

Knowledge and Practice of Immediate Dentures among the Dentists in Private Clinics in Khartoum State: A Descriptive Cross-sectional Study

Okasha Hassan¹, Fadia Awadalkreem², Ibrahim A Ismail³, Vivek Padmanabhan⁴

ABSTRACT

Aim of the study: To assess the awareness and practice of Immediate Dentures among the dentists who work in the private clinics in Khartoum state, Sudan.

Materials and methods: A descriptive cross-sectional questionnaire-based study was conducted among the dental medical officers, registrars, specialists, and consultants who are working in private clinics and centers in Khartoum state and registered the private medical institutions in Sudan. The sample population was 664, using the stratified sampling technique and simple randomization within the stratum, 265 dentists were asked to participate in the study voluntarily.

A self-administered questionnaire consisted of 32 closed questions and 3 sections, section (1) involved the participant's data, section (2) contained the participant's knowledge, and section (3) the participant's practice was distributed. The participant's knowledge and practice scores were calculated as percentages achieved by dividing the number of accurate answers of the participants by the total number of questions and categorized as Good (66.6–100%), Average (33.3–66.6%), and Poor (less than 33.3%).

Data was collected and analyzed using a statistical package of Social Science (SPSS) computer software version 22. Chi-square was used for statistical analysis.

Results: The response rate was 100%, with nearly equal distribution between males (135, 50.9%) and females (130, 49.1%). The age range is 24–39 years, with a mean of 31.65 ± 7.52 years. The majority of the participants (172, 64.9%) were freshly graduated and young practitioners, with the majority of them having experience ranging from 1 to 6 years. The result of the study revealed that 65.7% of the respondents have average knowledge about immediate denture while 8.7% expressed poor knowledge and only 25.7% had excellent knowledge.

On the other hand, the majority of the participants (200, 75.5%) have never constructed an immediate denture, while only 21.1% have a history of constructing 1–5 immediate dentures, 3% constructed more than 5–10 immediate dentures and only 0.4% constructed more than 10 immediate dentures.

The lack of knowledge and experience was the main barrier preventing the use of immediate dentures, and the mainstream of the participants (118, 44.5%), evaluated their knowledge about the immediate denture as poor.

Using the Chi-square test, the correlation between the participants' knowledge and their gender, years of experience, and qualification was found not significant (p -values of 0.46, 0.27, and 0.66, respectively) while a significant correlation was found between the participants' self-evaluation of their knowledge and their knowledge score with a p -value of 0.000*.

Conclusion: Within the limitations of this study, the dental practitioners have average knowledge about the immediate denture, but the practice of the immediate denture is still very limited and requires enhancement.

Clinical significance: Immediate dentures have a significant role in maintaining the patient's esthetics, phonetics, masticatory efficiency, self-esteem, and quality of life. Hence, the knowledge and practice of the different dentists about the immediate denture are of great importance to improve the standard of care provided for the patient.

Keywords: Dentists, Immediate denture, Knowledge, Practice.

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INTRODUCTION

Loss of natural teeth is a major and irreversible process facing both the elderly and, in some cases, the young population.¹ Caries, periodontal disease, trauma, and tooth wear are the main causative factors associated with tooth loss.² A high prevalence of untreated caries and periodontal disease was documented in the Sudanese population by Khalifa et al.²

Edentulism is an unpleasant circumstance affecting the patient's speech, appearance, taste, and mastication. It adversely affects the patient's quality of life and increases their psychological need for prosthetic treatment.³

Many prosthetic options have been described for the rehabilitation of completely and partially edentulous patients,

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including dentures.⁴ Conventionally, patients are advised to wait a minimum of 3 months for healing following tooth extraction before the fabrication of a complete or partial denture.⁵ Nevertheless, many patients may find this period of edentulism very upsetting, increasing their distress, anxiety, and embarrassment, and seeking an immediate restoration for their teeth.⁶

The Glossary of Prosthodontic Dentistry defines an “immediate denture” as any removable dental prosthesis fabricated for placement immediately following the removal of a natural tooth or teeth.⁷ Richardson was the first to describe the use of immediate dentures as a treatment modality for patients presented with a few remaining hopeless teeth that should be extracted and immediately replaced in 1860, as documented by Rubina⁸ and Kraljevic et al.⁹

