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Attitude and Awareness Toward Dental Bleaching among selective samples in Benghazi-Libya

Nuha Elkadiki and Roya M. Elmaghrbi

Department of Conservative Dentistry, Faculty of Oral and Dental Medicine, Benghazi University, Libya.

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ABSTRACT

Background and Aim: Bleaching is the lightening of tooth color by a chemical material. Bleaching nowadays is based on the use of hydrogen peroxide in various concentrations. This study is addressed the Perceptions and Prevalence regarding tooth bleaching among selective samples of patients in Benghazi-Libya. **Methods**: This is a prospective cross-sectional questionnaire-based online Survey. Distributed randomly among selected individuals in Libyan international medical university and social media (Snapchat and Twitter) via the link in Google Sheets. The questionnaire was formulated based on similar studies. A test re-test pilot study was carried out to assess the validity and consistency of the questionnaire. Divided into four parts according to risk factors: Socio-demographic data (gender, age, nationality, marital status, educational status, cigarette smoke, pipe tobacco user, and occupational status). **Results**: statistical analysis showed differences among the gender whether they are visiting the dental (p=0.222). A significant difference was observed in dissimilitude among the knowledge regarding bleaching (p=0.032), and there was a significant difference among the complications following tooth bleaching, (P=0.107**). Conclusion**: all the precipitants are heard about tooth bleaching via their dentists, and prefer to use home bleaching. Respondents who frequently visit dentists had higher levels of knowledge of tooth bleaching

Keywords: Bleaching; whitening; dentist; hydrogen peroxide.

1. Introduction

In 1868, tooth whitening was introduced. Moreover, it was affected by hydrogen peroxide (Greenwall *et al.,* 2001 and Fisher, 1911). In 1960, over-the-counter (OTC) whitening gels were introduced, (10% carbamide peroxide), it has a few side- effects, difficulty in using this method due to the necessity of full patient compliance, relatively low success rate because it was dependent on fully complying with dental instructions (Leonard *et al.,* 2003), and results are less than ideal. These techniques had two positive effects: Improved gingival health and whitened teeth (Haywood *et al.,* 1990) extrinsic tooth stains caused by smoking, certain foods, and drinking and are caused mainly by a high level of fluoride and exposure to certain metals during tooth formation, (Hannig and Joiner, 2006) these stains removed by regular prophylactic procedures without dental prophylaxis. Extrinsic stains will become darker and even treatable by whitening (Goldstein and Garber, 1995). However, many dental practitioners use in-office tooth bleaching with high concentrations of hydrogen peroxide (Ontiveros, 2011) some adverse effects are reported on vital tooth bleaching, including tooth sensitivity, gingival irritation, reduced adhesion to dental tissues, and alterations in the dental structure (Meireles *et al.,* 2012).

Cosmetic dentistry has become an essential part of restorative dentistry, is one of the least invasive methods to treat discolored teeth, (Alshara, *et al.,* 2014) tooth-whitening techniques (Nora, Nomay, 2016) increased the opportunities for patients and clinicians to provide the esthetic treatment (Terry and Geller, 2012). Many research studies were conducted to evaluate patients' perceptions

Corresponding Author: Nuha Elkadiki, Department of Conservative Dentistry, Faculty of Oral and Dental Medicine, Benghazi University, Libya.
E-mail: nuha.elkadiki@gmail.com

(Dahl and Pallesen, 2003) there was a study conducted among 235 Malaysian adult participants showed that (52.8%) were unsatisfactoriness with their dental appearance, (56.2%) were not satisfied with their tooth color, and 48.1% desired tooth bleaching (Azodo and Ogbomo, 2014).

