

Knowledge, Attitude and Practice of Preventive Dentistry Among Private Dental Practitioners in Vadodara, India

Ramya R¹, Ajithkrishnan CG², Thanveer K³

ABSTRACT

Background: Private dentists' knowledge and attitude on preventive dentistry may influence their practice and contribute to oral health of individuals and community. The objective of the study was to investigate the preventive orientation of private dental practitioners in Vadodara (India) through a questionnaire study.

Methodology: A cross-sectional self-administered questionnaire survey was conducted among Indian Dental Association- enrolled private dentists in Vadodara. The 37-item pre-tested questionnaire included questions about personal and professional characteristics and items to assess knowledge, attitude, practice and barriers related to preventive dentistry. Statistical methods included descriptive statistics and chi-square and correlation analysis using Pearson's Correlation coefficient.

Results: 82 of 140 eligible respondents filled the questionnaire (response rate: 58.57%). Majority were BDS degree holders (64.63%). Most dentists had solo-practice (65.85%) and had a work experience of 1-10 years (56.10%). 75% reported reading national and/or international dental journals. 62.20% claimed to have attended Continuing Dental Education programmes within the last year and interest was expressed by 89.02%. Majority (80.49%) possessed above average knowledge. Knowledge was higher among least experienced groups compared to the most experienced groups and it was statistically significant. 48.78% of respondents exhibited highly favourable attitude. Frequently rendered preventive measures were oral hygiene instructions, anti- tobacco advice and dietary advices practiced by 86.59%, 80.49% and 43.90% of dentists respectively. Oral cancer screening, fluoride and sealants were done by most dentists on risk basis. Lead protection was ignored by 43.90%. Most dentists perceived patient-related barriers as most impeding to preventive care. No correlation was observed between knowledge and attitude.

Conclusion: Preventive orientation of private dentists in Vadodara was encouraging with scope for improvement.

Keywords: Prevention, General dental practitioners, Dental services

¹ Reader
Department Of Public Health Dentistry
K.M. Shah Dental College And Hospital,
Vadodara, Gujarat (India)

² Professor and Head
Department Of Public Health Dentistry
K.M. Shah Dental College And Hospital,
Vadodara, Gujarat (India)

³ Professor
Department Of Public Health Dentistry
K.M. Shah Dental College And Hospital,
Vadodara, Gujarat (India)

Dr. Ramya R
ramya83_r@rediffmail.com

J Oral Health Comm Dent 2015;9(2)69-80

INTRODUCTION

Although prevention of oral diseases is a dream that can be realized only by the combined actions of the dentist, the patient and the community, it goes without objection that the dentist definitely plays the lead role. Dentists' acquisition of knowledge and skills has constantly paved the path towards prevention. The trend from extraction to restoration and onwards to prevention is a perfect example of the same. The dentist not only has responsibilities towards progress of the profession but also has his share of duties towards improvement of oral health of the community. Leatherman, in 1979, rightly stated, "It is the dental professional's responsibility to teach and motivate the patient and the whole community to prevent dental diseases (1)."

As primary preventive care has proved to be cost-effective (2), the main thrust of primary preventive dental care has been most often borne by public health preventive programs such as the water fluoridation programs and sealant programs. Furthermore, the overwhelming acceptance of these public health measures have conferred popularity to preventive dentistry and advanced the trend towards prevention. But in the recent times, it has been recognized that it is however facile to assume that public health measures alone can exert a beneficial effect (3). This has led to remarkable changes in today's dental practice. Primary preventive approaches in private dental clinics, have not only emerged as a supplemental measure to reduce the burden of dental diseases but also as a promise of predominant form of service-mix of dental practice in the future.

Private dental practitioners have an important role in imparting dental health education to public, influencing patients' preventive oral health behavior and providing preventive dental care to lower the burden of oral diseases. Preventive orientation of

private dental practitioners in terms of their knowledge, attitude, oral health behavior, preventive dental care and perceived barriers to provision of preventive dental care, is of significance in order to envision these professionals as the resources of the community.

Exploration of available literature revealed little information about preventive orientation of dental practitioners. To the best of the investigator's knowledge, there existed only one published Indian study (4) till date that assessed knowledge, attitude and practices of dentists related to preventive dentistry, which too was restricted to prevention of dental caries only. Thus, a questionnaire study to assess the preventive orientation of private dental practitioners of Vadodara (Gujarat), covering aspects of prevention of majority of the commonly occurring oral diseases was conducted.

MATERIALS AND METHOD

A cross-sectional questionnaire study was conducted among IDA enrolled private dentists. Prior to the main study, a pilot study was conducted for psychometric testing of the developed questionnaire among 15 dental practitioners enrolled in the local branch of the Indian Dental Association (IDA). The participants who were part of the pilot study were not included again in the main study to avoid bias. A description of the questionnaire development and psychometric testing is as follows.

QUESTIONNAIRE DEVELOPMENT

Theoretical Construct

A conceptual approach was taken in the development of the questionnaire, based on the theoretical framework proposed by Shafer & Tait (1986) (5). Schafer and Tait proposed beliefs, values, attitudes and intervening factors as responsible for behavior. Through the theoretical framework, role of dentists' knowledge, attitude, behavior, perceived barriers to provide preventive care in preventive dental practice

could be studied. The model suggests that dentists' knowledge and attitudes have an influence on their preventive dental practices, in support of the research hypothesis.

Development of The Item Pool

Items for the questionnaire were gathered from a number of sources. The questions related to 'knowledge' domain were designed originally by the investigator herself on absorbing the most important as well as basic concepts in preventive dentistry from standard internationally recognized textbooks in Preventive Dentistry. The questions related to preventive practices of dentists, their preventive oral self-care habits, attitudes and perceived barriers to provision of dental care were adopted from previous surveys in similar topics conducted in developing countries (namely, Korea, Iran) (6-10) and were modified to suit the Indian scenario. The prepared list of questions was approved by qualified academicians in the specialty of Public Health Dentistry, KM Shah Dental College & Hospital.

QUESTIONNAIRE STRUCTURE AND SCALE CONSTRUCTION DECISIONS

The initial questionnaire contained 47 items. Out of those, eight questions were pertaining to general information of the participants. Eight questions were included to assess the knowledge of dentists on preventive dental practices, seven items in the questionnaire estimated the attitude of dentists towards preventive dentistry, eight questions were related to the dentists' preventive dental practice. Another set of eight questions enquired about the dentists' preventive oral self-care habits and the last eight questions were related to the perceived barriers to provision of preventive dental care. Blank lines were provided at the end of the questionnaire for the participating dentists to add or suggest any uncovered aspect related to preventive dental practice.

