some extent positive impact on recent graduates might be there by the public health and preventive courses in dental colleges [8]. In terms of attitude and practices also as the age increased the scores decreased. The increase number of years of practice might have contributed to such unfortunate findings. The low level of knowledge in public towards preventive measures along with lack of government policies might have resulted into practice of more tertiary preventive procedures leaving primary prevention as an unexplored arena among dentist.

Our results show that only around 22% agreed and 15 % strongly agreed that fluoride can benefit in adults also. This was in accord with the outcomes of previous studies in which only 5.2% strongly agreed with the statement. In fact, advantages of fluoride should be seen in all people regardless of age for caries prevention [7].

The practices of caries prevention were found very poor among dentist. The fluoride application in adults was always done by only 14 % of dentist. Whereas?, in the study conducted on Taiwanese dentist topical fluoride was not provided to the patients above 13 years by merely 10% of dentists.

Overall (In general?), poor knowledge, attitude and practices were noted in the present study.

This was in contrast to another Indian study conducted in Gurugram city which reported very high knowledge and positive attitude and practices pertaining to preventive dentistry [18]. Practitioners have also reported that fluoride can be one of the prominent preventive factor for dental caries among adults also [19]. However, these results cannot be truly compared to those of the present study due to differences in the target population. One should also consider that in questionnaire studies there is likelihood of social desirability and thus reporting falsely creating a good bias, and/or deviation from negative bias [20].

5. LIMITATIONS

This study had the inbuilt limitations of all cross-sectional questionnaire studies. Likert scales used for assessing attitude and practices may be related with prejudices, like end-aversion bias, positive skew, and the halo effect [21-25]. Findings from single city may not be fully generalizable. Cross-sectional studies alone cannot facilitate in planning explicit and appropriate interventions, but such studies helps in setting a stage for the inception and initiation of preventive oral health policies and services in the Indian scenario [26-29].

6. CONCLUSION

Strategies to update dentists' knowledge and practices of primary preventive measures for dental caries may be beneficial in promoting oral health. Apex councils should revise curriculum by devoting additional time to primary prevention of caries as compared to restorative measures. The practices of preventive dentistry would be superior if additional efforts are made to foster most recent scientific evidence in dentists and public.

ETHICAL APPROVAL

This cross-sectional questionnaire study was performed after obtaining ethical approval from Institutional Ethical Committee.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our

area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Wagle M, Acharya G, Basnet P, Trovik TA. Knowledge about preventive dentistry versus self-reported competence in providing preventive oral healthcare - a study among Nepalese dentists. *BMC Oral Health*. 2017;17(1):76.
2. Taiwan Bureau of Health Promotion. Oral Health of Taiwan Children 2006e2007. DOH95-HP-1317.
3. Jain SK, Pushpanjali K, Reddy SK, Gaikwad R, Deolia S. Comparison of different caries diagnostic thresholds under epidemiological and clinical settings among 7-15 year old school children from Bangalore city. *J Int Soc Prev Community Dent*. 2013;3(2):85-91.
4. Buran T, Sanem Gökçe Merve Kılınc, Elmas Kasap. Prevalence of Extraintestinal Manifestations of Ulcerative Colitis Patients in Turkey: Community-Based Monocentric Observational Study. *Clinical Medicine and Medical Research*. 2020; 1(2):39-46. DOI:<https://doi.org/10.52845/CMMR/2020v1i2a8>
5. Janakiram C, Antony B, Joseph J, Ramanarayanan V. Prevalence of Dental Caries in India among the WHO Index Age Groups: A Meta-Analysis. *Journal of Clinical and Diagnostic Research*. 2018; 12(8): ZE08-ZE13
6. Gerrie NF. A definition of preventive dentistry. *J Public Health Dent*. 1969; 29:60.
7. Sushanth VH, Kalra DD, Kumar NP, Prashant GM, Bhate P, Imranulla M. Assessment of knowledge, attitude, and practice regarding preventive options in oral care among dentists in Davangere city, Karnataka: A cross-sectional study. *Dent Med Res*. 2015;3:20-5.

