COMPREHENSIVE EVALUATION OF COMPLETE DENTURE CLEANSING AND MAINTENANCE HABITS AMONG ELDERLY PATIENTS- A CROSS SECTIONAL STUDY

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ABSTRACT

*Aim: This cross sectional study was performed to evaluate the complete denture cleansing and maintenance habits among elderly institutionalized patients. **Materials & Methods:** The present study was conducted in the department of Prosthodontics. This cross sectional study included 100 complete denture patients who have been delivered complete dentures in the recent past. Patients were screened, examined and finalized from the normal OPD of the department. A questionnaire was prepared which was having 10 questions about cleansing methodologies, cleaning frequencies, denture cleaning materials and other associated factors. Each patient was provided 10 questions via questionnaire. They are requested to truthfully respond. The relative importance of the study was explained to the patients. **Results:** out of 100 patients, males were 64 and females were 36. Total 30 patients were reported to age group >65 years. Just 6 patients were falling in the age range of 45-50 years. Therefore we can presume that most of the denture wearers were related to geriatric age groups. P value was reported to be significant for the age group of 45-50. **Conclusion:** In the studied patients, researchers concluded that the overall status of complete denture hygiene and maintenance was below moderate level.*

Keywords: Complete Denture Hygiene, Oral health, Oral hygiene practices

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I.   INTRODUCTION

It is an established fact that there is large number of fully or partially edentulous patients in this era. Complete dentures are meant for artificially replacing missing teeth and restoring the functional and esthetic needs of the patients. Literature searches in this regards have shown us that the presence of diseases and the utilization of few medications can negatively influence the oral tissues and amount of salivation.[1,2] These literatures have also evidenced that the proficient and habitual cleaning of complete dentures are crucial for maintaining optimal oral health and high durability of the prosthesis complete denture. Usually, complete denture patients are confronted with many diseases including denture stomatitis.[3,4] For managing denture stomatitis, the operator should instruct the patient to keep the complete dentures out of the mouth for 6 to 8 h per day. Many of the renowned researches have shown that the current rates of edentulism is somewhere between 7% and 69% of the adult population. This incidence differs as per different continents and different racial populations. Regrettably, evidence-based internationally accepted standard norms for the utmost care and maintenance of complete denture prostheses do not exist.[5,6] However, the American College of Prosthodontists (ACP) in 2009 created a task force to launch evidence based guidelines for the optimum care and maintenance of complete dentures. As we all are aware that the incidence of edentulousness is ever increasing, the requirement for dentures as well as their cleanliness is of greatest importance. Many of the renowned studies have illustrated the complication of poor denture hygiene on systemic health.[7,8,9] These primarily include infectious diseases like sub-acute endocarditis, colitis, appendicitis and pneumonia. Many of the complete denture patients don't even ask about the denture cleanliness and maintenance on the day of denture delivery. However, it is the responsibility and moral duty of the doctor also to explain about denture cleanliness and maintenance to the patients with denture delivery. These practices can be effectively catered by showing them study models along with printed handbills.[10] This study was attempted to rationally estimate the complete denture cleansing and maintenance habits among elderly institutionalized patients by analyzing their replies produced via pre-formed questionnaire.

II.   MATERIALS & METHODS

This study was designed, outlined and executed in the department of Prosthodontics of the institution. In this cross sectional study, total 100 patients were studied and evaluated for their responses. This was particularly performed in the patients who received complete dentures from the department of Prosthodontics in the recent past. All complete dentures were constructed in the department by the under graduate students under strict supervision faculty members. Every patients were notified about the study in detail. Written and signed consents were taken from all participants. A self prepared, close ended questionnaire was prepared that have 10 questions about complete denture hygiene, familiarity, awareness and other associated entities. Authors have determined to perform this study using questionnaire because questionnaire based studies are believed to be extremely useful to obtain comprehensive data about personal and group beliefs. Questionnaire based studies are also capable of assessing the patients at personal levels. The relative significance of the study was explained in detail to all patients. To meet the ethical issues and patients rights, privacy of the patents was completely ensured. Authors requested all participating subjects

to respond truthfully without any disorientation. The questionnaire responses were registered by calling the patient's for their recall appointments. Results thus obtained was compiled and sent for necessary statistical analysis. P value less than 0.05 was considered significant (p< 0.05).

