

Evaluation of Awareness and Knowledge About Denture Cleansers Among Dental Professionals

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Abstract Denture cleansers have been widely used in prosthodontics for cleaning and maintaining dentures. However, little is known about dentist's knowledge, awareness and experience of denture cleansers. Denture wearers would benefit greatly from a dental professional's guidance regarding use of dental cleansers. Basic objective of this study is to investigate awareness and knowledge about denture cleansers among dental professionals. A quota sampling technique was adopted with a sample size of 200 respondents. A well-structured questionnaire was used for collection of cross-sectional data. Statistical analyses were adopted to draw logical and scientific inferences. The χ^2 test was used to test the independence of various attributes. Highest number of respondents (55.5 %) used tablet form of denture cleanser. 47.5 % reported that they had little knowledge about adverse effects of denture cleansers. A significant percentage (36 %) reported that no knowledge is imparted about denture cleansers in their curriculum. Eighty seven percent of respondents felt the need to enhance their knowledge. It is inferred from the present study that it is very important to raise dentist's awareness and knowledge about denture cleansers by teaching them in more depth and further in continuing education and training, so as to enable them to impart adequate guidance to their patients.

Keywords Denture cleanser · Denture hygiene · India · Dentist · Education

Introduction

The oral health of the completely edentulous patients is a prime factor related to quality of life, nutrition, social interactions and general systemic health of denture wearing patients [1]. Dentures accumulate plaque, stain and calculus similar to the natural dentition. Failure to properly clean the accumulated biofilm from dentures is associated with an increased incidence of denture stomatitis in addition to serious systemic diseases [2–4].

Because of the well-defined relationship of biofilm to stomatitis, dental professionals must carefully instruct the edentulous patients regarding the proper methods for cleaning and maintaining dentures. Budtz-Jorgensen [5] reported that 65 % of denture wearers in Denmark exhibited signs of denture stomatitis. Jagger and Harrison [6] reported that 35 % of denture wearers used, or had used, denture cleansers daily. Denture cleansers have been widely used in prosthodontics to prevent colonization of *Candida albicans* and related candida species and formation of denture plaque [7–11]. Gornitsky et al. [12] reported that use of denture cleansers significantly reduced the number of micro-organisms on dentures in a hospitalized geriatric population. However, daily use of denture cleansers can affect the physical and mechanical properties of denture base material [13–15]. Murdoch-Kinch et al. [16] noted occurrence of oral mucosal injury caused by denture cleansers.

Denture wearers would benefit greatly from a dental professional's guidance regarding the use of denture cleansers. However, little is known about dentists' knowledge, awareness and experience of denture cleansers in India. The literature available for the present investigation is very scanty and especially in India not much work has been reported.

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In order to meet the gap and document the knowledge on denture cleansers, a systemic study has been adopted and the basic objectives of this study are:

- To investigate awareness and knowledge about denture cleansers among dental professionals in northern part of India, viz., Chandigarh, Haryana, Punjab and Himachal Pradesh.
- To document the literature and substance generated through this study for the curriculum in undergraduate and postgraduate courses.

Materials and Methods

The present investigation was carried out with basic objective of ascertaining the knowledge and awareness of denture cleansers among dental professionals. A quota sampling (non-probability sampling) technique was adopted with a sample size of 200 respondents. The respondents were dentists involved in teaching, private practice, research and employed with various organizations. A well-structured and pre-tested questionnaire (Table 1) was used for the collection of cross-sectional data. The data was collected through personal interview of the sampling units, wherever necessary detailed discussion was also held with respondents and their views were also listed. In order to meet the desired objectives and verify underlying hypothesis, suitable analyses viz. tabular, graphic, diagrammatic and the uppermost necessary, statistical analysis, were adopted to draw logical and scientific inferences. Since the response obtained in the present investigation relates to attribute or qualitative data, to test the independence of various attributes, the Chi square test was found the most appropriate.