Items related to the different domains were designed in such a way that they were to be answered on different scale in order to avoid boredom and respondent fatigue as well as to minimize bias. For instance, dentists' level of knowledge was planned to be assessed based on their responses to a set of objective type questions and counted for correct and incorrect answers (nominal scale). The questions were designed in such a way that there was only a single correct option for each question. Each participant's knowledge on preventive dentistry was assessed based on the number of correct/ incorrect answers. A score of '0' was given for each incorrect answer and a score of '1' was given for each correct response. Attitude of the dentists towards preventive dentistry was assessed by their responses to seven pairs of bipolar adjectives on a semantic differential scale; and score for each item were summed to give a net numerical value to the attitude. Frequency of preventive care and high-risk care for specific preventive procedures were evaluated by the responses assessed on a Thurstone-type scale. Perceived barriers to provision of preventive dental care by the dentists were rated on a 5-point Likert Scale.

PSYCHOMETRIC TESTING PROCEDURE

The prepared questionnaire was administered to 15 IDA registered private dental practitioners in Vadodara, to test for validity and reliability. SPSS version 11.5 was used for factor analysis and reliability analysis.

Content Validity

The sampling adequacy of items of the prepared questionnaire was good with a total of 47 items. However, written remarks mentioned by participants at the end of the questionnaire indicated that questions about preventive orthodontics need to be added. Also ambiguous questions were pointed out by the participant.

Construct Validity

All the questions were conforming to the theoretical framework proposed by Schafer and Tait (1986) (5). Good convergent validity and discriminant validity was observed for the present questionnaire.

Factorial Validity

A 5-factor structure was proposed corresponding to domains of preventive-orientation namely, dentists' knowledge of preventive dental practices, dentists' attitudes about preventive dentistry, dentists' preventive dental practices, dentists' oral health behavior and perceived barriers to prevention of dental care. These factors were identified through literature search of similar previously done studies in which the factors were explored through exploratory factor analysis, done to ensure the communalities within the items in a domain. A confirmatory factor analysis by unweighted least squares method was performed to analyze the stability of the proposed factor model using AMOS5.0 software (SPSS Inc). The model fit indices (Adjusted Goodness of Fit Index:0.89, Relative Fit Index:0.92, Normed Fit Index:0.94, Root Mean Squared Residual:0.07) indicated that the factor model was stable across the sample.

Item - Analysis, Reliability Coefficient and Interpretation

Item analysis was performed for items in each of the domains. Inter item consistency was measured for items in each factor and expressed as Chronbach's reliability co-efficient (Chronbach's alpha) except for the knowledge domain as Chronbach's alpha is applicable only for summative scales.

According to the rules of thumb for interpretation of Chronbach's alpha given by George and Mallory (2003) (11), the items in the domains "dentists' attitude about preventive dentistry" ($\alpha=0.8$) and "dentists' preventive dental practices" ($\alpha=0.8$) were found to exhibit good inter- item consistency.

Prior to item analysis, subsequent reductions and modifications, the items in the domain showed negative correlations with each other and the domain as a whole. Scale modifications and improvements were made where necessary. In spite of these measures, unacceptable inter-item consistency ($\alpha=0.3$) was observed for the revised items in the domain "dentist's preventive oral health behavior". Therefore, it was decided that the entire domain should be excluded from the questionnaire. The items in the domain "Barriers to provision of preventive dental care" were found to have poor internal validity but were within the acceptability range; therefore the items were decided to be retained. The revised questionnaire had 37 items.

STUDY SAMPLE

A convenient sample of all the private dental practitioners in Vadodara, registered with the local branch of the Indian Dental Association (IDA). The sampling frame was constituted by a total of 172 dental professionals enrolled in the IDA. The addresses and contact details of the members were obtained from the membership directory of IDA, Vadodara branch. As the list did not bear the details of how many of the enrolled professionals were in private practice, the members were contacted to know the same before the investigator approached them in person for questionnaire administration. It was found that there were 155 private dental practitioners enrolled in Vadodara, enrolled with the IDA, Vadodara branch.

IDA enrolled dentists who were independent private dental practitioners, private dentists under supervision, visiting consultant dental specialists and private dental practitioners attached to academic institute were included. Non IDA dentists, non-practicing dental academicians, dentists working in government set up and those unwilling to participate in the study were excluded. Prior to the administration of the

questionnaire, the participant dentists were provided with an information sheet explaining the purpose and the potential benefits of the present study. Also, specific instructions regarding answering the questionnaire were provided. After the participant dentist thoroughly understood the contents of the information sheet, an informed

consent (written) was obtained from him/her in the informed consent form.

QUESTIONNAIRE ADMINISTRATION

The questionnaire used in the study was of self-administered type and was distributed to the private practitioners in person by the principal investigator

in order to obtain a good response rate. The private practitioners were requested to fill it either at once or later at their leisure time, whichever was convenient to them. The filled forms were collected in person by the principal investigator. A maximum of three telephonic reminder calls were made to each practitioner prior to collection. Participants who did not return the filled questionnaires even after the reminders were considered as non-respondents and the reasons for their incompletion were enquired.

Statistical Analysis

Only completely filled questionnaires were considered for analysis. Data was entered in Microsoft Excel 2007 for descriptive statistics and imported to SPSS version 11.5 for inferential analysis. Descriptive statistics included distribution of the private dental practitioners based on age and professional factors for males and females, percentage of excluded participants and non-respondents, percentages of correct answers for each of the questions relating to knowledge, mean values of attitude towards preventive dentistry for each aspect, frequency and percentage profile of various aspects of primary preventive dentistry practiced by the dentists including risk-based preventive care for specific preventive procedures and percentage of dentists with various perceived barriers to provision of preventive dental care. Knowledge and attitude were classified suitably in order to simplify analysis. Inferential statistical methods included chi-square tests for comparison of percentage of participants by gender, age and professional characteristics according to knowledge and attitude. Yate's correction was applied where cell frequency was less than five. Correlation between knowledge and attitude scores of dentists with respect to preventive dentistry was estimated using the Karl Pearson's Correlation coefficient. The Confidence interval and level of significance was set at 95% and 0.05 respectively for all tests.

