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## ***Original article***

# **Attitude of Dental Clinicians Towards Flexible Dentures: A Questionnaire Survey in Libya**

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## **ABSTRACT**

**Background:** Management of partially edentulous patients with hard and soft tissue undercuts is complicated, and the use of flexible dentures for these cases offers dual advantages of aesthetics and flexibility. However, research shows a varying preference for flexible dentures among general dental practitioners, prosthodontists, and other dental specialties.

**Objectives:** The aim of this study was to survey the attitude and awareness of a sample of Libyan dental clinicians towards advantages, disadvantages, indications, and contraindications of flexible dentures.

**Material and methods:** A descriptive cross-sectional study was conducted among 250 dentists currently practicing in different cities of Libya. Only 218 dentists responded. Using Google form software, a self-administrable e-questionnaire consisting of thirty-one multiple choice questions with “yes,” “no” or “not sure” answers encompassing major aspects of flexible dentures was conducted through an online survey.

**Results:** Out of 250 Libyan dentists to whom the questionnaire was sent, only 218 dentists responded and our results revealed that the respondents were females more than males with a ratio (2:1) and more than half of them were of age group (35-60 years) work in governmental dental practice with more than ten years of experience and 34.9% of them prefer and often offer flexible dentures to their patients. The majority of respondents with a long-term success of the flexible denture were prosthodontists who had more than ten years of experience with a correct response rate of more than 50% of questions that reflected their attitude and knowledge.

**Conclusions:** Despite the fact that flexible dentures are not taught in Libyan universities of dentistry, about more than one-third of respondents prefer and recommend this treatment to their patients, and the long-term success of these prostheses was dependent on clinicians’ education and their clinical experience.

**Keywords:** *Flexible denture, E-questionnaire, Attitude, Libyan dental clinicians.*

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## **INTRODUCTION**

Aesthetic and functional rehabilitation of partially edentulous patients with hard and soft tissue undercuts are frequently encountered. Management of such situations with removable cast partial dentures as definitive removable prostheses is complicated and requires pre-prosthetic surgical intervention for alteration of the denture bearing area, careful planning of the path of insertion and removal, adaptation of the denture base using resilient lining material, in addition

to the problem of clasps location that may deteriorate aesthetics.

Nowadays, prosthodontic patients demanding the aesthetic aspect of their prostheses. In response to this demand, manufacturers and dental healthcare providers (dentists and dental technicians) have developed innovative, aesthetic, natural-looking materials and methods for fabricating removable dental prostheses.<sup>1</sup>

An alternative denture prosthesis design in which optimal flange height and thickness can be achieved is by using flexible dentures.<sup>2</sup> Other commonly used

terms are "metal-free dentures" and "clasp-free dentures".<sup>3</sup> Flexible denture base material is a nylon-based thermoplastic material that does not sacrifice function and preserves aesthetics.<sup>2</sup> Some of the commercially available products are Valplast, Sunflex, Duraflex, Flexite, Proflex, Lucitone, and Impak, whereas Valplast, Sunflex, and Lucitone are monomer free.<sup>2</sup>

The advantages of flexible dentures are that they combine flexibility with subsequent resistance to fracture and plastic deformation; insertion into undercuts is much easier compared to conventional removable dental prostheses, and the denture base is thinner than in conventional dentures. Also, there is no risk of allergic and hypersensitivity reactions (no residual monomer), besides the transparency of the material that reflects the shade of mucosa and the absence of metal clasp make the denture more aesthetic<sup>(4)</sup>. Free movement is allowed by the overall flexibility and can, therefore, be referred to as "a built-in stress breaker".<sup>5</sup>

Patients usually come to our clinics to restore their lost teeth. However, the purpose of denture construction should not be restricted to tooth replacement but should maintain the surrounding tissue health<sup>(6)</sup>. The flexibility of the flexible dentures acts as a tissue conditioner and therefore reduces the leverage rotational force and damaging effect on the underlying mucosa.<sup>7</sup>

Flexible dentures use a special flexible resin that prevents them from chafing the gums and allows the wearer to chew properly. It also provides a soft base that prevents the gums from being rubbed.<sup>2</sup>

Among the flexible denture indications are patients for whom aesthetics is a top priority, patients who refuse the preparation of abutment teeth, patients with allergy to metal, and patients whose medical history or age contraindicates a pre-prosthetic surgical intervention when needed. Good oral hygiene and sufficient interarch space are very important in case selection for flexible removable denture prosthesis.<sup>6</sup>

Designing flexible dentures for the management of patients particularly those facing partial edentulism in the aesthetic zone is still of non-preference by the clinicians in the Libyan ministry of health and it was not included in the curriculum of Libyan governmental universities. However, among private dental practitioners, this treatment modality is highly favourable. Therefore, this study was an effort to survey the attitude of a sample of Libyan dental clinicians towards advantages, disadvantages, indications, and contraindications of flexible dentures.

