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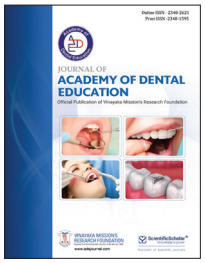
Journal of Academy of Dental Education

Article in Press



Original Article

Assessment of awareness about COVID-19 and proper home care of removable dental prostheses in denture wearers

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Received: 09 January 2025
Accepted: 20 January 2025
EPub Ahead of Print: 03 April 2025
Published:

DOI
10.25259/JADE_2_2025

Quick Response Code:

Supplementary material available in:
https://dx.doi.org/10.25259/JADE_2_2025

ABSTRACT

Objectives: The objectives of this study were to check awareness regarding COVID-19 infection, to check awareness regarding home care of removable dental prostheses, to check availability of commercial denture cleaning products, and to check awareness regarding home cleaning agents.

Material and Methods: We conducted a survey of 208 patients who reported at the outpatient department of SGT Dental College, Hospital and Research Institute, SGT University, who were using removable dental prostheses during the pandemic in their local language following traditional paper and personal interview (PAPI) format over a period of 2 months.

Results: We found that 71.6% people were unsure when asked if COVID-19 could be transmitted through their dental prosthesis, while 25.9% people said that it could not. 67.2% people were not sure about using household products such as soap, vinegar, and baking soda as denture cleansers; and 30.8% people said that soap could be used. 95.5% people had never visited their local pharmacy to purchase a denture cleaning product. 94% said that they do not need follow-up when asked how often should they visit their dentist after receiving their dentures and 97% people said the same when asked how often they actually visited their dentist after receiving their prosthesis.

Conclusion: We concluded that there is a need to create awareness regarding the use of common household products and commercially available products as denture cleansers and the need for regular follow-up. Further studies should be conducted on transmission of viruses like severe acute respiratory syndrome coronavirus-2 through removable dental prostheses and awareness should be spread about the same. Similar multicentric studies should be conducted to assess and spread awareness about the same. Further, there is a need for more studies on various ways to spread awareness and their efficiency.

Keywords: COVID-19, Dentures, Denture cleaners, Oral hygiene, Removable dental prosthesis, Oral hygiene

INTRODUCTION

The pandemic COVID19 disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has affected the world in many ways.[1] The timeline of COVID-19 in India began on January 30th, 2020, when the first COVID-19 case was confirmed in Kerala.[2]

COVID-19 is a zoonotic pathogen which can be transmitted from animals to humans and humans to humans through the droplet, feco-oral, and direct contact with an incubation period of 2–14 days.[3]

The primary mode of transmission of COVID-19 is through respiratory droplet spread.[1] Salivary gland ducts have been considered as a potential source for SARS-CoV-2 as they are among the primary targets of this virus. Moreover, saliva, along with secretions of major and minor salivary glands, contains nasopharyngeal and lung secretions and as a result, acts as the primary source of infection.[4] A person can contract the virus either through direct inhalation or through touching inanimate objects contaminated with the virus.[1]

Due to a denture's close proximity to the pharynx, denture wearers might have an increased risk of aspirating COVID-19 virus.[5] Keeping in mind that SARS-CoV-2 virus can spread through contaminated inanimate objects, the removable prosthesis can potentially act as an agent for transmission.[1] Moreover, the acrylic resin used to fabricate the base plate for the dentures has microporosities, which may harbor pathogens.[5]

Even with the increasing popularity of fixed prostheses such as implants and bridges, removable prostheses are still used widely due to their cost-effectiveness. However, such prostheses tend to slowly bring about changes to the intraoral flora, resulting in more favorable conditions for invasion and colonization of harmful microorganisms, in turn, causing conditions such as denture stomatitis.[4] Furthermore, the use of removable dental prostheses results in constant friction on the soft tissues of the oral cavity, making it more susceptible to infection.[6]

Improper cleaning of dentures results in the formation of biofilm, which can predispose to various conditions such as oral fungal infection, denture stomatitis, and inflammatory papillary hyperplasia.[7] The rate at which the aforementioned biofilm formation and accumulation occur depends on a variety of factors, including but not limited to duration for which the prosthesis is worn and the denture cleansing regimen used by the denture wearer.[8]

Secondary bacterial or fungal infections are also more likely to occur in patients with COVID-19 due to lowered immunity, especially in the elderly.[9] As the geriatric population has a higher tendency to have missing teeth, they form a major bracket of the population using dental prostheses such as removable partial dentures or complete dentures.[10]

Such bacterial and fungal strains may be colonized in different tissues and organs, even in the oral cavity, and as a result of that, patients with COVID-19 may experience increased bacterial colonization on their removable prostheses, even in its early and mild stages.

