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## Knowledge and attitude of dental practitioners on the use of denture adhesives: A questionnaire survey

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### Abstract

**Context:** Denture adhesive (DA) is defined as a material used to adhere a denture to the oral mucosa. When used properly, denture adhesives can benefit the patient by improving retention and stability, comfort, functionality, and psychological pleasure. There are still divergent views among dental practitioners regarding the use of DA.

**Aims:** This study aimed to examine the knowledge, attitudes, and behaviors of private dental practitioners in Indian cities, about the use of DA.

**Settings and Design:** This questionnaire survey was conducted by creating an online English language questionnaire on Google Forms concerning dental professionals' use of denture adhesives in North Indian cities (Delhi NCR, Chandigarh, and Rohtak).

**Methods and Material:** The online URL of the Google survey form was sent to a total of 500 dental professionals. The response rate of the study is 68.6%. The questionnaire consisted of 15 items.

**Statistical analysis used:** Data was analyzed using SPSS 21 software. Descriptive data were reported for each variable. Shapiro Wilk test was used to check the normality of the data. For assessing the association between categorical data, the Chi-square test was used. The level of statistical significance was set at a *p*-value less than 0.05.

**Results:** Most of the participants were dental practitioners (44%). A majority (72.7%) recommends powder-based DA. The majority of them lacked in-depth knowledge regarding zinc toxicity and indication, contraindication, and patient education.

**Conclusions:** There is a need for awareness among dental practitioners regarding the use of DA. Practitioners may keep themselves updated on new materials by taking continuing education courses, thus enhancing the level of care for prosthodontics patients.

**Keywords:** Denture adhesives, complete denture, complete denture retention

### Introduction

The global population is aging in general. A senior citizen is defined as a person who is 60 years or older, according to the national policy for the aged. Population aging is a global phenomenon that began in the twentieth century with industrialized countries and has now spread to developing nations. As oral diseases are chronic and build up over time, the elderly are more prone to suffer unfavorable outcomes [1]. With an increase in the population of the elderly population, there has been an increase in total and partial Edentulism, necessitating complete and partial denture treatments in order to ensure rehabilitation.

Complete denture therapy requires technical perfection during prosthesis creation as well as excellent patient management once the dentures are in place. Even the most competent practitioners often struggle to meet the high expectations of many patients for optimal denture retention and stability. Discussing and executing proper denture adhesive usage will assist dentists in meeting their patients' expectations as well as the treatment goals [2].

Denture adhesive (DA) is defined as a material used to adhere a denture to the oral mucosa [3]. In the late fourteenth century, adhesives were first used in contemporary dentistry. The first adhesive patent was granted in 1913, and further patents were issued in the 1920s and 1930s [4].

According to current evidence-based guidelines published by the American College of Prosthodontics, detailed reviews of the literature, and research studies, DAs improve denture retention, stability, masticatory performance, occlusal force, food particle sealing, and overall function when used properly [6-10].

A significant number of edentulous individuals find denture adhesives to be beneficial and satisfactory in terms of providing better denture retention, [6, 11, 12] as well as being more comfortable when eating and speaking with DA than without [13-15]. Furthermore, many denture wearers use DA as an over-the-counter solution to improve retention and stability, but its usage is not universally endorsed by dentists. Denture adhesives are valuable to the patient in terms of enhancing retention and stability, increased comfort, improved function, and psychological satisfaction when used properly. Even while adhesives improve denture function, they should not be used to compensate for denture shortcomings. Denture adhesives should not be used erroneously by patients without sufficient advice and guidelines from their dentists.

Because of these divergent perspectives among dental professionals, DA is very slowly gaining recognition in their practices as a way to improve denture retention, stability, and function in certain specific conditions. Dentists must be knowledgeable about DA to identify patients who require them and to educate them on the benefits, drawbacks, and proper use of these medications. Despite their extensive usage among denture wearers, this is a fascinating issue since it has gotten so little attention in dentists' official training.

