

# Knowledge, Attitude and Practices of Denture Adhesives Use Among Private Dental Practitioners' of Jabalpur City, Madhya Pradesh: A Cross Sectional Survey

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**Abstract** The use of denture adhesives (DA) and their role in prosthodontics has been a conflicted topic both in clinical practice and dental education. The use of adhesives, are viewed as poor reflection of their clinical skills and prosthetic expertise or to provide retention to an ill-fitting prosthesis by many dentists. These conflicting views have raised many doubts among practising dentists on the use of DAs in their clinical practice. The aim of this study was to assess the knowledge, attitudes and practices of DA use among private dental practitioners' of Jabalpur city, Madhya Pradesh. This descriptive, cross-sectional survey was conducted using a self-administered questionnaire involving private dental practitioners of Jabalpur city. A total of 172 private dental practitioners of Jabalpur made up the sample of the study. A comprehensive, closed-ended, self-administered questionnaire was employed which was designed to collect the sociodemographic details and to assess the knowledge, attitudes and practices of DA use among private dental practitioners'. The institutional review committee approved the study. Data were imported to the SPSS 13.01 program to draw the means and percentages. Majority of the dentists were males (55 %), preponderance (68 %) of the dentists were in the

21–30 years age-group. Greater part of the study population comprised of general dental practitioners (GDPs) (81 %). When the subjects were questioned if DA were soluble in saliva, 32 % of the GDPs replied wrongly. Similarly 25 % of the GDPs didn't know that using DA with incompletely removed old DA affected tissue health. Zinc containing DA are recently held responsible for causing neurological diseases on their prolonged usage, 71 % of the GDPs and 74 % of other specialists were unaware in this context. A total of 115 (83 %) GDPs, 6 (100 %) prosthodontists and 22 (81 %) other specialist's used DA as a beneficial adjunct in their clinical practice. DA being used frequently by the dentists, unfortunately they did not have sufficient knowledge regarding the material. The attitude is a reflection of an individual's knowledge, which was also not homogeneous. By pursuing continuing education courses, the practitioners can update themselves regarding new technology and materials, thus improving the standard of care for prosthodontic patients.

**Keywords** Denture adhesive · Knowledge · Attitude · Questionnaire

## Introduction

Aging is a universal process and a normal inevitable biologic phenomenon. Throughout the world, a demographic revolution is underway as the proportion of older people is growing faster than any other age group [1]. Man, from time immemorial, has tried to increase the life span and enhance his health from various scientific innovations. With discoveries in medical sciences and improvements in his social conditions, the average life span now in most parts of the world continues to increase [2]. Elderly

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consists of individuals with their ages nearing or surpassing the average life span of human beings. Around the world approximately 600 million people are aged 60 years and over, and this number will double by 2025 and by the year 2050 it is projected to be 2 billion and 80 % of this population are living in developing countries [1, 3].

It is predicted that the elderly population of India shall be the highest in the world by 2025 and their contribution to the demographic profile is increasing everyday [2]. According to the 1991 census, the geriatric population constituted 6.7 % of the total Indian population and is expected to increase its share to 10 % by the year 2021 [4]. Jabalpur is the 38th largest urban agglomeration in India and the second largest urban agglomeration in Madhya Pradesh as per the 2011 census. According to a recent census the city of Jabalpur, the elderly constitute 35 % of the total population [5].

Oral disorders are chronic in nature and cumulative throughout life and hence unfavourable outcomes are likely to be greatest among the elderly [6]. In the coming decades, dental practitioners will face the challenge of providing dental care for a growing number of elderly who fail to retain their natural teeth [7]. Current predictions suggests that over the next two decades there will be 4 % increase in the number of elderly and hence a corresponding increase in the number requiring prosthodontics rehabilitation [8]. Improved oral health will allow elderly to improve their self-confidence and have active social contacts.

The speciality of prosthodontics has continuously evolved as a result of progress in laboratory and biomaterial science, clinical technologies and multi-disciplinary advancements. More advanced procedures are followed lately in replacement of the missing tooth and restoring it to its prior form, function and aesthetics. Successful prosthodontics treatment combines exemplary technique, effective patient rapport, education and familiarity with all possible management options to provide the highest degree of patient satisfaction [9].

Complete dentures constitute one of the most important treatment options in prosthodontics, more so with an increase in average life expectancy of the individual. Newly made dentures could be a disappointment to a patient if deficient in retention and/or stability and could contribute to a sense of social anxiety and lack of confidence in them [9]. However, retention of complete dentures has always posed to be a problem for the dentist.