This increase in opportunistic bacterial colonization rates could exacerbate the clinical manifestations of COVID-19 disease, such as respiratory distress syndrome and even fatal pneumonia and therefore could potentially be a warning sign for patients with early COVID-19 disease. An increase in the colonization of these bacteria may accelerate the degradation of the dentures and may be associated with damage to dental or oral tissue.[9]

With the advent of COVID-19 disease, scientific literature is available informing the preventive measures that should be adopted by dental practitioners. However, there appears to be a significant gap in awareness regarding the preventive measures that should be adopted by the patient using removable oral prostheses.[1]

Ideally, a denture cleanser should remove all types of deposits along with any stains. Dentures should be well polished and adequately cleaned with hand soap and a properly designed brush, according to the recommendation by the American Dental Association.[11] This brushing method requires manual dexterity and visual acuity, which are usually compromised in elderly individuals.

Oral health continues to be a low priority area particularly in developing countries where basic medical services are also not adequate.[12] Therefore, there is a need to emphasize the importance of proper home care of the removable prostheses before their placement in the oral cavity.[1]

This survey was conducted to assess the awareness in patients wearing dentures during the pandemic regarding the disinfection of their dentures. The null hypothesis was that there is sufficient awareness regarding the disinfection of removable prostheses during the pandemic.

MATERIAL AND METHODS

A questionnaire [Supplementary material] consisting of 14 questions was prepared, which consisted of questions related to the participants' awareness about COVID-19, including its treatment, vaccination, and precautions necessary. It also included questions about home care and cleaning of removable dental prostheses and the need for follow-up after receiving one.

The questionnaire was developed using the guidelines given by Eysenbach, that is, the Checklist for Reporting Results of Internet E-Surveys. Following this, the validation analyses were performed, namely face validation to ensure understanding and to minimize response bias and pilot data preparation. The questionnaire was well understood by the respondents. Content was validated and as per the aim of the study. Checking the relevance of the questions was the last step under content reliability.

These questions were verbally asked from the participants in their local language following the Traditional Paper and Personal Interview or PAPI questionnaire format and their answers were recorded. The questionnaire was well understood by all the participants.

A total of 208 patients visiting SGT Dental College and Research Institute, Gurgaon, Haryana, India, were included

in the study. Irrespective of age, the patients visiting SGT Dental College and Research Institute and wearing removable dental prostheses during the past 2 years of the pandemic were included in the study.

This study was awarded the grant for (Indian Council of Medical Research [ICMR]- short-term studentship [STS]) 2022.

Statistical significance

Statistical significance was determined using p-values, with a threshold of $P < 0.05$ indicating significant differences:

- Significant differences were found in beliefs about COVID-19 transmission through dental prostheses ($P = 0.023$), fear of visiting dentists during the pandemic ($P = 0.026$), and the importance of maintaining oral hygiene with tobacco use ($P = 0.001$) based on gender.
- Significant differences in the use of vinegar for cleaning prostheses based on age categories ($P = 0.022$) and beliefs about COVID-19 transmission through prostheses based on the duration of prosthesis use ($P = 0.044$).

RESULTS

A video recording survey was conducted over a period of 2 months and 208 responses were recorded. The sample included 136 males (65.4%) and 72 females (34.6%). The mean age of the participants was 64.94 years (Standard deviation = 11.31), with 20 patients (9.6%) in the 30–49-year age category, 100 patients (48.1%) in the 50–69 years age category, and 88 patients (42.3%) aged 70 years and above. Regarding the duration of dental prosthesis use, 101 patients (48.6%) had used their prostheses for <5 years, 74 patients (35.6%) for 5–10 years, and 33 patients (15.9%) for more than 10 years [Table 1].