## MATERIALS AND METHODS

A descriptive cross-sectional study was conducted among 250 dentists (general dental practitioners, prosthodontists & other dental specialists) currently practicing in different cities of Libya who were

conveniently sampled and entirely volunteered to participate the study. Using Google form software,<sup>8</sup> a self-administered e-questionnaire consisting of thirty-one multiple choice questions with "yes," "no" or "not sure" answers encompassing major aspects of flexible dentures was conducted through an online survey. Online reminders were sent to intended participants more than one time to increase the response rate. Only 218 dentists responded. Dentists who never provided flexible dentures to their patients were excluded.

Previous studies were used to prepare the questionnaire,<sup>1,4,9,10</sup> which was validated by pre-testing on a group of dentists in the faculty of dentistry, Benghazi University, as the questionnaire was modified until - in the view of respondents- the questions measured what they are intended to measure. The final form of the questionnaire was then distributed electronically among participants and the response was no longer accepted after 7 weeks.

The questionnaire included three sections of questions, a demographic section including information about the participants such as age, gender, qualification level, work institution, and the number of years of experience. The second section included questions reflecting the attitude of Libyan dentists towards flexible dentures and whether they are using them. The third section reflected the success of flexible dentures which is revealed by the level of participants' satisfaction with their dentures one year after delivery and their need for denture replacement.

Results were evaluated using Google form software,<sup>8</sup> and python programming language.<sup>11</sup> Data were analyzed and visualized using tableau VizQL (Visual Query Language).<sup>12</sup> Chi-square test was used to analyze the correlation among variables at a 0.05 level of significance. The conclusions were made by the results.

## RESULTS:

The response rate was rather high 87.2%. A total of 218 dentists were taken as samples for the questionnaire study from different cities in Libya in which, as summarized in (Table 1), 67% (146) were female and 33% (72) were male. Most of the respondents 57.8% (126) were of (36-50 years) age group, while 6.4% (14) were of (more than 50 years), and 35.8% (78) were of (25-35 years). One hundred and thirty-two of the respondents (60.2%) were governmental dental practitioners, while 39.8% (86) were private dental practitioners. Regarding the years of work experience, 21.1% (46) of the respondents had 1-5 years, 20.2% (44) had 6-10 years, and the majority 58.7% (128) had more than ten years of work experience in the practice of removable prosthesis. The qualification level of the respondents was ranging from 31.2% (68) prosthodontists, 31.2% (68) specialists (not prosthodontists), and 37.6% (82) general dental practitioners.

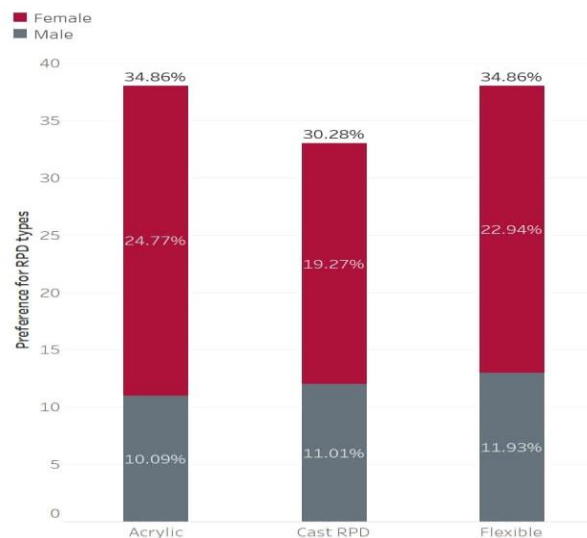
**Table 1:** Number & percentage of respondents' profiles

Item	Group	No.	%
Gender	Male	72	33%
	Female	146	67%
Age	25 - 35 Yrs.	78	35.8%
	36 - 50 Yrs.	126	57.8%
	> 50 Yrs.	14	6.4%
Work institution	Governmental	132	60.2%
	Private	86	39.8%
Years of work experience	1 - 5 Yrs.	46	21.1%
	6- 10 Yrs.	44	20.2%
	> 10 Yrs.	128	58.7%
Qualification level	General dental practitioner	82	37.6%
	Specialist (not prosthodontist)	68	31.2%
	Prosthodontist	68	31.2%