8. Lin TH, Hsieh TY, Horowitz AM, Chen KK, Lin SS, Lai YJ et al. Knowledge and practices of caries prevention among Taiwanese dentists attending a national conference. *Journal of Dental Sciences*. 2010;5(4):229-236.
9. Daniel V, Daniel K. Perception of nurses' work in psychiatric clinic. *Clinical Medicine Insights*. 2020;1(1):27-33.
DOI:<https://doi.org/10.52845/CMI/2020v1i1a5>
10. Moon HS, Paik D, Horowitz AM, Kim J. National survey of Korean dentists' knowledge and opinions: dental caries etiology and prevention. *J Public Health Dent*. 1998; 58:51e6.
11. Ghasemi H, Mrutomaa H, Torabzadeh H, Vehkalahti MM. Knowledge of and attitudes towards preventive dental care among Iranian dentists. *Eur J Dent*. 2007; 1:222e9.
12. Nagarajappa R, Sanadhya S, Batra M, Daryani H, Ramesh G, Aapaliya P et al. Perceived barriers to the provision of preventive care among dentists of Udaipur, India. *J Clin Exp Dent*. 2015;7:e74-9.
13. Murthy GA, Mohandas U. The knowledge, attitude and practice in prevention of dental caries amongst pediatricians in Bangalore: A cross-sectional study. *J Indian Soc Pedod Prev Dent*. 2010;28:100-3.
14. Daniel V, Daniel K. Diabetic neuropathy: new perspectives on early diagnosis and treatments. *Journal of Current Diabetes Reports*. 2020;1(1):12-14.
DOI:<https://doi.org/10.52845/JCDR/2020v1i1a3>
15. Streiner DL, Norman GR. Devising the items. In *Health measurement scales: A practical guide to their development and use*. In PDQ Statistics. Oxford University Press, Oxford. 1995;31.
16. Al-Sabri FA, Ba-Salamah M, El-Marakby AM, Okash S, Ghaleb IH, Abdulrab S. Tooth decay prevention: Knowledge and practices survey of dental students. *Int J Clin Pediatr Dent*. 2019;12(2):92-95.
17. Nishi M, Harding M, Kelleher V et al. Knowledge of caries risk factors/indicators among Japanese and Irish adult patients with different socio-economic profiles: a cross-sectional study. *BMC Oral Health*. 2017;17:55.
18. Ripa LW. A half-century of community water fluoridation in the United States: review and commentary. *J Public Health Dent*. 1993;53:17-44. 26.
19. Daniel V, Daniel K. Exercises training program: It's Effect on Muscle strength and Activity of daily living among elderly people. *Nursing and Midwifery*. 2020; 1(01):19-23.
DOI:<https://doi.org/10.52845/NM/2020v1i1a5>
20. Ripa LW. A critique of topical fluoride methods (dentifrices, mouth rinses, operator and self-applied gels) in an era of decreased caries and increased fluorosis prevalence. *J Public Health Dent*. 1991; 51:2341.
21. Semb GB, Ellis JA. Knowledge taught in school: what is remembered? *Review of Educational Research*. 1994;64(2):253-286.
22. Bhardwaj T, Tandon S, Chand S, Bhargava A. Knowledge, attitude and practice towards preventive dental care- A KAP study. *J Global Oral Health*. 2019; 2(1):36-40.
23. Chhabra KG, Shetty JP, Prasad KVV, Mendon SC, Kalyanpur Ramya. The beyond measures: Non fluoride preventive measures for dental caries. *JIOH*. 2011; 3(2):1-8.
24. Chhabra KG, Sharma A, Chhabra C, Reddy JJ, Deolia SG, Mittal Y. Knowledge, attitude, and practices regarding pharmacovigilance and adverse drug reaction reporting among dental students in a Teaching Hospital, Jodhpur, India: A Cross-sectional Study. *J Contemp Dent Pract*. 2017;18(10):964-969.
25. Streiner DL, Norman GR. Devising the items. In: Streiner DL, Norman GR, editors. *Health measurement scales: a practical guide to their development and use*. PDQ Statistics. Oxford: Oxford University Press. 1995;15-26.
26. Deolia SG, Chhabra C, Chhabra KG, Kalghatgi S, Khandelwal N. Dental anomalies of the deciduous dentition among Indian children: A survey from Jodhpur, Rajasthan, India. *J Indian Soc Pedod Prev Dent*. 2015; 33:111-5.
27. Rathi N, Chandak M, Mude G. Comparative evaluation of dentinal caries in restored cavity prepared by galvanic and sintered burs. *Contemporary Clinical Dentistry*. 2018;9(5):S23-27.

- DOI:https://doi.org/10.4103/ccd.ccd_801_17.
28. Thosar NR, Bane SP, Hake N, Gupta S, Sudhindra BM, Rathi N. Knowledge, attitude and practice of mothers for administration of medicaments to their children and its correlation with dental caries. *International Journal of Current Research and Review*. 2020;12(18): 5–8.
- DOI:<https://doi.org/10.31782/IJCRR.2020.12189>.
29. Patil S, Ranka R, Chaudhary M, Hande A, Sharma P. Prevalence of dental caries and gingivitis among pregnant and nonpregnant women. *Journal of Datta Meghe Institute of Medical Sciences University*. 2018;13(1):44–47.
- DOI:https://doi.org/10.4103/jdmimsu.jdmimsu_5_18.

© 2021 Sindi et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/71148>