Patients' attitudes and feelings towards aesthetics dentistry have improved due to the simplicity of the procedure followed by the speedy result of tooth bleaching (Tin-Oo *et al.,* 2011) the growing demand for esthetics induces patients to desire dental whitening and make out dentists more likely to get to offer the treatment (Fernando *et al.,* 2018). In New Zealand, a study conducted among general dental practitioners reported increased demand for tooth whitening (77.8%) and veneers (54.8%). Additionally, 56.8% of general dental practitioners believed that patients had higher aesthetic expectations and females had an increased demand for tooth whitening than males (Theobald *et al.,* 2006 and Nora Nomay, 2016) nowadays, tooth bleaching is cost-effective and conservative with added advantages of long-term functionality and effectiveness. hence, this study aimed to evaluate the Perceptions and Prevalence regarding tooth bleaching among selective samples in Benghazi-Libya.

2. Method

A prospective cross-sectional questionnaire in Arabic/English language was distributed randomly among selected individuals and was delivered to the participants on an online google form. Moreover, divided into four parts: the first part is the demographic part, which includes the personal information of the participants (age, sex, nationality, marital status, occupation, & educational status). The second part is related to the knowledge about tooth bleaching, experience with tooth bleaching, and the tooth whitening material. The third part was related to the frequency and complications associated with tooth bleaching, and the fourth part is related to the source of information about tooth bleaching. The questionnaire was formulated based on similar studies. A test re-test pilot study was carried out to assess the validity and consistency of the questionnaire.

2.1. Data collection procedure

The frequencies were calculated for each question. The chi-square test was used to analyze frequencies.

The significance level was set at $P \leq 0.05$. Statistical analysis was performed with IBM® SPSS® Statistics Version 20 for Windows.

3. Results

Gender: In the present study, 279 (100%) participated; there were 230 (82.4%) females and 49 (17.6%) males.

Age: 176 (63.3%) were in the age range (of 18-25), 69 (24.8%) were in the age range (of 26-35), 21 (7.6%) were in the age range (35-40), 12 (4.3%) were with age range above 40 years.

Nationality: 262 (93.9%) were Libyans, 10 (3.6%) were Palestinians, 2 (0.7%) were Syrians, 3 (1.1%) were Egyptians, 1 (0.4%) were Moroccan, and 1 (0.4%) were British.

Marital state: 192 (71.6%) were single, 4 (1.5%) were engaged, 67 (25%) were married, 2 (0.7%) were divorced, and 3 (1.1%) were widowers.

Educational state: 258 (93.1%) attended university even with postgraduate degrees, while 19 (6.9%) received a high school education or less.

Cigarettes: 30 (10.8%) were smokers, and 249 (89.2%) were none smokers.

Pipe tobacco user: 3 (1.1%) were smokers while 274 (98.9%) were none, smokers.

Occupational state: 83 (30.4%) were dentists, and 190 (69.6%) were not.
Many dental visits: 17 (6.2%) never visited a dentist, 113 (41.1%) visited the dentist 1-5 times, and 145 (52.7%) visited the dentist more than five times.

Regarding knowledge about tooth bleaching

31 (11.2%) showed poor knowledge, 86 (31.2%) showed fair knowledge, 79 (28.6%) showed good knowledge and 80 (29%) showed excellent knowledge.

Experience: 65 (23.5%) Whitened their teeth at a dental clinic, while 117 (42.1%) Whitened their teeth at home.

Products used for whitening

62 (22.8%) used no products for whitening, while 170 (62.5%) used whitening dentifrices, 16 (5.9%) used mouthwash and rinses, 9 (3.3%) used whitening strips and 15 (5.5%) used to paint on gels.

Noticeable improvements in tooth color after using

90 (33.8%) noticed improvements after using no products for whitening, 58 (21.8%) noticed improvements after using whitening dentifrices, 66 (24.8%) noticed improvements after having in-office bleaching, 27 (10.2%) noticed improvements after having home bleaching, 12 (4.5%) noticed improvements after using rinses, 2 (0.8%) noticed improvements after using chewing gum and 11 (4.1%) noticed improvements after using whitening strips.

Frequency of bleaching

121 (47.3%) never used bleaching, 44 (17.2%) did bleaching every 3m, 30 (11.7%) every 6m, 29 (11.3%) every year and 32 (12.5%) did bleaching once in a lifetime.