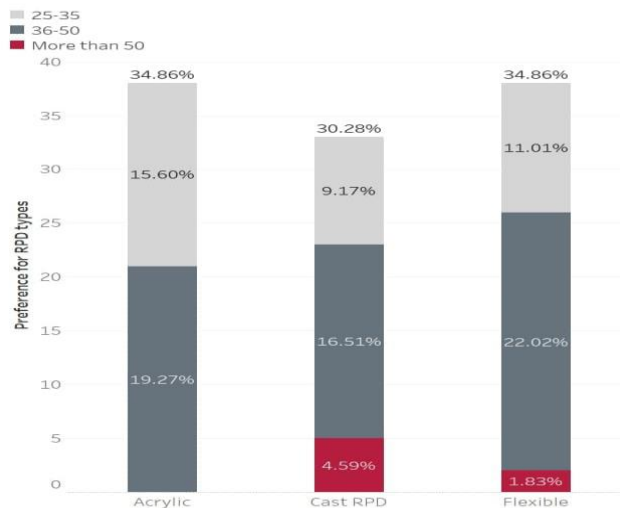
In correlation between demographic data using python programming language, most of the respondents of age group (35-60 years) – who were the largest population participated in the study - were females work in a governmental institution (36.84%).

In relating this age group to the qualification level, the majority had more than 10 years of experience, 13.16% of them were prosthodontists, while 28.95% were other dental specialties, and 18.42% were general dental practitioners.

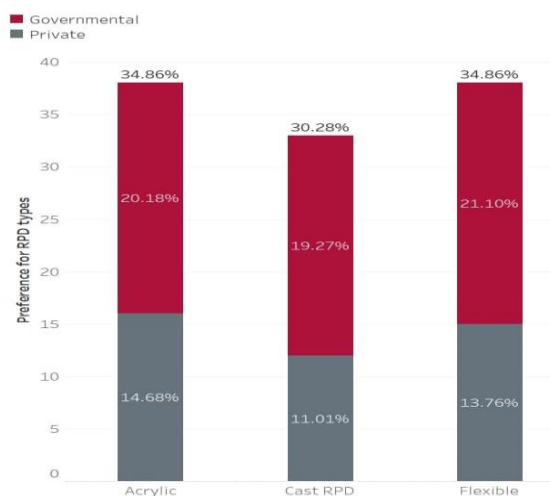
Regarding the preference of the respondents to RPD types, our results revealed that more than one-third 34.9% (76) of them prefer and they often prescribe flexible dentures to their patients. In an attempt to relate their preference to age group, gender, and work institution, (Figures 1, 2, and 3) showed that most of them (22.94%) were females with (22.02%) age ranging (36-50 years) and they were (21.10%) governmental dental practitioners.



**Fig. 1:** Preference for RPD types in relation to gender



**Fig. 2:** Preference for RPD types in relation to age group



**Fig. 3:** Preference for RPD types in relation to work institution

The second section of questions from Q 8 to Q 29 in the questionnaire showed the difference in the acknowledgment and attitude of the respondents towards flexible denture advantages, disadvantages, indications, contraindications, and their commercial names.

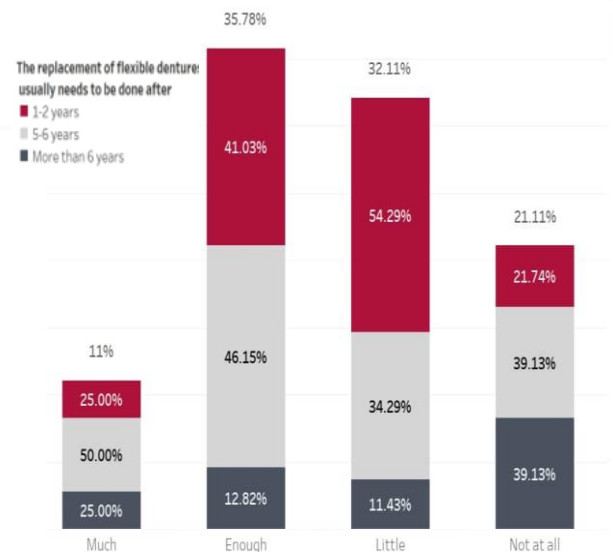
Using Google form software, the frequently missed questions -which had a correct response rate of less

than 50%- were ten questions. A summary of the responses regarding these questions is shown in (Table 2). The question with the least correct response rate was (Flexible denture material is only made up from Nylon) in which only (22) 10.1% had a correct answer, while (70) 32.1% had wrong answers and (126) 57.8% were not sure.