The use of denture adhesives (DA) in complete dentures can be justified when it is not possible to obtain sufficient retention and stability and when implants or surgical ridge augmentation procedures are not an option because of the patient's economic situation, systemic conditions, [10] or age [11].

Adhesives have been introduced in modern dentistry in the late fifteenth century. The earliest patent pertaining to adhesive was issued in 1913 and other patents followed this in the 1920s and 1930s [12]. American Dental Association referenced adhesives in the 1,035 edition of Accepted dental remedies [13]. Since then, adhesives have been introduced with different compositions with the aim of providing viscosity and stickiness by absorbing water thus improving the retentiveness of the removable prosthesis.

Denture adhesives are found advantageous and satisfactory by a substantial proportion of edentulous patients in providing better retention [14–16] of their dentures; more comfortable when chewing and speaking with DA than without [17–19]. In addition, many denture wearers utilize DA as an over-the-counter approach to improve retention and stability but the use of these products is not wholly endorsed by the dental profession.

Despite considerable documentation advocating patients' use of adhesives, many dentists view adhesive usage as poor reflection of their clinical skills and prosthetic expertise [20] or to provide retention to an ill-fitting prosthesis [21] and even assumed to cause irritation to the denture bearing tissues in spite of clinical trials failing to prove the same [22]. Many dentists also fear that DAs are causing increased residual ridge resorption (RRR) and soft tissue hyperplasia [23, 24].

These conflicting viewpoints among dental professionals have led to slow acceptance of DA in their practice as a means to enhance denture retention, stability and function. Dentists need to be familiar with DA to be able identify those patients who actually need them and to be able to educate them about the advantages, disadvantages and correct use of these products. This is an intriguing topic because it has received so little attention in the formal training of dentists, despite their widespread use among denture wearers [14].

Hence, the aim of this study was to assess the knowledge, attitudes and practices of DA use among private dental practitioners' of Jabalpur city, Madhya Pradesh.

## Materials and Methods

This descriptive, cross-sectional survey was conducted using a self-administered questionnaire involving private dental practitioners of Jabalpur city. A list of private dental practitioners in Jabalpur city was obtained from the dentist's directory 2010, [25] published by the Indian Dental Association, Jabalpur branch. This directory enlists all the dentists practicing in Jabalpur. This sample of 180 private dental practitioners was personally approached by the investigators and requested to complete a comprehensive closed-ended, self-administered questionnaire. One hundred and

seventy-two dentists participated in the study. The response rate for the study was 95.5 %. The common reason to refuse participation was time constraint.

A comprehensive, closed-ended, self-administered questionnaire was employed which was designed to gather the socio-demographic characteristics, duration of practicing dentistry, assess the knowledge, attitudes, and practice of DA use and their recommendation. All participants signed an informed consent before answering the questionnaire. The participants were asked not to reveal their identity.

This 19 item questionnaire included seven knowledge related statements (mechanism of adhesion, composition, clinical use, indications and contra-indications), each of these statements had three options to choose from: yes, no and don't know. Four Attitude statements were included (use, perceived necessity, patient education). The options for attitude were based on 5-point Likert scale, [26] it requires the dentists to make a decision on their level of agreement along this scale (Strongly disagree, disagree, don't know, agree, strongly agree). Finally eight practice questions (clinical practice, patient instructions on use, patient recall and evaluation) were included.

The questionnaire was pilot tested on 30 private dental practitioners and was assessed for the uniformity of interpretation. No major corrections were necessary in this questionnaire except a few minor grammatical changes in the structure of the questions. This data gathered during the pilot survey was not included in the main study. The questionnaire took about 15 min to complete. The institutional review committee approved the study.

Data were imported to the SPSS 13.01 program [27] to draw the means and percentages. For better interpretation of the results the subjects are divided into different groups namely; age groups (21–30, 31–40, 41–50, >50 years), gender (males and females), qualification (bachelor degree holders—general dental practitioners (GDPs), master degree holders in the branch of prosthodontics and master degree holders other than prosthodontics—other specialist's), duration of clinical practice (1–10, 11–20, >20 years).

## Results

The sociodemographic characteristics of the subjects are shown in Table 1. Majority of the dentists were males (55 %), preponderance (68 %) of the dentists were in the 21–30 years age-group. Greater part of the study population comprised of GDPs (81 %).