Immediate dentures have many reported advantages, including maintaining the patient’s oral functions, avoiding the embarrassment of being without teeth, and offering good adaptation for dentures.^{9,10} Moreover, it precludes the loss of vertical dimension and muscle tone, the disharmony of the muscles of facial expression, and the development of abnormal chewing habits.^{6,8,10,11} Furthermore, the remaining teeth can serve as guidance to duplicate the arrangement and shade of the natural tooth and improve the patient’s satisfaction level.^{6,8,10}

A controversy regarding the efficiency of immediate dentures in reducing the rate of alveolar resorption has been reported in the literature.^{10–12} Johnson¹¹ compared the differences in bone resorption levels in cases of conventional and immediate dentures. He found that patients receiving immediate dentures after full extraction displayed less resorption than conventional dentures, which are constructed after a period of healing. In contrast, Carlsson et al.¹² revealed no difference in the level of bone resorption at the lower anterior segment between the group of dentures fitted immediately and those fitted after 2 months.¹² Rignon-Bret et al.¹³ documented the significant efficiency of the xenogenic bone substitute socket grafting technique in reducing maxillary alveolar bone resorption following multiple anterior tooth extractions and immediate denture therapy.

On the other hand, discomfort owing to the tissue healing under the denture, increased cost and number of clinical visits, as well as the lack of trying steps in conventional immediate dentures, are the commonly addressed conventional immediate denture disadvantages.¹⁰

Immediate denture construction may necessitate a high standard of knowledge to alter the vertical dimensions in some cases, to determine the correct tooth position, tooth form, to adjust the overjet and overbite, and to certify balanced occlusion.^{10,14–17} Recently, computer-aided design and computer-aided manufacturing (CAD-CAM) and digital workflow technology have been successfully used to integrate the virtual tooth setup with the 3D replica of the patient’s face to improve the esthetic treatment outcome.^{18–22}

Despite the reducing trends in the edentulism state worldwide, people are still losing their teeth.^{1,2,10,14} Around 19% of the older population in the UK uses removable prostheses, with increasing demands for an esthetic and immediate prosthetic treatment option. Consequently, the dentist’s knowledge about immediate dentures and the method of construction is of significant importance, and as dental practitioners play a significant role in patient education, there is an increasing demand to investigate the level of knowledge and awareness of dental practitioners about immediate dentures. The study aims to assess the awareness and

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Table 1: Shows the population size and its distribution among the different private clinics in Khartoum state

Location	Khartoum	Khartoum-North	Omdurman
The numbers of the Dentists	338 (50.9%)	165 (24.9%)	161 (24.2%)
Total	664		

practice of immediate dentures among dentists who work in private clinics in Khartoum state, Sudan.

MATERIALS AND METHODS

The study was approved by the Ministry of Health and the Faculty of Dentistry, University of Khartoum Research Board. The study was conducted between June 2019 and January 2020.

The Study Population

The study population included all the dental medical officers, registrars, specialists, and consultants who were working at the private clinic in Khartoum state, Sudan, and registered at the private medical institutions in Sudan which were found to be 664 (Table 1).

The exclusion criteria for the study were the dental house officers and the participants who did not sign the informed consent.

Sample Selection and Sample Size Calculation

A stratified randomized sampling technique was used. All the doctors who were registered at the specialized center lists of the private medical institutions in Sudan were divided into strata according to their locations in the state (Khartoum, Khartoum North, and Omdurman). Then, from each stratum, a simple random sample is selected depending on the percentage of the stratum in the total population number.

The adequate sample size was determined using the following formula:

$$n = X^2N/X + N - 1$$

$$\text{where } X = Z^2 * p * 1 - p / e^2$$

$$n = \text{Sample size}$$

$$N = \text{Population size}$$

$$Z = \text{z-score } 1.96$$

$$P = \text{Population proportion } 50\%$$

$$e = \text{Margin of error } 5\%$$

By applying the formula, the sample size was 243 participants. However, to avoid the risk of dropout, 265 questionnaires were distributed, and all were answered; thus, the sample size was extended to 265.

Participants were asked to participate in the study voluntarily, and signed informed consent was obtained from each participant



before enrolment. The participants were given the questionnaire in person with the assumption that they would freely complete it within a week.

