

## Original Article

# Denture hygiene knowledge, attitudes, and practices toward patient education in denture care among dental practitioners of Jabalpur city, Madhya Pradesh, India

Vinay Suresan, Sneha Mantri<sup>1</sup>, Suryakant Deogade<sup>1</sup>, K. Sumathi<sup>1</sup>, Pragya Panday<sup>1</sup>, Ankit Galav<sup>1</sup>, Kanika Mishra<sup>1</sup>

Department of Public Health Dentistry, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha,<sup>1</sup>Department of Prosthodontics, Hitkarini Dental College and Hospital, Jabalpur, Madhya Pradesh, India

### Abstract

**Context:** Researchers have concentrated their focus on denture wearer's attitude and practice toward denture cleansing despite the fact that they should be more focused on the attitudes of the dentists' themselves towards patient education at the time of denture delivery. It is an obligation of every dentist to motivate, instruct and provide the means and methods of plaque control for their patients.

**Aims:** The aim was to assess the denture hygiene knowledge, attitudes and practice towards patient education in denture care among dental practitioners (DPs) of Jabalpur city, Madhya Pradesh, India.

**Material and Methods:** A total of 168 dental practitioners completed a comprehensive questionnaire. All participants signed an informed consent before answering the questionnaire. The institutional review committee approved the study.

**Statistical Analysis:** Chi-square test for non-parametric study was employed to determine the statistical difference between the two groups. A *P*-value of 0.05 was considered to be statistically significant.

**Results:** Most of the subjects were qualified with a bachelor degree 142 (85%). 25 (18%) subjects did not associate oral biofilms on complete denture with conditions like denture stomatitis and other serious systemic diseases. Approximately half of the DPs 69 (48%) and specialists 8 (31%) agreed that explaining denture hygiene instructions to old patients can be very time consuming. A recall program for their patients is of importance according to 39 (27%) of DPs and 3 (12%) specialists.

**Conclusions:** It may be concluded that the study subjects had limited knowledge of denture cleansing materials and denture hygiene importance. Attitudes varied among the subjects when it came to sharing information with their patients.

**Key Words:** Attitudes, dental practitioner, denture hygiene, knowledge, questionnaire

### Address for correspondence:

Dr. Vinay Suresan, Department of Public Health Dentistry, Kalinga Institute of Dental Sciences, P.O. KIIT University, Campus-5, Patia, Bhubaneswar - 751 024, Odisha, India. E-mail: [reachvinays@yahoo.co.in](mailto:reachvinays@yahoo.co.in)

Received: 2<sup>nd</sup> May, 2015, Accepted: 1<sup>st</sup> October, 2015

Access this article online	
Quick Response Code:	
Website:	<a href="http://www.j-ips.org">www.j-ips.org</a>

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Suresan V, Mantri S, Deogade S, Sumathi K, Panday P, Galav A, et al. Denture hygiene knowledge, attitudes, and practices toward patient education in denture care among dental practitioners of Jabalpur city, Madhya Pradesh, India. J Indian Prosthodont Soc 2016;16:30-5.

Suresan, et al.: Denture hygiene knowledge, attitudes and practices towards patient education in denture care among dentists of Jabalpur city

## INTRODUCTION

In man, health and disease are not static conditions but exist on a continuum and on this continuum; exists arbitrary points or boundaries to delineate specific diseases.<sup>[1]</sup> These boundaries are frequently for the convenience or to rapidly describe in a word where along health – disease continuum the individual or condition exists. Such may be the situation in the putative progression from health to periodontitis to exfoliation of the tooth.<sup>[1]</sup>

If periodontal health is to be maintained, daily effective oral hygiene measures should be pursued, failing to do so will unleash the inevitable consequences of plaque accumulation.<sup>[2]</sup> Dental plaque accumulates of all surfaces; both hard and soft in the oral cavity. Removable dentures are also vulnerable to plaque accumulation hence; oral hygiene maintenance is a life-long exercise.