Table 2 shows the response of the subjects' knowledge on DA use in denture therapy. When the subjects were questioned if DA were soluble in saliva, 32 % of the GDPs

**Table 1** Socio-demographic characteristics of the study subjects ( $N = 172$ )

Variables	$N$ (%)
Age group	
21–30 years	117 (68)
31–40 years	45 (26)
41–50 years	6 (3)
>50 years	4 (2)
Gender	
Male	95 (55)
Female	77 (45)
Qualification	
General practitioner	139 (81)
Prosthodontists	6 (3)
Other specialist's	27 (16)
Years of clinical experience	
1–10 years	135 (78)
11–20 years	30 (17)
>20 years	7 (4)

replied wrongly. Similarly 25 % of the GDPs didn't know that using DA with incompletely removed old DA affected tissue health. Zn containing DA are recently held responsible for causing neurological diseases on their prolonged usage, 71 % of the GDPs and 74 % of other specialists were unaware in this context. When the subjects were asked to identify the wrong mechanism of action among the given options, 120 (73 %) GDPs, 6 (100 %) prosthodontists and 14 (52 %) other specialists were successful in identifying the wrong answer (Fig. 1). A mixed response was elicited when the subjects were asked if the use of DA in patients with xerostomia is beneficial or contraindicated (Fig. 2).

Table 3 shows the dentists attitude regarding DA from different points of view. DA was considered to improve retention in improperly fabricated dentures according to 32 % of GDPs and 41 % of other specialists.

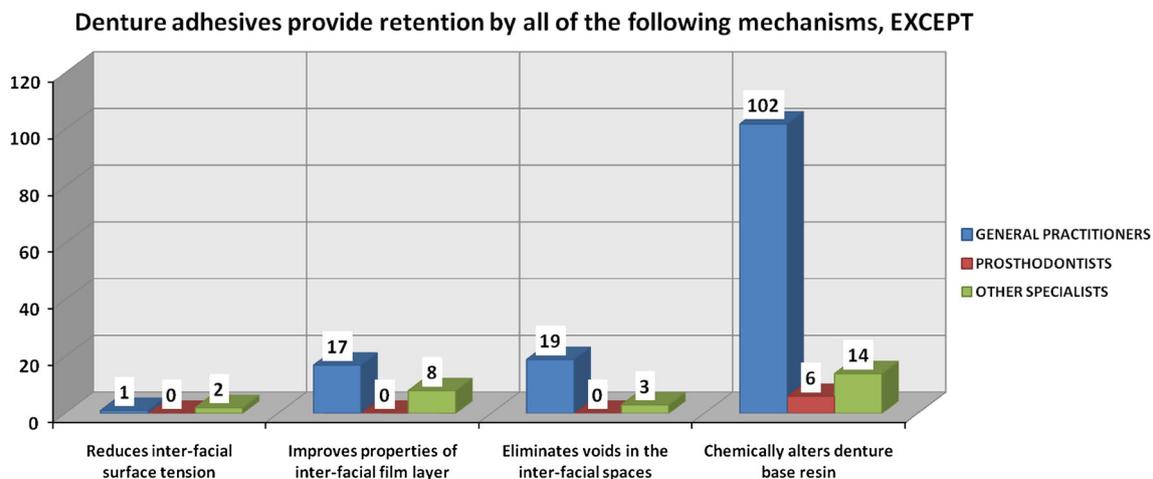
A total of 115 (83 %) GDPs, 6 (100 %) prosthodontists and 22 (81 %) other specialist's used DA as a beneficial adjunct in their clinical practice. When asked if the study subjects prescribed DA for their patients routinely; 58 (42 %) GDPs along with 16 (59 %) other specialist's answered, 'no' and 5 (83 %) prosthodontists answered, 'when needed'. More results related to the use of DA in their clinical practice are presented in Table 4.

Figure 3 shows the utilization of DA in various stages of denture fabrication. These results showed that most of the GDPs (48 %) used DA to stabilize trial bases during recording jaw relations.

