

ASSESSMENT OF THE KNOWLEDGE, AWARENESS AND PRACTICE (KAP) AMONG EGYPTIAN PATIENTS REGARDING TEETH BLEACHING

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ABSTRACT

Background: The rising desire for improved aesthetics and brighter smiles has made tooth-bleaching (also known as tooth-whitening) a widely sought-after dental treatment. It has quickly become one of the most rapidly expanding sectors of cosmetic dentistry. Tooth-whitening offers a more conservative solution for discolored teeth compared to other restorative treatments like composite fillings, veneers, or crowns.

Objective: Assessment of the knowledge, awareness and practice (KAP) among Egyptian Patients regarding teeth bleaching.

Subjects and Methods: Two hundred and fifty one Egyptian patients who had teeth bleaching procedure were included in this study. Detailed questionnaire with eight questions was used to assess Knowledge, Awareness and Practice (KAP) regarding teeth bleaching among these participants.

Results: Around 61.8% of patients did teeth bleaching in dental office, 57.4% of patients felt tooth sensitivity, 47.4% of patients have experienced gingival bleeding, 75% of patients who did at home bleaching applied it for less than 2 weeks, 57% of patients are satisfied with the results they got and 71.3% of the patients will repeat the teeth bleaching procedure if needed.

Conclusion: Regarding teeth bleaching procedure, Egyptian patients have high knowledge, awareness and practice scores.

KEYWORDS: knowledge, awareness, practice, home bleaching, office, assessment, Egyptians.

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INTRODUCTION

The portrayal of perfect white smiles in the media has significantly influenced the public. The quality of color in television, movies, and other media has heightened self-awareness of discolored teeth. In the late 1980s, several companies introduced both home-based and professional tooth whitening products to the U.S. market. These products have grown in popularity as the public increasingly demands whiter, more perfect smiles. There are various methods for whitening teeth, each with its mechanism of action, and their effectiveness depends on the specific type of tooth discoloration being treated (*Bonafé et al., 2021*).

Tooth stains are caused by compounds known as chromogens, which possess color or darker shades. These chromogens can accumulate within the tooth (intrinsic) or on its surface (extrinsic). These stains can be caused by factors such as genetics, age, antibiotics, high fluoride levels, and developmental disorders, and can even occur before the tooth erupts. Dental restorations can also cause staining after the tooth has erupted. Extrinsic staining, or external staining, is primarily due to environmental factors like smoking, pigments in food and drinks, antibiotics, and metals such as iron or copper. These colored compounds are absorbed into the dental pellicle or directly adsorbed onto the tooth surface, leading to teeth staining (*Hattab et al., 1999*).

Bleaching, in this context, refers to the chemical breakdown of chromogens. The primary active ingredient in most whitening products is hydrogen peroxide (H₂O₂), which can be provided either directly as hydrogen peroxide or in the form of carbamide peroxide. Carbamide peroxide is a stable compound that decomposes upon contact with water to release hydrogen peroxide. Therefore, the chemistry behind most tooth whitening processes involves hydrogen peroxide (*de Geus et al., 2016*).

Common risks associated with tooth whitening include increased tooth sensitivity and mild

gingival irritation. The severity of these side effects depends on the concentration of the peroxide bleach component, the duration of the treatment, and the non-bleach ingredients in the product. Tooth sensitivity typically occurs during the treatment and can persist for several days, while gingival irritation usually starts within a day of treatment and can also last for several days. Additional risks identified in laboratory studies include tooth erosion, degradation of tooth minerals, increased susceptibility to demineralization, and damage to the tooth pulp (*Al-Sowaygh, 2019*).

To estimate satisfaction level of patients in terms of dental esthetics, a lot of studies have been performed (*Azodo and Ogbomo, 2014; Mehl et al., 2014, 2015*). A study conducted at the Medical University of Lodz in Poland, involving 313 patients seeking tooth whitening treatment, revealed that 61.0% were dissatisfied with the appearance of their teeth. Additionally, 89.1% had tried to enhance their teeth's appearance using whitening toothpaste. However, half of the participants expressed concerns about the safety of the bleaching procedures (*Wisniewski et al., 2004*).

Currently, there is limited information available on the knowledge and awareness of tooth bleaching in Egypt. As restorative dentistry advances every day, many techniques have become more affordable and cost-effective for both developed and developing countries, with tooth bleaching being one of these techniques.

SUBJECTS AND METHODS

Ethics Approval

The current study was approved by ethical committee of Future University In Egypt with number FUE-REC(30)/8-24.

Study Design

The current study was a time based cross-

sectional descriptive study including 251 adult Egyptian Patients. Participants were selected from outpatient clinics of Future University and King Salman International University for a period of one month from June 2024 to the 15th day of July 2024. The aim of the study was explained to the participants and written informed consent was signed by them before data collection

Patients were recruited based on their comprehensive diagnosis sheets which include information about previous dental history and then we selected the patients who had undergone bleaching before and gave them the questionnaire to fill it. Multiple-choice questionnaires including eight questions were used, focused on the level of awareness, knowledge and practice. A questionnaire was designed in English and translated in Arabic.

The questionnaire included questions about applied method of teeth bleaching, postoperative complications as pain and gingival bleeding and their intensity, time of treatment applied and satisfaction degree of patients. The questionnaire was inspired by former study by *Mazilu et al., 2022*.

