

# Association between Prosthesis Cleanliness and Patient's Knowledge on Hygiene Habits among Complete Denture Patients and Partial Denture Prosthesis Wearers

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## ABSTRACT

**Introduction:** To have good oral health of patients wearing denture they must maintain high standards of both oral hygiene and denture hygiene. The aim of this study was to access the level of knowledge on hygiene and prosthesis cleanliness among elderly individuals wearing removable dental prostheses.

**Methods:** The sample consists of 382 patients visiting the Dental Outpatient Department of Dhulikhel Hospital for a period of 3 months. The oral examination was conducted using basic diagnostic tools (Mouth mirror, periodontal probe and explorer). A prepared questionnaire was developed regarding oral hygiene habits and also the cleanliness of the removable dental prosthesis and was classified according to the 3-point scoring system for all the subjects.

**Results:** A total of 115 (67.3%) and 63(66.3%) patients above age 50 had kept their prosthesis extremely dirty and dirty in CD and RPD wearers. Patients with low education level had kept their prosthesis extremely dirty [109(73.6%) in CD wearers] and dirty [36(63.2 %) in RPD wearers]. 45(72.6 %) patients wearing RPD at night and 102(75.6 %) patients wearing CD at night had dirty and extremely dirty prosthesis respectively. Factors like age, education, duration of wearing prosthesis, prosthesis worn during night time were associated with prosthesis cleanliness. Similarly, instructions for cleaning prosthesis, method of cleaning and frequency of cleaning had significant association with prosthesis cleanliness.

**Conclusion:** Prosthesis cleanliness was affected by age and education level. Most of the patients were uninformed about the good oral hygiene practices. More information should be provided to the patients for raising the awareness and motivating them in cleaning the denture in order to provide cleaner prosthesis.

**Key words:** Complete Denture; Habits; Hygiene; Removable Partial Denture.

*Conflict of Interest: None*

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## INTRODUCTION

As age increases the related risk of tooth loss, the number of patients who will require fixed or removable dental prostheses is expected to increase.<sup>1, 2</sup> In order to achieve optimal oral health it is well documented in the literature that denture wearing patients should be advised to maintain high standards of both oral hygiene and denture hygiene.<sup>3, 4, 5, 6</sup>

Patient education remains one of the best ways to help prevent the onset of diseases that can occur due to poor denture hygiene, mechanical plaque control, good denture wearing habits, and regular visits to the dentist are the best ways of minimizing and treating denture related pathology such as denture-related stomatitis. The most common method of plaque control still involves using a brush with soap and water or a denture paste<sup>7, 8, 9, 10</sup>

The objective of this study was to assess the awareness and also find association between knowledge of hygiene and prosthesis cleanliness among removable denture wearers.

## METHODS

A cross-sectional study was conducted on patients visiting the Dental Outpatient Department (DOPD) of Dhulikhel Hospital, Kathmandu University school of medical sciences who were wearing complete or partial removable dental prosthesis since 6 months and between the age group of 20 years and 70 years were selected for the study. The total numbers of patients involved in the study were 382 and the duration of study was 3 months (November 2022 to January 2023) after receiving Ethical approval from the institutional review committee (IRC) of Kathmandu University school of medical sciences (KUSMS) (IRC –KUSMS Approval No 160/22). Sample size was calculated to be 382, using formula,  $n = Z^2 p(1-p)/d^2$ , Where  $Z$ =static constant corresponding to the level of confidence,  $p$ =expected prevalence and  $d$ =precision or margin of error. The sample size was calculated based on the average annual turn out of patients in Prosthodontics Department of Dhulikhel Hospital and considering prevalence of 46% of denture cleanliness among the study participants as shown by Cinquanta L et al.<sup>11</sup> with 5% margin of error, at 95% confidence

interval and  $Z=1.96$ . Convenience sampling method was used for selection of patients.

This study included patients wearing removable dental prosthesis for 6 months and above and patients wearing prosthesis for less than 12 to 24 hours and having mental disorders were excluded from this study.

A questionnaire was developed, and the study purpose was explained, interviewed and questions were filled personally. Data about age, gender, education and knowledge on hygiene habits regarding removable dental prosthesis and methods of cleaning the prosthesis were asked. Therefore the data were primary and no secondary data were included.