Successful treatment combines exemplary technique, effective patient rapport and education. When asked if

**Table 2** Subjects knowledge on denture adhesives use in denture therapy *N* (%) (*N* = 172)

Questions	General practitioner	Prosthodontists	Other specialist's
Are denture adhesives soluble in saliva?			
Yes	56 (40)	5 (83)	21 (78)
No	44 (32)	1 (17)	3 (11)
Don't know	39 (28)	0 (0)	3 (11)
Does the use of dentures with incompletely removed old denture adhesives affect tissue health?			
Yes	98 (71)	6 (100)	26 (96)
No	5 (4)	0 (0)	0 (0)
Don't know	36 (25)	0 (0)	1 (4)
Can improper use of denture adhesives cause denture stomatitis?			
Yes	96 (69)	6 (100)	25 (92)
No	20 (14)	0 (0)	1 (4)
Don't know	23 (17)	0 (0)	1 (4)
Does prolonged use of denture adhesives with ill-fitting dentures cause residual ridge resorption?			
Yes	73 (52)	6 (100)	26 (96)
No	19 (14)	0 (0)	0 (0)
Don't know	47 (34)	0 (0)	1 (4)
Can excessive use of zinc containing denture adhesives cause neurological disease?			
Yes	24 (17)	6 (100)	7 (26)
No	17 (12)	0 (0)	0 (0)
Don't know	98 (71)	0 (0)	20 (74)



**Fig. 1** Subjects knowledge on the mechanism of action of denture adhesives (*N* = 172)

dentists disseminated adequate information regarding the method of application, removal/cleaning of the denture bases and tissue surfaces, misuse and maintenance of oral hygiene; 59 (42 %) GDPs, 5 (83 %) prosthodontists along with 6 (22 %) other specialist's only shared all the instructions with their patients.

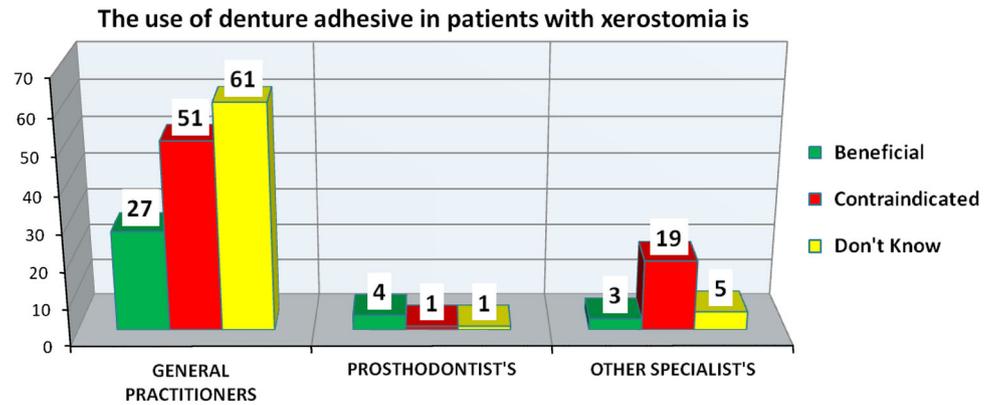
## Discussion

This survey gathers the knowledge about DA amongst these dentists which would in turn greatly benefit its use in

their clinical practice in providing guidance in use for patients requiring them. The main reason for prescribing DA is to improve denture retention and stability in turn improving patient's confidence and comfort in wearing dentures. This consensus was upgraded by a panel of Prosthodontics [15]. In this survey DA is referred to a commercially available non-toxic, soluble material (powder, cream or liquid) that is applied to the tissue surface of the denture.

The results show that 32 % of the GDPs were unaware that this group of DA was soluble in saliva. Dentists need to possess knowledge in order to educate all denture

**Fig. 2** Subjects knowledge on the use of denture adhesives in patients suffering from xerostomia ( $N = 172$ )



**Table 3** Subjects attitudes related to the use of denture adhesives

Questions	N(%) of respondents $N = 172$		
	Strongly agree/agree	Don't know	Strongly disagree/disagree
Denture adhesive is used to provide retention to improperly fabricated or ill-fitting prosthesis.			
General practitioners	45 (32)	14 (10)	80 (58)
Prosthodontists	0 (0)	0 (0)	6 (100)
Other Specialist's	11 (41)	0 (0)	16 (59)
Patients with poor oral hygiene maintenance should not use denture adhesives.			
General practitioners	90 (65)	23 (17)	26 (19)
Prosthodontists	5 (83)	0 (0)	1 (17)
Other specialist's	24 (89)	1 (4)	2 (7)
Prescribing denture adhesive indicates inadequate skills of the clinician to fabricate dentures.			
General practitioners	13 (10)	21 (15)	105 (75)
Prosthodontists	1 (17)	0 (0)	5 (84)
Other specialist's	5 (19)	1 (4)	21 (78)
More the amount of denture adhesive used better is the retention of the denture.			
General practitioners	22 (16)	16 (12)	101 (73)
Prosthodontists	0 (0)	0 (0)	6 (100)
Other specialist's	0 (0)	0 (0)	27 (100)

wearing patients about the product as they are widely used in the removable prosthetic care. Patients rightfully expect their dentist to be accurately informed about the use of such products and be the source of correct information for his patients.