Oral hygiene has ancient roots; the first reference toward maintenance of oral hygiene by people was in the form of “chewing sticks.” As early as 3500 BC, the Babylonians used chewing sticks taken from special aromatic trees designed to clean the teeth and freshen breath.<sup>[3]</sup> Most common device used to achieve oral hygiene in the present day is the “toothbrush.” Mechanical tooth cleaning by means of a toothbrush is considered the most common ways of disturbing dental plaque development.

Changing demographics, show increase in life expectancy and the growing numbers of elderly.<sup>[4]</sup> Growth in this aging population has resulted in a corresponding increase in the number of elderly requiring dentures. Complete dentures constitute one of the most important treatment options in prosthodontics.<sup>[5]</sup> Newly made dentures could be a disappointment to a patient if he is deficient in maintaining proper denture hygiene.<sup>[6]</sup>

Denture cleanliness is essential to prevent malodor, poor aesthetics and the accumulation of plaque/calculus with its deleterious effects on the mucosa.<sup>[7]</sup> The micro-porous surfaces of an acrylic denture provide a wide range of environments to support microorganisms that can threaten the health of physically vulnerable denture patients.<sup>[8]</sup> There are innumerable solutions, pastes and powders available for cleaning dentures with a variety of claims about their relative efficacies.<sup>[7]</sup>

Ideally, denture care products should be easy to handle, effective for removal of inorganic/organic deposits and stains, bactericidal and fungicidal, nontoxic to the patient, nondeleterious to the denture materials and inexpensive. Given that brushing is the most common cleansing method for

complete dentures, the use of specific brushes and cleansers is of paramount importance for good outcomes.<sup>[9]</sup>

Dentists’ and denture patients should realize that microbial plaque on dentures may be harmful to both the oral mucosa and the general health. Hence, it is the responsibility of the patient to maintain oral hygiene through daily home care routine. However, denture wearers in comparison to the dentate, pay less attention toward the importance of plaque control.<sup>[10]</sup> It is the obligation of the dentist to motivate and instruct the denture wearers and provide the means and methods for plaque control.<sup>[11]</sup> Dental professionals must have a current knowledge of denture cleansing strategies to maximize the services offered to their denture patients.<sup>[8]</sup>

Researchers have concentrated their focus on denture wearers’ attitude and practice toward denture cleansing<sup>[12-17]</sup> when they should be more focusing on the attitudes of the dentists’ and practices toward patient education at the time of denture delivery. When a literature search was directed in this direction, there were not many literatures available. Hence, the purpose of this study was to assess the denture hygiene knowledge, attitudes and practice toward patient education in denture care among dental practitioners (DPs) of Jabalpur city, Madhya Pradesh, India.

## SUBJECTS AND METHODS

A descriptive, cross-sectional survey was conducted using a self-administered questionnaire involving private DPs of Jabalpur city. A list of private DPs in Jabalpur city was obtained from the dentists’ directory 2010<sup>[18]</sup> published by the Indian Dental Association, Jabalpur branch. This directory enlists all the dentists’ practicing in Jabalpur. A total of 180 private DPs of Jabalpur made up the sampling frame for this study. These private DPs were personally approached by the investigators and the nature and the purpose of the study was explained. The willing was requested to complete a comprehensive closed-ended, self-administered questionnaire. One hundred sixty-eight dentists’ participated in the study. The response rate for the study was 93.3%. The common reason to refuse participation was time constraint.

This questionnaire was designed to gather the sociodemographic characteristics, assess the denture hygiene knowledge, attitudes, and practice advice. This 23-item questionnaire included five knowledge related questions (plaque on denture bases, denture cleansing aids, etc.), each of these questions had three options to choose from: Yes, no and do not know. Five attitude statements were included (use, perceived necessity, patient education). The options for attitude were based on 5-point Likert scale,<sup>[19]</sup> it requires the dentists’ to make a decision on

Suresan, et al.: Denture hygiene knowledge, attitudes and practices towards patient education in denture care among dentists of Jabalpur city

their level of agreement on this scale (strongly agree, agree, do not know, disagree, strongly disagree). Finally the practice advice questions (clinical practice, patient instructions on use, patient recall and evaluation). Nine experts in the field were invited to review this questionnaire for its face and content validity. The experts were requested to identify the deficient areas and provide recommendations and suggestions on ways to improve the clarity of the questions. The cumulative average of the level of agreement among the experts was 82% or 0.82 which denotes a high level of agreement.