Complications

103 (38.7%) never bleached, 72 (27.1%) suffered from sensitivity, 42 (15.8%) showed no improvement in color, 19 (7.1%) suffered from burning gum, 30 (11.3%) suffered from sensitivity with burning gum.

After teeth, bleaching avoids tea, coffee, and smoking

155 (59.8%) avoided tea and smoking, while 104 (40.2%) continued tea and smoking.

Source of information regarding bleaching

25 (9.5%) never heard of tooth bleaching. 35 (13.3%) heard from friends and relatives, 149 (56.4%) heard from the dentist, 22 (8.3%) s heard from advertisements, 31 (11.7%) heard from articles and 2, (0.8%) heard from other sources.

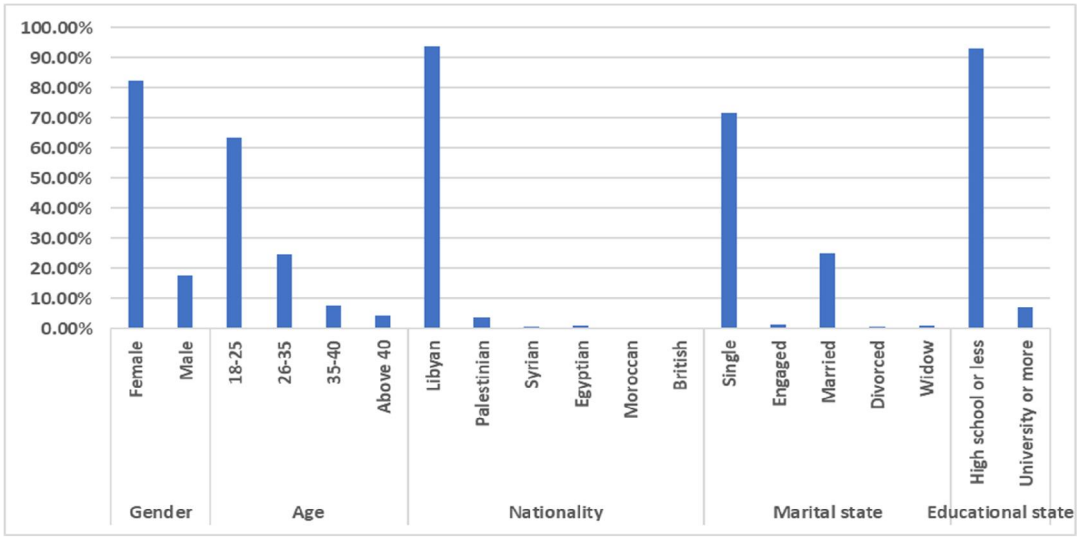
Table 1: Percentage and frequencies of answers of different questions.

Variables		**Frequency**		
		N	**%**	**p-value**
Gender	**Female**	230	82.4%	<0.001*
	Male	49	17.6%	
Age	**18-25**	176	63.3%	<0.001*
	26-35	69	24.8%	
	35-40	21	7.6%	
	Above 40	12	4.3%	
Nationality	**Libyan**	262	93.9%	<0.001*
	Palestinian	10	3.6%	
	Syrian	2	0.7%	
	Egyptian	3	1.1%	
	Moroccan	1	0.4%	
	British	1	0.4%	
Marital state	**Single**	192	71.6%	<0.001*
	Engaged	4	1.5%	
	Married	67	25%	
	Divorced	2	0.7%	
	Widow	3	1.1%	
Educational state	**High school or less**	258	93.1%	<0.001*