Results and Discussion

The data obtained as per questionnaire were subjected to further tabulation and analysis and the results are summarized below

Respondent Profile

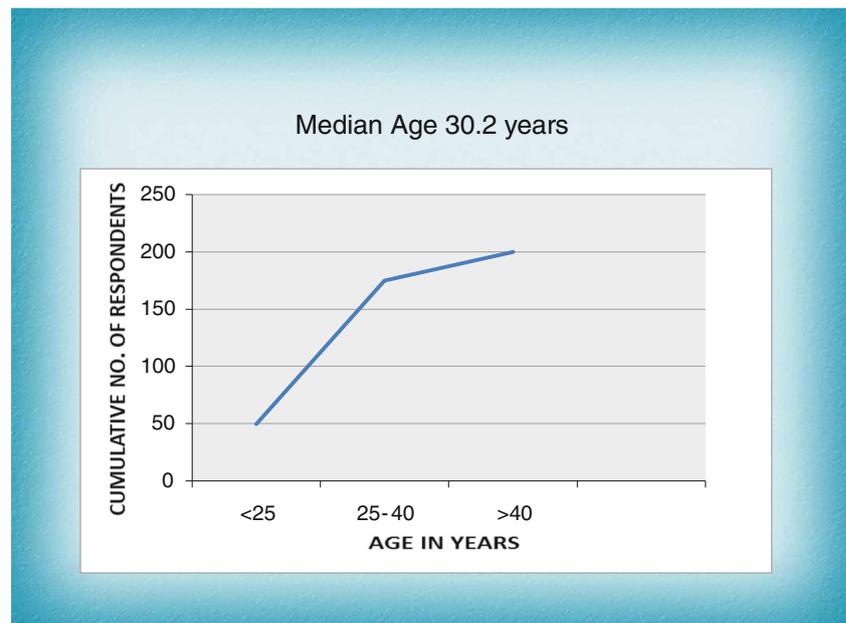
As mentioned above, the post stratification of the survey results revealed that the Northern India boundaries of Chandigarh, Haryana, Punjab and Himachal Pradesh have been widely covered in this investigation. It is worth mentioning that for some of the questions there was a small non-response as well. However in certain questions multiple answers have also been reported and there is fluctuation in number of observations. Some of the popular indicators are discussed as under

Table 1 Questionnaire

QUESTIONNAIRE		
Name	:	
Age	:	
Sex	:	
Address	:	
Educational Qualification BDS/MDS:		
Occupation	:	- Faculty in Dental College - Private Practitioner - Both - Govt. Job
Q1.	Do you recall your patients to check the maintenance of dentures?	
	1. Yes, always	2. Yes, sometimes 3. No
Q2.	Are you aware of denture cleansers?	
	1. Yes, very much	2. Yes, but only a little 3. No
Q3.	How often do you recommend to your patients to clean dentures?	
	1. Twice daily	2. Once daily 3. After every meal
Q4.	Which method according to you is best suited for denture cleaning?	
	1. Chemical	2. Mechanical 3. Combination
Q5.	Which form of denture cleansers do you recommend to your patients?	
	1. Powder	2. Tablet 3. Paste/Cream
Q6.	How many brands of denture cleansers do you know?	
	1. Three or more	2. Less than three 3. None
Q7.	Are you aware of any disadvantages/adverse effects of denture cleansers?	
	1. Yes, very much	2. Yes, but only a little 3. No
Q8.	Do you recommend a special denture cleansing brush to your patients to clean dentures?	
	1. Yes, often	2. Yes, occasionally 3. No
Q9.	Do you think adequate knowledge is imparted during undergraduate level regarding denture cleaning?	
	1. Yes, very much	2. Yes, but little 3. No
Q10.	Do you feel the need of enhancing or updating the knowledge about denture cleansers?	
	1. Yes, very much	2. Yes, but little 3. No
Q11.	Do you know the composition of the denture cleansers?	
	1. Yes	2. No 3. Somewhat
Q12.	Do you recommend on the basis of composition, quality or price of the denture cleansers?	
	1. Yes, always	2. Yes, sometimes 3. No

- Age: The data revealed that the range of age was of the order of 22–64 years (Fig. 1). Since the distribution of age was taken as open ended the *Median* was the most appropriate measure of central value. The median age was estimated to be 30.2 years.
- Gender: The analysis revealed that female dental surgeons (60.5 %) dominated over male respondents (39.5 %). It indicates that for a profession of dentistry

Fig. 1 Age distribution of respondents (cumulative)



more and more females are coming up in the study area (Fig. 2).