Denture hygiene in patients using DA should be given additional attention whereas, the present study demonstrated that 25 % of GDPs were unaware that incomplete removal of DA before reapplication was detrimental for tissue health. Stafford et al. [28] indicated that DA could influence oral flora by causing an imbalance in the flora. Most of GDPs (47 %) were ignorant that prolonged use of DA on ill-fitting dentures would result in RRR [15]. The prolonged use of ill-fitting dentures not only causes trauma to soft tissues, but also accelerates alveolar ridge resorption [29]. The indication and contraindication for advising the use of DA in any patient is moderated by thorough

understanding of the basic facts like its mechanism of action [13, 16, 30] which was lacking among the GDPs (86 %) leading to the misuse of these products.

Of late, serious reports on the chronic and excessive use of Zn containing DA causing potential neurotoxicity have caught the attention of dental fraternity [14, 31, 32]. Unfortunately, 17 % of the GDPs and 74 % of other specialist were unknowledgeable about the adverse effect of Zn in DA. Nations et al. and Hedera et al. [33, 34] in their case series studies identified misuses of Zn containing DA as the sole source of neurologic disease in patients using them. Recently overuse of Zn-containing DA has been recognized as a potential cause of copper deficiency myelopathy [35]. Recovery from neurological symptoms with replacement therapy appears to be limited and so emphasis falls on patient education on the use of DA. As a consequence; patients should be encouraged to seek professional

advice before using such products and follow professional instructions carefully before using them.

Patients suffering from xerostomia are benefited by the use of well hydrated DA as it provides a cushioning or lubricating effect, hence reducing functional irritation to the supporting soft tissues and in turn preventing denture stomatitis and ulcerations [9]. In this study 37 % GDPs, 70 % of other specialist contraindicated the use of DA in patients with Xerostomia.

Denture adhesives has not yet gained worldwide dentist acceptance. This may be due to dentists very limited knowledge about DA [12, 31, 32] and also the lack

importance given to this topic either in the undergraduate curriculum or in continuing dental education programmes. Until and unless steps are taken to correct these shortcomings the, dentists knowledge of DAs cannot be enhanced.

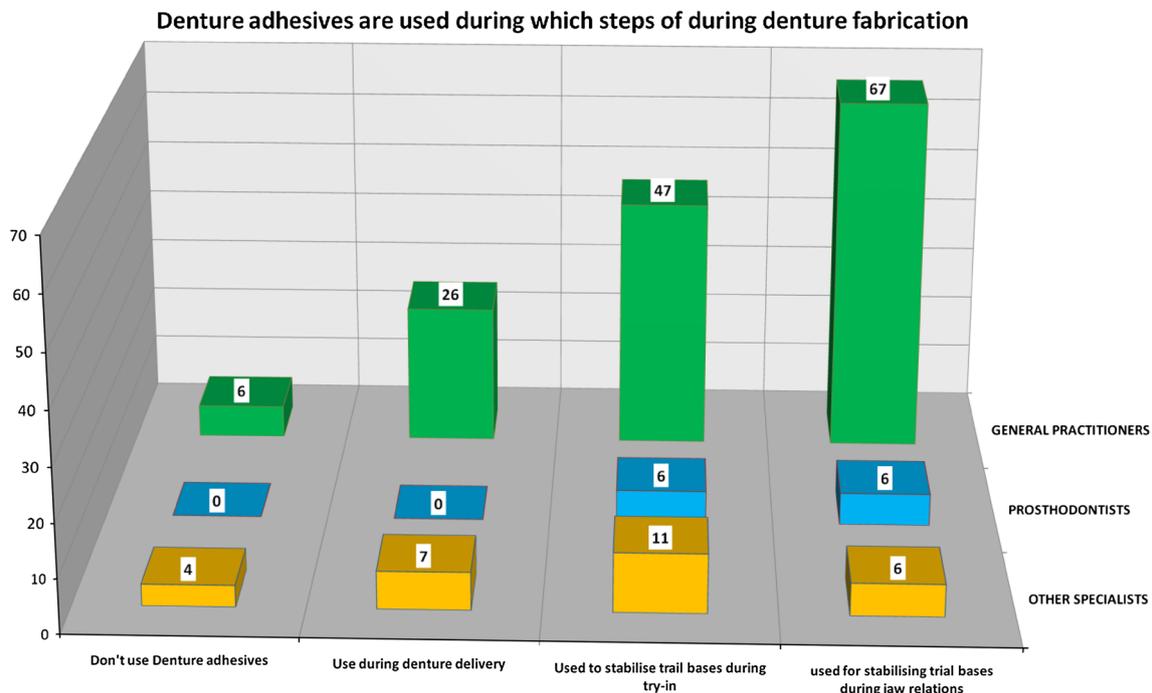
Knowledge warrants attitude. As discussed earlier in this section, nearly half of the GDPs indecisive about the indication of DAs for patients wearing ill-fitting dentures. Similar responses were recorded when the attitude of the dentists was assessed according to the statement; DA is used to provide retention to improperly fabricated or ill-fitting prosthesis; 32 % of GDPs and 47 % of other specialist's replied 'agreed' in contrast to none of the Prosthodontists. These differences in responses maybe due to dissimilar specialty curriculum.