III.   STATISTICAL ANALYSIS AND RESULTS

All the recorded data and responses were gathered and sent for statistical evaluation using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The resulting data was subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 1 and Graph 1 illustrate that out of 100 patients, males were 64 and females were 36. Total 30 patients were reported to age group >65 years. Just 6 patients were falling in the age range of 45-50 years. Therefore we can presume that most of the denture wearers were related to geriatric age groups. P value was reported to be significant for the age group of 45-50 (0.00, *p<0.05 significant). 33 patients were cleaning their denture using brush with tooth paste. 15 patients were not employing any method of denture cleansing (Table 2). 15 patients said that they immerse the complete dentures in commercially available cleansing tablet solution. 3 patients agreed that they brushing and soak complete dentures in hypo solution however nobody had asked them to do so. Few additional findings are also showed in table 2. Here, P value was found to be significant (0.020). Around 26 studied complete denture patients were arbitrarily performing clean-up (Table 3 and Graph 2). Total 12 participants stated that they clean their CD on daily basis. Total 11 participants stated that they clean their CD 3 day/week. Total 22 participants stated that they clean their CD 2 day/week. Total 15 participants stated that they clean their CD 1 day/week. Total 14 participants stated that they are very rarely clean their CD as per availability of material or cleansing aid. P value was found to be significant (0.010). All rate of recurrences associated with CD cleansing has been showed in table 3. Table 4 shows fundamental statistical explanation with level of significance assessment using Pearson chi-square test. Question no 2, 4 and 5 illustrated significant levels on performing Pearson Chi-Square (p<0.05 significant).

Table 1: AGE & GENDER WISE DISTRIBUTION OF PATIENTS

Age Group (Yrs)	Male	Female	Total	P value
45-50	3	3	6 [6 %]	0.00*
51-55	11	6	17 [17 %]	0.90
56-60	17	5	22 [22 %]	0.60
61-65	16	9	25 [25 %]	0.30

>65	17	13	30 [30 %]	0.01*
Total	64	36	100	*Significant

*p<0.05 significant

Table 2: QUESTIONNAIRE RESPONSES ASSESSMENT WITH RELATED STATISTICAL INFERENCES

Questions	Variables	No. of Respondents	p Value
1	No cleaning at all	15	
2	CD cleaning by tooth brush & water	10	
3	CD cleaning by tooth brush & soap	11	
4	CD cleaning by tooth brush & tooth paste	33	
5	CD cleaning by immersing in cleansing solution (tablet)	15	0.020*
6	CD cleaning by soaking in mouthwashes	7	
7	CD cleaning by both brushing and immersing in mouthwash	4	
8	CD cleaning by brushing and soaking in hypo solution	3	
10	Any other combination	2	

*p<0.05 significant

Table 3: DISTRIBUTION OF PATIENTS ACCORDING TO FREQUENCY OF CLEANING

| S. No	Frequency	Cleaning frequency (No. of respondents)	p value
1	Per Day	12	
2	3 day/week	11	
3	2 days/week	22	
4	1 day/week	15	0.010*
5	Arbitrarily	26	
6	Seldom	14	

*p<0.05 significant

Table 4: FUNDAMENTAL STATISTICAL EXPLANATION WITH LEVEL OF SIGNIFICANCE ASSESSMENT USING PEARSON CHI-SQUARE TEST

Question No.	Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1	1.93	1.648	0.823	1.67	1.564	1.0	0.348
2	2.34	1.456	0.950	2.24	2.675	1.0	0.001*
3	2.94	0.124	0.648	2.98	2.566	1.0	0.090
4	3.94	0.724	0.758	2.34	1.646	2.0	0.001*
5	4.45	1.084	0.246	1.89	2.235	2.0	0.000*
6	3.12	0.346	0.647	1.12	1.897	1.0	0.080
7	4.94	1.452	0.578	2.45	2.569	2.0	0.050

8	2.63	1.896	0.324	2.98	2.357	1.0	0.090
9	3.96	1.898	0.036	1.67	1.458	2.0	0.500
10	2.29	0.458	0.235	2.78	2.563	1.0	0.300