The questionnaire was pilot tested on thirty DPs and was assessed for the uniformity of interpretation. No major corrections were necessary. These data gathered during the pilot survey were not included in the main study. The questionnaire took about 15 min to complete.

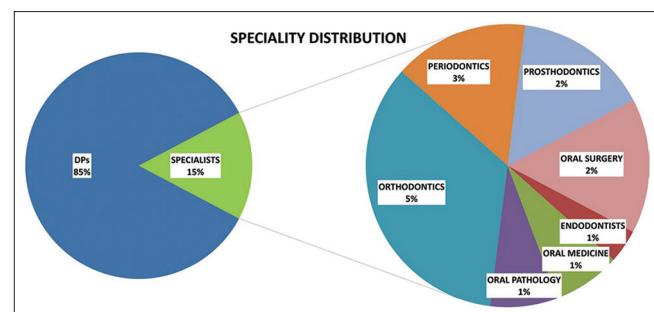
All participants signed an informed consent before filling the questionnaire. The participants were asked not to reveal their identity. The Institutional Review Committee approved the study.

The collected data were imported into the IBM SPSS Statistics for Windows, Version 18.0. Chicago: SPSS Inc program<sup>[20]</sup> to draw the means and percentages. Chi-square test for nonparametric study was employed to determine the statistical difference between the two groups (DPs and specialists). A  $P < 0.05$  was considered to be statistically significant.

## RESULTS

The sociodemographic characteristics of the study subjects are shown in Table 1. The majority of the dentists' were females 90 (54%) and the greater part of the study population were DPs qualified with just a bachelor degree 142 (85%) as displayed in Figure 1. Dentists' knowledge associated with denture hygiene maintenance is presented in Table 2. As presented in this table, when the subjects were questioned if oral biofilms on complete denture are associated with conditions like denture stomatitis and other serious systemic diseases, 25 (18%) of the DPs responded wrongly. Similarly, neither the DPs nor the specialists in this study could come to a common consensus to use or not to use regular toothpaste for denture cleansing. Thirty-two percentages of the DPs cited that cleaning the tissue bearing side of the denture affects its retention in the mouth.

Dentists' attitude toward denture hygiene instruction delivery to their patients is presented in Table 3. The attitude variables measured that approximately half of the DPs 69 (48%) and specialists 8 (31%) agreed that explaining denture hygiene



**Figure 1:** Scattering of subjects according to qualification ( $n = 168$ )

**Table 1: Socio-demographic characteristics of the study subjects ( $N=168$ )**

Variables	N (%)
Gender	
Male	78 (46)
Female	90 (54)
Qualification	
Bachelor degree	142 (85)
Master degree	26 (15)

**Table 2: Dentists knowledge associated with denture hygiene maintenance  $N=168$**

Questions	N (%)		<i>P</i> value
	Dental practitioners <i>N=142</i>	Specialist's <i>N=26</i>	
Do dentures accumulate plaque/biofilms?			
Yes	126 (89)	26 (100)	0.198 NS
No	4 (3)	0 (0)	
Don't know	12 (8)	0 (0)	
Are oral biofilms on complete denture associated with conditions like denture stomatitis and other serious systemic diseases?			
Yes	95 (67)	26 (100)	0.003* S
No	25 (18)	0 (0)	
Don't know	22 (15)	0 (0)	
Is regular toothpaste advisable for denture cleansing?			
Yes	95 (67)	11 (42)	0.057 NS
No	41 (29)	13 (50)	
Don't know	6 (4)	2 (8)	
Does cleaning the tissue bearing side of the denture affect its retention in the mouth?			
Yes	46 (32)	4 (15)	0.009* S
No	63 (44)	20 (77)	
Don't know	33 (23)	2 (8)	
Does placement of denture in hypochlorite cleansing solution for a longer period damage the dentures?			
Yes	61 (43)	16 (62)	0.202 NS
No	30 (21)	3 (12)	
Don't know	51 (36)	7 (27)	