Table 1: Percentage distribution of variables under study

Variable	ALL (N=82)	MALES (N=34)	FEMALES (N=48)
Age- Group (Years)			
24-33	37(45.12%)	12(35.29%)	25(52.08%)
34-43	23(28.05%)	9(26.47%)	14(29.17%)
44-53	15(18.29%)	8(23.53%)	7(14.58%)
54-63	6(7.32%)	4(11.76)	2(4.17%)
64-73	1(1.22%)	1(2.94%)	0(0.00%)
Qualification			
Bds	53(64.63%)	19(55.88%)	34(70.83%)
Mds	23(28.05%)	13(38.24%)	10(20.83%)
Bds/Mds With Diploma Or Certificate Course	6(7.32%)	2(5.88%)	4(8.33%)
Job Profile			
Self-Employed	54(65.85%)	26(76.47%)	28(58.33%)
Employed By Someone	14(17.07%)	1(2.94%)	13(27.08%)
Consultant Visiting Dental Specialist	3(3.66%)	2(5.88%)	1(2.08%)
Private Practitioner Attached To Academic Institute	11(13.41%)	5(14.71%)	6(12.50%)
Experience (Years)			
<1	2(2.44%)	1(2.94%)	1(2.08%)
1-10	46(56.10%)	16(47.06 %)	30(62.5%)
11-20	19(23.17%)	7(20.59%)	12(25.00%)
21-30	12(14.63%)	8(29.53%)	4(8.33%)
31-40	3(3.66%)	2(5.88%)	1(2.08%)
Professional Reading			
No Professional Reading	3(3.66%)	1(2.94%)	2(4.17%)
Professional Reading Restricted To Dental Magazines And Newsletters	17(20.73%)	4(11.76%)	13(27.08%)
Professional Reading Restricted To National Dental Journals	31(37.80%)	13(38.24%)	18(37.50%)
Professional Reading Including International Journals	31(37.80%)	16(47.06%)	15(31.25%)
Time Since Last Cde Programme Attended On Preventive Dentistry			
Within The Last Year	51(62.20%)	21(61.76%)	30(62.50%)
During Last 2-5 Years	13(15.85%)	6(17.65%)	7(14.58%)
More Than 5 Years Ago	6(7.32%)	4(11.76%)	2(4.17%)
Never	5(6.10%)	2(5.88)	3(6.25%)
Don't Know	7(8.54%)	1(2.94%)	6(12.50%)
Interest In Cde Program On Preventive Dentistry			
Yes	73(89.02%)	28(82.35%)	45(93.75%)
No	2(2.44%)	1(2.94%)	1(2.08%)
No Idea	7(8.54%)	5(14.71%)	2(4.17%)

Table2: Knowledge on preventive dentistry of subjects by gender, age and professional characteristics

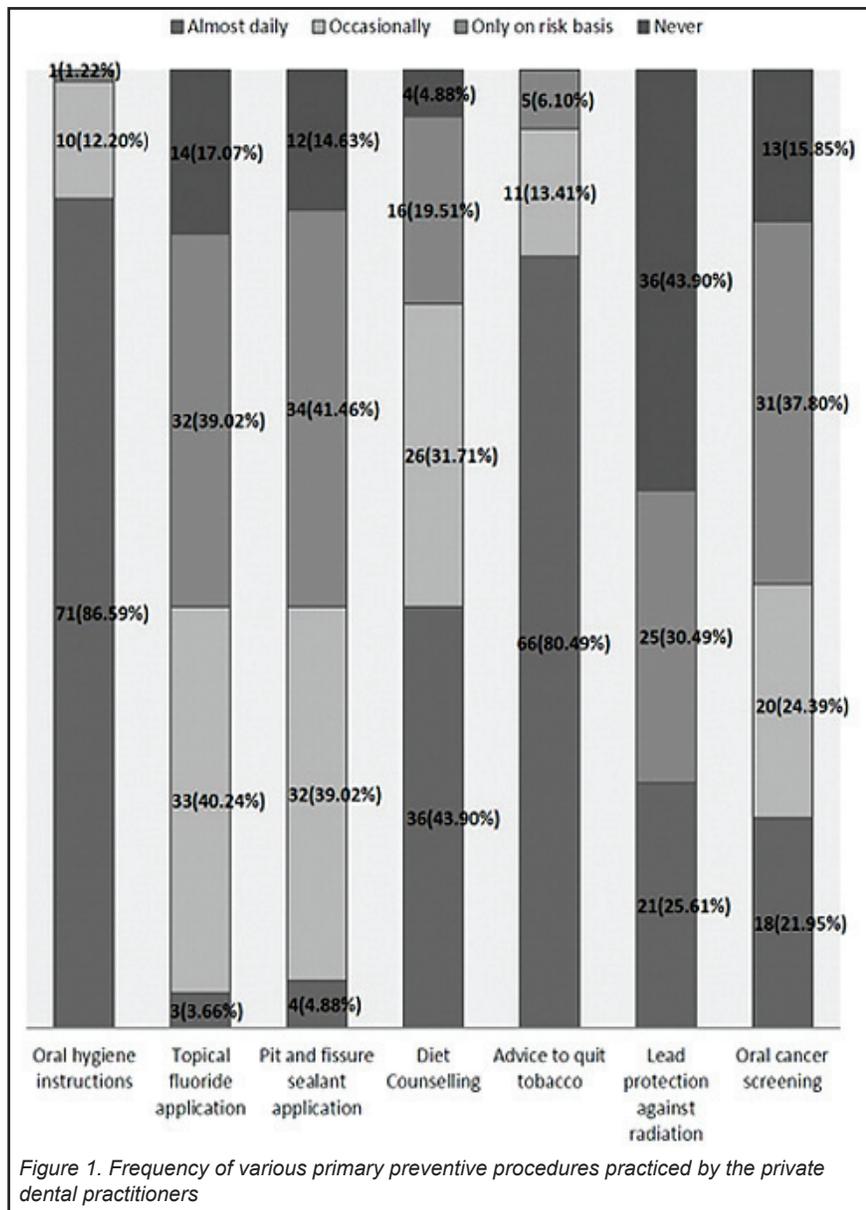
Knowledge level	Below Average	Average	Above Average	Total	Significance
GENDER					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi-Square=2.20 df=2 p=0.330(NS)
Males	5(14.71%)	25(73.53%)	4(11.76%)	34	
Females	5(10.42%)	41(85.42%)	2(4.17)	48	
AGE GROUP					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi-Square= 14.909 df=8 p=0.061(NS)
24-33 years	3(8.11%)	32(86.49%)	2(33.33%)	37	
34-43 years	3(13.04%)	19(82.61%)	1(4.35%)	23	
44-53 years	1(6.67%)	11(73.33%)	3(20.00%)	15	
54-63 years	2(5.41%)	4(66.67%)	0(0.00%)	6	
64-73 years	1(100%)	0(0.00%)	0(0.00%)	1	
QUALIFICATION					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi -Square= 3.323 df=4 p=0.505(NS)
BDS	8(15.09%)	42(79.25%)	3(5.66%)	53	
MDS	1(4.35%)	19(82.61%)	3(13.04%)	23	
BDS/MDS with diploma/ certificate course	1(16.67%)	5(83.33%)	0(0.00%)	6	
PRACTICE TYPE					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi-Square= 5.181 df=6 p=0.521(NS)
Self-employed dental practitioner in private office	9(16.67%)	40(74.07%)	5(9.26%)	54	
Dental practitioner in private clinic employed by someone	0(0.00%)	13(92.86%)	1(7.14%)	14	
Consultant visiting dental specialist	0(0.00%)	3(100.00%)	0(0.00%)	3	
Private practitioner in academics	1(9.09%)	10(90.91%)	0(0.00%)	11	
WORK EXPERIENCE					
All	10(12.20%)	66(80.49%)	06(7.32%)	82	Chi-Square=18.736 df=8 p=0.016(S)
<1 year	00(0.00%)	01(50.00%)	01(50.00%)	02	
1-10 years	03(6.52%)	42(91.30%)	01(2.17%)	46	
11-20 years	03(15.79%)	12(63.16%)	04(21.05%)	19	
21-30 years	03(25.00%)	09(75.00%)	00(0.00%)	12	
31-40 years	01(33.33%)	02(66.67%)	00(0.00%)	03	
PROFESSIONAL READING					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi-Square=7.692 df=6 p=0.262(NS)
No professional reading	01(33.33%)	2(66.67%)	00(0.00%)	03	
Professional reading restricted to dental magazines and newsletters	01(5.88%)	16(94.11%)	00(0.00%)	17	
Professional reading restricted to national dental journals	07(22.58%)	22(70.97%)	02(6.45%)	31	
Professional reading including international journals	1(3.23%)	27(87.10%)	03(9.68%)	31	
ATTENDANCE IN PREVENTION- RELATED CDE					
All	10(12.20%)	66(80.49%)	6(7.32%)	82	Chi-Square=5.837 df=8 p=0.665(NS)
Within last year	08(15.69%)	38(74.51%)	05(9.80%)	51	
Within last 2-5 years	00(0.00%)	12(92.31%)	01(7.69%)	13	
>5 years back	01(16.67%)	05(83.33%)	00(0.00%)	06	
Never attended	01(20.00%)	04(80.00%)	00(0.00%)	05	
Don't Know	00(0.00%)	07(100.00)	00(0.00%)	07	