- Educational Standard: The distribution of qualification stated that 66 % of respondents were graduates (BDS) compared to 34 % postgraduates (MDS) (Fig. 3).
- Profession: Table 2 gives distribution of respondents according to their profession. It is interesting to note that majority of respondents prefer private practice (45 %) followed by working as teaching faculty (36 %). The preference for government jobs in dentistry is almost negligible (2 %) (Fig. 4).

Recall of Patients

The study revealed that 56 % of the professionals always recalled their patients for checking the dentures as per their desired satisfaction. However, only 39 % revealed that patients are called back sometimes and the rest 5 % never called their patients again.

Awareness of Denture Cleansers

The analysis revealed that 61 % of dental professionals were well aware about the denture cleansers and very often used this practice. On the other hand 37.5 % expressed little awareness. Hong et al. [17] reported that more than 76 % of Chinese dentists and more than 62 % of Indonesian dentists had heard only a little about denture cleansers. A negligible fraction of 1 % had no knowledge at all. The data further revealed that 15 % of dentists suggested to

their patients to clean their respective dentures twice daily, 27 % once daily and majority (58 %) were of the view that dentures should be cleaned after every meal.

Method of Cleaning

In general, there are three methods available for cleaning the dentures- chemical, mechanical and combination of both. Just 1.5 % advocated chemical method, 14.5 % mechanical method and a very high percentage (84 %) were using a combination of both (Fig. 5). It indicates that combination of chemical and mechanical method is more popular among dental professionals in the study area.

Form of Denture Cleanser

As per questionnaire, the respondents were asked about their preference of denture cleansers in the form of powder, tablet or paste/cream. It was revealed that the powder form was used by 18.5 %, tablet form by 55.5 and 27 % used the form of paste/cream (Fig. 6). Multiple choices were reported along with a small fraction of non-response as well.

Brands of Denture Cleanser

In response to a question on the number of brands available to them for prescription to their patients, majority (65 %) of the dental surgeons responded that they prescribed less than three brands, however a satisfactory percentage of 26 % reported that they may like to prescribe in certain situations more than three brands of denture cleansers.