**Table 2:** Distribution of the frequently missed questions, those with a correct response rate of less than 50%

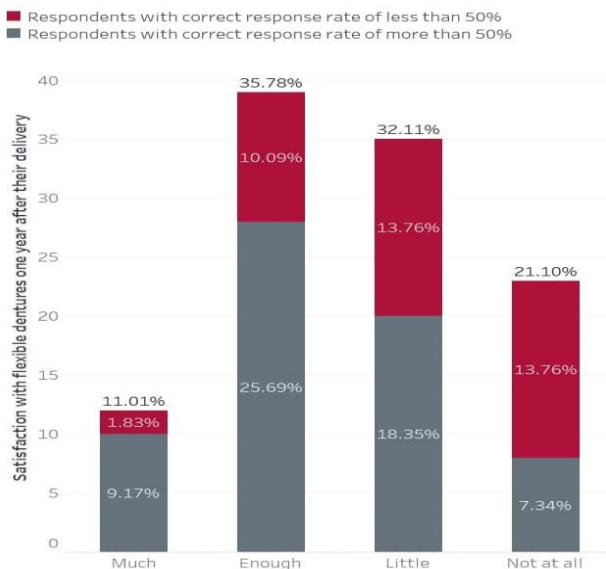
Question title	Correct answer		Wrong answer		Not Sure	
	No.	%	No.	%	No.	%
Flexible denture material is only made up from Nylon	22	10.1%	70	32.1%	126	57.8%
A patient with knife-edge ridges can be indicated to use flexible dentures	46	21.1%	78	35.8%	94	43.1%
Patients with lingual tori can use flexible dentures without undergoing surgery	56	25.7%	86	39.4%	76	34.9%
Flexible dentures are indicated for patients who have limited mouth opening	60	27.5%	74	33.9%	84	38.5%
Flexible dentures displace more soft tissue due to their flexibility	68	31.2%	96	44%	54	24.8%
Staining by various ingredient of food, tea and coffee is unlikely to happen	68	31.2%	58	26.6%	92	42.2%
A flexible denture may be an option in the treatment plan of a patient with ectodermal dysplasia	80	36.7%	18	8.3%	120	55%
The technique for the insertion and adjustment of flexible dentures is the same as that used to acrylic partial ones	82	37.6%	68	31.2%	68	31.2%
Do you know the commercial names of the product you are using for the construction of flexible dentures?	84	38.5%	134	61.5%		
Flexible denture provides more stability during mastication	106	48.6%	44	20.2%	68	31.2%

On analyzing the answers to the third section of questions, the last two questions reflected the level of satisfaction with flexible dentures and the need for their replacement, our results revealed the long-term success of the flexible dentures in more than one third (78) 35.8% of the respondents those were enough satisfied, and most of them 46.15% needed acceptable range of years (5-6 years) for dentures replacement as shown in (Figure 4), and by using a python heat map 16.51% of the total sample had a long term succeed flexible dentures.