RESULTS

Out of 155 private dental practitioners enrolled with the local IDA branch, 15 who had already participated in the pilot study were excluded leaving behind 140 participants available for the questionnaire study. Eighty two included participants responded, yielding a response rate of 58.57%. Amongst

the 82 respondents, 34(41.46%) were males and 48(58.54%) were females. Table1 shows the percentage distribution of the variables under study. Table 2 throws light upon the distribution of participants by gender, age and professional characteristics according to knowledge level. Knowledge level was categorized as ‘Below Average(0-4),

‘Average(4-7)’ and ‘Above average(8-9)’ using mean and standard deviation of knowledge scores(6.024 ± 1.25) of study subjects. Majority of study subjects (80.49%) exhibited average knowledge level. Statistically significant difference in knowledge was observed only for professional characteristic of clinical work experience. Attitude was as-



sessed including the dimensions of scientific basis, practice efficiency, ease of practice, attractiveness, financial benefit, reputability and essentiality of preventive dental practice on a 7- point semantic differential scale. Attitude was categorized as ‘Unfavourable(<35)’, ‘Favourable(35-42)’ and ‘Highly Favourable(43-49)’ using mean and standard deviation of attitude scores(41.93±4.785) of study participants. Among the total study subjects, 48.78% exhibited highly favourable attitude towards preventive dentistry, 45.12% exhibited favourable attitude

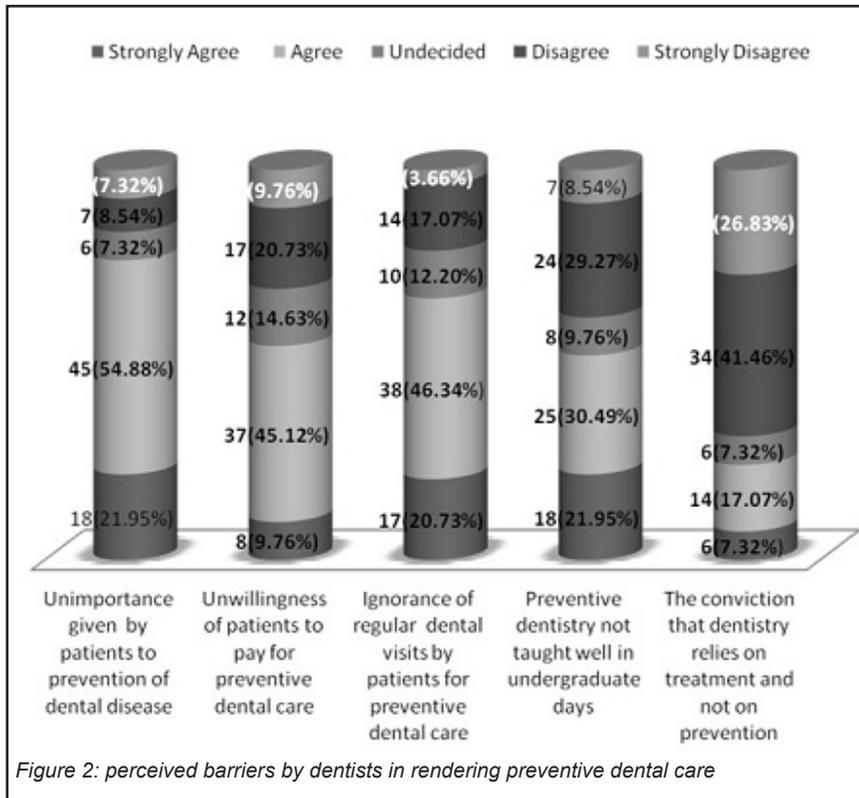
and only 6.10% exhibited unfavourable attitude. Statistically significant difference in attitude levels was not observed for any of the variables under study. Figure 1 is a proportional bar diagram presenting the frequency of various primary preventive procedures practiced by the private dental practitioners. Figure 2 is a proportional bar diagram that graphically portrays the perceived barriers by dentists in rendering preventive dental care. The frequency of responses of dentists on a 5-point Likert scale regarding various potential barriers to provide preventive

dental care is depicted in the figure. Figure3 is a scatter plot for correlation between knowledge scores and attitude scores of participants. The pattern of the plot clearly demonstrates that there is no correlation between knowledge and attitude scores of the participants. Strength of determination, represented by r², the square of correlation coefficient (r) is unremarkable; only 0.4% of the times, attitude can be explained by knowledge.