Questionnaire Design: A self-administered questionnaire, written in English, including a validated set of 32 closed-ended questions, was distributed to the participants as a modification of a previously validated questionnaire.²³ The questionnaire had 3 sections: The first section included 6 questions concerning the participant's data. The second section was "The Dentist's Knowledge about immediate denture", which consisted of 23 questions. The third section was "The Dentist's Practice about Immediate Denture", which involved 2 questions; and finally, one question to investigate the participant's self-evaluation about their knowledge.

The Participant's Knowledge and Practice Scores

The participant's knowledge and practice scores were calculated as percentages achieved by dividing the number of accurate answers by the total number of questions. Hence, the knowledge and practice scores of the participants were subdivided into 3 categories: Excellent, average, and poor. Accordingly, the knowledge of the participants was categorized into three categories: Good (66.6–100%), average (33.3–66.6%), and poor (less than 33.3%).

Reliability and Validity of the Questionnaire

A pilot study was performed to inspect the questionnaire's internal consistency and test-retest reliability using the Cronbach Alpha test. The questionnaire was administered to 30 participants twice, with 2-week elapsed time intervals. The questionnaire reliability was assessed using Cronbach's test and found to be 0.76, which was considered satisfactory. The results of the pilot study were not included in the final analysis of the study.

Data Analysis

The data were collected, coded, tabulated, and statistically analyzed using the IBM Statistical Package for Social Sciences software (SPSS version 22). Descriptive statistics were presented in frequency tables, graphs, means, and standard deviations. The Chi-square test was used to analyze the data. A *p*-value of 0.05 was considered significant, with a 95% confidence interval.

RESULTS

Participants' Characteristics

There are 265 participants enrolled in the survey, with a response rate of 100% and a nearly equal distribution between males (135, 50.9%) and females (130, 49.1%). Age-groups range from 24 to 39 years, with a mean of 31.65 ± 7.52 years (Table 2).

The majority of the participants (172, 64.9%) were freshly graduated and young practitioners, with the majority of them having experience ranging from 1 to 6 years, 1–3 years reported by 87 subjects (32.8%), while 85 (32.1%) had more than 3–6 years of experience (Table 2).

The vast majority of the participants (192, 72.4%) heard about immediate dentures at the university undergraduate level, while 34 (12.8%), 20 (7.5%), 18 (6.8%), and 1 (0.4%) from the internet, journals, continuous education courses, and other sources, respectively (Table 2).

A total of 181 participants (68.3%) reported that the immediate denture should be constructed before the extraction, while 29.4%

Table 2: Shows the participant's characteristics (gender, academic qualification, years of experience), sources of information about immediate denture, and time for the construction of immediate denture

Variable	Frequency <i>n</i>	Percent %
Gender		
Male	135	50.9
Female	130	49.1
Total	265	100
Academic qualification		
PhD	5	2%
MDS	26	10%
MSc	59	22%
BDS	175	66%
Total	265	100
Years of experience		
1–3 years	87	32.8%
More than 3–6 years	85	32.1%
More than 6–10 years	61	23%
More than 10 years	32	12.1%
Total	265	100
Sources of information about immediate denture		
Universities	192	72.5%
Continuous education course	18	6.8%
Journals	20	7.5%
Internet	34	12.8%
Others	1	0.4%
Total	265	100
Time for the construction of immediate denture		
Before extraction	181	68.3%
One week later	78	29.4%
One month later	2	0.8%
I do not know	4	1.5%
Total	265	100

answered a week later, 0.8% 1 month later, and 1.5% reported their lack of knowledge (Table 2).

Participant's Knowledge about Immediate Denture

The majority of the participants (232, 87.5%) mentioned that immediate denture could eliminate the period of edentulism following tooth extraction while 23 (8.3%) agreed that immediate dentures could prevent the psychological effects of edentulism. Moreover, more than half of the respondents (171, 64.5%) reported that the immediate denture could reduce ridge resorption (Table 3).

Almost half of the participants (128, 48.3%) thought that immediate dentures might increase wound contamination; whilst 167 (63%) declared that the insertion of an immediate denture could reduce the postoperative bleeding after extraction (Table 3).

A total of 182 respondents (68.7%) agreed that immediate denture can preserve the vertical dimension of the patients from collapse. Additionally, 100 of them (37.7%) thought that immediate dentures could not preserve the patient's masticatory efficiency while 138 (52.1%) declared that immediate denture construction can prevent tongue enlargement (Table 3).