Therefore, the goal of this study was to examine the knowledge, attitudes, and behaviors of private dental practitioners in Indian cities, about the use of DA.

## Materials and Methods

This questionnaire survey was conducted by creating an online English language questionnaire on Google Forms concerning dental professionals' use of denture adhesives in North Indian cities (Delhi NCR, Chandigarh, and Rohtak).

The online URL of the Google survey form was sent to a total of 500 dental professionals including general dentists, prosthodontics, and other specialists working as general practitioners. 250 dental practitioners of the Delhi NCR region were randomly selected from the IDA (Indian Dental Association) dentist directory and the URL of the survey form was sent to them via e-mail.

In addition, the URL of the survey form was also sent to resident doctors and academicians of various dental colleges and hospitals via email and personal messaging.

343 dental professionals out of 500 invitations participated in the study. The response rate of the study is 68.6%.

The questionnaire consisted of 15 items. The internal consistency and reliability of the questionnaire were measured by pilot testing it on 10 dental practitioners and calculating Cronbach's alpha value from the responses, which was found to be 0.773 and an average inter-item correlation of 0.776.

Three questions were related to the participant's disassociated with their use, and the patient's complaints. Furthermore, knowledge about natural substitutes was asked as an open-ended question.

Out of 15 items, 3 had the option of open-ended response and 12 were closed-ended questions.

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 21, IBM Inc. Descriptive data were reported for each variable. Descriptive statistics such as mean

and standard deviation for continuous variables were calculated.

Summarized data was presented using Tables and Graphs. Shapiro Wilk test was used to check the normality of the data. For assessing the association between categorical data, the Chi-square test was used. The level of statistical significance was set at a  $p$ -value less than 0.

## Results

A total of 343 participants responded to the questionnaire (response rate-68.6%). But only 327 were completed (65.4%). Some respondents within the sample skipped 1 or 2 questions, therefore the totals were sometimes smaller than expected.

The majority of the dentists were females (59.9%), preponderance (73.2%) of the dentists were in the below 30 years age group. The greater part of the study population comprised general dental practitioners (44%). (Table 1)

**Table 1:** Socio-demographic characteristics of the participants

<b>Gender</b>	
Females	206(60.1)
Males	136(39.7)
Prefer not to say	1(0.3)
<b>Age</b>	
Below 30 years	251(73.2)
31-40	68(19.8)
41-50	18(5.2)
Above 50	6(1.7)
<b>Qualification</b>	
General practitioner	151(44.02)
Other specialist working as general practitioner	76(22.7)
Prosthodontics	106(30.9)

Most of the dental professionals said their source of knowledge was the BDS curriculum (75.5%).

The majority of participants responded that they recommend denture adhesives in a few patients (84%). They listed the conditions where they feel the need to prescribe denture adhesives as open-ended responses. Patients with resorbed ridges and xerostomia were the common reasons listed by the participants.

When asked about the form of denture adhesive, the majority of dental professionals prefer powder form (72.7%). Only 10 percent said they prefer a zinc-free form of denture adhesives. 167 participants responded with the reason for not recommending denture adhesives. 46.1 percent thought that they create further problems, 29.9 percent did not think they are useful at all and 24 percent said they were not familiar with the product.

330 participants responded, 55 percent recommended using denture adhesives in old complete dentures with retention problems, 34.8 percent recommended their use in new complete dentures and 9.7 percent recommended their use in new partial dentures with tooth and tissue support.

Most of the participants (63.3 percent) prescribed denture adhesives for 1 month, 22.6 percent for 3 months, and only 3.9 percent prescribed for 6 months while 10.2 percent recommended continuous use.

The majority of participants 45.5 stated the reason for prescribing DA's was inadequate anatomy of residual ridges, while 26 percent stated that it assisted in adaptation to a new complete denture and 29 percent said it assisted in providing positive psychology to the patient.

93.5 percent of participants demonstrate and instruct their patients' proper application and removal of adhesives, while

6.5 percent don't demonstrate.