Fig. 2 Gender of respondents

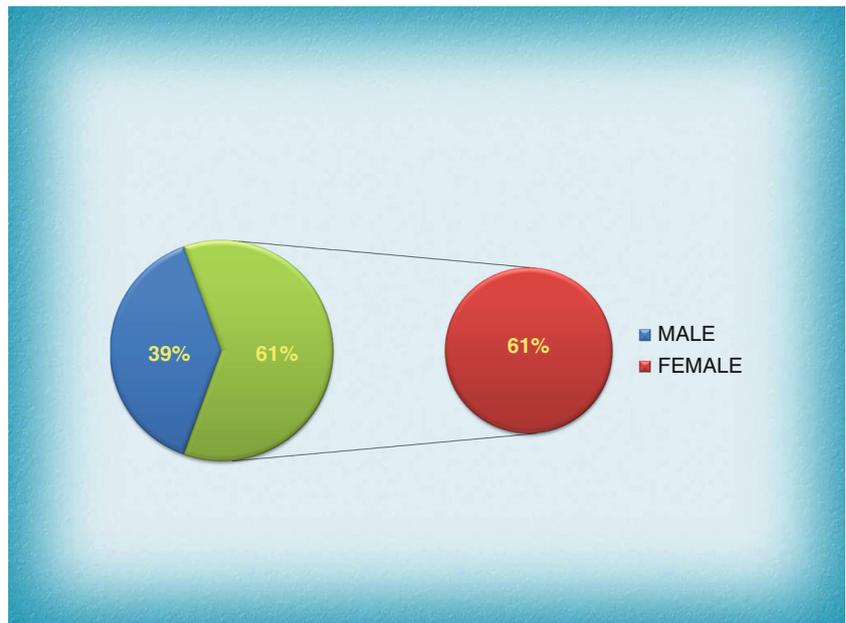


Fig. 3 Educational standard

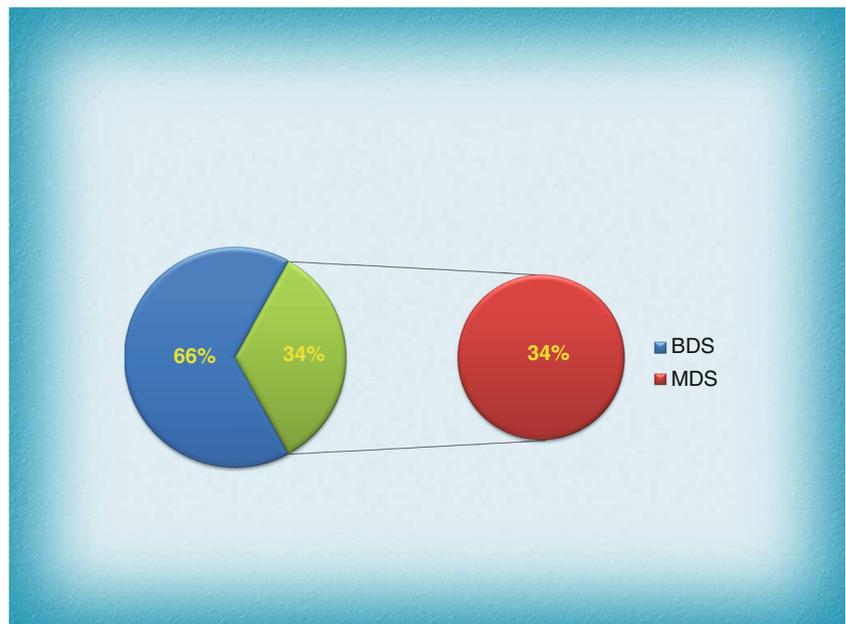


Table 2 Distribution of respondents according to their profession

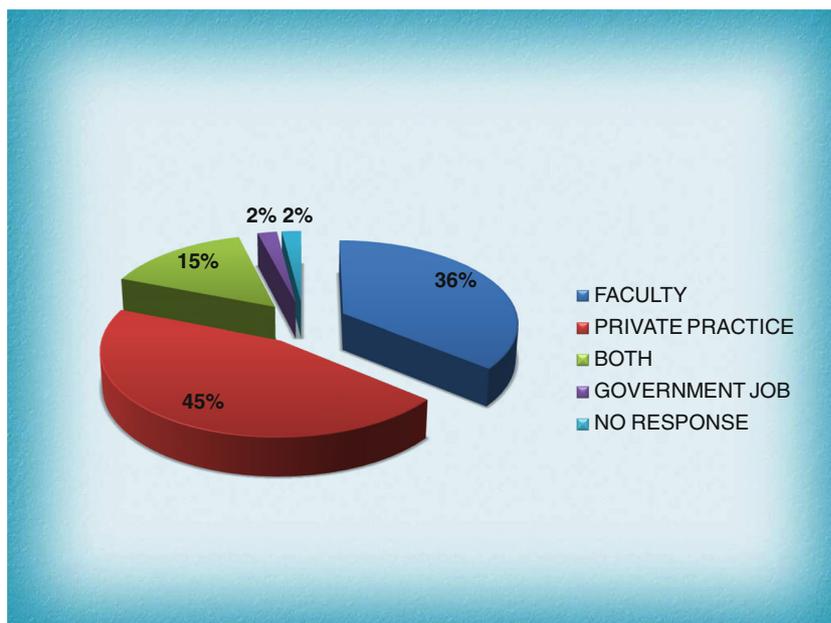
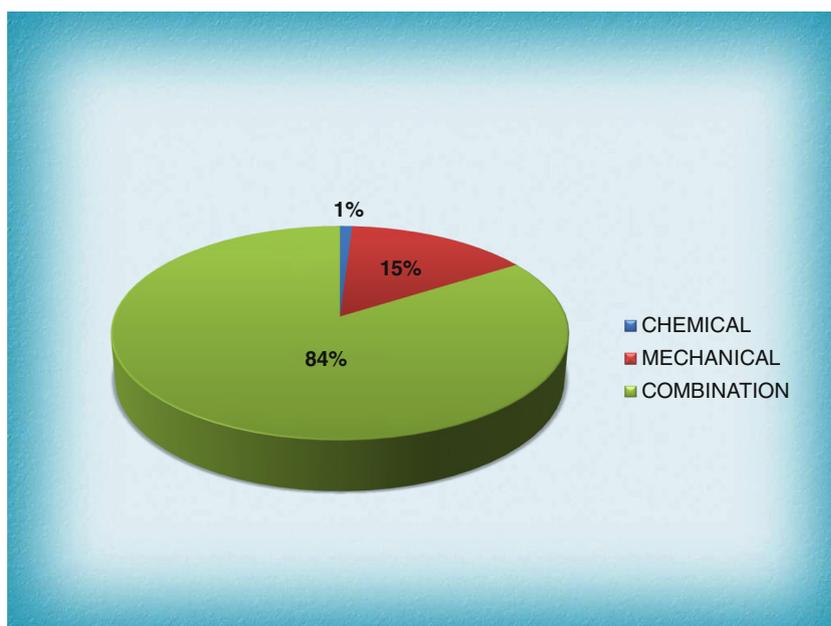
	Faculty	Private practice	Both	Government job	No response
Number	72	90	30	4	4
%	36	45	15	2	2

It is interesting to note that in spite of being in dental profession 9 % were not aware of any brand of denture cleansers. Hong et al. reported that 67.4 % of Japanese, 88.5 % of Chinese and 68.3 % of Indonesian dentists did not know about any imported brand of denture cleansers.

However, 83.7 % of Japanese dentists knew “three or more” or “less than three” domestic brands whereas 96 % of Chinese dentists and 91.3 % of Indonesian dentists had no knowledge about any domestic brand [17].

Adverse Effects of Denture Cleansers

On awareness about adverse effects or disadvantages of denture cleansers 22.5 % reported that they are very much aware about the same. On the other hand 47.5 % reported that they have little knowledge and a good 28 % response was received about no knowledge on adverse effects of denture cleansers. In

Fig. 4 Profession**Fig. 5** Method of cleaning

a study done by Hong et al. [17] more than 76 % of dentists in China and more than 61 % of Indonesian dentists did not know of any disadvantages of denture cleansers. Problems such as deterioration of the physical and mechanical properties of denture base materials, and oral mucosal injury arising due to erratic use of denture cleansers may be prevented by raising dental professionals' awareness and knowledge about adverse effects/disadvantages of denture cleansers.