We found that out of the 208, 50.9% people believed that COVID-19 is like the common cold (47.1% males, 54.2% females; $P = 0.53$) [Table 2] while 21.9% said that it does not exist, of which there were 24 males (17.6%) and 8 females (11.1%). The perception of COVID-19 as deadly was similar across age groups ($P = 0.87$) [Table 3]. Differences were not significant in opinions about COVID-19 across groups ($P = 0.49$) [Table 4].

In addition, a significant majority (86.8% males, 90.3% females; $P = 0.20$) [Table 2] reported following all recommended precautions. A consistent majority across all age categories followed all recommended precautions ($P = 0.95$) [Table 3]. A significant number in Group 1 and Group 2 reported following all precautions compared to Group 3 ($P = 0.19$) [Table 4].

Furthermore, 71.6% people were unsure when asked if COVID-19 could be transmitted through their dental prosthesis while 25.9% people said that it could not. Significantly more males (30.9%) than females (13.9%) believed that COVID-19 could not be transmitted through dental prostheses ($P = 0.023$) [Table 2]. A higher percentage of patients (39.4%) believed that COVID-19 could not be transmitted through a prosthesis ($P = 0.044$).

Moreover, 74.6% people said that they were scared to go to a dentist during the pandemic. A higher percentage of females (34.7%) than males (20.6%) were scared to visit a dentist ($P = 0.026$) [Table 2].

We found that 77.6% people believed that home treatment is sufficient for COVID-19 and 93% people were vaccinated for COVID-19. When asked about home care and maintenance of removable dental prostheses, 97.5% people said that their dental prosthesis should be cleaned at least once a day, 91.5% people said that their dental prosthesis should be stored in a container filled with water when they are not using it, and 64.2% people said that regular toothpaste should be used to clean their dentures while 24.9% said that hand wash should be used. Furthermore, 67.2% people were not sure about using household products such as soap, vinegar, and baking soda as denture cleansers; 30.8% people said that soap could be used. There was a significant difference in the use of vinegar, with category 1 patients more likely to use it ($P = 0.022$) [Table 3].

In addition, 95.5% people had never visited their local pharmacy to purchase a denture cleaning product; 4.5% had and they got denture cleaning tablets.

It was found that 85.6% people said that it is more important to maintain oral hygiene if someone has any tobacco-related habits while 13.4% were unsure about the same. 91.2% of males and 70.8% of females agreed on the importance, showing a significant difference ($P = 0.001$) [Table 2].

When asked how often should a patient visit their dentist after receiving their dentures, 94% said that they do not need follow-up and 97% of the participants said the same when asked how often had they actually visited their dentist after receiving their prosthesis.

Table 1: Descriptive characteristics of study patients (n=208).

Characteristics	Categories	*n* (%)
Gender	Males	136 (65.4)
	Females	72 (34.6)
Age categories (years)	Category 1 (30–49)	20 (9.6)
	Category 2 (50–69)	100 (48.1)
	Category 3 (70 and above)	88 (42.3)
Age (mean in years)	64.94±11.31	
Groups-based time since dental prosthesis is being used (years)	Group 1 (<5)	101 (48.6)
	Group 2 (5–10)	74 (35.6)
	Group 3 (More than 10)	33 (15.9)

Table 2: Responses toward awareness about COVID-19 and home care of removable dental prosthesis among denture wearers based on gender (*n*=208).