NS: Not Significant, S: significant, \*:  $\chi^2$  test comparing between DPs and specialists

Suresan, et al.: Denture hygiene knowledge, attitudes and practices towards patient education in denture care among dentists of Jabalpur city

instructions to old patients can be very time-consuming. A total of 119 (83%) DPs, 23 (88%) specialists agreed that patient education regarding the impact of denture hygiene on systemic health is important. When asked if denture adhesives (if used) need not be cleaned completely and reapplied again daily; 111 (79%) DPs along with 19 (73%) specialists strongly disagreed. A recall program for complete denture patients is of importance even though denture teeth experience neither caries nor periodontal problems according to 39 (27%) of DPs and 3 (12%) specialists.

Dissemination of denture hygiene practice recommendations to their patients is presented in Table 4. Practically all of the subjects 136 (96%) – DPs and 25 (96%) – specialists instruct their patients regarding the denture care at the time of denture delivery. Ninety-nine (70%) of DPs and 12 (46%) of specialists used verbal medium of instruction delivery. The various denture cleansing methods recommended by subjects is displayed in Figure 2. Fifty-eight (41%) DPs falsely recommend brushing with soap water to clean their dentures, 43 (30%) DPs recommended brushing with toothpaste and 21 (15%) DPs and 14 (54%) specialists endorsed the use of alkaline-per-oxide. These differences between the DPs and the specialists were statistically significant ( $P < 0.001$ ).

## DISCUSSION

Poor denture hygiene is a seemingly common problem encountered by prosthetic dentists' with their numerous complete denture patients.<sup>[21]</sup> Elderly patients, particularly those who are in a compromised state, are not able to maintain good denture hygiene due to some physical and/or mental handicap.<sup>[22-24]</sup> However, the maintenance of denture hygiene is neglected in not just compromised geriatric patients but also with normal healthy denture wearers.<sup>[25]</sup> This can be attributed to a definite lack of motivation, basic knowledge or simply carelessness and neglect. Cleansing and disinfecting of dentures are essential for the maintenance of oral soft tissue health and successful use of removable dentures. Therefore, it is very important for dentists' to educate their patients regarding daily denture cleansing regimen to prevent undesirable circumstances. This is where the knowledge

of the dentists' themselves plays an imperative role. Such knowledge can be made universal by stressing on the postdenture delivery instructions in the undergraduate curriculum.

Dentists' knowledge was assessed in the present study wherein, when the DPs were questioned whether oral biofilms on complete denture was associated with conditions like denture

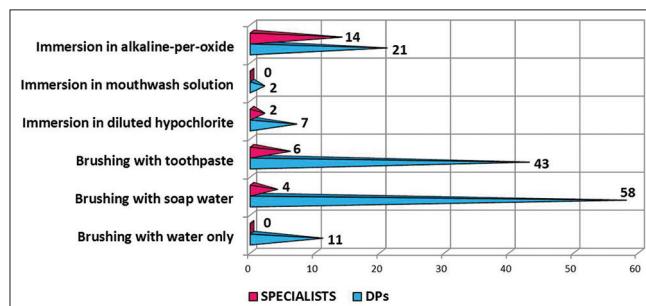
**Table 3: Dentists attitudes towards denture hygiene instruction delivery to their patients**

Questions	N (%) of respondents N=168		
	Strongly agree/ agree	Don't know	Strongly disagree/ disagree
Explaining denture hygiene instructions to old patients can be very time consuming	69 (48)	4 (4)	69 (48)
Dental practitioners	8 (31)	0 (0)	18 (69)
It is of no use to provide older people with denture hygiene instructions, as they decline to follow	38 (27)	7 (5)	97 (68)
Dental practitioners	1 (4)	0 (0)	25 (96)
A recall program for complete denture patients is of no importance as denture teeth experience neither caries nor periodontal problems	37 (27)	3 (9)	89 (65)
Dental practitioners	3 (12)	0 (0)	23 (89)
Patient education regarding the impact of denture hygiene on systemic health is not important	14 (9)	9 (6)	119 (83)
Dental practitioners	1 (4)	2 (8)	23 (88)
Denture adhesives (if used) need not be cleaned completely and reapplied again daily	25 (18)	6 (4)	111 (79)
Dental practitioners	3 (12)	4 (15)	19 (73)