*p<0.05 significant

Graph 1: AGE & GENDER WISE DISTRIBUTION OF PATIENTS
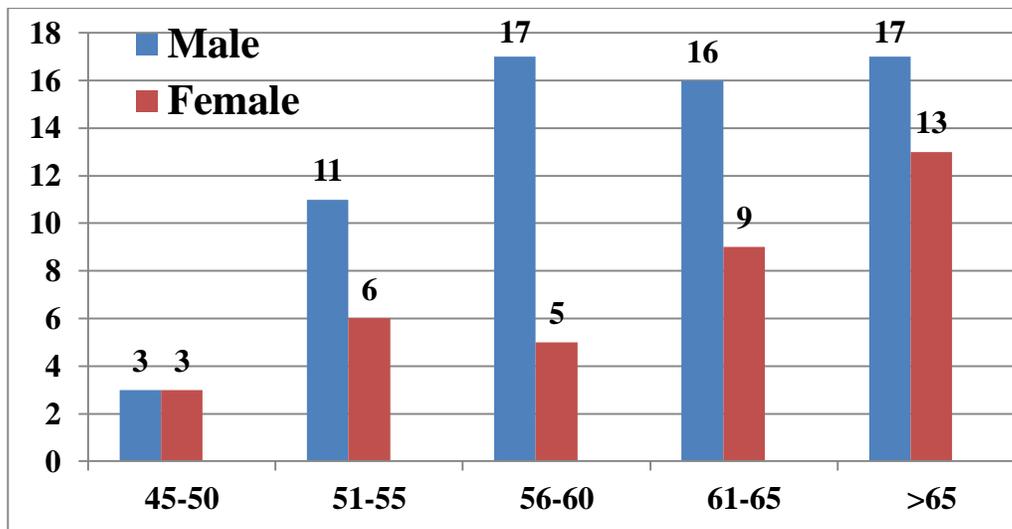
Graph 2: GRAPHICAL ILLUSTRATION OF PATIENTS ACCORDING TO FREQUENCY OF CLEANING
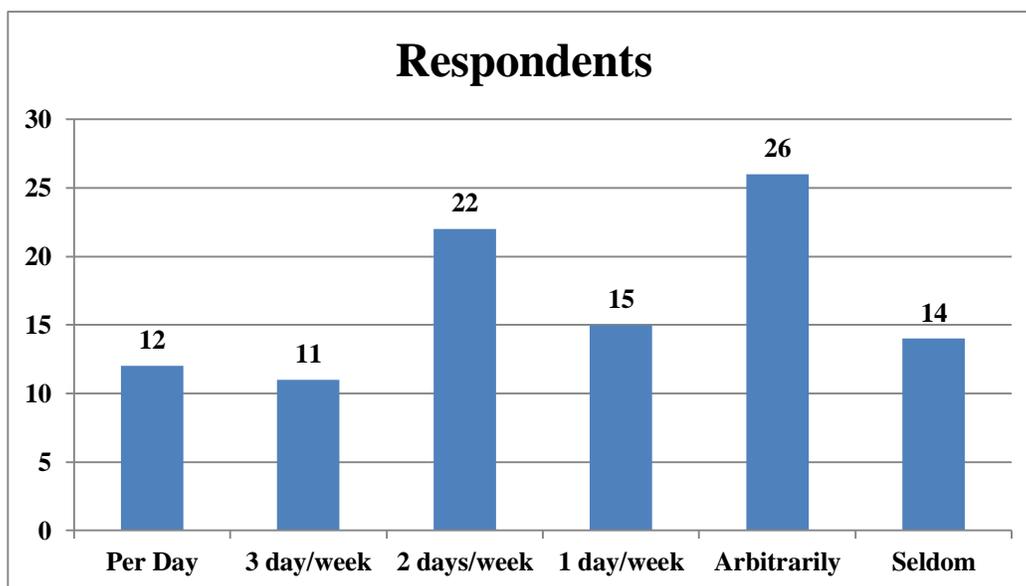
IV. DISCUSSION

All we know that an ideal denture cleanser must be easy to use, efficiently remove organic and inorganic substances from all three denture surface including occlusal surface, polished surface and tissue surface. An ideal denture cleanser must be having broad spectrum bactericidal and fungicidal capabilities. Almost all of the prominent denture cleansers cause minimum trauma to the denture parts or acrylic resins. As per various published researches in the literature, the judicial usages of denture cleansers extensively reduced the colonies of microorganisms on dentures in edentulous patients. This is particularly stands true in elderly admitted patients. Many of the pioneer studies have shown several positive and apparent negative outcomes with the utilization of denture cleansers.[11,12] These pioneer researches have explored the effect and correlation of denture cleansers with structural parameters of acrylic resins (denture base materials). Irrespective of the nature of prosthesis selected, the ultimate success depends on the efficient denture hygiene, denture maintenance and oral hygiene. As per mentioned by many of the standard textbooks, the tissue contacting surface of the complete denture serve as the most favorable site for the development of fresh colonies of micro-bacterium.[13] This is particularly achieved by making favorable environment for bacterial and fungus growth. The end result is nothing but the most notorious shelter of all micro-organisms 'dental plaque'. The dental plaque is an entity which is usually characterized by high moisture, high temperature and diminished oxygen supply. All such cascades and mechanisms severely hamper the self cleansing action of the saliva which eventually result into the development of denture induced infection and inflammation called; denture stomatitis.[14] Peracini and associates had evaluated complete denture hygiene methods and habits relating to the use of complete dentures, the age of dentures, and whether subject have been trained on how to clean their dentures.[15] They showed the mean age of patients as 63 years. They further stated that most of the studied patients were females (82). This was in contrast with our study wherein we have more of male patients. Their results illustrated that around 62 % of the patients had been employing the same maxillary complete denture for more than 6 years. They further reported that roughly 49 % of patients had used the same mandible complete denture for more than 6 years. Peracini and associates had also showed that the mechanical plaque control method (tooth brushing) was the most frequently used cleaning method by their studied patients. Veres et al observed that 36% of the participants brushed their dentures, and very few people (5%) used immersion as cleaning and 63% used only water to clean their prostheses.[16] Whereas the most of the studies had found that commonly used denture hygiene method is brushing with toothbrush.[17] Razan and colleagues did a study to assess the denture hygiene knowledge, attitudes and practice toward patient education in denture care among dental interns in Saudi Arabia.[18] They concluded that despite the dental interns knowledge in denture hygiene, dental interns were lacking the optimal information in regards to denture cleaning materials. As a result, their patients were not advised properly on the optimal method of maintaining denture hygiene. In recent studies, researches have made their primal focus on the attitude of denture's wearers and made their practices on the denture cleanness.[19]