DISCUSSION

Advances made in dental technology have made evident, the stimuli for secondary and tertiary level preventive care provided by the private dental practitioners. However, little information exists on how primary preventive dentistry is practiced in dental clinics in India and where preventive oral health services are placed on the priority scale by dental practitioners. Attention to primary prevention signifies what one terms as ‘preventive – orientation’ (12). Preventive orientation reflects up on the service- mix in current dental practices and the factors that may influence its distribution which is important in the anticipation of future practice of dentistry. Therefore, the conduct of the present study that investigated the preventive orientation of private dental practitioners in Vadodara, by assessing the private dentists’ knowledge, attitude and practice with respect to preventive dentistry, is justified to its need.

The response rate (58.57%) recorded in the present study which was greater than that reported by Patil YB et al (4) (55%), Pereira da Silva R (13) et al (54.26%) and Narendran S et al (14) (46.4%). However, the response rate was lower than that reported by Ghaseemi H et al (7) (64%), Moon H et al (6) (83%) and Kujan O et al (15) (66.6%). The non-respondents who had not filled the questionnaire even after three telephonic reminder calls cited their busy schedule and lack of time as reasons for not filling the questionnaire.



Length of the questionnaire might have probably affected the response rate as length presumably affects response by way of the respondents' attitudes and behavior -- the increased length adds to the burden on respondents and pushes more of them over a threshold

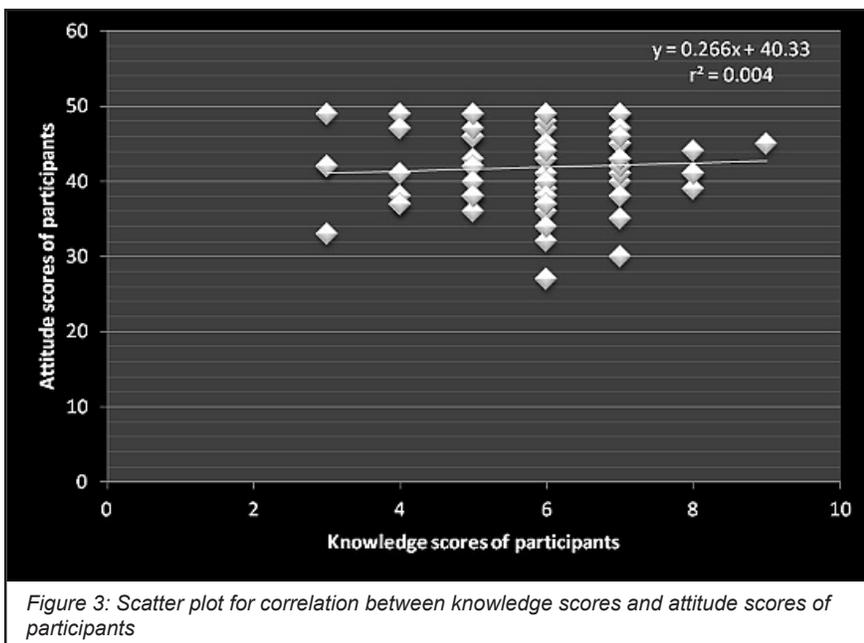
beyond which they will no longer cooperate. McAvoy BR et al (16) have suggested that generally being opposed to research methods used, being uninterested in or disliking the topic being researched or the threatening nature of some topics, being insufficiently in-

volved in the subject being researched, fearing that research activities disrupt the general practice workload and lack of financial incentives could be the other possible reasons for resistance to questionnaire surveys. Barclay S et al (17) and Narendran S et al (14) have remarked on the dropping responses in surveys on private practitioners stating that mean response rate in private practitioner surveys was 61% as reported in a review of surveys on general practitioners; but in actuality, the situation might be still worse as studies with lower response rates are less likely to be published. With reference to the above and as described by Asch DA et al (18), the response rate observed in the present study is acceptable as well as with in the norm for self-administered questionnaire surveys to health care providers, particularly dentists.

In the present study, highest percentage of responding dentists belonged to 24-33 year age-group and fewer dentists in the older age groups. This may be regarded as a reflection of the increasing number of dental schools producing more and more dental graduates in the recent past in India.

The category 'BDS/MDS with diploma or certificate course' was included as a subdivision under the variable 'qualification', giving due importance to the short term courses in various specialization areas of dentistry; however it could not be related to other studies in literature due to differences in recognition of such courses in other countries. Moon H et al (6) reported that all the respondents in his study were general practitioners as dental specialties were not recognized in Korea.

It was found that independent self-employed private dental practice (solo-practice) was the predominant practice type among private practitioners in Vadodara. Majority of the dentists (56.10%) were found to have a work experience of 1-10 years which is comparable to the findings reported



by Ghasemi H et al (7) in which 56% of private dental practitioners had a work experience of 1-8 years.

Nearly three- fourths of the respondents were found to engage themselves in reading national and international journals compared to only 43% Iranian dental practitioners engaged in such extensive reading reported by Ghasemi H et al (7).

The finding that 62.20% of participants reported of having participated in CDE program related to preventive dentistry within the last one year is encouraging. This is a greater percentage compared to the percentage of dentists who attended such programmes in Riyadh within the last two years as reported by Al Shalaan TA et al (19). A highly positive response obtained with respect to study subjects' interest in attending CDE programs on preventive dentistry is suggestive of the inclination of dentists to update their knowledge in preventive dentistry.

Majority of the participants had average knowledge level (80.49%). It was interesting to find that a higher percentage of females possessed above average knowledge level as compared to males which can be attributed to their greater participation in CDE programmes.