Questions	Options	Patients, *n* (%)			*P*-value
		Males	Females	Total	
What is your opinion on COVID-19?	Does not exist	24 (17.6)	08 (11.1)	32 (15.4)	0.53
	Like common cold	64 (47.1)	109 (54.2)	103 (49.5)	
	It is deadly	29 (21.3)	17 (23.6)	46 (22.1)	
	None of the above	19 (14)	08 (11.1)	27 (13)	
Which of the following precautions do you follow?	Wear a mask	07 (5.1)	05 (6.9)	12 (5.8)	0.20
	Sanitize hands	03 (2.2)	02 (2.8)	05 (2.4)	
	Social distancing	0	0	0	
	None of the above	08 (5.9)	0	08 (3.8)	
	All of the above	118 (86.8)	65 (90.3)	183 (88)	
Can COVID-19 be transmitted through dental prostheses?	No	42 (30.9)	10 (13.9)	52 (25)	0.023*
	May be	0	0	0	
	Unsure	91 (66.9)	59 (81.9)	150 (72.1)	
	Yes	03 (2.2)	03 (4.2)	06 (2.9)	
Are you scared to go to a dentist during COVID-19 pandemic?	Yes	28 (20.6)	25 (34.7)	53 (25.5)	0.026*
	No	108 (79.4)	47 (65.3)	155 (74.5)	
Is home treatment sufficient for COVID-19 cure?	Yes	104 (76.5)	56 (77.8)	160 (76.9)	0.83
	No	32 (23.5)	16 (22.2)	48 (23.1)	
Are you vaccinated for COVID-19?	Yes	124 (91.2)	68 (94.4)	192 (92.3)	0.40
	No	12 (8.8)	4 (5.6)	16 (7.7)	
How often should your dental prosthesis be cleaned?	Once a day	135 (99.3)	68 (94.4)	203 (97.6)	0.087
	Once a week	0	01 (1.4)	01 (0.5)	
	Once a month	0	0	0	
	Once a year	0	0	0	
	Never	01 (0.7)	03 (4.2)	04 (1.9)	
How should your dental prosthesis be stored when you are not using it?	Can be kept anywhere	03 (2.2)	03 (2.8)	05 (2.4)	0.70
	Safely in a container	05 (3.7)	05 (6.9)	10 (4.8)	
	Stored in a container filled with water	127 (93.4)	64 (88.9)	191 (91.8)	
	In a denture cleaning solution	01 (0.7)	01 (1.4)	02 (1)	
What should be used to clean your dental prosthesis?	Need not to be cleaned	0	0	0	0.67
	With water	16 (11.8)	6 (8.3)	22 (10.6)	
	Regular toothpaste	85 (62.5)	50 (69.4)	135 (64.9)	
	Handwash	34 (25)	16 (22.2)	50 (24)	
	Denture cleaning tablets	01 (0.7)	0	01 (0.5)	
Which one of the following household products can be used to clean your dental prosthesis?	Vinegar	01 (0.7)	02 (2.8)	03 (1.4)	0.18
	Baking soda	01 (0.7)	0	01 (0.5)	
	Soap	36 (26.5)	27 (37.5)	63 (30.3)	
	Not sure	98 (72.1)	43 (59.7)	141 (67.8)	
Have you ever visited your local pharmacy to purchase a denture cleaning product?	Yes	06 (4.4)	03 (4.2)	09 (4.3)	0.93
	No	130 (95.6)	69 (95.8)	199 (95.7)	

(*Contd...*)

Table 2: (*Continued*).

Questions	Options	Patients, *n* (%)			*P*-value
		Males	Females	Total	
Is it more important to maintain oral hygiene if you have tobacco-related habits?	Yes	124 (91.2)	51 (70.8)	175 (84.1)	0.001*
	The two are not related	01 (0.7)	01 (1.4)	02 (1)	
	Unsure	11 (8.1)	20 (27.8)	31 (14.9)	
	No	0	0	0	
How often should you visit your dentist for a follow-up?	Once a month	03 (2.2)	0	03 (1.4)	0.39
	Once in 6 months	01 (0.7)	02 (2.8)	03 (1.4)	
	Once a year	05 (3.7)	03 (4.2)	08 (3.8)	
	Do not need follow-up	127 (93.4)	67 (93.1)	194 (93.3)	
How many times have you visited your dentist since you received your prosthesis?	Once a month	02 (1.5)	0	02 (1)	0.07
	Once in 6 months	01 (0.7)	01 (1.4)	02 (1)	
	Once a year	0	03 (4.2)	03 (1.4)	
	Do not need follow-up	133 (97.8)	68 (94.4)	201 (96.6)	

*Significant

Table 3: Responses toward awareness about COVID-19 and home care of removable dental prosthesis among denture wearers based on age categories (*n*=208).

