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Assessment of Denture Cleanliness among Complete Denture Wearer in Chitwan

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ABSTRACT

Introduction

Oral cleanliness is important for all to maintain the overall health status. It is also important for the old aged edentulous people with dentures. The complete dentures are custom made device which are the replacement for the missing all tooth of mouth. Many microorganisms adhere to the surfaces of dentures and form denture plaque and calculus. They are there due to inadequate denture hygiene maintenance. This study was performed with the aim of assessing cleanliness of complete dentures among the denture wearers.

Methods

A descriptive cross-sectional study conducted among 140 complete denture in the Department of Prosthodontics and Maxillofacial Prosthetics at Chitwan Medical College and Hospital. A convenience sampling method was used in this study. After taking the sociodemographic information and other information related to dentures, the participants dentures were evaluated with disclosing agent. The stained dentures were then assessed according to the Denture Cleanliness Index. Data was analyzed by using descriptive statistical tools in SPSS-16 and results were presented in form of tables.

Results

The mean age of 140 patients was 71.39±5.80 years. There were 81 (57.9%) females and 59 (42.1) males. About 27 (19.3%) denture wearers did not remove dentures from their mouth at night. Among total, 81 (57.9%) of participants brushed their dentures with water. Denture Cleanliness Index scores of 2 was observed in 64 (45.8%) of denture wearers.

Conclusions

It can be concluded that majority of participants had uncleaned dentures suggesting the need of proper denture hygiene instructions and routinely follow-up for the cleanliness of dentures and their overall intraoral health status whether or not there were denture stomatitis.

Keywords: Complete denture; Denture Cleanliness Index; denture hygiene; older people.

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INTRODUCTION

Older people are in increased need of care and love. However, this is the period when they are mostly neglected by family making their lifestyle difficult. In addition, the old age people are having many systemic diseases and are also prone to oral problems such as mucosal inflammation, halitosis.[1, 2] This is much more enhanced by the poor oral health. Hence there is a need of proper oral hygiene in old age people.[3, 4]

Loss of tooth is an evitable problem, prevalent in the old age people. The tooth loss leads to functional disability and esthetic problems, eventually lading to the poor oral health related quality of life among the old people.[3] In order to restore the function and enhance the appearance, these age group people are substituted with removable or partial complete dentures. Recently implant retained dentures have also been given to the patients.[5]

Any foreign body kept inside the mouth for the long time is the source of neglect in the old age. These foreign body may it be removable partial or complete dentures, are the source of adherence of microorganisms.[6-8] The rough surface of the dentures, the materials used for fabricating dentures are also the factors associated with it. These microorganisms are also the cause of many systemic problems such as pneumonia, endocarditis and diabetes.[9, 10]

The main basis of denture hygiene is removal of dental plaque adhering to the dentures. Such information is lagging or the people of old age forget to maintain. The later effect is formation of stains in dentures and dental plaque.[11] Studies related to denture cleanliness and hygiene is lagging in Nepal. Studies have shown that the dentures of old age people have been harbored with microorganisms[8, 10, 12] but the cleanliness associated has not been investigated yet. Hence this study was carried out with the aim to assess the cleanliness of complete dentures among the denture wearers.

METHODS

A descriptive cross-sectional study was conducted among the complete denture wearing old age people in the Department of Prosthodontics and Maxillofacial Prosthetics at Chitwan Medical College and Hospital. The duration of data collection was May 2021 till Feb 2023. Completely edentulous old aged people who have been wearing acrylic dentures for a period more than 1 year and those were willing to participate in the study and gave written consent were included in the study. However, old denture wearer who did not wish to remove the denture and those people with known systemic diseases were not included in the study. A convenience sampling method was used in this study.

The sample size was calculated using formula $n=Z^2pq/d^2$. Taking Z=1.96 at 95% Confidence interval, p=0.63[13], q=0.37 and d=8%, the sample size was calculated as 139.91. Finally, 140 pairs of dentures were included in the study.

After the participants arrived at the hospital, they were informed about the purpose of the study. Then after receiving the written consent, the participants were asked basic questionnaire related to socio-demographic information name, age, address, gender, period of wearing dentures, and materials used for cleaning. All the information was recorded in proforma.

In the second part of the study, the dentures were washed with cold water to remove away food particles and debris. Then a disclosing agent was applied in the fitting surface of the dentures. It was left in this condition for 30 seconds and later washed under cold water. The stained dentures were then assessed according to the Denture Cleanliness Index (DCI) with scores 0 (Best) to 4 (Worst).[13, 14] Later denture hygiene instructions were given to the patients.

The data was entered into Microsoft excel 2019 and then transferred to Statistical Package for the Social Sciences (SPSS) version 16 (SPSS, Inc., an IBM Company, Chicago, IL). Descriptive statistical analysis was done. The results were presented in form of tables.

RESULTS

Altogether 140 denture wearers participated in the study. The mean age of the participants was 71.39±5.80 years. There were 81 (57.9%) females and rest were males (Table 1).

Table 1. Age and gender wise distribution of denture wearers.