In the oldest age group, the below-average knowledge level was found to be most prevalent. This can be justified by the fact that preventive dentistry as a subject was introduced recently and did not form part of academic curriculum of the older age groups.

A higher percentage of the MDS qualified were found to possess above-average knowledge on preventive dentistry which is probably due to the exhaustive and comprehensive post-graduate curriculum which calls for an in depth knowledge on every aspect of subject of specialization including prevention. McGlone P et al (20) have stated that

post-graduate education, if provided in a manner it should be, is bound to increase the knowledge of dentists in all dimensions.

Among the various job categories, in the present study, a higher percentage of practitioners attached to academic institutes were found to have average or below average knowledge level. Average knowledge level was observed among all consulting dental specialists and a relatively higher percentage of self-employed private dental practitioners were found to have above-average knowledge level. Whether full time devotion to private practice acted as inducers to gain knowledge about preventive dentistry warrants investigation.

In the present study, the least experienced practitioners were found to possess greater knowledge on preventive dentistry than the most experienced groups and the finding was statistically significant. The negative association between the number of years of experience and knowledge suggests that the preventive dentistry course in dental schools may be having a somewhat positive impact on the recent graduates with lesser clinical experience.

No significant difference was found in the knowledge level of dentists engaged in various levels of professional reading. Similar finding was reported by Ghasemi H et al (7). However, in the present study, extensive professional reading including reading national and international dental journals were found to exert a positive effect on the knowledge level of dentists as evident by the finding that only those engaged in such extensive reading were found to have above average knowledge on preventive dentistry.

Attendance in CDE programmes on preventive dentistry was not found to significantly affect practitioners' knowledge on preventive dentistry. This observation was in concordance

with the study results of Tseenjav B (21) among Mongolian dentists and Ghasemi H et al (7) among Iranian dentists that reported of no impact on knowledge level of the dentists through participation in CDE programmes on preventive dentistry. However, one cannot overlook a noteworthy fact that in the present study, above-average knowledge on preventive dentistry was possessed only by those who had attended CDE programmes in the recent past or within last 2-5 years. One can also not deny that for dental professionals, continuing dental education is a professional and ethical obligation to remain abreast with today's fast developing science. The failure of such programmes to make a difference in the knowledge level of dentists in the present study as well as other similar reports mentioned might be due to poor content and method of delivery rather than the questioned potential of such programmes.

Dentists' attitudes towards prevention have received much attention in recent years. Attitudes are a prerequisite for performance and action. Overall, the dentists in the present study showed positive attitudes towards preventive dental care with a high mean attitude score of 41.93(SD=4.785) for a maximum possible score of 49. This can be considered as a positive sign of interest towards preventive dental care among the dentists. The finding that majority of the respondents perceived preventive dentistry as a scientific subject reveals the respondents' belief that preventive dentistry is a logical subject with a sound scientific base (64.63%). It is in affirmation with a study conducted by Ghasemi H (7) in which dentists' attitudes were positive regarding scientific status of preventive dentistry. However, in the present study, an unequivocal response was not observed regarding perception of preventive dentistry as efficient and easy practice despite positive attitude showed by a good percentage (42.68% and 35.37%) of the respondents with

respect to same. It was astounding to note that only 23.17% of dentists perceived preventive dentistry as attractive; 1.22% categorically expressed that preventive dentistry was unattractive. While dentists agreed that preventive dentistry was not costly, only 32.93% perceived it to be beneficial. These findings probably express the respondents' conjecture that the efforts, time, training and money spent towards primary preventive care are not usually convincing in improving practice profile of dentists. In the studies conducted by Ghasemi H (7) and Holloway et al (22), similar attitudes were observed among dentists with respect to beneficial aspect of preventive dentistry. However majority (47.56%) of participants reported that incorporating preventive dental care would be reputable to their practice; the reason is obvious, preventive dental care brings out the service nature of the profession and earns appreciation and recognition from the public. But the finding is in contradiction to that reported by Ghasemi H (7) and Holloway et al (22) who observed that dentists did not perceive preventive dentistry to be personally reputable. Also, as high as 87.80% of the participants believed that preventive dentistry was essential for the community; whether this is a sign of community-consciousness of the dental practitioners or the expression of the attitude that preventive care should be a part of community based programs and not a part of private practice, needs to be investigated.

Although none of the independent variables examined in the study had a statistically significant effect on attitude, the implications of the observed frequencies of the variables are remarkable.

A greater percentage of females were found to have highly favorable (56.25%) and greater percentage of males was found to have unfavorable attitudes (8.82%). That is, generally, female dentists demonstrated more

positive attitudes towards preventive dental care. This may be due to the different beliefs and values, personal needs, and behaviour among men and women as described by Schafer and Tait. These attitudes among women towards preventive dental care are in line with study findings reported by Ghasemi H et al (7) and may indicate their greater interest in preventive care compared to their male colleagues.

Overall, a predominance of favorable attitudes was noticed among the participants of different age groups. Highly favorable attitude in the present study was observed among majority of the individuals in the younger age groups namely, 24-33 and 34-43 year olds. This reflects that the younger dentists are more enthusiastic and inclined to preventive dentistry than the older groups. Highly favorable attitude was noticed in greater numbers among the MDS qualified than among other groups. Although highly favorable and favorable attitudes were observed across all job profiles, it should be noted that none of the consultant dental specialists and practitioners attached to academic institutes had unfavorable attitude; this indicates that specialization and the enriching academic atmosphere nurtures positive attitude towards preventive dentistry. Participants in < 1 year and majority of the 1-10 year experiences had favourable (100%) and highly favorable attitudes respectively (56.52%) respectively. This indicates that the new generation practitioners are more oriented to prevention as compared to the highly experienced participants. This is probably because of greater exposure to knowledge on preventive dentistry at the early stages of practice which could be incorporated at the very start of practice; however, an established private clinic set up and the mindset of dentists needs to accommodate preventive dentistry amidst other services rendered that requires flexibility in thoughts and action to which most experienced

dentists might be hostile to as they are used to conventional way of treating.

The extent of professional reading and interest in attending CDE programme on preventive dentistry ironically were found to have inverse relationship with attitude and could not be explained in the light of current knowledge.

In the present study, a vast majority (86.59%) of the private dental practitioners were reported to render oral hygiene instructions to their patients almost daily on a routine basis. The results of the present study are in concordance with that of Al Shalan TA et al (19) who reported that oral hygiene advice was the highest rated preventive method practiced among general dentists in Saudi Arabia.