Questions	Options	Patients, *n* (%)				*P*-value
		Category 1	Category 2	Category 3	Total	
What is your opinion on COVID-19?	Does not exist	03 (15)	14 (14)	15 (17)	32 (15.4)	0.87
	Like common cold	09 (45)	55 (55)	39 (44.3)	103 (49.5)	
	It is deadly	05 (25)	19 (19)	22 (25)	46 (22.1)	
	None of the above	03 (15)	12 (12)	12 (13.6)	27 (13)	
Which of the following precautions do you follow?	Wear a mask	01 (5)	06 (6)	05 (5.7)	12 (5.8)	0.95
	Sanitize hands	01 (5)	02 (2)	02 (2.3)	05 (2.4)	
	Social distancing	0	0	0	0	
	None of the above	0	04 (4)	04 (4.5)	08 (3.8)	
	All of the above	18 (90)	88 (88)	77 (87.5)	183 (88)	
Can COVID-19 be transmitted through dental prostheses?	No	7 (35)	20 (20)	25 (28.4)	52 (25)	0.43
	May be	0	0	0	0	
	Unsure	13 (65)	76 (76)	61 (69.3)	150 (72.1)	
	Yes	0	4 (4)	2 (2.3)	06 (2.9)	
Are you scared to go to a dentist during COVID-19 pandemic?	Yes	04 (20)	25 (25)	04 (27.3)	53 (25.5)	0.78
	No	16 (80)	75 (75)	64 (72.7)	155 (74.5)	
Is home treatment sufficient for COVID-19 cure?	Yes	13 (65)	83 (83)	64 (72.7)	160 (76.9)	0.10
	No	07 (35)	17 (17)	24 (27.3)	48 (23.1)	
Are you vaccinated for COVID-19?	Yes	17 (85)	96 (96)	79 (89.8)	192 (92.3)	0.12
	No	03 (15)	04 (4)	09 (10.2)	16 (7.7)	
How often should your dental prosthesis be cleaned?	Once a day	20 (100)	96 (96)	87 (98.9)	203 (97.6)	0.66
	Once a week	0	01 (1)	0	01 (0.5)	
	Once a month	0	0	0	0	
	Once a year	0	0	0	0	
	Never	0	03 (3)	01 (1.1)	04 (1.9)	

(*Contd...*)

Table 3: (*Continued*).

Questions	Options	Patients, *n* (%)				*P*-value
		Category 1	Category 2	Category 3	Total	
How should your dental prosthesis be stored when you're not using it?	Can be kept anywhere	0	03 (3)	02 (2.3)	05 (2.4)	0.15
	Safely in a container	0	08 (8)	02 (2.3)	10 (4.8)	
	Stored in a container filled with water	19 (95)	88 (88)	84 (95.5)	191 (91.8)	
	In a denture cleaning solution	01 (5)	01 (1)	0	02 (1)	
What should be used to clean your dental prosthesis?	Need not to be cleaned	0	0	0	0	0.24
	With water	01 (5)	11 (11)	10 (11.4)	22 (10.6)	
	Regular toothpaste	17 (85)	68 (68)	50 (56.8)	135 (64.9)	
	Handwash	02 (10)	21 (21)	27 (30.7)	50 (24)	
	Denture cleaning tablets	0	0	01 (1.1)	01 (0.5)	
Which one of the following household products can be used to clean your dental prosthesis?	Vinegar	02 (10)	01 (1)	0	03 (1.4)	0.022*
	Baking soda	0	01 (1)	0	01 (0.5)	
	Soap	03 (15)	30 (30)	30 (34.1)	63 (30.3)	
	Not sure	15 (75)	68 (68)	58 (65.9)	141 (67.8)	
Have you ever visited your local pharmacy to purchase a denture-cleaning product?	Yes	02 (10)	03 (3)	05 (5.7)	09 (4.3)	0.19
	No	18 (90)	98 (98)	83 (94.3)	199 (95.7)	
Is it more important to maintain oral hygiene if you have tobacco-related habits?	Yes	18 (90)	82 (82)	75 (85.2)	175 (84.1)	0.89
	The two are not related	0	01 (1)	01 (1.1)	02 (1)	
	Unsure	02 (10)	17 (17)	12 (13.6)	31 (14.9)	
	No	0	0	0	0	
How often should you visit your dentist for a follow-up?	Once a month	0	03 (3)	0	03 (1.4)	0.23
	Once in 6 months	01 (5)	01 (1)	01 (1.1)	03 (1.4)	
	Once a year	02 (10)	04 (4)	02 (2.3)	08 (3.8)	
	Do not need follow-up	17 (85)	92 (92)	85 (96.6)	194 (93.3)	
How many times have you visited your dentist since you received your prosthesis?	Once a month	0	02 (2)	0	02 (1)	0.13
	Once in 6 months	01 (5)	0	01 (1.1)	02 (1)	
	Once a year	0	03 (3)	0	03 (1.4)	
	Do not need follow-up	19 (95)	95 (95)	87 (98.9)	201 (96.6)	

