Assessment of denture hygiene habits among the denture wearers visiting a tertiary hospital of Nepal

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ABSTRACT

Introduction: Denture plaque is a dense layer of microorganism developed on surfaces of prosthesis. This plaque usually harbors various bacteria and fungus which can cause infections. For cleaning denture various cleaning regimens are used such as denture cleaners, soap. Various researchers have found that denture brushing is the most common practice among denture wearers but approximately 50% of them do not remove prosthesis overnight. The aim of our study was to assess denture hygiene practice among denture wearers. **Methods:** A descriptive cross- sectional study was done in Patan Academy of Health Sciences with convenience sampling in the people wearing denture. Data collection was done by face to face interview and clinical examination.These collected data was entered and analyzed in Excel to find out prevalence of denture hygiene habits. **Results:** Most of study participants 283(74.10%) wore interim removable partial denture. All of the study participants cleaned their denture. Of them, majority 181(47.40%) cleaned their denture once a day. Most of the study participants 330(86.40%) removed denture at night and 13.60% did not remove denture at night. 46(12%) of our study group did not remove prosthesis while brushing. Of those who removed prosthesis while brushing used soap for cleaning. **Conclusions:** All our study population cleaned denture, majority of them cleaned denture once a day with soap water and brush, small number of people didn't remove the denture at night and while cleaning. This denture hygiene practice concludes the need of awareness of denture hygiene practice to denture wearer for good oral hygiene.

Keywords: Denture, denture hygiene, denture plaque, prosthesis.

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INTRODUCTION

Denture plaque, a dense biofilm of microorganisms adhering to polymethyl methacrylate (PMMA), harbors pathogens like streptococci and candida species, directly contributing to oral conditions such as denture stomatitis.[1,2] Effective plaque control is critical for preventing mucosal inflammation, and common cleaning methods include mechanical brushing with denture cleaners, toothpaste, mouthwash, or soap.[3]

Existing literature highlights global inconsistencies in hygiene practices. Papadiochou et al.[4] noted that while denture brushing is prevalent, nearly 50% of wearers retain dentures overnight, a risk factor for mucosal diseases. Similarly, Axe et al.[5] revealed a disconnect between professional recommendations (denture cleaners) and patient preferences (toothpaste) across six countries. In Nepal, a single center study (Chitwan Medical College) found 81% of patients cleaned dentures extra orally with toothbrushes, yet overnight retention patterns and regional variations remain underexplored.[6] These gaps underscore the need for context specific data, particularly in tertiary care settings where diverse patient demographics may influence hygiene behaviors.

To address this, our study assessed denture hygiene practices including cleaning methods, frequency, overnight removal among patients visiting a tertiary hospital in Nepal. By identifying local trends and discrepancies, we aimed to develop targeted educational interventions that reduce denture related mucosal diseases. The objective of this study was to evaluate denture hygiene habits among wearers at tertiary Nepalese hospital and utilize findings to enhance patient education on optimal prosthesis maintenance.

METHODS

A descriptive cross- sectional study was carried out in department of dentistry, PAHS from Jan 2021 to Jan 2024) after ethical approval from institutional review committee (Ref. No. dr2009291452). Convenience sampling technique was used to collect data. Individuals of 35 years or above those who were wearing denture at least for one year were included. Denture worn by patient were categorized as complete denture, cast partial denture and interim partial denture. Patient with missing teeth but replaced by fixed partial denture, dental implants and non-denture wearers were excluded from the study.

Sample size was calculated using the prevalence from the study by Saha et al.[7]

$n = Z^2 x (p \times q)/e^2$

$= 1.96^2 \times 0.53 \times (1-0.53)/0.05^2$

$= 382$

Where, n = sample size,

Z= 1.96 at 95% confidence level

p = prevalence of Denture hygiene practice (53%)

e = margin of error, 5%

q = 1-p

Data collection was done by primary investigator utilizing face to face interview and clinical examination of patient after obtaining written informed consent. During face-to-face interview, self-reported questionnaire was administered to study population to be filled, assisted by their guardians or primary investigator. Participants were asked about their denture hygiene habits like frequency of denture cleaning per day, techniques and materials used to clean denture, their habit of removing denture at night and recorded. During clinical examination type of denture worn by patient was categorized. These data collected were entered and analyzed in Excel to find out prevalence of denture hygiene habits and percentage of various type of denture worn by the patient.