In the present study, majority of the practitioners performed topical fluoride application occasionally (40.24%) and 39.02% rendered the preventive measure only to high-risk individuals and 17.07% never applied topical fluoride which is definitely a good profile to project as compared to (41.2%) of dentists in Saudi Arabia who did not use professional topical fluoride by, reported by Al Shalan TA et al (19).

Although more than 80% of private dental practitioners in the present study had applied pit and fissure sealants, majority of the practitioners (41.46%) did so, on a risk-based approach and only 4.88% reported of application on routine basis to patients. Patil YB et al (4) reported that 73.4% of dentists in Pune always applied pit and fissure sealant on their patients' teeth.

A high percentage of participants (95.12%) in the present study were found to render diet counseling with majority rendering advices to their patients almost daily (43.90%). The figure is greater than that reported by Al-Shalan TA et al (19) (83.3%) among dentists in Saudi Arabia. This finding is encouraging as dental practitioners

have a role in supporting their patients to adopt appropriate dietary habits. In many nations, viz the UK, it is been made a policy that dental practitioners should give dietary advice, including reduction of non-milk extrinsic sugar consumption as an important part of their health education to patients (23). Such policies if introduced in India would not only further increase the frequency of dietary advices rendered but also standardize the quality of such advices and allow more interaction with the patient.

In the present study, majority of the practitioners (43.90%) never provided/recommended lead protection against radiation for their patients. However, 30.49% patients in the present study reported that they provided lead shields only on risk basis viz for pregnant patients. This indicates that preventive radiology was not understood and implemented appropriately by dentists in Vadodara.

84.15% of participants in the study claimed to screen for oral cancer, although a majority did so only on a risk basis. There is a current debate on whether the implementation of screening as a separate procedure from the daily routine work of dental practitioners would be an effective measure for early detection and prevention of oral cancer. The American Cancer Society (1992) guidelines for oral cancer examination recommended routine screening for cancers in oral region every 3 years for persons over 20 years of age and annually for those of 40 years of age and older. The Canadian task force (1999) for preventive health concluded screening for patients at high risk must be performed annually. The British Dental Association in 2000 encouraged their members to consider opportunistic oral cancer screening as a management strategy in general dental practice (24). In a study conducted by Kujan O (15) on UK dental practitioners, 60.9% responded 'yes' to if they screened for oral cancer; 94.1% responded that they

used visual examination, 14.2% used toluedine blue but none reported to have used cytobrush biopsy or fluorescence imaging as methods for oral cancer screening.

All dentists in the study invariably advised their patients to quit tobacco habits. This is heartening to know as private dental practitioners have been found to realize their role in helping patients quit tobacco habits. In a study of Australian dentists by Mullins R (25), only 2% of dentists surveyed felt that the patient's smoking habits were not their business. However, such attitudes were not reflected in their practice. Lesser than one quarter of dentists in the studies mentioned above claimed to routinely discuss tobacco use with their smoking patients. In the study conducted by Mullins R (25), nearly half of the dentists were reported to have said nothing about smoking unless the patient already had problems attributable to smoking indicative of a risk-based approach in providing anti-tobacco advises. Clover K et al (26) reported quite high levels of patient-based activity regarding smoking among Canadian dentists; 64% reported advising patients to quit. Kujan O et al (15) reported that 59.2% of UK dental practitioners provided advice on the risks of tobacco habit for every patient who smoked.

In the present study, apart from rendering tobacco quitting advices, a huge majority (65.85%) of the participants had tobacco cessation/counseling as part of their dental practice. This is appreciable as it is proven to be more valuable than a mere advice. The 2000 Public Health Service Clinical Practice Guideline indicates that intensive interventions directed towards quitting tobacco are more effective than brief professional advices. The intensive intervention refers to structured tobacco cessation counseling sessions. In a study conducted by Albert D et al (27), of the dentists surveyed, 25.5% reported that they advised patients to quit smoking at

almost every visit but only half of these dentists agreed that they had a specific strategy and tobacco-cessation as part of their practice.

In the present study, dentists' knowledge on preventive dentistry was not found to correlate with their attitude to preventive dentistry. Small sub-sample size in practice categories for each preventive measure considered in the study would make any correlation between practice categories with either knowledge or attitude statistically invalid and was not performed. However, the finding that knowledge did not translate to attitude conforms to the shortcomings and failure of Knowledge-Attitude-Practice as theoretical framework to explain or change behavior.

If one categorized the barriers as patient-related, dentist-related and profession-related, we would say, the present study results revealed that the dentists judged themselves and factors related to their profession as being the least responsible, but the patients as being the most responsible for the limited provision of preventive measures. Similar results were reported by Ghasemi H et al (10) in a study conducted among Iranian dentists. A few participants in the present study (identities disclosed) had filled in some specific barriers other than those listed in the questionnaire. One of them had mentioned that being in private practice employed by some other dentist did not give him/her the freedom to practice preventive dentistry even if he/she wished to. This implies that practice type had some implications on provision of preventive dental care. Some others pointed out that lack of reimbursements for preventive procedures also made preventive procedures infrequently sought for and infrequently provided at private clinics. This indirectly reflects on the financial reasons as barriers to provision of preventive dental care.

The present study is one of the few

studies in the literature that gives an insight into the preventive-orientation of private dental practitioners in a holistic manner including all aspects of primary prevention. The scales employed to measure knowledge, attitudes, practice and perceived barriers were robust to study the objectives in detail. Furthermore, the study, being the first of its kind, conducted among private dental practitioners in Vadodara provided base-line information on their preventive-orientation to suggest and plan suitable measures.

As is usually a natural characteristic of questionnaire surveys, there are high chances of over-representation because responding dentists tend to be more interested in the topics of the questionnaire, more knowledgeable and more confident. Besides, due to the tendency to give socially acceptable answers, preventively-oriented attitudes found may not relate to dentists' everyday professional activity. Another important limitation of the present study was the poor response rate which could have been a potential source of bias and would have affected the generalizability. However, the present study was only a formative research and the results were not meant to be nationally representative but initial evaluations that could be used to identify potential areas of further investigation.