Variables	Frequency (%)
Age Group	56-84 years
Mean Age±SD (yrs)	71.39±5.80
Gender	
Male	59 (42.1)
Female	81 (57.9)

Among the participants 27 (19.3%) did not remove dentures from their mouth at night. Out of 140, 81 (57.9%) of participants brushed their dentures with water (Table 2).

About 64 (45.8%) of denture wearers had DCI scores of 2, while 9 (6.4%) of denture wearers had 0 score (Table 3).

DISCUSSION

There is a need of good oral hygiene for the personal well-being. Similarly, good denture hygiene is also necessary in the older individuals who are wearing dentures from a long time.[14-17] The authors previously performed a study observing the denture hygiene habit and denture care practice among the complete denture wearer.[18] However, it is a quite known fact that the dentures are also the medium for attachment of plaque and simultaneously deposit calculus similar to the natural counterparts.[13] These denture plaque is also the source of multiple potentially harmful micro-organisms.[11, 19-22]

Table 2. Dentures use, hygiene habits among denture wearers.

Dentures use, hygiene habits		Frequency (%)
Denture wearing period (mean age ± SD) (yrs)		5.47±2.07
Wear dentures at night	Yes	27 (19.3)
	No	113 (80.7)
Method of cleaning denture	Brushing with water only	81 (57.9)
	Brushing with soap	36 (25.7)
	Brushing with toothpaste	23 (16.4)

Table 3. Denture Cleanliness Index scores of denture wearers.

Denture Cleanliness Index	Score	Frequency (%)
Clean denture. No plaque is visibly seen, no staining, no plaque detectable	0	9 (6.4)
Denture is visibly clean. Little staining (<25% staining of fit surface)	1	38 (27.1)
Denture has visible plaque and/or debris. Moderate staining of fit surface (25-50% staining of the fit surface)	2	64 (45.8)
Denture has visible plaque and/or debris. Severe (>50% staining of the fit surface)	3	29 (20.7)
Denture has visible calculus deposit(s), on any surface	4	-

Observing the fact that the in old age, the dentures are hardly cleaned, the present paper was done to highlight the cleanliness of dentures among the complete denture wearers of Chitwan. This is the first of its kind observing the cleanliness of dentures in Nepal.

Study suggests that an uncleaned denture always favors the accumulation of dental plaque, eventually leading to the development of dental caries, periodontitis and denture stomatitis.[10-12, 23] Our previous study has also shown that denture wearers 52.85% of the participants had been using the same denture above 5 years.[18] Fabricating the denture in Nepal is bit expensive and due to the socioeconomic grounds and family history, the dentures might have been used for long time.[18] However, it can also be speculated that the dentures hygiene had also not been maintained. Old aged people also tend to wear the dentures at night which was also observed in the present study.

A number of methods for cleaning the dentures are available either it be with chemical or with mechanical methods.[13, 24] The mostly used methods as reported by different studies were using toothbrush with soap or toothpaste and later rinsing with water.[11, 24] Many people also soak the dentures in chemical cleansers which are commercially available.[11] In the present study, more than half 81 (57.9%) of denture wearers had the habit of brushing the dentures with water only. About 36 (25.7) dentures wearer brushed their dentures with soap. The findings of the study were similar to our previous study.[18]

DCI score was developed by Mylonas et al as a part of quantifying denture cleanliness and assist in achieving the clinical records.[14] In a series of studies by same author, a baseline data of denture cleanliness was carried out followed by providing denture hygiene instructions and again taking the score.[13,14, 24] The authors reported improvement in the denture cleanliness score. In the present study, only baseline score was carried out. The score 2 was prevalent followed by score 1 and score 3. This was not in line with the scores portrayed by Mylonas et al where score 3 was more prevalent followed by score 2.[13, 14] This method helped to evaluate the cleanliness of dentures in a simple and quick way, however, this method seems to be successful only in hospital setting. The disclosing agent is not available in home-use and the ergonomics of denture wearer is still poor in old age. The removal of biofilm was also a problem in old age in a study conducted in Brazil.[25] The authors had also observed the poor denture hygiene habit and care practice among the complete denture wearing participants. In few participants denture hygiene instructions follow-up improved the hygiene of dentures.

The maintenance of the denture hygiene is pertinently dependent upon knowledge received during the denture delivery, manual dexterity and mental status of denture wearer.[4] The old aged people mostly rely on others for assistance of oral care. Moreover, they have less assess to the dentist for their oral care.[4] In a study reported by Shetty B, majority of the participants lacked the desire to clean their denture on daily basis.[26] In another study, Rathi et al reported the lack adequate knowledge and awareness of denture hygiene maintenance.[27] Since the objective of the study was only to assess the cleanliness score and the descriptive cross-sectional design of the study did not allow the authors to do the follow-up study. The authors also recommend further studies using multicenter with follow-up.

The small sample size is the main limitation of the study. In addition, the study was single centered, confined to Chitwan, so the data thus presented cannot be generalized. Further, multicentric study should be conducted.

CONCLUSIONS

It can be concluded that majority of participants had uncleaned dentures suggesting the need of proper denture hygiene instructions and routinely follow-up for the cleanliness of dentures and their overall intraoral health status whether or not there were denture stomatitis.

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