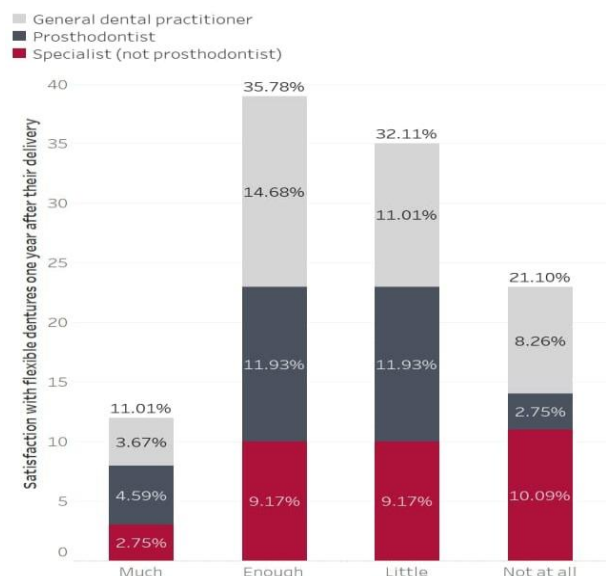


**Fig.4:** Distribution of years needed for replacement according to Level of satisfaction with flexible denture

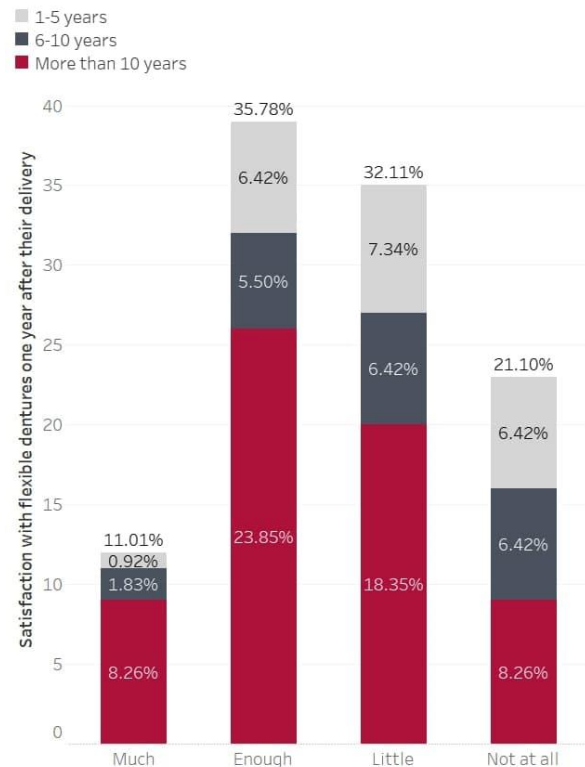
In an attempt to correlate this long term success to the attitude of those respondents, their qualification level, and their years of experience, chi-square test indicated no significant association ( $p > 0.05$ ). While using tableau analyzing language, (Figures 5, 6, 7) illustrated that out of the respondents 35.8% who had a long term succeed flexible dentures, nearly three quarters 25.69% had a correct response rate of more than 50% of the attitude questions and more than one third 11.93% were prosthodontists, in addition, majority of them 23.85% had more than 10 years of experience



**Fig.5:** Distribution of satisfaction level according to correct answers rate



**Fig.6:** Distribution of satisfaction level according to qualification level



**Fig. 7:** Distribution of satisfaction level according to years of experience

**DISCUSSION:**

Denture base materials have been subjected to extensive research, advancements, and improvements. Recently, flexible dentures have gained popularity as an alternative to PMMA among dental practitioners and patients in denture construction as it gives dual advantages of aesthetic and flexibility.

Although flexible dentures are prosthetic works that are not learned during faculty, the interest of dentists and technicians in their realization is growing. Their acknowledgment is usually based on investing in oneself by taking specialized courses in the field, but also in the materials and equipment needed to make flexible partial dentures.<sup>13</sup>

Nowadays, there are several different flexible materials in the dental market that general dental practitioners can choose from. However, research shows a varying preference for flexible dentures among general dental practitioners, prosthodontists, and other dental specialties. Therefore, the present study is an attempt to evaluate the attitude of Libyan dental clinicians towards flexible dentures.

This study was a self-administrable e-questionnaire conducted among 250 dentists currently practicing in different cities of Libya. Only 218 dentists responded



and our results revealed that the respondents were females more than males (2:1) and the majority of them were of age group (35-60 years) work in governmental dental practice with more than ten years of experience and 34.9% of them prefer and often offer flexible dentures to their patients.

Interpretation for the preference of age group ranging (36-50 years) to prescribe flexible dentures could be that the younger practitioners tend more to use newer techniques. This was in agreement with Polyzois et al.<sup>1</sup> Regarding the second section of the questionnaire, twenty-two questions reflected the attitude of the respondents towards flexible denture advantages, disadvantages, indications, and contraindications, as our results revealed that eighty-six of the respondents had a correct response rate of less than 50% of questions. Also, the results illustrated that Q9 had the least response rate, which indicates the material the flexible denture made of, only 22 respondents knew that it was made of nylon.<sup>5</sup>

The number of respondents who correctly answered Q16, Q19, Q22 and they knew that flexible dentures are contraindicated in patients with limited mouth opening, lingual tori, and knife-edge ridges were 60, 56, and 46 respectively. While the questions Q11, Q13, Q17, Q18, Q20 reflected the awareness towards indications of the flexible denture as 80 respondents knew that it is an option in the treatment plan of patients with ectodermal dysplasia, and more than half they aware that it is indicated for patients with teeth or tissue undercuts, patients with a history of repeated denture fracture and is considered as an alternative for patients those are allergic to acrylic dentures.<sup>6, 14</sup>