*Significant

Table 4: Responses toward awareness about COVID-19 and home care of removable dental prosthesis among denture wearers based on time since dental prosthesis is being used (*n*=208).

Questions	Options	Patients, *n* (%)				*P*-value
		Group 1	Group 2	Group 3	Total	
What is your opinion on COVID-19?	Does not exist	16 (15.8)	08 (10.8)	08 (24.2)	32 (15.4)	0.49
	Like common cold	49 (48.5)	40 (54.1)	14 (42.4)	103 (49.5)	
	It is deadly	20 (19.8)	19 (25.7)	07 (21.2)	46 (22.1)	
	None of the above	16 (15.8)	07 (9.5)	04 (12.1)	27 (13)	
Which of the following precautions do you follow?	Wear a mask	05 (5)	04 (5.4)	03 (9.1)	12 (5.8)	0.19
	Sanitize hands	02 (2)	02 (2.7)	01 (3)	05 (2.4)	
	Social distancing	0	0	0	0	
	None of the above	02 (2)	02 (2.7)	04 (12.1)	08 (3.8)	
	All of the above	92 (91.1)	66 (89.2)	25 (75.8)	183 (88)	

(*Contd...*)

Table 4: (*Continued*).

Questions	Options	Patients, *n* (%)				*P*-value
		Group 1	Group 2	Group 3	Total	
Can COVID-19 be transmitted through dental prostheses?	No	25 (24.8)	14 (18.9)	13 (39.4)	52 (25)	0.044*
	May be	0	0	0	0	
	Unsure	72 (71.3)	60 (81.1)	18 (54.5)	150 (72.1)	
	Yes	04 (4)	0	02 (6.1)	06 (2.9)	
Are you scared to go to a dentist during COVID-19 pandemic?	Yes	26 (25.7)	20 (27)	07 (21.2)	53 (25.5)	0.81
	No	75 (74.3)	54 (73)	26 (78.8)	155 (74.5)	
Is home treatment sufficient for COVID-19 cure?	Yes	78 (77.2)	52 (70.3)	30 (90.9)	160 (76.9)	0.064
	No	23 (22.8)	22 (29.7)	03 (9.1)	48 (23.1)	
Are you vaccinated for COVID-19?	Yes	94 (93.1)	69 (93.2)	29 (87.9)	192 (92.3)	0.58
	No	07 (6.9)	05 (6.8)	04 (12.1)	16 (7.7)	
How often should your dental prosthesis be cleaned?	Once a day	97 (96)	73 (98.6)	33 (100)	203 (97.6)	0.65
	Once a week	01 (1)	0	0	01 (0.5)	
	Once a month	0	0	0	0	
	Once a year	0	0	0	0	
	Never	03 (3)	01 (1.4)	0	04 (1.9)	
How should your dental prosthesis be stored when you're not using it?	Can be kept anywhere	01 (1)	02 (2.7)	02 (6.1)	05 (2.4)	0.05*
	Safely in a container	09 (8.9)	0	01 (3)	10 (4.8)	
	Stored in a container filled with water	89 (88.1)	72 (97.3)	30 (90.9)	191 (91.8)	
	In a denture cleaning solution	02 (2)	0	0	02 (1)	
What should be used to clean your dental prosthesis?	Need not to be cleaned	0	0	0	0	0.39
	With water	08 (7.9)	07 (9.5)	07 (21.2)	22 (10.6)	
	Regular toothpaste	68 (67.3)	47 (63.5)	20 (60.6)	135 (64.9)	
	Handwash	24 (23.8)	20 (27)	06 (18.2)	50 (24)	
	Denture cleaning tablets	01 (1)	0	0	01 (0.5)	
How many of the following household products can be used to clean your dental prosthesis?	Vinegar	02 (2)	01 (1.4)	0	03 (1.4)	0.05*
	Baking soda	01 (1)	0	0	01 (0.5)	
	Soap	20 (19.8)	32 (43.2)	11 (33.3)	63 (30.3)	
	Not sure	78 (77.2)	41 (55.4)	22 (66.7)	141 (67.8)	
Have you ever visited your local pharmacy to purchase a denture-cleaning product?	Yes	05 (5)	03 (4.1)	01 (3)	09 (4.3)	0.88
	No	96 (95)	71 (95.9)	32 (97)	199 (95.7)	
Is it more important to maintain oral hygiene if you have tobacco-related habits?	Yes	91 (90.1)	59 (79.7)	25 (75.8)	175 (84.1)	0.09
	The two are not related	01 (1)	0	01 (3)	02 (1)	
	Unsure	09 (8.9)	15 (20.3)	07 (21.2)	31 (14.9)	
	No	0	0	0	0	
How often should you visit your dentist for a follow-up?	Once a month	02 (2)	0	01 (3)	03 (1.4)	0.103
	Once in 6 months	03 (3)	0	0	03 (1.4)	
	Once a year	07 (6.9)	01 (1.4)	0	08 (3.8)	
	Do not need follow-up	89 (88.1)	73 (98.6)	32 (97)	194 (93.3)	
How many times have you visited your dentist since you received your prosthesis?	Once a month	02 (2)	0	0	02 (1)	0.263
	Once in 6 months	02 (2)	0	0	02 (1)	
	Once a year	03 (3)	0	0	03 (1.4)	
	Do not need follow-up	94 (93.1)	74 (100)	33 (100)	201 (96.6)	