After completing the questionnaire, the removable dental prostheses were examined and classified according to the scoring system for removable dental prosthesis cleanliness described by Hoard-Reddick et al.<sup>12,13</sup>

### Scores and criteria

Score 1 (clean prosthesis) soft-hard debris and pigmentations absent

Score 2 (dirty prosthesis) Soft debris present between the teeth, or over impression surfaces of denture. Hard debris or stains present around gingival margins and lingual and labial surfaces of mandibular central incisors, or at labial aspect of maxillary molars

Score 3 (extremely dirty prosthesis) Similar as score 2, with presence of additional debris on denture base.

The chi-square test was used for comparisons between hygiene habits and cleanliness regarding removable dental prosthesis. Statistical evaluation was done using the statistical package for social sciences (SPSS 20.0), the level of significance set at  $p$ -value  $<0.05$ .

## RESULTS

Total number of patients enrolled in this study was 382. The total number of patients wearing complete denture were 231(60.5%) (table 2) and removable partial denture were 151(39.5%) (table 1). According to the category based on prosthesis cleanliness, 16 (6.9%) patients had kept prosthesis clean, 67 (29%) dirty and 148 (64.1%) extremely dirty in complete denture patients (table 2) and 51(33.7%) clean, 83 (55%) dirty and 17 (11.2%) extremely dirty in removable partial denture (table 1).

Age was significantly associated with complete and partial removable denture wearers cleanliness ( $p < 0.05$ ). Dirty and extremely dirty prosthesis group had significantly higher proportion of patients in the age group  $\geq 50$  years, 63(66.3%) and 115 (67.3%) (table 1, table 2) respectively.

Almost half of the respondents were illiterate compared to other groups and there was statistical association between education and removable denture wearers cleanliness ( $p < 0.05$ ) (table 1 and table 2). The total 109 (73.6%, table 2) patients in CD and 36 (63.2%, table 1) in RPD had kept prosthesis extremely dirty and dirty respectively.

Similarly, the duration of wearing the prosthesis more than six months to one year was also significantly associated with dirty prosthesis and extremely dirty prosthesis ( $p < 0.05$ ) (table 1 and table 2) compared to wearing for less than 6 months among complete and removable partial denture wearers. 60(65.2%) patients had dirty prosthesis and 117(67.6%) patients

had extremely dirty prosthesis in RPD and CD prosthesis respectively.

Respondents wearing prosthesis at night had dirty prosthesis 45 (72.6%) in RPD and extremely dirty 102 (75.6%) in CD. The prosthesis worn during night time was statistically significant with removable prosthesis cleanliness ( $p < 0.05$ ) (table 1, table 2).

Majority of respondents who [97(69.4%) in CD and 45 (64.3%) in RPD] did not receive explanation from anyone on cleaning the prosthesis had extremely dirty and dirty prosthesis. Among those who had been informed about it, friends were the primary source of information and had kept prosthesis clean [7 (12.5%) in CD and 11 (26.2%) in RPD]. The source of information received for cleanliness was statistically significant to prosthesis cleanliness ( $p < 0.05$ ) (table 1 and table 2).

To assess the level of general knowledge about methods to clean the prosthesis 103 (66.5%) and 51(60%) in CD and RPD used plain water followed by toothbrush and paste which was statistically significant to cleanliness ( $p < 0.05$ , table 1 and table 2).

Frequency of cleaning the prosthesis was also significantly associated ( $p < 0.05$ ) (table 1 and table 2). It was observed that patients who had cleaned the prosthesis twice daily had clean prosthesis [8 (50%) in CD and 19 (76%) in RPD] compared to respondents who had never cleaned [35 (70%) in RPD and 103 (77.5%) in CD] had dirty and extremely dirty prosthesis respectively.