**Table 4: Denture hygiene practice recommendations associated questions N (%) of respondents N=168**

Questions	Dental practitioners	Specialist's	P value
Do you instruct your patients regarding the denture cleansing methods at the time of denture delivery?			
Yes	136 (96)	25 (96)	0.929 NS
No	6 (4)	1 (4)	
What kind of medium do you use for instructions?			
Verbal	99 (70)	12 (46)	0.026* S
Written	23 (16)	5 (19)	
Practical demo	20 (14)	9 (35)	
Do you educate your patients regarding the relationship between denture hygiene, oral hygiene and systemic health?			
Yes	138 (97)	22 (85)	0.006* S
No	4 (3)	4 (15)	

NS: Not Significant, S: significant, \*:  $\chi^2$  test comparing between DPs and specialists



**Figure 2:** Various denture cleansing methods recommended (n=168)

Suresan, et al.: Denture hygiene knowledge, attitudes and practices towards patient education in denture care among dentists of Jabalpur city

stomatitis and other systemic disease; 25 (18%) replied “no” and 22 (15%) replied “don’t know.” It is absolutely essential to ensure that the dentists themselves are adequately educated and knowledgeable and essential that they apply this knowledge to train and instruct their patients about the importance of denture hygiene maintenance and also to recall them at regular intervals to ensure that the hygiene is maintained. Oral biofilms and its impact on dentures and also various systemic diseases associated with denture stomatitis have to be given appropriate emphasis in the curriculum.

It has also been observed that the majority of denture wearers do not pay necessary attention toward the cleanliness and hygiene of their dentures.<sup>[12,26-28]</sup> This may be due to the denture wearers negligence as well as dentists’ who give insufficient instructions to their patients about denture cleansing methods. The DPs also show a negative attitude to disseminate proper instructions to their patients. To educate and instruct, the denture wearers on proper denture hygiene is a moral and ethical responsibility of the dentist.

Maximum number of subjects 136 (96%) in this study instructed their patients regarding denture cleansing methods at the time of denture delivery. These very same subjects, 69 (48%) of the DPs and 8 (31%) of the specialists; strongly agreed that explaining denture hygiene instructions to the elderly can be very time-consuming. Similarly, this notion that, it is of no use to provide the elderly with denture hygiene maintenance instructions as, they decline to follow was recorded in 38 (27%) of the DPs. In a comparable study conducted in Sao Paulo, Brazil<sup>[29]</sup> it was discovered that 51.89% of the practitioners did not give any instructions to their patients about denture cleansing after delivery of dentures. Another survey<sup>[30]</sup> performed on denture wearers showed that 82.9% of the patients stated they had never been instructed by their dentists’. The explanation of this immoral result might be explained as negligence on the part of the dentist himself or the reluctance of DPs to give correct answers and their attempts to give the expected answers during the survey. This is one of the major drawbacks of a questionnaire survey.

When asked about the medium of instructions used to provide denture cleansing information; 99 (70%) reported to being using only verbal medium and a mere 20 (14%) of the subjects provided a practical demonstration. As the famous Chinese proverb goes – I hear and I forget, I see and I remember, I do and I understand’ It, is absolutely essential to ensure that the patients are trained to an acceptable level of competency to maintenance of denture hygiene. And all such patients should be recalled at regular intervals for motivation and reinforcement.

Research indicates that inadequately maintained dentures contribute to a host of infections in denture patients and also compromises the physical condition of the denture itself and, regardless of the cleansing methods employed, food debris, bacterial plaque, calculus, etc., have all been demonstrated on denture surfaces.<sup>[12,22,25]</sup> Poor denture hygiene precipitates tissue response, which are direct sequels to accumulation of food debris, tartar, stains and proliferation of microorganisms.<sup>[22]</sup>

The fitting of complete dentures should not be considered the final stage of treatment, but the beginning of a long relationship between patient and dentist to maintain the health of oral tissues.<sup>[24]</sup> It is extremely important that patients return regularly to the dentist for oral health maintenance and for the evaluation of their dentures.