The majority (64 percent) said their patients don't complain about using Denture adhesives. But 37 percent said patients come back with complaints.

Participants gave mixed responses about the most common complaints. Bad taste (44%) and ineffectiveness (33%) were the most common complaints among the patients on using DA's.

Most participants (85.3%) didn't know about any natural substitute for adhesives and only 47% knew, out of which only a few were listed in the open-ended segment. Isobel (Psyllium husk) was the most common answer among them.

48.8% of general practitioners and 67.1% of other specialists recommend the use of denture adhesive in patients with old complete dentures with problems in retention while 49.1% of specialists in prosthodontics recommend the use of DA with an old CD with retention problems and 33.8% recommend in a new complete denture.

When asked the reason for prescribing DA in newly fabricated dentures all groups of practitioners have a similar trend of justification most common being to better adjust to a new CD in case of inadequate anatomy followed by "adding to positive psychology of the patient".

Comparing the response of different groups of practitioners on the duration of DA users, we got a consistent response of 1 month after the delivery of CD, when comparing the response based on the experience of practitioners, practitioners above 50 years of age said that they recommend DA use for 8 months duration while practitioners below 50 years recommended its use for 1 month only after complete denture insertion. Very few stated they recommend its use continuously.

## Discussion

The views of dentists toward using or recommending DAs were evaluated in this exploratory survey. The investigators selected the attitudes that piqued their interest the most. For reference purposes, the questions were modified from those used in prior research and prepared to collect replies.

A large majority of practitioners (90 percent) advocated the use of DAs, according to the survey. This is more in line with the data reported by Mantri *et al.* (84.3%)<sup>[16]</sup>. If compared to previous studies where Koksai *et al.* reported (41.8%)<sup>[11]</sup>, Muneer *et al.* (43.7%)<sup>[18]</sup>, and Polyzois *et al.* (60.3%)<sup>[17]</sup>. Given that the data comes from different countries, these discrepancies are anticipated. Many regions where these studies were conducted have their own culture and dental care trends (Istanbul, Turkey, Karachi-Pakistan, as well as Jabalpur, India, and Athens-Greece).

Most of the participants were female dental practitioners (60%) and mostly belonged to the below-30 age group (73.2%). Very few, only (1.7%) participants were above 50 years. The study participants were divided into general practitioners (44%), Prosthodontists (31%), and other specialists working as general dental practitioners (23%).

The most common source of information regarding the denture adhesive was found to be that acquired during the BDS curriculum (75.5%). Although most participants seemed to know the correct guidelines for the proper use of denture adhesives, few lacked proper knowledge. This suggests that guidelines for the use of DA, indications, contraindications, and mechanisms of action should be included in the BDS curriculum to educate the graduates regarding the correct use of DA.

The participants listed various reasons for recommending

denture adhesives, the most common being patients with resorbed ridges and compromised retention, and xerostomia. Judiciously using denture adhesives where users can benefit the patient is of importance here. So, Practitioners must be able to distinguish the situations where it is indicated from the situation where it is contraindicated such as, where there are gross inadequacies in retention and function in the denture, excessive bone resorption, and soft tissue shrinkage leading to loss of vertical dimension. Adhesives should not be used to retain fractured dentures or dentures with lost flanges or in patients with an inability to maintain proper hygiene of the denture. Although this knowledge was adequate among prosthodontists but was seemingly lacking in some general practitioners.

The participants recommended the denture adhesives in the form of powder (72.7%) which was in contrast to the previous studies performed by Polyzois *et al.*, who reported 93.8% recommended cream-based denture adhesives as well and Koksai *et al.* reported 62% recommended cream based<sup>[8, 23, 11, 18]</sup>. This difference can be a result of the availability of powder form in Indian markets and the educational effect of participating dental professionals. This also differs from the "Guidelines for the use of DA for oral and general health" by the Oral Health Foundation which also quoted studies stating that cream-based adhesives are more effective. Chowdry *et al.* investigated the retention performance of various commercially available adhesive adhesives *in vitro* research. It was discovered that paste-based products were more resistant to dislodgement than powder-based ones<sup>[19]</sup>. Despite this majority in this survey recommend the use of powder form. Because no specifics regarding the formulas were disclosed, the variations may potentially be attributed to the various components used.