*Significant

DISCUSSION

There is massive awareness created in our country in the past 2 years of the pandemic. Both government and private sectors have contributed immensely toward this. The elderly population has been affected more during this pandemic due to the various complicating health risks. Furthermore, a lot of ailments have gone unreported due to the overburdened health system. Therefore, this study attempted to assess the awareness related to COVID-19 in the population reporting to SGT Dental College, Chandu, as well as the various measures taken to avoid the spread of coronavirus through removable prosthetic appliances.

A number of studies have been conducted on the transmission of deadly viruses like SARS-COV-2. Elyassi Gorji *et al*., in 2021 observed that despite the microscopic structure of the acrylic resin base used in removable dental prostheses, there was no significant viral contamination observed.[4] On the other hand, Jerônimo *et al*., in 2022, found that denture stomatitis caused by fungal pathogens like *Candida albicans* may result in increased morbidity and mortality in COVID-19 patients. They highlighted the need for dental healthcare professionals to focus more on patients using removable dental prostheses to improve oral hygiene habits in these patients.[6] Lin *et al*., found that dentures from COVID-19 patients' bedside contained infectious virus.[13]

Derafshi *et al*., reported significant differences in the results of amplification of human herpesvirus 8 (HHV8) as assessed by polymerase chain reaction in the saliva of patients using removable dental prostheses compared to those who were not and asserted that the prostheses should be considered as a potential reservoir of colonization and subsequently, infection, especially in geriatric patients. In addition, adequate denture cleaning, along with the use of antiviral and local antibacterial agents, could contribute to a decrease in the accumulation of various kinds of microorganisms in the oral cavity.[14]

Karimzadeh *et al*., deduced that patients with COVID-19 infection could experience increased bacterial colonization on dentures, which may lead to damage to dental or oral tissues.[9] It can be, therefore stated that the pandemic has necessitated the need to maintain oral hygiene as well as monitor the frequency of cleaning of one's prosthesis.[10]

We conducted a survey of 208 patients who were using removable dental prostheses during the pandemic in their local language following the Traditional Pen-and-Paper Interview (PAPI) format. The null hypothesis, that there is sufficient awareness regarding the disinfection of removable prostheses during the pandemic, were rejected. Based on our results, there seems to be a gap in knowledge among the patients regarding COVID-19 transmission through removable dental prostheses. Not only that, there are only a few studies on the transmission of viral pathogens, including COVID-19 through dental prostheses. Further studies should be conducted on the same and the population, dentist and denture wearers alike should be educated on it.