Table 3: Shows the knowledge of the participants about immediate dentures' advantages, disadvantages, indications, and contraindications

Variables	Yes frequency/percentage (N/%)	No frequency/percentage (N/%)	I don't know frequency/percentage (N/%)
Immediate denture can eliminate the period of edentulism associated with tooth loss and its subsequent effects	232/87.5%	7/2.6%	26/9.8%
Immediate denture can prevent the psychological impact of being without teeth	234/88.3%	7/2.6%	24/9.1%
Immediate denture can reduce ridge resorption	171/64.5%	51/19.2%	43/16.2%
Immediate denture may increase wound contamination	128/48.3%	83/31.3%	54/20.4%
Insertion of immediate denture can reduce postoperative bleeding after extraction	167/63%	37/14%	61/23%
Immediate denture can preserve the vertical dimension of the patient from collapse	182/68.7%	27/10.2%	56/21.1%
Immediate denture can decrease the patient's masticatory efficiency	100/37.7%	94/35.5%	71/26.8%
Tongue enlargement can be prevented by immediate denture's construction	138/52.1%	31/11.7%	96/36.2%
Immediate denture helps the patient to adapt well and quickly to their complete denture	189/71.3%	19/7.2%	57/21.5%
The main indication of immediate denture is to maintain patient's esthetic	221/83.4%	22/8.3%	22/8.3%
One of the disadvantages of immediate denture is its high cost	142/53.6%	45/17%	78/29.4%
Immediate denture needs a highly motivated patient	199/75.1%	20/7.5%	46/17.4%
Patient cooperation is a vital variable when considering immediate denture construction	192/72.4%	15/5.7%	58/21.9%
Immediate denture requires more postoperative care than conventional dentures	174/65.6%	33/12.5%	58/21.9%
Immediate denture can be used as definitive treatment modality	117/44.2%	71/26.8%	77/29%
Diabetic patients are not candidate for immediate denture	117/44.2%	50/18.9%	98/36.9%

Table 3 shows that the majority of the respondents, (189, 71.3%) reported that immediate denture helps the patient to adapt well and quickly to their complete denture while 83.4% of them answered that the main indication of the immediate dentures is to maintain the patient's esthetic. On the other hand, almost half of the participants (142, 53.6%) mentioned that one of the disadvantages of the immediate denture is its high cost.

Additionally, one hundred ninety-nine participants (75.1%) answered that immediate denture construction needs highly motivated patients while 192 subjects (72.4%) answered that the cooperation of the patient is very essential when deciding to construct the immediate denture. Moreover, 174 participants (65.6%) were familiar with the fact that the immediate denture requires more postoperative care than conventional dentures. Furthermore, 117 of the participants (44.2%) reported the use of an immediate denture as a definitive treatment modality while only 18.9% (50 participants) believed that patients with Diabetes Mellitus could be candidates for the immediate denture (Table 3).

Table 4 shows that less than half of the participants (46%, 122 subjects) considered that self-curing acrylic material is the material of choice for the construction of immediate dentures while 117 subjects (44.2%) conveyed that the need for another impression to be taken immediately after teeth extraction for immediate denture construction. Moreover, 117 (44.2%) documented that the try-in stage is not a mandatory step in the construction of immediate dentures. Furthermore, 167 participants (63%) were familiar with the fact that the immediate denture requires more follow-up visits than conventional dentures with nearly half of the respondents (131,

49.4%) mentioning that the first adjustment should be performed in the next day and eighty-six of them were conversant that the immediate denture requires relining after construction.

On the other hand, the highest percentages of the participants (106 subjects, 40.3%) did not know the different types of immediate dentures, while only thirty subjects (11%) identified the conventional type, 5.7% the Telescopic type, 3.8% the attachment type, 1.9% reported the flanged type, 21.1% recognized the socket type, 16.2% described the interim type, and 9.5% gave a false answer (Table 4).

Participant's Practice of Immediate Denture

Most of the practitioners have never constructed an immediate denture (200 subjects, or 75.5%), while 56 subjects (21.1%) constructed between 1 and 5 immediate dentures, 8 subjects (3%) constructed more than 5–10 immediate dentures, and only 1, 0.4% constructed more than 10 immediate dentures (Table 4).