FDA (US Food and Drug Administration) and the American College of Prosthodontics note the potential negative side effects of overusing zinc-containing denture adhesives and advocate using zinc-free denture adhesives. An excess of zinc in the body can lead to health problems such as nerve damage that only appears slowly and over a long period. Two published case series studies identified patients experiencing progressive neurological symptoms following extended overuse of zinc-containing adhesives<sup>[20]</sup>. However, in this survey, only 12.4% were aware of these side effects as they chose to recommend zinc-free denture adhesives.

When asked the reasons for not recommending denture adhesives majority believed they create more problems (77%) and 30% believed they are not useful in achieving the goal and 24% were not familiar with the product. This suggests that this negative attitude towards the use of denture adhesives can be changed with proper education and experience in certain areas like familiarity or usefulness.

The majority of the participants (55.5%) recommended using denture adhesives for old complete dentures while 35% recommended using them with new complete dentures (CD). Only a few supported their use in removable partial dentures (9.8%). Reasons for using denture adhesives in new CD got mixed responses, 46% believed they are all useful only with resorbed ridges, 26% believed they help in patient's adaptation and 30% believed they have a positive impact on the patient's psychology.

On the duration of use of denture adhesive most settled for a 1-month duration (63.3%) indicating most practitioners recommend denture adhesives with new CD for a short duration to assist patients in adapting to a new prosthesis.

64.3% of participants stated that their patients do not

complain after using denture adhesives, while 36.6% said that patients return with complaints, the most common complaint being their ineffectiveness (33.1%), bad taste (44%) and difficulty in removal (33%).

Responses to new natural substitutes mostly got negative responses (85.3%). Only a few (14%) said yes and most of them named Isobgul as the natural substitute for denture adhesives.

Duqum, *et al.* [7] conducted a literature review to explain the evidence supporting the benefits and drawbacks of using denture adhesive in full denture patients. They came to the following conclusion:

- Denture adhesives help full dentures stay in place and operate better. However, for the appropriate usage, application, and removal of denture adhesives, defined standards are required.
- The biological effects of denture adhesives on the denture-bearing mucosa require long-term research.
- Regular recall programs for full denture patients should be promoted.

The result confirms that the knowledge about these products is limited to most specialists in the field of prosthodontics and is not universal. This can lead to misuse, misconception, and malpractices of denture adhesives among general dental practitioners. Therefore, further education of the practitioners regarding denture adhesives needs to be done.