CONCLUSION

According to the results of the present study, it is concluded that majority of the surveyed dentists were familiar with the principles of preventive dentistry, possessed a good knowledge on various aspects of prevention and showed favorable attitudes to prevention with a definite room for improvement. However, knowledge and attitude were not found to be correlated. Also, favourable attitude towards preventive dentistry did not reflect absolutely on the practice except oral hygiene instructions, dietary advice and advice to quit tobacco which were the measures provided almost

routinely by majority of the dentists. Topical fluorides, sealants and lead protection were some of the observed measures not that routinely practiced by private dental practitioners in Vadodara; although the reason might be a 'risk-based approach' in administering measures, whether dentists were able to delineate low-risk and high-risk groups could not be deduced from the study and whether such an approach is appropriate for all the measures mentioned is yet to be elucidated in Indian context. Therefore, to meet each patient's need and target resources appropriately, it would be helpful if comprehensive guidelines for preventive practice were developed for application in Indian scenario. In order to diminish barriers to the provision of preventive dental care, factors that influence dentists' preventive practice must be investigated. A few recommendations suggested by authors which could benefit the professional community to prevent dental diseases are:

- Application of an inter-disciplinary approach in prevention, utilizing a common risk factor strategy, for instance in prevention of tobacco related habits and reduction in dietary sugars.
- Quality assessment of CDE programmes by regulatory authorities with emphasis on all aspects of primary preventive dental practice.
- Emphasis of protection against radiation in study meets organized by professional bodies such as the Indian Dental Association.
- Greater devotion to primary preventive measures compared to curative procedures in dental colleges by allotting more hours in syllabus and practice related to primary preventive dentistry.

REFERENCES

1. Forrest JO. Preventive dentistry. 2nd ed. Great Britain: Henry King Ltd. 1981: p1-8.
2. Harris NO, Christen AG. Primary preventive dentistry. 3rd ed. Connecticut (USA): Appleton and Lange; 1991: p1-18.
3. US Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville,

MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000:2-3. URL: <http://www.nidcr.nih.gov/>. Accessed on 5Aug2011.

4. Patil YB, Kakodkar V, Hegde S. Knowledge, attitude and practice amongst dentists in Pune towards primary preventive measures for dental caries- A questionnaire study. *JIAPHD* 2009;**13**: 18-24.
5. Schafer RB, Tait JL. A guide for understanding attitude and attitude change. North Central Regional Extension Publication (USA), 1986:p1-11.
6. Moon H, Park D, Horowitz AM, Kim J. National survey of Korean dentists' knowledge and opinions: dental caries etiology and prevention. *J Public Health Dent* 1998;**58**(1):51-56.
7. Ghasemi H, Murtomaa H, Torabzadeh H, Vehkalahti MM. Knowledge of and attitude towards preventive dental care among Iranian dentists. *Eur J Dent* 2007;**1**:222-229.
8. Ghasemi H, Murtomaa H, Torabzadeh H, Vehkalahti MM. Determinants of oral health behavior among Iranian dentists. *Int Dent J* 2007;**57**:237-42.
9. Ghasemi H, Murtomaa H, Torabzadeh H, Vehkalahti MM. Risk-based approach in preventive practice among Iranian dentists. *Oral Health & Prev Dent* 2008;**6**(1):53-60.
10. Ghasemi H, Murtomaa H, Torabzadeh H, Vehkalahti MM. Perceived barriers to the provision of preventive care among Iranian dentists. *Oral Health Prev Dent* 2009;**7**:339-46.
11. George D, Mallery P. SPSS for Windows step by step: A simple guide and reference. 11.0 update. 4th ed. Boston: Allyn and Bacon 2003:p1-15.
12. Kawamura M, Sasaki T, Imai-Tanaka T, Yamasaki Y, Iwamoto Y. Service mix in a general dental practice in Japan: A survey in a sub-urban area. *Aust Dent J* 1998;**43**(6):410-16.
13. Pereira da Silva R, Alfredo de Salles CL, Pereira CV, Florio FM. Profile of the dental surgeon related to the recommendation of individual preventive strategies. *Braz J OralSci* 2006;**5**(17):1022-27.
14. Narendran S, Chan M, Turner SD, Keene HJ. Fluoride knowledge and prescription practices among dentists. *J Dent Educ* 2006;**70**(9):956-64.
15. Kujan O, Duxbury AJ, Glenn AM, Thakker NS, Sloan P. Opinions and attitudes of the UK's GPs and specialists in oral surgery, oral medicine and surgical dentistry on oral cancer screening. *Oral Diseases* 2006;**12**:194-99.
16. McAvoy BR. General practice postal surveys: a questionnaire too far? *BMJ* 1996;**313**:732-33.
17. Barclay S, Todd C, Finlay I, Grande G.

- Wyatt P. Not another questionnaire! Maximizing the response rate, predicting non-response and assessing non-response bias in postal questionnaire studies of GPs. *Family Practice* 2002;**19**:105-11.
18. Asch DA, Jedrzejewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol* 1997;**50**(10):1129-36.
19. Al Shalaan TA, Wyne AH. Practices and attitude of general dentists in Saudi Arabia towards various caries prevention methods. *Pak Oral Dental J* 2002;**22**(2):175-80.
20. McGlone P, Watt R, Shieham A. Evidence based dentistry: an overview of the challenges in changing professional practice. *Br Dent J* 2001;**190**:703-07.
21. Tseveenjav B. Preventive dentistry in Mongolia. Academic Dissertation. Department of Oral Public Health. Institute of Dentistry. University of Helsinki, Finland; 2004. URL: <http://www.thesis.helsinki.fi/julkaisut/laa/hamma/vk/tseveenjav/preventi.pdf>. Accessed on 24 Dec 2010.
22. Holloway PJ, Clarkson JE. Cost: Benefit of prevention in practice. *Int Dent J* 1994;**44**:317-22.
23. Morgan MZ, McFarlane E, Stewart KF, Hunter ML, Fairchild RM. An assessment of nutritional information in oral health education leaflets. *Community Dent Health* 2010;**27**:81-88.
24. Hawkins RJ, Wang EL, Leake JL. Preventive health care, 1999 update: prevention of oral cancer mortality. *J Can Dent Assoc* 1999;**65**:617-27.
25. Mullins R. Attitudes and smoking habits of dentists in Victoria: 16 years on. *Aust Dent J* 1994;**39**:324-26.
26. Clover K, Hazell T, Stanbridge V, Samson-Fisher R. Dentists' attitudes and practice regarding smoking. *Aust Dent J* 1999;**44**(1):46-50.
27. Albert DA, Ward A, Ahluwalia K, Sadowsky D. Addressing tobacco in managed care: A survey of dentists' knowledge, attitudes and behaviors. *AJPH* 2002;**92**(6):997-1001.