The combination of brushing and soaking method is recommended as the effective way for cleaning dentures.<sup>[17,31,32]</sup> In the present survey, 62 (37%) of the dentists’ advised their patients to brush their dentures using soap water. However, in some studies,<sup>[7,12,15]</sup> the most preferred cleansing regimen by the patients was brushing only. Usage of hypochlorite containing solutions in cleansing of dentures with metal component causes corrosion or tarnish of the metal.<sup>[7,33,34]</sup> In the present survey, 9 (5%) of the subjects recommended the use of hypochlorite solution for denture cleansing. The majority of dentists recommended their patients a combination of brushing and soaking in cleansing solutions. However, there are still some dentists who gave no instructions or who did not recommend adequate and efficient cleansing methods or who advised inadequate cleansing regimen. Therefore, the results of the present study revealed that dental professionals must update their knowledge of denture cleansing strategies continuously in order to maximize the services offered to their denture patients and must not avoid spending time for instructing them.

The current study that dentists recommended a combination of brushing and soaking solutions, however, most of the dentists did not the adequately instructor recommend an efficient cleansing regimen to their patients. Within the limitations of this study, it may be concluded that the dentists had limited knowledge of denture cleansing materials and hence their patients were ill-advised on how to maintain adequate denture hygiene. Dentists must stay updated with the recent denture cleansing strategies and share with their patients generously. Also, the attitudes were not favorable among the subjects when it came to sharing information with the elderly denture wearers. Dentists’ are in the need of an eye-opener in this issue of patient education where; its lost importance can be restored. This would sequentially increase the awareness among denture wearers through oral health educational and motivation.

Suresan, et al.: Denture hygiene knowledge, attitudes and practices towards patient education in denture care among dentists of Jabalpur city