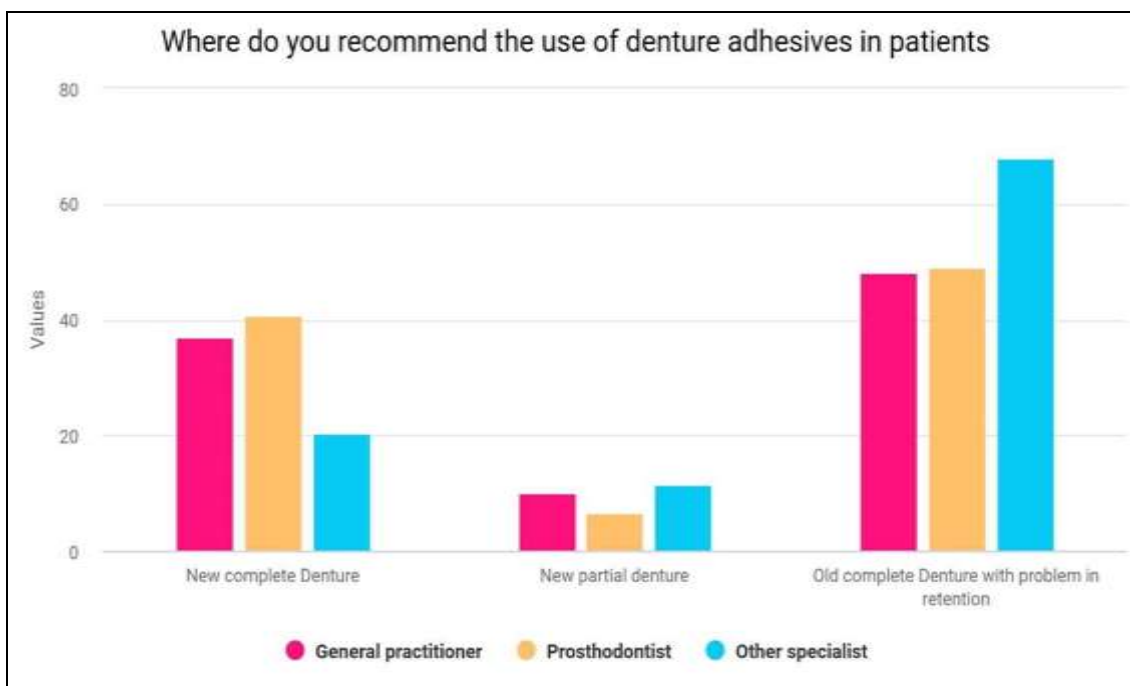


Fig 1: Association of qualification with the use of denture adhesives