The majority of dental practitioners reported that the main barriers that prevent them from practicing immediate denture construction are a lack of knowledge and experience (54.7%/145 participants) and 53.9%/143 participants, respectively, while some of them (49 participants/18.5%) referred to the need for extra steps. Only 30 participants/11.3% mentioned the expenses of the denture (Table 4).

The mainstream of the participants, 118 subjects (44.5%), evaluated their knowledge about the immediate denture as poor, while 32.1% (85 subjects) considered it good, 19.2% (51 subjects) reported no knowledge, and only 4.2%, 11 subjects mentioned they have excellent knowledge about immediate dentures (Table 4).

Knowledge and Practice of Immediate Dentures

Table 4: Shows the participant's knowledge about immediate denture construction, the participant's practice of immediate denture, barriers that prevent the construction of immediate denture and how the participants evaluated their knowledge about immediate denture (*The participant's Self-evaluation*)

Variable		Frequency n	Percent %
Knowledge about Immediate Denture's construction	The material that commonly used for the construction of immediate dentures	Self-cure acrylic	122 46%
		Heat-cure acrylic	84 31.7%
		Chrome cobalt	7 2.6%
		Flexible material	48 18.2%
		I don't know	4 1.5%
	Total		265 100%
		Yes	117 44.2%
		No	82 30.9%
	The need of another impression to be taken immediately after extraction for immediate denture construction	I do not know	66 24.9%
		Total	265 100%
		Yes	82 30.9%
	A try-in stage is a mandatory step to evaluate esthetic in immediate denture construction	No	117 44.2%
		I do not know	66 24.9%
		Total	265 100%
	Immediate denture requires more follow-up visits than conventional denture	Yes	167 63%
		No	33 12.5%
		I do not know	65 24.5%
	Total		265 100%
		Next day	131 49.4
		After 3 days	33 12.5
	About the first adjustment to the immediate denture (some participants select more than one answer)	After 1 week	77 29.1
		After 1 month	17 6.4
		I don't know	69 2.6
Yes		86 32.5%	
No		102 38.5%	
Is immediate denture requiring relining or rebasing after placement?	I do not know	77 29%	
	Total	265 100%	
	Conventional	30 11%	
Types of immediate denture you know?	Telescopic	15 5.7%	
	Attachment	10 3.8%	
	Flanged	5 1.9%	
	Sockets	56 21.1%	
	Interim	43 16.2%	
	I Don't know	106 40.3%	
	Total	265 100%	
Practice of Immediate Denture	Never construct	200 75.5%	
	Number of immediate dentures constructed by the participants	1-5	56 21.1%
		More than 5-10	8 3%
		More than 10	1 0.4%
		Total	265 100%
	Barriers that prevent the practitioners from constructing immediate dentures	Lack of knowledge	Yes 145 54.7%
			No 120 45.3%
		Lack of experience	Yes 143 53.9%
			No 122 46.1%
		Need for extra steps	Yes 49 18.5%
		No 216 81.5%	

(Contd...)

Table 4: (Contd...)

Variable		Frequency n	Percent %	
How the participants evaluated their knowledge about immediate denture? (The participant's self-evaluation)	Expensive	Yes	30	11.3%
		No	235	88.7%
	Refused by the patient	Yes	0	0%
		No	0	0%
	No definite reason	Yes	0	0%
		No	0	0%
	Excellent		11	4.2%
	Good		85	32.1%
	Poor		118	44.5%
	No knowledge		51	19.2%
Total		265	100%	

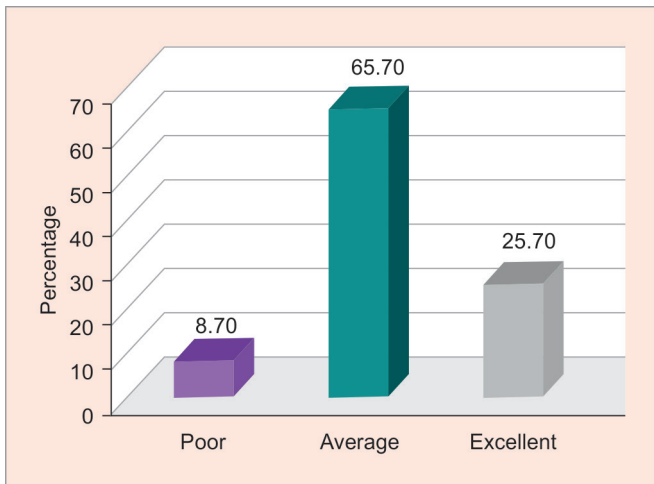


Fig. 1: The general level of the participant's knowledge about immediate dentures

The General Level of Knowledge among the Participants

Considering the knowledge score of the participants, the result of the present study revealed that 174 of the participants (65.7%) have average knowledge, while 23 (8.6%) have poor knowledge, and 68 (25.7%) have excellent knowledge as shown in Figure 1.