Moreover, there is little knowledge among patients about the use of common household products such as vinegar and baking soda as denture cleansers. Since they are easily accessible and affordable, denture wearers should be educated about the proper use of such products. These products can effectively eliminate microorganisms from denture surfaces, provided they are used at suitable concentrations.[15]

Kumar *et al*., conducted a study in 2020 and concluded that a significant percentage of the population avoided dental visits or treatment during the COVID-19 outbreak. They found a significant association between the dental visits made before the COVID-19 outbreak and those after the COVID-19 outbreak and also between the perceived risk of visiting dental clinics during COVID-19 times and attitude toward making such visits in case the need arises.[16]

Vohra *et al*., deduced that people coming to the dental outpatient department were in a lot of stress and anxiety regarding dental procedures during the COVID-19 pandemic. About 70.7% had quarantined themselves before coming for dental treatment. 62.4% were willing for dental treatment post-vaccination, 26% were not willing for treatment, and 11.6% were not sure.[17]

This is consistent with our results. Therefore, it can be concluded that there was significant fear among people to visit the dentist during the pandemic. Such problems can be solved by creating more awareness and following meticulous sterilization protocols.

In a study conducted by Dwivedi *et al*., in 2021 in Assam state, the authors concluded that there was a great impact on the oral hygiene habits and maintenance of dentures in patients after education and motivation through video conferencing.[18]

Gupta *et al*., conducted a study in 2017 and found that poor oral hygiene score was associated with a significant risk of oral cancer. When stratified by tobacco-chewing habit, the poor oral hygiene score was a significant risk factor only among tobacco users.[19]

It is very well established that tobacco has a direct correlation to oral diseases. Therefore, maintaining oral hygiene becomes even more important for people with a tobacco habit. As per our results, more awareness needs to be generated regarding this.

In addition, most of the patients were not aware of the need for follow-up. It is well established that a follow-up of at least once a year, if not more, is necessary for adequate function and maintenance of the prosthesis and of the patient's

health, oral and otherwise. There seems to be an urgent need for greater awareness around this. It could be done through written instruction to the patient after each dental visit. Furthermore, with the advent of digital technology, patients could be reminded about upcoming appointments through short message service and messaging platforms like WhatsApp. In addition, awareness camps could be organized in the community regarding the need for follow-up. There is also a need for greater awareness about the availability and effectiveness of commercially available denture cleansers like denture cleaning tablets. It is suggested that similar multicentric surveys should be conducted to assess the need for awareness around COVID-19 and care of removable dental prostheses.

CONCLUSION

We concluded that there is a need to create awareness regarding use of common household products and commercially available products as denture cleansers, and the need for regular follow up. Further studies should be conducted on transmission of viruses like SARS-COV-2 via removable dental prostheses and awareness should be spread about the same. Similar multicentric studies should be conducted to assess and spread awareness about the same. Further, there is a need for more studies on various ways to spread awareness and their efficiency.

Authors' contributions: KR: Collected the data and patient management and wrote the manuscript; RS: Conceived and designed the analysis, patient management, corresponding author, and manuscript editing; DS: Patient management and data analysis; AK: Patient management; BY: Guidance and manuscript verification; RM: Patient care and coordination.

Ethical approval: The research/study was approved by the Institutional Review Board at Institutional Ethical Committee, Shree Guru Gobind Singh Tricentenary (SGT) Dental College, Hospital and Research Center, number FODS/EC/ICMR-STS/2022.16, dated 29th August 2022.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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How to cite this article: Rawal K, Sanan R, Singh D, Kothe A, Yadav B, Minocha R. Assessment of awareness about COVID-19 and proper home care of removable dental prostheses in denture wearers. J Academy Dent Educ. doi: 10.25259/JADE_2_2025