V.   CONCLUSION

Within the limitations of the study authors concluded few very significant inferences. In the studied patients, they find that the overall status of complete denture cleansing and maintenance was below moderate level. Our study results must be considered as suggestive for presuming prognosis for similar clinical conditions. However, we expect some other large scale studies to be performed that might further establish certain standard and authentic guidelines in these perspectives.

REFERENCES

1. Dikbas I, Koksal T, Calikkocaoglu S. Investigation of the cleanliness of dentures in a university hospital. Int J Prosthodont 2006;19:294-298.

2. Zissis A, Yannikakis S, Harrison A. Comparison of denture stomatitis prevalence in 2 population groups. Int J Prosthodont 2006;19:621-5.

3. Jeganathan S, Payne JA, Thean HPY. Denture stomatitis in an elderly edentulous Asian population. J Oral Rehabil 1997;24:468-72.

4. Hoad-Reddick G, Grant AA, Griffiths CS. Investigation into the cleanliness of dentures in an elderly population. J Prosthet Dent 1990;64:48-52.

5. 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.

6. Polyzois GL. Denture cleansing habits. A survey. Aust Dent J 1983;28:171-3.

7. Lee HE et al. Effects of different denture cleaning methods to remove Candida albicans from acrylic resin denture based material. J Dent Sci 2011;6:216-23.

8. De Castellucci Barbosa L, Ferreira MR, De Carvalho Calabrich CF, Viana AC, De Lemos MC, Lauria RA. Edentulous patients' knowledge of dental hygiene and care of prostheses. Gerodontology 2010;25:99-106.

9. Baran I, Nalçaci R. Self-reported denture hygiene habits and oral tissue conditions of complete denture wearers. Arch Gerontol Geriatr 2009;49:237-41.

10. Abelson DC. Denture plaque and denture cleansers: review of the literature. Gerodontics 1985;1:202-6.

11. McNeme SJ, Von Gonten AS, Woolsey GD. Effects of laboratory disinfecting agents on color stability of denture acrylic resins. J Prosthet Dent 1991;66:132-6.

12. Kyung-Sook Hwang et al. The Effect of Cleanser Containing Persulfate Compounds and Sodium Perborate Monohydrate on Orthodontic Appliances. Int J Clin Prev Dent 2016;12:80-9.

13. Salles MM et al. Antimicrobial activity of complete denture cleanser solutions based on sodium hypochlorite and Ricinus communis – a randomized clinical study. J Appl Oral Sci 2015;23;637-43.

14. Jnanadev KR and Satish BCL. Disinfecting the acrylic resin plate using Electrolyzed Acid Water and 2% Glutaraldehyde. A comparative microbiological study. J Indian Prosthodont Soc 2011;11: 36- 44.

15. 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(3):247-52.

16. Veres EM, Wolfaardt JF, Hnizdo E. Denture cleansers: Part III — A survey of materials and methods employed by denture wearers. J Dent Assoc S Afr 1985;40:591-4.

17. Tanoue N, Matsumura H, Atsuta M. Wear and surface roughness of current prosthetic composites after toothbrush/dentifrice abrasion. J Prosthet Dent 2000;84:93-7.

18. Razan FA et al. "Evaluation of Knowledge, Attitude, and Practices toward Complete Denture Hygiene among Dental Interns in Saudi Arabia". EC Dental Science 2019;18:1181-8.

19. Felton D and Cooper L. Evidence based guidelines for the care and maintenance of complete denture. JADA 2011;142:1-20.