Recommendation of Denture Brush

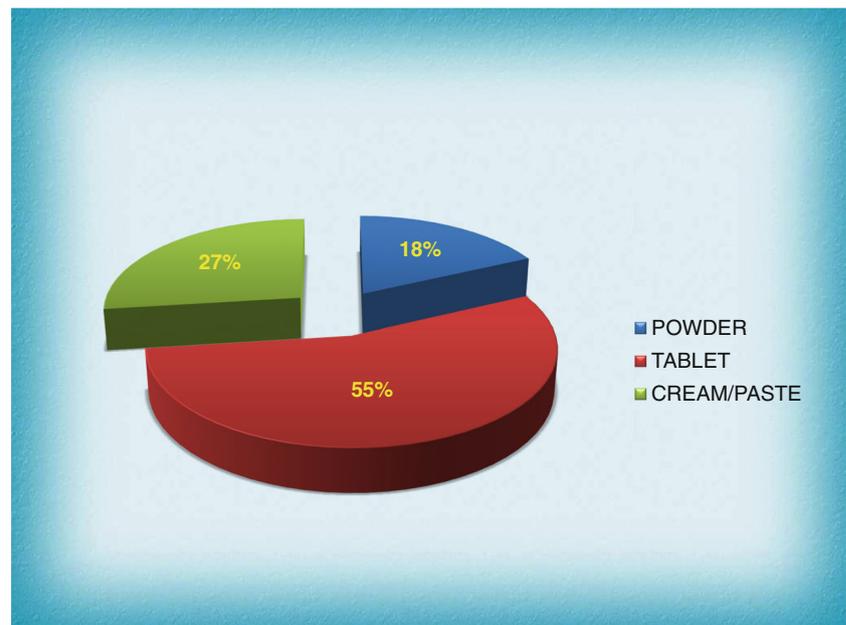
The analysis revealed that 36.5 % of respondents recommended denture brush very often, followed by 36 %

occasionally and 27 % not at all. Since denture brush is a most handy way of cleaning the denture a good percentage has shown this way of recommendation.

Imparting Knowledge during Graduation/Post-Graduation

A significant percentage (36 %) of respondents reported that in their curriculum no knowledge is imparted about denture cleansers. Just 15 % reported a high intensity of knowledge gained during their study. Rest 49 % were of the view that negligible knowledge is included during course. The researchers are of the view that adequate

Fig. 6 Form of denture cleanser



importance should be given to this topic in the dental curriculum so that the dental professionals can effectively make use of this knowledge for the safety of dentures. The study further revealed that a striking 87 % of respondents felt the need to enhance/update their knowledge.

Composition of Denture Cleansers

The composition of a compound is a must to be known by every specialist in their respective fields of specialization. The same holds true for dental surgeons as well that they must be aware about ingredients used in specified percentages for denture cleansers. On this issue 32 % were well aware, 37.5 % had only partial knowledge, while on the basis of price of the product, recommendation was made to the patients. During discussion some of the respondents revealed that along with the composition, cost of the product is equally important for them.

Statistical Analysis

In order to investigate further the real concept of our study, statistical analysis was carried out to test for the independence of attributes as per questionnaire used.

Educational Standard with Awareness of Denture Cleansers

Table 3 gives a classification of frequencies according to two attributes viz. educational standard and awareness of denture cleansers. It could be seen that the respondents with BDS degree are having highest awareness followed by

little in the same category. On the other hand MDS with much awareness are also on higher side within its own category. The calculated value of $\chi^2 = 0.9233$ for 2 degrees of freedom (df) at 5 % level of significance is found to be non-significant. Hence the hypothesis of independence of two attributes is being accepted.

Educational Standard with Method of Denture Cleaning

Table 3 shows that majority of graduates are using a 'combination of both chemical and mechanical method'. Here also $\chi^2 = 0.148$ gives an indication of independence of two attributes.

Educational Standard with Enhancement of Knowledge

The distribution of Table 3 clearly indicates further that majority of graduates felt greater necessity to enhance their knowledge about denture cleansers. Calculated χ^2 (2.12) indicates that two attributes are not interacting each other or in other words do not show any association.