Questions Q8, Q10, Q14, Q23, Q24, and Q25 analyzed the attitude of the respondents towards the advantages of the flexible denture, as more than half they knew that it is unbreakable, it needs minimum or no mouth preparation, it provides more stability during mastication<sup>4, 5, 14</sup> as being reported by Thakral et al.<sup>15</sup> and Sharma et al.,<sup>16</sup> it more cosmetic and lighter in weight compared to acrylic denture<sup>14</sup> as being agreed by Shamnur et al.<sup>17</sup> while the number of them who aware that flexible denture doesn't displace soft tissues during function was only sixty-eight.<sup>4, 5, 14</sup>

Responses to the questions Q12, Q26, Q27, Q29 revealed that more than half of the respondents were aware that good oral hygiene is very important, and as there was no addition that could be made onto nylon a flexible denture is not easy to repair.<sup>6, 9</sup> While only 31.2% knew that staining of a flexible denture by various ingredients of food, tea and coffee is likely to happen, and 68.8% agreed that the cost factor plays a role in the patient's decision to make a flexible denture rather than an acrylic one.<sup>9</sup>

Considering the insertion and adjustment, Q21 exhibited that less than half of the respondents knew

that the technique for the insertion and adjustment of flexible denture is not the same as that used to acrylic partial ones as its trimming and polishing with rubber wheel must be done with intermittent contact to prevent material from melting.<sup>14</sup>

Despite that flexible dentures are intended for temporary applications and not to be used for the long term, our study revealed that only 17.6% knew that.<sup>4</sup> In total both permanent and temporary uses of flexible denture prostheses are almost equal.<sup>4</sup> In addition, as illustrated by Q28, only 38.5% of the respondents were aware of the commercial names of the product they use for the construction of flexible dentures.

In discussing the results related to respondents with a long term success of the flexible denture, our study revealed that the majority of them were prosthodontists who had more than ten years of experience with a correct response rate of more than 50% of attitude questions and it was a believable result because it is not a surprise to reveal that a prosthesis success and satisfaction is related to and affected by the clinician's attitude and experience those make the case selection for flexible denture more professional which in turn increasing its success, and our results were in consistence with Hill et al.<sup>18</sup> as he reported that the decision of flexible denture was mostly depended on case selection and there are differences between general dentist and specialist in the use of flexible denture prostheses.

## CONCLUSION:

Despite the fact that flexible dentures are not taught in Libyan Universities of dentistry, about more than one-third of them prefer and recommend this treatment to their patients and the long-term success of these prostheses was dependent on clinicians' education and their clinical experience.

Each new material or technique introduced into the field of dentistry has its pros and cons, and a thorough understanding of its advantages, disadvantages, indications, and contraindications is obligatory for a careful case selection to ensure an optimum restoration with a perfect treatment prognosis. Hence, patients' satisfaction and an enhanced quality of life can be met.

Although dental practitioners were aware of the benefits of flexible dentures to fulfill the patient's demand for a more retentive and aesthetic prosthesis, there is still a need to educate and motivate them on how to manage them on a regular academic curriculum. Seminars and workshops should also be arranged to help dentists enhance their skills to keep up with new updates in dental materials and technology.

### Limitation of the study:

There were several limitations to this study that must be addressed accordingly. The distribution of respondents in private and governmental dental institutions was imbalanced. Thus, the result of this study could be affected in some way.

A representative and randomized sample is required to determine the actual awareness of dental practitioners and specialists. The primary objective of this study, however, was to assess the attitude and awareness of a selected sample of Libyan dentists as a convenience sampling was used. A questionnaire is a well-established strategy for data collection. However, it has its own limitations. For example, social desirability bias and non-response rate may affect the representativeness of the sample and the quality of the information.<sup>19</sup> However, no personal data was collected and the participation was entirely voluntary. As a result, in the current study, these biases would have less of an impact. Furthermore, the current study's response rate was rather high (87.2%).

### Ethical approval:

The study was following the ethical standards of the institutional research committee of Benghazi University and approval was obtained.

### Informed consent:

In the questionnaire, an explanation of the aim of the study and a statement of agreement to participate were written. As well Using electronic surveying gives the responders the freedom either to agree or refuse to answer the questionnaire.

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