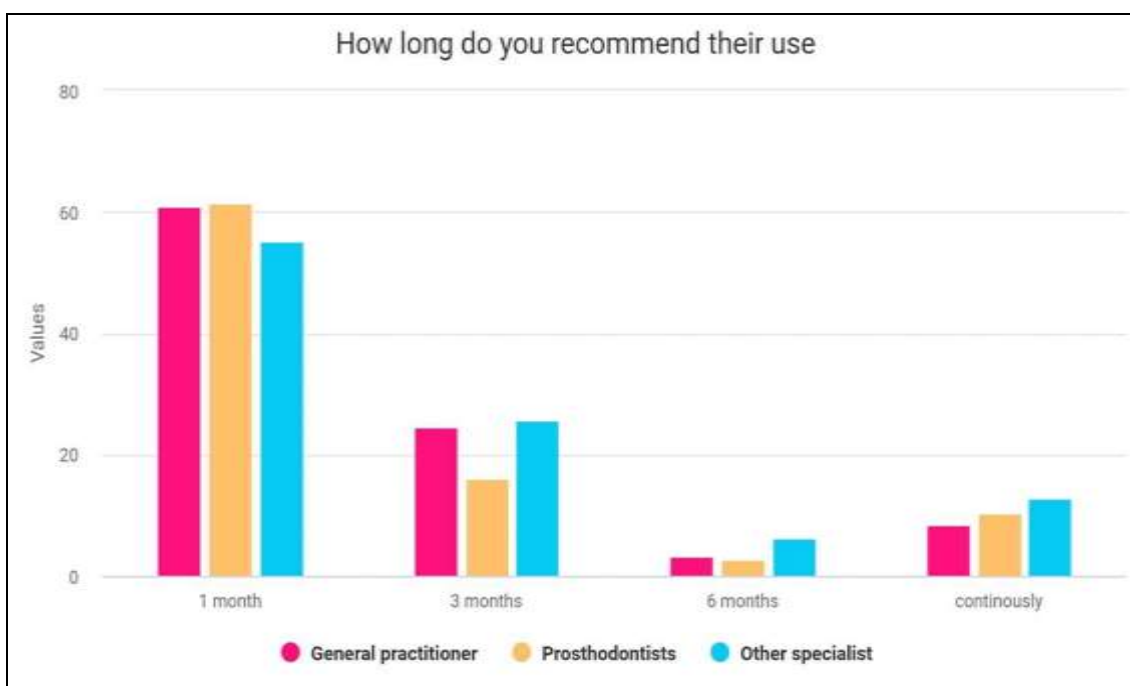
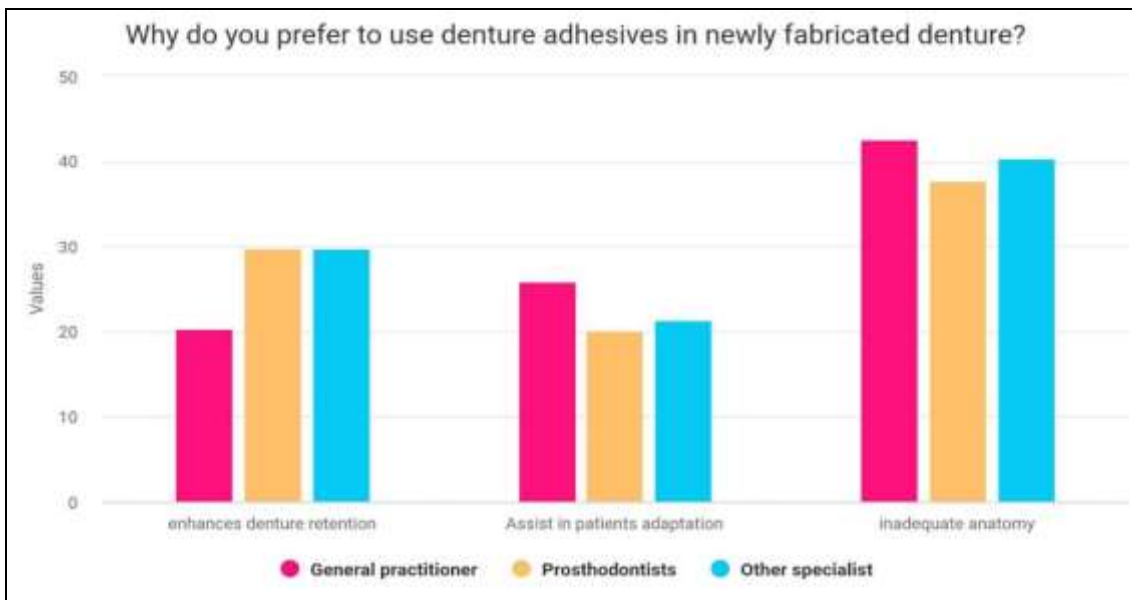
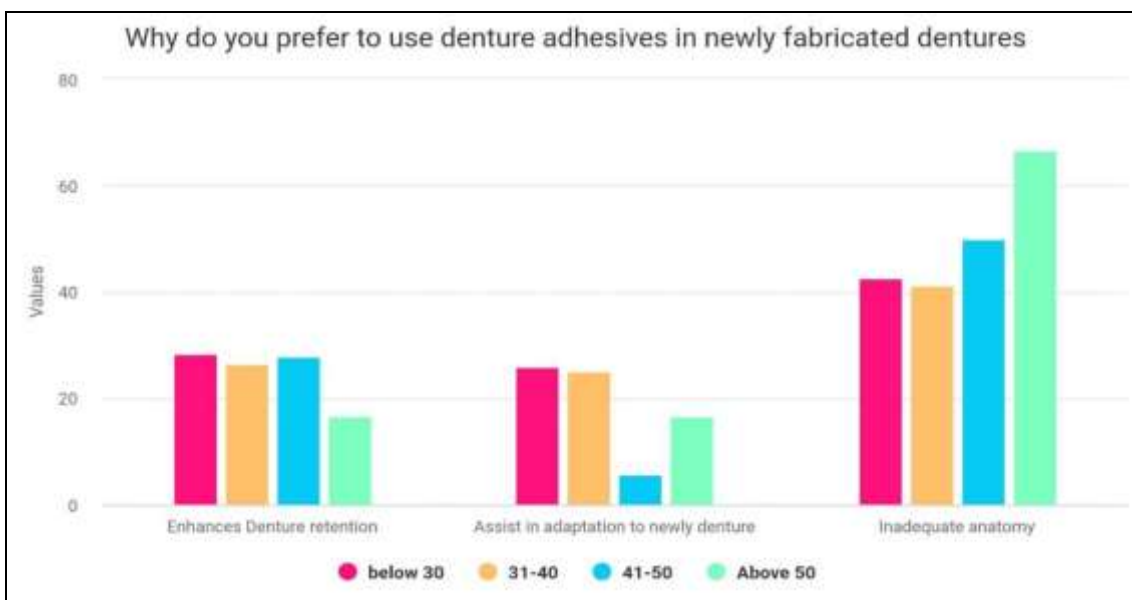