**Table 1:** Association between different variables with prosthesis cleanliness for removable partial denture

| Variables                                 | Category         | Removable Partial denture wearers n=151 (39.5%) |                     |                                 |         |
|---|------------------|---|---------------------|---------------------------------|---------|
|   |                  | Category based on Prosthesis cleanliness n (%)  |                     |                                 | P value |
|   |                  | Clean n=51<br>(33.7%)                           | Dirty n=83<br>(55%) | Extremely dirty<br>n=17 (11.3%) |         |
| Age                                       | ≤ 50 years       | 31 (55.4)                                       | 20 (35.7)           | 5 (8.9)                         | <0.05   |
|   | ≥ 50 years       | 20 (21.1)                                       | 63 (66.3)           | 12 (12.6)                       |         |
| Education                                 | 10+2 above       | 20 (41.6)                                       | 25 (52.1)           | 3 (6.3)                         | <0.05   |
|   | School level     | 19 (41.4)                                       | 22 (47.8)           | 5 (10.8)                        |         |
|   | Illiterate       | 12 (21.1)                                       | 36 (63.2)           | 9 (15.7)                        |         |
| Duration of wearing Prosthesis            | ≤ 6 months       | 30 (50.8)                                       | 23 (38.9)           | 6 (10.3)                        | <0.05   |
|   | ≥ 6 months       | 21 (22.8)                                       | 60 (65.2)           | 11 (12.0)                       |         |
| Prosthesis worn during night time         | Never            | 22 (55)   | 15 (37.5)           | 3 (7.5)                         | <0.05   |
|   | Sometimes        | 21 (42.8)                                       | 23 (46.9)           | 5 (10.3)                        |         |
|   | Everynight       | 8 (12.9)  | 45 (72.6)           | 9 (14.5)                        |         |
| Instructions for cleaning Prosthesis from | Friends          | 11 (26.2)                                       | 28 (66.6)           | 3 (7.2)                         | <0.05   |
|   | Dentist          | 25 (64)   | 10 (25.6)           | 4 (10.3)                        |         |
|   | None             | 15 (21.4)                                       | 45 (64.3)           | 10 (14.3)                       |         |
| Method of cleaning prosthesis             | Toothbrush+paste | 29 (43.9)                                       | 39 (48.5)           | 5 (7.6)                         | <0.05   |
|   | Plain water      | 22 (25.8)                                       | 51 (60)             | 12 (14.2)                       |         |
| Frequency of cleaning prosthesis          | Morning          | 14 (43.7)                                       | 12 (46.8)           | 3 (9.5)                         | <0.05   |
|   | Morning+Night    | 19 (76)   | 5 (20)              | 1 (4)                           |         |
|   | Once a week      | 10 (22.7)                                       | 28 (63.6)           | 6 (13)                          |         |
|   | Never            | 8 (16)  | 35 (70)             | 7 (14)                          |         |

**Table 2:** Association between different variables with prosthesis cleanliness for Complete denture wearers

| Variables                         | Category     | Complete denture wearers n=231 (60.5%)         |                     |                                 |         |
|-----------------------------------|--------------|--|---------------------|---------------------------------|---------|
|                                   |              | Category based on Prosthesis cleanliness n (%) |                     |                                 | P value |
|                                   |              | Clean n=16<br>(6.9%)                           | Dirty n=67<br>(29%) | Extremely dirty<br>n= 148 (64%) |         |
| Age                               | ≤ 50 years   | 11 (18.4)                                      | 16 (26.6)           | 33 (55)                         | <0.05   |
|                                   | ≥ 50 years   | 5 (2.9)  | 51 (29.8)           | 115 (67.3)                      |         |
| Education                         | 10+2 above   | 9 (28.1)                                       | 9 (28.1)            | 14 (43.8)                       | <0.05   |
|                                   | School level | 5 (9.8)  | 21 (41.2)           | 25 (49)                         |         |
|                                   | Illiterate   | 2 (1.4)  | 37 (25)             | 109 (73.6)                      |         |
| Duration of wearing Prosthesis    | ≤ 6 months   | 11 (18.9)                                      | 16 (27.6)           | 31 (53.5)                       | <0.05   |
|                                   | ≥ 6 months   | 5 (2.9)  | 51 (29.5)           | 117 (67.6)                      |         |
| Prosthesis worn during night time | Never        | 8 (20)   | 16 (40)             | 16 (40)                         | <0.05   |
|                                   | Sometimes    | 5 (8.9)  | 21 (37.6)           | 30 (53.5)                       |         |
|                                   | Everynight   | 3 (2.2)  | 30 (22.2)           | 102 (75.6)                      |         |

|   |                  |           |           |            |       |
|---|------------------|-----------|-----------|------------|-------|
| Instructions for cleaning Prosthesis from | Friends          | 7 (12.5)  | 18 (32.2) | 31 (55.3)  | <0.05 |
|   | Dentist          | 5 (14.3)  | 10 (28.5) | 20 (57.2)  |       |
|   | None             | 4 (2.8)   | 39 (27.8) | 97 (69.4)  |       |
| Method of cleaning prosthesis             | Toothbrush+paste | 12 (15.7) | 19 (25)   | 45 (59.3)  | <0.05 |
|   | Plain water      | 4 (2.6)   | 48 (30.9) | 103 (66.5) |       |
| Frequency of cleaning prosthesis          | Morning          | 6 (20)    | 14 (46.6) | 10 (33.4)  | <0.05 |
|   | Morning+Night    | 8 (50)    | 8 (50)    | -          |       |
|   | Once a week      | 2 (3.8)   | 15 (28.8) | 35 (67.4)  |       |
|   | Never            | -         | 30 (22.5) | 103 (77.5) |       |

## DISCUSSION

Good oral hygiene is important in achieving overall physical and emotional well-being throughout life. Thus, this study was done to see the patient's awareness on dental hygiene habits and cleanliness of prosthesis among complete and removable denture wearers which will prevent them from different oral diseases and can further improve their quality of life.