	University or more	19	6.9%	
Cigarette status	**Yes**	30	10.8%	<0.001*
	No	249	89.2%	
Pipe tobacco user	**Yes**	3	1.1%	<0.001*
	No	274	98.9%	
Occupational status	**Dentist**	83	30.4%	<0.001*
	No	190	69.6%	
How many times did you visit the dentist	**Never**	17	6.2%	<0.001*
	1-5 times	113	41.1%	
	More than 5 times	145	52.7%	
Regarding knowledge about tooth bleaching	**Excellent**	80	29%	<0.001*
	Good	79	28.6%	
	Fair	86	31.2%	
	Poor	31	11.2%	
Whitened their teeth at a dental clinic	**Yes**	65	23.5%	<0.001*
	No	212	76.5%	
Whitened their teeth at home	**Yes**	117	42.1%	<0.001*
	No	161	57.9%	
Products used for whitening	**No products used**	62	22.8%	<0.001*
	Whitening dentifrice	170	62.5%	
	Mouthwash/Rinses	16	5.9%	
	Whitening strips	9	3.3%	
	Paint on gels	15	5.5%	
Noticed improvement in tooth color	**Never did whitening**	90	33.8%	<0.001*
	Whitening dentifrice	58	21.8%	
	In-office bleaching	66	24.8%	
	Home bleaching	27	10.2%	
	Rinses	12	4.5%	
	Chewing gum	2	0.8%	
	Whitening strips	11	4.1%	
Frequency of bleaching	**Never**	121	47.3%	<0.001*
	Every 3m	44	17.2%	