Association between the Participants' Knowledge Score KS and their Gender, Years of Experience, qualification, and self-evaluation of their knowledge: The correlation between the participants' knowledge and their gender, years of experience, and qualification was found not significant (*p*-values of 0.46, 0.27, and 0.66, respectively) using the Chi-square test, as shown in Table 5.

In contrast, the correlation between the knowledge of the participants and their self-evaluation of the immediate denture is significant, with a *p*-value of 0.000* (Table 5).

DISCUSSION

An immediate denture is a complete or partial removable prosthesis that is constructed before tooth extraction to be inserted immediately after extractions to replace the missing dentition, maintain the patient's esthetics and function, and improve the

Table 5: Association between the participants' knowledge and their gender, years of experience, qualifications, and self-evaluation of their knowledge

Knowledge score	Poor	Average	Excellent	Total	<i>p</i> -value
Gender					
Male	9	92	34	135	0.46
Female	14	82	34	130	
Years of experience					
1–3 years	10	60	15	85	0.27
More than 3–6 years	8	55	23	86	
More than 6–10 years	2	40	19	61	
>10 years	3	18	11	32	
Participants' s qualifications					
BDS	19	113	42	174	0.646
MDS	1	15	9	25	
MSc	3	39	16	58	
PhD	0	5	1	6	
Self-evaluation for knowledge					
Excellent	0	6	5	11	0.000*
Good	0	45	40	85	
Poor	10	89	19	118	
No knowledge	12	35	4	51	

*indicates significance value; Chi-square test was performed

patient's quality of life.^{9–22} The construction of an immediate denture is challenging and necessitates close cooperation between the patient, technician, and clinician.^{14,23,24} Hence, the clinician's and patient's awareness of the different aspects of immediate dentures is of great importance. In accordance with this, Sushma et al.²³ conducted a study in India to evaluate the awareness and attitude of patients and prosthodontists towards immediate dentures. The result of the study revealed that 70.8% of the patients were unaware of a treatment option called immediate dentures, and 80% of the patients expressed their desire to have an artificial prosthesis ready before edentulism (immediate denture).²³



The present study reported an equal distribution of both genders (males and females) in contrast to Del Aguila et al.²⁵ who documented an increase in the percentage of female dentists from 3% in 1970 to more than 14% in 2002 in Washington state. Moreover, they considered this percentage to be increased to 30% of the active dentists by 2020.²⁵ This difference can be attributed to the variation in the study areas, as the present study was conducted in a developing country in contrast to Del Aguila et al.'s study.

The majority of the participants in this study were freshly graduated with experience ranging between 1 and 6 years. A positive and significant association between years of experience and participants' knowledge score was observed, which can be explained by the limited or even lack of knowledge about immediate dentures in undergraduate education.²⁵ An immediate denture was considered one of the special prostheses and has been included in only one lecture during the whole undergraduate education. Moreover, in the present study, no relation was observed between the practitioner's knowledge and qualification status. This can be attributed to the fact that the study was conducted among dentists who were working in private clinics, keeping in mind that immediate dentures are considered special prostheses that are not met every day in the clinic and reflecting the added value of experience over academic qualifications.

When considering the advantages of immediate dentures, the result of the present study agreed with Sushma et al.,²³ who stated that immediate dentures could eliminate the period of edentulism associated with tooth loss and its subsequent adverse effects. Furthermore, the majority of the participants stated that immediate dentures could prevent the psychological effects of edentulism. This result was in line with many authors' reports of the physiological and psychological effects and many adverse consequences of edentulism.^{6,9,14,15}

On the other hand, the present study revealed that the majority of the participants considered that immediate dentures have a significant role in ridge preservation and help in the longevity of the bone underneath the edentulous mucosa. This result is similar to the previous study conducted by Sushma et al.,²³ which documented that the majority of prosthodontic specialists are aware of immediate dentures' advantages, including ridge preservation.¹⁸ On the other hand, George et al.¹⁰ and Johnson¹¹ documented that immediate dentures displayed less resorption than conventional dentures. In contrast to this, Carlsson et al.¹² revealed no difference in the level of bone resorption when compared between a group of dentures fitted immediately and the ones fitted after 2 months.