RESULTS

A total of 382 participants were included in the study, of which, 213(55.80%) were females. The age of the study participants ranged from 35 to 90 years with mean age 63.39±12.54 years.

The distribution of study participants according to type of denture worn is shown in table 1. The majority of participants 283(74.10%) wore an interim removable partial denture. Complete dentures were less common 68(17.80%) and cast partial dentures were the least prevalent 31(8.10%).

Table 1: Distribution of study participants according to type of denture worn (n=382)

Type of denture	n(%)
Interim removable partial denture	283(74.10%)
Cast partial denture	31(8.10%)
Complete denture	68(17.80%)
Total	382(100)

The distribution of study participants according to denture age is demonstrated in table 2. Where, most of the dentures worn by participants were relatively new 217(56.80%), a substantial portion wore dentures for 6 to 10 years, while minority of participants were old denture wearer, those who have been wearing dentures since 11 to 15 years.

Table 2: Distribution of study participants according to denture age (n=382)

Denture age (in years)	n(%)
1-5	217(56.80%)
6-10	145(38%)
11-15	20(5.20%)
Total	382(100)

Table 3 shows the distribution of study participants according to frequency of cleaning denture. The majority of participants 181(47.40%) cleaned their dentures once a day, representing a common practice. Significant percentage of participants 115(30.10%) reported cleaning dentures twice a day.

Table 3: Distribution of study participants according to frequency of cleaning denture (n=382)

Frequency of cleaning	n(%)
Once a day	181(47.40%)
Twice a day	115(30.10%)
Thrice a day	48(12.60%)
More than three times a day	38(9.90%)
Total	382(100)

Table 4: Distribution of study participants according to how denture is stored overnight (n=330)

Storage of denture overnight	n(%)
Immersion of denture in dwater	243(73.60%)
Immersion of denture in denture cleaner	87(26.40%)
Total	330(100)

Distribution of study participants according to how denture is stored overnight is shown in table 4. It describes the overnight storage practices of the 330 participants who reported removing their dentures at night. Above data reveled that immersion in water was the predominant practice, employed by 243(73.60%) participants.

Table 5: Distribution of study participants according to technique of denture cleaning (n=336)

Technique of denture cleaning	n(%)
Brushes with denture cleaners	30(8.90%)
Brushes with toothpaste	71(21.10%)
Brush with soap	235(69.90%)
Total	336(100)

Table 5 shows distribution of study participants according to technique of denture cleaning. The clear preference for brush and soap as dominant denture cleaning technique were used by 235(69.90%) of participants.

DISCUSSION

Among 382 study population, 169(44.20%) were males and 213(55.80%) were females. Age of the study participants ranged from 35 to 90 years with mean age 63.39 years. Most of them 283(74.10%) wore interim removable partial dentures and 56.80% of them wearing denture for 1 to 5 years, which suggested increasing number of new removable partial denture wearer in our population. While all participants (100%) cleaned their dentures, predominantly once daily (47.40%), with soap (69.90%). However, concerning practices persisted among our denture wearers where 13.60% retained dentures overnight and 12% cleaned them intraorally without removal.