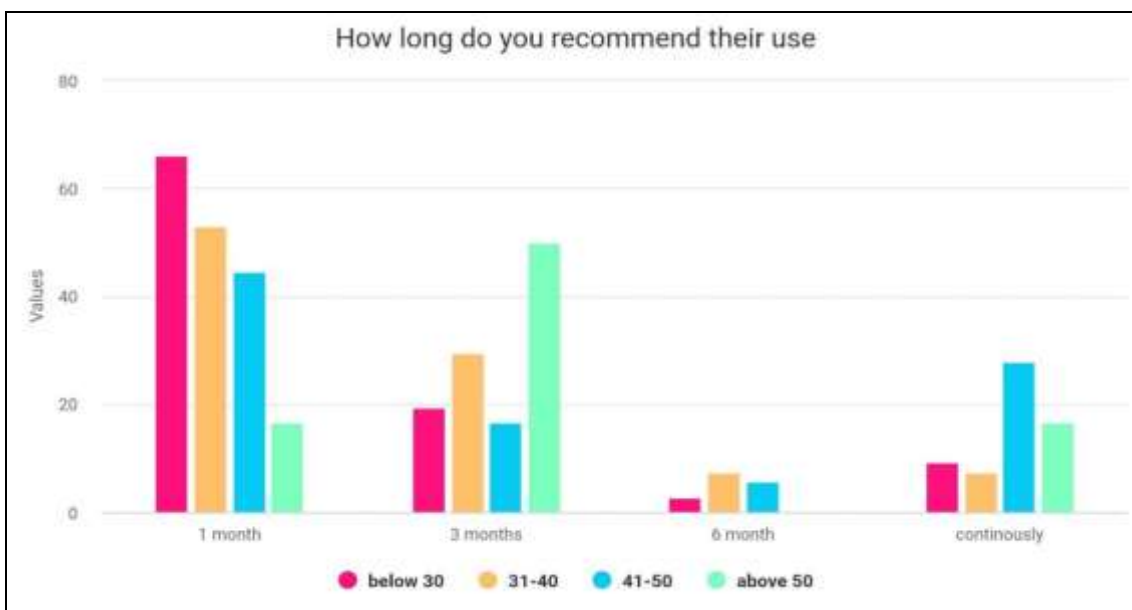
Fig 2: Association of qualification with duration of denture adhesive use



**Fig 3:** Association of qualification with the justification of using denture adhesives in new dentures



**Fig 4:** Association of experience with use of denture adhesive use



**Fig 5:** Association of duration of denture adhesive use with experience

## Conclusion

While a DA is not designed to improve the fit of a poorly fitting denture, it can have a significant influence on a patient's comfort and confidence in using the prosthesis. However, before working with the adhesive, it's vital to assess the fit and function of the current dentures, since this will influence what a practitioner and/or patient can do with it. Our study results revealed that, despite dentists' regular use of DA, they lacked appropriate knowledge of the substance. The attitude reflects a person's knowledge, which in this case can be addressed comprehensively. The dental profession can better advise patients in the care of their prostheses by having a systematic understanding of the features and limits of these over-the-counter items. Practitioners may keep themselves updated on new materials by taking continuing education courses, thus enhancing the level of care for prosthodontics patients.

## Conflict of Interest

None

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