	Every 6m	30	11.7%	
	Every year	29	11.3%	
	Once in lifetime	32	12.5%	
Complications	**Did not bleach**	103	38.7%	<0.001*
	Sensitivity	72	27.1%	
	No improvement in color	42	15.8%	
	Burning gum	19	7.1%	
	Sensitivity with burning gum	30	11.3%	
After teeth whitening avoiding tea coffee and smoking	**Yes**	155	59.8%	0.002*
	No	104	40.2%	
Source of information regarding bleaching	**Never heard of tooth bleaching**	25	9.5%	<0.001*
	Friends and relatives	35	13.3%	
	Dentist	149	56.4%	
	Advertisements	22	8.3%	
	Articles	31	11.7%	
	Others	2	0.8%	

* Significant ($p<0.05$) ns non-significant ($p>0.05$)

(a)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80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
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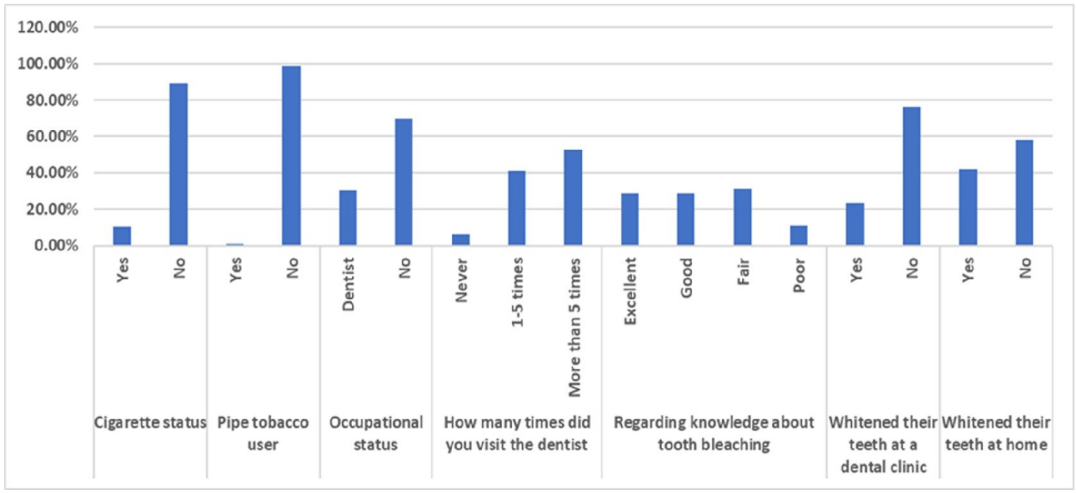
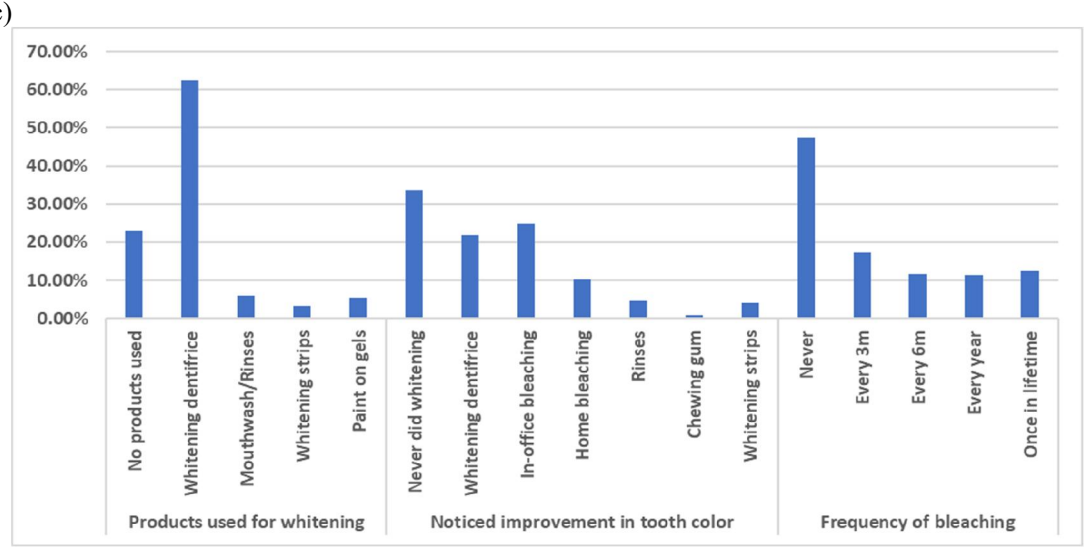
Female
Male
18-25
26-35
35-40
Above 40
Libyan
Palestinian
Syrian
Egyptian
Moroccan
British
Single
Engaged
Married
Divorced
Widow
High school or less
University or more
Gender
Age
Nationality
Marital state
Educational state