Removable denture consists of both denture base and denture teeth. These denture bases are fabricated with acrylic or PMMA, metal alloy (cobalt chromium) and polymers (like nylon based thermoplastic resins, polyether ketone and aryl ketone polymers. Most used acrylic in denture base is heat cured PMMA which is inherently porous, non-shedding and readily aggregates denture plaque.[8] Denture plaque consists of microorganisms like Candida albicans, Streptococcus mutants, Staphylococcus aureus which are pathogenic in nature and causes infections such as denture stomatitis if hygiene is not maintained.[8]

According to guideline published for denture care and maintenance by American College of Prosthodontists in 2011 dentures should be cleaned daily by soaking and brushing with denture cleaners outside the mouth.[9] Since aim of our study is to assess denture hygiene practice among denture wearers, we found each patient of study 382(100%) cleaned their denture. Of them, majority 181(47.40%) cleaned their denture once a day which is like study done by Apratim et al.[10] where their 44.70% of study population used to clean denture once daily. These observed practices suggest potential gaps between guidelines and implementation. The 12% intraoral cleaning cohort is particularly concerning, as de Souza et al. identified this as a key risk factor for stomatitis.[1]

Even if our denture population used to clean denture once a day only 330(86.40%) removed denture at night and 52(13.60%) did not remove denture at night or day for cleaning, and some of them used to brush teeth and denture intraorally as they normally brush their teeth. It might be because they didn't get their post denture insertion instructions properly or they didn't follow instructions. This data was in align to the study done by Tosun et al.[11] where their 18.60% of study population didn't remove denture at night. Similarly, among those who removed denture at night, majority of them 243(73.60%) immersed dentures in water others remaining stored in denture cleaners in both researches.

Our finding that 86.40% remove dentures overnight contrast with Chaulagain et al.'s report from Chitwan Medical College where overnight retention was prevalent among complete denture wearers.[6] The high soap usage 69.90% aligns with their observation that commercial denture cleaners are rarely used in Nepal.[6] Globally, our overnight removal rate exceeds Papadiochu et al.'s report of 50% retention[4] but parallels Tosun et al.'s finding of 18.6% non-removal.[11] The preference for soap overdenture cleaners (8.90%) mirrors Ogunrinde et al.'s Nigerian study (72.40% soap usage)[12] and reflects Axe et al.'s documentation of global patient professional discordance.[5]

Denture hygiene must be regular chores for maintaining oral hygiene hence, for appropriate denture care instructions must be given to denture wearer and one of the reasons for poor denture hygiene may be inadequate instructions and information from dental specialist after insertion of denture.[13,14] 13.60% of patient who didn't took out their denture for cleaning and storing overnight may be those

group of patients who haven't received or followed denture hygiene instructions given by dental professionals. Hence, as suggested by Khasawneh et al.[14] both verbal and written post denture insertion instructions for denture hygiene must be given. Our study revealed incorrect denture care habit which may lead to chronic inflammations and infections. These findings highlighted importance of awareness program and regular dental check-ups specially for people wearing dentures even if they don't have complains to enhance knowledge and practice of denture hygiene. This attributed practice regarding,

"Insufficient instruction" evidence suggests multifactorial causes, where Milward et al. demonstrated only 28% of wearers recalled hygiene instructions.[14] This suggests cultural preferences for continuous wear may override clinical advice and economic factors likely influence cleaner selection as soap is more accessible.

These suboptimal practices may contribute to Nepal's oral disease burden. While we didn't assess mucosal health, as Emami et al. established clear associations between poor hygiene and stomatitis.[8] Our unicentric design limits generalizability, but as Nepal's one of tertiary hospital's assessment, it revels opportunities for targeted interventions like Khasawneh et al.'s verbal and written education model.[14]

CONCLUSIONS

Even though all study population cleaned denture, majority of them cleaned denture once a day with soap water and brush, small number of people didn't remove the denture at night and did not remove denture while cleaning. This denture hygiene practice concludes the need for enhanced patient education programs focused on overnight removal protocols, proper extra oral cleaning techniques and regular dental screenings to mitigate mucosal disease risks in denture wearing population.

CONFLICTS OF INTEREST: None declared

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AUTHORS' CONTRIBUTIONS

AM, AV, RS and SPJ contributed to the conception and design of the study. AM, AV, RS, NK and SPJ collected and analysed the data. AM drafted the manuscript. AV, RS and SPJ, NK critically revised the manuscript for important intellectual content. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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