The highest percentage of the participants thought that immediate dentures might increase wound contamination. This, reveals a fault knowledge and antagonizes the fact that immediate dentures can prevent food particles and fluids from escaping inside the sockets and protect the sockets against trauma from the tongue, food, or teeth of the opposing arch, thus promoting rapid socket healing and preventing wound contamination,^{5,8,10,26} Despite the fact that George et al.¹⁰ reported the lack of evidence between immediate denture wearing and the incidence of bacterial endocarditis, they highlighted the importance of prevention as recommended by Gould et al.²⁷

The result of the present study is in accordance with Kraljevic et al.⁹ George et al.,¹⁰ and Jogezi et al.¹⁴ stated that an immediate denture can restore the patient's original appearance by selecting the size and form of the artificial teeth using the remaining teeth and maintaining the patient's mastication, chewing, speech,

and vertical dimension. At the same time, it has therapeutic and prophylactic effects by acting as a protective bandage over the extraction wound, reducing the bleeding tendency and the possibility of infection.

Moreover, the result of the present study highlighted the role of the immediate denture in preserving the vertical dimension of the edentulous patients from collapse, a result that matched Sushma et al.,²³ who reported that the majority of the prosthodontic specialists (116 out of 120 participants) in Malkapur, Karad (Taluka), Kolhapur and Satara in India agreed that the immediate denture maintains the patients' esthetics, phonetics, and vertical relation. As a result, the patient can quickly adapt to the final conventional dentures. Caputi et al.²⁸ stated that immediate dentures preserve the facial appearance and height, maintain the muscular tone and phonetics, and decrease post-extraction pain.

Furthermore, the majority of the participants identified and answered correctly all the questions related to the advantages of immediate dentures reported by Jogezi et al.,²⁴ such as the immediate denture can maintain the patient's appearance and speech, ensure denture adaptation, increase the patient's self-esteem, maintain the patient's vertical dimension, reduce the pattern of ridge resorption, preserve the wound clot as well as protect the wound healing, and maintain tissue support, including the lip, tongue, and cheek. The same observations were highlighted by Kuruvilla et al.,⁵ Rubina et al.,⁸ Kraljevic et al.,⁹ George et al.,^{10,15} Jogezi et al.,¹⁴ Hasti et al.,¹⁶ Rawat et al.,¹⁷ Egan and Thamson,²⁶ and Yeung et al.²⁹

In contrast, George et al.¹⁰ mentioned that immediate dentures may encourage hemorrhage in patients with bleeding disorders, despite their perceived protection of blood clots in extraction sockets.

The majority of the participants in the present study considered that the patient with diabetes mellitus could not be considered a candidate for an immediate denture, a result that was antagonized by Hussain et al.³⁰ They stated that by providing immediate dentures to diabetic patients, a marked improvement in quality of life (QoL) was observed.

On the other hand, the result of the present study revealed that the main disadvantage of the immediate denture is the lack of try-in stages, a result that is in line with George et al.,¹⁰ who considered that the lack of try-in stages is one of the disadvantages of the immediate denture and that the best esthetic result could be achieved by copying the existing natural tooth set-up. Also, Jogezi et al.¹⁴ documented that the inability to complete a wax try-in of the entire denture base is one of the disadvantages of the immediate denture, in addition to the difficulty in dealing with the different bony irregularities such as the tori. Kraljevic et al.⁹ reported that the absence of a try-in is one of the limitations of the immediate denture.