Method with Form of Denture Cleanser

The distribution of respondents in a two way frequency table (Table 4) gives that highest number of respondents are using 'tablet' form of denture cleanser with a 'combination of chemical and mechanical method' of cleaning. It is interesting to note that 'chemical method' in 'any form of cleanser' is not found to be so popular. The two attributes were tested for their independence by Chi square test and it was observed that $\chi^2 = 7.26$ for 4 df is again found

Table 3 Association of educational qualification with awareness, method of cleaning and enhancement of knowledge

	Educational qualification		
	BDS	MDS	
Awareness			
Much	77	45	$\chi^2 = 0.9233$
Little	53	22	
None	1	1	
Method of cleaning			
Chemical	3	1	$\chi^2 = 0.148$
Mechanical	21	11	
Combination	108	56	
Enhancement of knowledge			
Much	112	60	$\chi^2 = 2.12$
Little	16	8	
None	4	0	

to be non-significant at 5 % level of significance. Hence like above these two attributes are also not associated to each other.

Form of Denture Cleanser with Frequency of Cleaning

Table 4 gives distribution of two factors viz. frequency of cleaning and form of denture cleanser. Here $\chi^2 = 9.78$ clearly indicates rejection of null hypothesis at 5 % level of significance and gives the indication that the two attributes are not independent. A glimpse of table indicates that highest frequency is seen for the recommendation of 'cleaning after every meal' with the help of 'tablet form'. On the other hand least one was for the recommendation of 'twice daily' with 'powder form'. The study clearly indicates that tablet form with once cleaning has also been up to some extent found to be favourable.

Method with Frequency of Cleaning

Table 5 gives the distribution of frequencies according to method and frequency of cleaning. The analysis clearly states that the marginal total corresponding to combination of chemical and mechanical method is the highest. The marginal frequency for the 'after every meal' cleaning is very frequently suggested by the dental professionals. On the other hand individually the 'combination of chemical and mechanical method' for 'after every meal' cleaning is the most popular among the respondents. Analysis further suggests that chemical method is not much popular for any

Table 4 Association of form of denture cleanser with method and frequency of cleaning

	Form of denture cleansers			
	Powder	Tablet	Paste/cream	
Method of cleaning				
Chemical	1	3	0	$\chi^2 = 7.26$
Mechanical	4	11	13	
Combination	33	97	43	
Frequency of cleaning				
Twice daily	5	13	15	$\chi^2 = 9.78$
Once daily	10	35	8	
After every meal	23	63	33	

Table 5 Association of frequency with method of cleaning

	Frequency of cleaning			
	Twice daily	Once daily	After every meal	
Method of cleaning				
Chemical	0	2	3	$\chi^2 = 4.48$
Mechanical	6	4	22	
Combination	24	45	93	

Table 6 Association of age with number of brands

	Number of brands			
	≥ 3	< 3	None	
Age of respondents				$\chi^2 = 38.42$
<25	7	39	14	
25–40	30	80	4	
>40	15	10	0	

of frequency of cleaning. χ^2 value (4.48) is also not found to be significant and suggests the independence of the two attributes.

Age with Brands Association

The number of brands of denture cleansers used by any dentist is one of the prime factors associated with present investigation. The researcher has classified the dental professionals according to their age groups vis-à-vis number of brands known to them. Analysis suggested that the dentists between age group 25–40 had maximum number of frequency for 'less than three' brands. For other classifications in both directions the distribution is quite

skewed. Thereby a significant χ^2 (=38.42) gives the idea that age and brand loyalty are very highly significantly associated with each other ($p < 0.01$) (Table 6).

Conclusion

The foregoing analysis has pointed out a number of indicators for the proper use and knowledge about denture cleansers in the study area. Since no such information was available about this area, a sample large enough has given good estimates of parameters under study. Also it is inferred that it is very important to teach dental professionals about denture cleansers in dental curriculum in more depth and further in continuing education and training, so as to enable them to impart adequate knowledge to their denture patients. Patients would benefit greatly from a professional's guidance in the use of denture cleansers and reduce the incidence of denture stomatitis and candida infections due to denture plaque. Problems arising from improper use of denture cleansers such as deterioration of physical and mechanical properties of denture base materials and oral mucosal injury can be prevented.

The study has been confined to a cluster of four northern states of India only. A more in depth study, considering certain area specific parameters in its entirety, is suggested to generalise the results.

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