## Acknowledgments

The authors' sincerely acknowledge the timely and valuable statistical expertise provided by Mr. Tejaswi Venkatesh Murthy.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Hancock EB. Periodontal diseases: Prevention. *Ann Periodontol* 1996;1:223-49.
2. Axelsson P, Lindhe J. The significance of maintenance care in the treatment of periodontal disease. *J Clin Periodontol* 1981;8:281-94.
3. Mandel ID. Chemotherapeutic agents for controlling plaque and gingivitis. *J Clin Periodontol* 1988;15:488-98.
4. United Nations Population Division. World Population Prospects: The 2002 Revision, New York, NY, USA: United Nations; 2003. Accessed from: <http://www.un.org/esa/population/publications/wpp2002/WPP2002-HIGHLIGHTSrev1.PDF>. [Last accessed on 2012 Jan 10].
5. Malhotra PC. Denture Adhesives – A Boon or a Bane. 1<sup>st</sup> ed. Huntington, NY: Nova Science Publishers; 2000. p. 143-50.
6. Ahlawat P, Darki HA, Zahir Y, Saini D. Survey on availability and usage of denture adhesives in Malaysia: A preliminary study. *Asian J Pharm Health Sci* 2012;2:286. Available from: <http://www.ajphs.com/wp-content/uploads/2012/10/AJPHS-Vol2-Issue1-12.pdf>. [Last accessed on 2014 Aug 08].
7. Jagger DC, Harrison A. Denture cleansing – The best approach. *Br Dent J* 1995;178:413-7.
8. Shay K. Denture hygiene: A review and update. *J Contemp Dent Pract* 2000;1:28-41.
9. Fernandes RA, Lovato-Silva CH, Paranhos Hde F, Ito IY. Efficacy of three denture brushes on biofilm removal from complete dentures. *J Appl Oral Sci* 2007;15:39-43.
10. Tarbet WJ, Axelrod S, Minkoff S, Fratarcangelo PA. Denture cleansing: A comparison of two methods. *J Prosthet Dent* 1984;51:322-5.
11. Budtz-Jørgensen E. Materials and methods for cleaning dentures. *J Prosthet Dent* 1979;42:619-23.
12. Dikbas I, Koksal T, Calikkocaoglu S. Investigation of the cleanliness of dentures in a university hospital. *Int J Prosthodont* 2006;19:294-8.
13. Neill DJ. A study of materials and methods employed in cleaning dentures. *Br Dent J* 1968;124:107-15.
14. Murtomaa H, Könönen M, Laine P. Age and maintenance of removable dentures in Finland. *J Oral Rehabil* 1992;19:123-8.
15. Kulak-Ozkan Y, Kazazoglu E, Arikan A. Oral hygiene habits, denture cleanliness, presence of yeasts and stomatitis in elderly people. *J Oral Rehabil* 2002;29:300-4.
16. Polyzois GL. Denture cleansing habits. A survey. *Aust Dent J* 1983;28:171-3.
17. Schou L, Wight C, Cumming C. Oral hygiene habits, denture plaque, presence of yeasts and stomatitis in institutionalised elderly in Lothian, Scotland. *Community Dent Oral Epidemiol* 1987;15:85-9.
18. Indian Dental Association. The Crown – Dentists' Directory – 2010. 1<sup>st</sup> ed.: Bhanot Publishers; 2010. p. 10-5.
19. Likert R. A technique for the measurement of attitudes. *Arch Psychol* 1932;140:55.
20. IBM SPSS Statistics Inc. Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.
21. Srinivasan M, Gulabani M. A microbiological evaluation of the use of denture cleansers in combination with an oral rinse in complete denture patients. *Indian J Dent Res* 2010;21:353-6.
22. Gornitsky M, Paradisi I, Landaverde G, Malo AM, Velly AM. A clinical and microbiological evaluation of denture cleansers for geriatric patients in long-term care institutions. *J Can Dent Assoc* 2002;68:39-45.
23. Manderson RD, Ettinger RL. Dental status of the institutionalized elderly population of Edinburgh. *Community Dent Oral Epidemiol* 1975;3:100-7.
24. Jorge Júnior J, de Almeida OP, Bozzo L, Scully C, Graner E. Oral mucosal health and disease in institutionalized elderly in Brazil. *Community Dent Oral Epidemiol* 1991;19:173-5.
25. Sheen SR, Harrison A. Assessment of plaque prevention on dentures using an experimental cleanser. *J Prosthet Dent* 2000;84:594-601.
26. Collis JJ, Stafford GD. A survey of denture hygiene in patients attending Cardiff Dental Hospital. *Eur J Prosthodont Restor Dent* 1994;3:67-71.
27. Hoard-Reddick G, Grant AA, Griffiths CS. Investigation into the cleanliness of dentures in an elderly population. *J Prosthet Dent* 1990;64:48-52.
28. Budtz-Jørgensen E, Stenderup A, Grabowski M. An epidemiologic study of yeasts in elderly denture wearers. *Community Dent Oral Epidemiol* 1975;3:115-9.
29. Peracini A, Andrade IM, Paranhos Hde F, Silva CH, de Souza RF. Behaviors and hygiene habits of complete denture wearers. *Braz Dent J* 2010;21:247-52.
30. Paranhos Hde F, da Silva CH, Venezian GC, Macedo LD, de Souza RF. Distribution of biofilm on internal and external surfaces of upper complete dentures: The effect of hygiene instruction. *Gerodontology* 2007;24:162-8.
31. Jegannathan S, Payne JA, Thean HP. Denture stomatitis in an elderly edentulous Asian population. *J Oral Rehabil* 1997;24:468-72.
32. Dills SS, Olshan AM, Goldner S, Brogdon C. Comparison of the antimicrobial capability of an abrasive paste and chemical-soak denture cleaners. *J Prosthet Dent* 1988;60:467-70.
33. Backenstose WM, Wells JG. Side effects of immersion-type cleansers on the metal components of dentures. *J Prosthet Dent* 1977;37:615-21.
34. Kastner C, Svare CW, Scandrett FR, Kerber PE, Taylor TD, Semler HE. Effects of chemical denture cleaners on the flexibility of cast clasps. *J Prosthet Dent* 1983;50:473-9.