(b)


120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
Yes
No
Yes
No
Dentist
No
Never
1-5 times
More than 5 times
Excellent
Good
Fair
Poor
Yes
No
Yes
No
Cigarette status
Pipe tobacco user
Occupational status
How many times did you visit the dentist
Regarding knowledge about tooth bleaching
Whitened their teeth at a dental clinic
Whitened their teeth at home

(c)


70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
No products used
Whitening dentifrice
Mouthwash/Rinses
Whitening strips
Paint on gels
Never did whitening
Whitening dentifrice
In-office bleaching
Home bleaching
Rinses
Chewing gum
Whitening strips
Never
Every 3m
Every 6m
Every year
Once in lifetime
Products used for whitening
Noticed improvement in tooth color
Frequency of bleaching

(d)

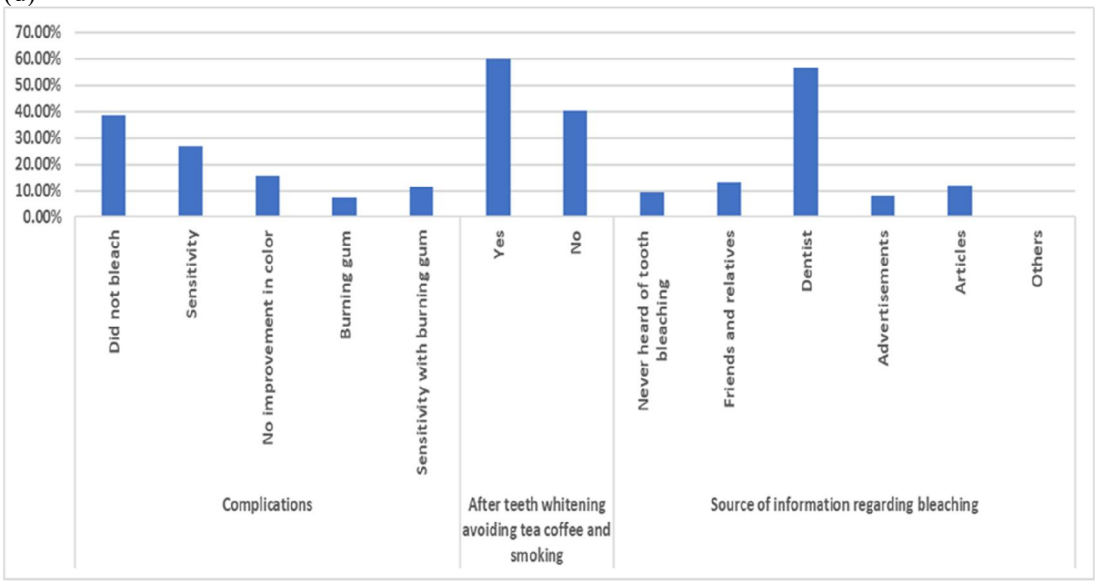


Fig. (a, b, c, d): Pie charts representing frequencies of answers.

4. Discussion

Demographic characteristic

Most of the sample is the female age group of 18-25 (66.7%). The male group ranged from 18 to 25 (49%), And this disagreed with (Marzieh Karimi *et al.,* 2021) were the male group was more than the female, because in our study the male group was a small number and not equally distributed , Regarding the Educational level of the individuals using whitening products, females with high education showed an increase in the use of the bleaching material (94.3%) compared to those with low educational levels showed a percentage of only 5.7%, and this was similar to the study of (Salem *et al.,* 2014). Concluding these results indicated that the level of education affects the use of the bleaching material. 69.9% of the participants of this study who uses whitening agents are mainly community workers (other jobs), the rest are Dentists 30.1%. Agree with (Nora Nomay, 2016), stated that the dentist is less interested in using bleaching materials due to the heavy work of the dentist. Therefore, they have less time to undergo this treatment. In addition, they noted well the complication of bleaching.

Regarding their knowledge of tooth bleaching

The results of the study indicate that the participant's knowledge about tooth bleaching is good, result agreed with (Nora Nomay, 2016), which is due to increasing patient demands toward the esthetic appearance. The analysis confirms that the highest percentage of whitening, about 76.7% disagree with the use in the dental clinic, and 23.3% agree. These results have strong similarities to the study conducted in 2020 by (Ghada AlOtaibi *et al.,* 2020), which was related to the expensive treatment at the clinic and the time-consuming.

Frequency and complication of tooth bleaching

A large number of the participants felt that tooth sensitivity is the main complication following bleaching, that was agreed (Ghada AlOtaibi *et al.,* 2020); this is because of the action of the hydrogen peroxide, which may infiltrate through enamel and dentin into the pulp, Also, the bleaching agent gels are hypertonic and osmotically draw water from the pulp through the dentin and the enamel. Therefore, this potentially stimulates Intra dental nerves. Regarding using other agents for bleaching in general, both whitening strips and gels in both males and females are less recommended to use, in addition, both toothpaste and mouthwash are widely used as whitening agents in both males and females. and this was agreed with (Priskila Naomi *et al.,* 2019) on top of that, this was related to the

awareness of the patients toward the use of toothpaste and mouthwash and the best marking method used to instruct the populations on their effect.

Source of knowledge

Most of the participants heard about tooth bleaching via their dentists (38.7%), and others heard via Friends and relatives (11.8%). which disagreed with (Ghada AlOtaibi *et al.,* 2020) because in this study about 52.7% of the participants visited the dentist more than five times

Conclusion

Within the limitation of the study, it can be fall out that socio-demographic factors such as age, gender, marital status, and the level of education had a significant influence on knowledge. Respondents with frequent dental visits had higher levels of information about tooth bleaching, in comparison to respondents with a lack of dental visits. Most of the participants heard about tooth bleaching via their dentists, and most of them have used home bleaching more than professional bleaching, so, society should be educated to promote good oral health and warn against the excessive use of home-made bleaching products that can damage the tooth enamel, causing sensitivity and associated problems. More effort is needed by the dental profession to inform the population about tooth bleaching and to do all the percussion to reduce the percentage of sensitivity after tooth bleaching.

Disclaimer

The article has not been previously presented or published and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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