Elderly patients, particularly those who are in a compromised state, are not able to maintain good denture hygiene due to some physical or mental handicap.<sup>14</sup> In our study, we found highly significant association between age and prosthesis cleanliness ( $p < 0.05$ ) (table 1 and table 2). This signifies that as the age of patients increase, the level of cleanliness is found to have decreased. Our study is similar to the results of study done by Hoad-Reddick, et al<sup>15</sup> which shows that it was difficult for some denture wearers to keep their dentures clean,<sup>16</sup> this could be due to physical health and proper information not provided to the elderly patients.<sup>16</sup>

Most of the study participants belonged to a lower education level, who had kept their prosthesis dirty perhaps due to the lack of education. This has also been stated by Mylonas et al.<sup>4</sup> These results differ from those of Burnett et al,<sup>17</sup> who states that even though after receiving some

educational training, no change in cleaning habits was found.

Duration of wearing the prosthesis played a significant role in cleanliness of prosthesis. Patients wearing prosthesis for more than 6 months had extremely dirty prosthesis compared to those wearing for less than six months. Our study is in agreement with another study that shows significant association with regards to denture age which is inversely proportional to cleaning.<sup>18</sup>

The total 8(20%) (table 2) in CD and 22 (55%) (table 1) in RPD who did not wear prosthesis at night had kept prosthesis clean whereas total 3(2.2%) in CD and 8(12.9%) in RPD who wore prosthesis at night had kept their prosthesis clean. Studies have shown that oral diseases are found reduced with the less number of hours prosthesis were worn.<sup>19,20</sup> Our study also found a significant relationship between continuous wearing of dentures and prosthesis cleanliness ( $p < 0.05$ ) (table 1 and table 2).

Most of them were unaware about information on how to clean prosthesis and those who received information were mainly from dentist, followed by friends and relatives. Some studies have shown that denture hygiene instructions were not provided properly by dentists,<sup>21,22</sup> and on the other hand even those who had received

information did not follow the instructions.<sup>23</sup> Our study shows significant association ( $P < 0.05$ ) (table 1 and 2) with regards to the instructions for cleaning prosthesis and prosthesis cleanliness. Those who received instructions from dentists or friends were significantly lower in number than those who did not receive instructions at all.

When patients were asked about methods of cleaning, the responses were using only plain water as major cleanser. The method of cleaning prosthesis was statistically significant with prosthesis cleanliness irrespective of RPD or CD ( $p < 0.05$ ) (table 1 and 2). This was in accordance to the study done by Saha et al.<sup>5</sup> However, other studies done by Veres et al.<sup>24</sup> reported that most common method was using toothbrush and paste which could lead to surface abrasion,<sup>25</sup> and denture pigmentation.<sup>26</sup>

Our study showed that patients cleaning twice daily had clean dentures that is 8 (50) (table 2) in CD and 19 (76) (table 1) in RPD compared to other three categories but is not in accordance to study done by Nevalainen et al.<sup>23</sup> who stated that cleanliness does not depend on the frequency of usages but follow correct technique and information on cleaning.

Due to time constraint, only 382 patients could be included in the study. Therefore, it is recommended that the future studies should include a greater number of sample and must be carried out for a longer duration. While providing information it may be that some patients report regular denture cleaning because they do not want to inform the interviewer of their own shortcomings and thus avoiding embarrassment. This kind of misleading information from the respondents could lead to wrong results.

## CONCLUSION

This study shows age, education of patients are factors affecting prosthesis cleanliness among removable denture wearers. The research also showed that majority of the participants were not explained about cleaning the prosthesis. Oral hygiene practices were uninformed to most of the patients. Many cleaned the prosthesis with plain water and wore at night. Proper instructions given on the importance of cleaning denture and how to use it properly and effectively can prove to be very helpful in maintaining the oral hygiene. Therefore, provision should be made so that the dental practitioners impart proper oral hygiene instructions to all the patients.

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