The majority of the participants reported that the main indication of the immediate denture is to maintain the patient's esthetic. A result that agrees with many other investigators.^{5,8,14,23}

The present study demonstrated that the high cost and the need for further adjustment were the main disadvantages of the immediate denture. This result is following a survey conducted by Sushma et al.,²³ who found that the majority of the prosthodontic specialists in India believed that immediate denture's treatment protocol requires special skills, more time, and extra financial constraints. Furthermore, this result is consistent with previous literature concerning the disadvantages of immediate dentures.^{10,14,31}

In the present study, it was found that the majority of the participants considered the immediate denture a temporary prosthesis. This result was in line with George et al.¹⁰ and Leathers L.³² In contrast, Lee J³³ considered immediate dentures a definitive prosthesis for a medically compromised elderly patient, while Jogezi et al.²⁴ and Bedrossian et al.³⁴ stated that immediate dentures can act either as definitive or temporary prostheses.

Almost half of the participants falsely considered self-curing acrylic resin to be the material of choice for immediate denture construction. This result antagonized what was reported in the previous literature and highlighted the participants' limited knowledge and lack of practice.^{10,35} Shalini et al.³⁵ considered the use of acrylic resin owing to its reduced cost and recommended the replacement of the denture after 5 years due to the wear characteristics of the acrylic. On the other hand, George et al.¹⁰ highlighted the option of using the patients' existing partial denture, which can be made of chrome cobalt after adding additional teeth to it or constructing a new immediate denture. Many factors can affect this decision, such as the condition of the previous denture, the denture design and material, and the patient's preference.

The present study revealed that the majority of dental practitioners think that the barriers preventing them from performing immediate dentures treatment are lack of knowledge, lack of experience, expenses, the need for extra steps, and finally, the patient's rejection of these treatment modalities. In the same vein, the result of the study revealed an average level of knowledge, reflecting the fact that some universities included immediate dentures and others did not concentrate on giving lectures concerning immediate dentures during the pre-graduate program level. Strengthening the fact that the topic of immediate dentures may be neglected in most of the universities' clinical curriculum programs and matching the observations and recommendations reported by Sushma et al.²³ in a study conducted in India.

Moreover, the increased postoperative care in comparison to conventional dentures was agreed to be one of the barriers that limit the practice of immediate dentures. This result is in line with Jogezi¹⁴ who highlighted the importance of close cooperation between the patients, doctors, and technicians in immediate denture treatment and addressed it as a challenge.

The majority of the participants reported their lack of knowledge about the different types of immediate dentures, a result that matched Sushma et al.²³ In the same line, the majority of the participants stated wrongly that the immediate denture required another impression after tooth extraction and did not require relining or rebasing after placement, which highlighted the lack of participants practice of immediate denture construction and matched the previous observations.²³

Regarding the practice of immediate denture construction, although the practice of placing artificial dentures immediately after the removal of the last tooth or teeth is increasing in popularity,³⁵ Based on this study, the majority of the participants declared that they did not practice or even prescribe immediate dentures for their patients. The lack of knowledge, experience, and formal training, as well as the lack of confidence, maybe the main reasons. Hence, the majority of the participants were unsatisfied with their knowledge about immediate dentures, and so they evaluated their knowledge as poor. This result is in accordance with Sushma et al.²³ in India who documented that undergraduate students need more training in the special fields, including immediate denture construction.

A recommendation to increase awareness of immediate dentures has been highlighted.

The limitation of this study is that it covers only one state in Sudan despite the fact that it is the main state with the majority of the private clinic allocation. The challenge encountered during the study was the distribution and collection of the questionnaires due to the extended geographical distribution of the study area.

CONCLUSION

Within the limitations of this study, an average level of knowledge about the immediate denture was reported among the dental medical officers, registrars, specialists, and consultants who were working at the private clinic in Khartoum state. Although some participants were aware of immediate dentures, a lack of practice was reported. The participant's gender, years of experience, and qualifications were not related to their level of knowledge. Further detailed surveys, including a larger number of institutions as well as governmental hospitals.

It is crucial to concentrate at the pre-graduation level to increase knowledge about immediate dentures, and each student should make at least one immediate denture at their pre-graduation level.

AUTHOR CONTRIBUTIONS

Hassan O formulated the study design and contributed to the conceptualization, data collection, and finalizing the manuscript.

Awadalkreem F formulated the study design, contributed to the conceptualization, data interpretation, writing, editing, validating and finalizing, and submission of the manuscript.

Ismail and I contributed to the conceptualization, revised, and finalizing the manuscript.

Padmanabhan V contributed to the conceptualization of the study, revising and finalizing the manuscript.

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