Obtaining the greatest advantage from the use of an adhesive product is dependent on its proper usage. In the current study, 143 dentists (83 %) were using DA in their clinical practices which is; well above the percentage recorded by Temel [36] (56.3 %). These high percentages of dentists using these products in their clinical practice may be due to the easy access and low cost of the product.

Maximum utilization DA by the dentists (48 % GDPs, 100 % Prosthodontists, 22 % other specialist's) in their clinical practice was for stabilizing trial bases during recording jaw relations. This was consistent with the consensus were reached by the prosthodontists panel (88 %) in the study by Slaughter et al., [15, 37] the reason being

**Table 4** Denture adhesives use in their clinical practice *N* (%)  
*N* = 172

Questions	General practitioner	Prosthodontists	Other specialist's
Do you use denture adhesives in your practice?			
Yes	115 (83)	6 (100)	22 (81)
No	24 (17)	0 (0)	5 (19)
Do you recall patients using denture adhesives periodically?			
Yes	85 (61)	6 (100)	20 (74)
No	54 (39)	0 (0)	7 (26)
Do you professionally clean the old dentures whenever the patients visit your clinic again?			
Yes	92 (66)	6 (100)	23 (85)
No	47 (34)	0 (0)	4 (15)



**Fig. 3** The utilization of denture adhesives in various stages of denture fabrication (*N* = 172)

stable record bases is a pre-requisite for recording accurate jaw relations.

Patients should be educated about the importance of regular 'recall appointments' for the evaluation of the condition of denture and its foundation [38, 39]. These considerations are particularly important for patients employing DA because the use of such product can modify or eliminate customary cues for returning to the dental office. Thirty-nine percent of GDPs did not recall their denture patients using DA. Because patient-specific and time-dependent changes in the denture-bearing tissues occur, all clinicians should periodically evaluate each denture wearer for RRR, changes in vertical dimension of occlusion, phonetics, integrity of the denture bases and prosthetic tooth wear, as well as for other biological reasons, including general systemic health, health of the oral soft tissues, oral cancer screening and blood pressure screening [14]. Although the evidence is weak, dentures should be cleaned annually by a dentist or dental professional by using ultrasonic cleansers to minimize bio film accumulation over time [40]. Sixty-six percent of GDPs professionally cleaned the old dentures whenever the patients visited their clinic.

Overall, the present study achieves its purpose by creating minor inroads into a otherwise unknown domain of use, misuse, misconceptions and malpractice of DAs among the practicing dentists of Jabalpur city. The results from the present study conclude that the throughout knowledge about these dental materials are limited to only the specialists in the field of prosthodontics and not universal. Owing to the limited number of subjects the extrapolation of the results is restricted. This outlines the major limitation of the present study which can be overcome in future research on similar grounds covering wider geography and increased number of dentists.

## Conclusion

While not intended as an enhancer for an ill-fitting denture, the proper utilization of a DA can largely impact a patient's comfort level, not to mention his or her confidence in wearing the prostheses. Prior to working with the adhesive, however, it is important to determine the existing denture fit and function, as this may dictate what a practitioner, and/or patient can hope to accomplish with the help of adhesive. It was concluded from our survey reports that despite DA being used frequently by the dentists, unfortunately they did not have sufficient knowledge regarding the material. The attitude is a reflection of an individual's knowledge, which was also not homogeneous. It is through a methodical knowledge of the attributes and limitations of these over-the-counter products that the dental profession can better guide patients in the management of their

prosthesis. By pursuing continuing education courses the practitioners can update themselves regarding new technology and materials, thus improving the standard of care for prosthodontic patients.

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