The sample size for this cross sectional study was calculated by the following equation:

$n = \frac{Z^2 \cdot P(1-P)}{d^2}$, where n is the sample size, Z = (z-value 1.96 for 95% confidence), p =estimated proportion of the population and d =margin of error.

$$n = \frac{Z^2 \cdot P(1-P)}{d^2}$$

$$n = \frac{1.96^2 \cdot 0.271(1-0.271)}{0.055^2} = 250.89 \approx 251$$

So, the current study included 251 patients.

Statistical Analysis:

Data were coded and entered using the statistical package for the Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA). Data was summarized using frequency (count) and relative frequency (percentage).

RESULTS

Demographic Data:

Age

All patients were older than 18 years old Table (1) Figure (1).

Table (1) Age of participants

Age	NO.
18-39Y	177(70.5%)
≥40Y	74(29.5)

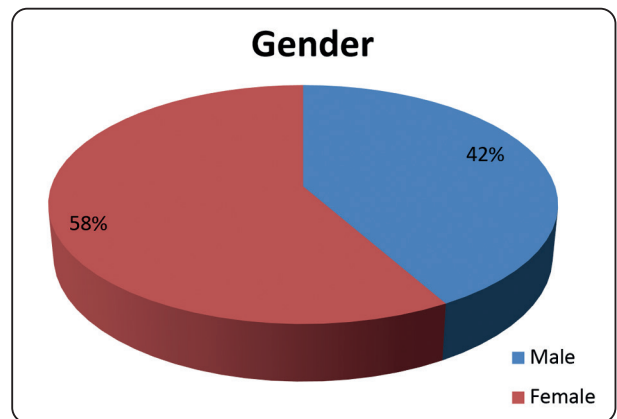


Fig. (1)

Gender:

The study included 105 males and 146 females Table (2) Figure (2).

Table (2) Gender of the participants

Male	Female
105 (42%)	146 (58%)

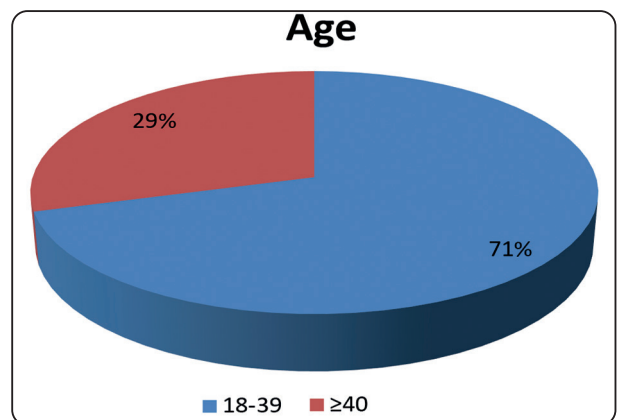


Fig. (2)

Full data were collected and represented in terms of patient numbers and percentages Table (3).

TABLE (3) Descriptive question analysis

Question	Answer	Patient Count	Percentage %
1-What is the method of teeth whitening you did?	At home.	96	38.2%
	In office.	155	61.8%
2-Have you experienced any tooth sensitivity after tooth whitening?	Yes	144	57.4%
	No.	107	42.6%
3-If you have felt pain, what is the degree of that pain?	Mild.	156	62.2%
	Moderate.	71	28.3%
	Severe.	12	4.8%
	no pain	12	4.8%
4-Have the tooth whitening procedure caused any gingival bleeding?	Yes	119	47.4%
	No.	132	52.6%
5-If you experienced gingival bleeding following tooth whitening procedure, what is its degree?	Mild.	108	90.8%
	Moderate.	11	9.2%
6-If you have used at home tooth whitening technique, how long did you use it?	Less than 2 weeks.	72	75.0%
	More than 2 weeks	24	25.0%
7-Are you satisfied with the results you got?	Yes	143	57.0%
	No.	108	43.0%
8-If needed, would you retry the same tooth whitening technique again?	Yes	179	71.3%
	No.	72	28.7%

1-What is the method of teeth whitening you did?

For the first question “What is the method of teeth whitening you did?”, the percentage of participants who did at home teeth bleaching was

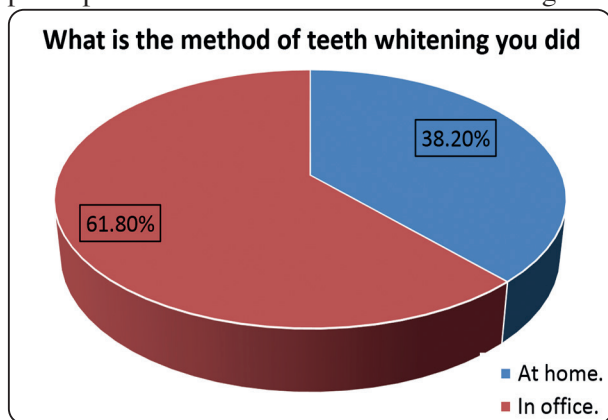


Fig. (3)

much less than those who had in office bleaching. (38.2 versus 61.8).

2- Have you experienced any tooth sensitivity after tooth whitening?

For the second question” Have you experienced any tooth sensitivity after tooth whitening?”, the percentage of participants who felt tooth sensitivity were a little bit higher than those who didn’t feel sensitivity (57.4 versus 42.6).

3-If you have felt pain, what is the degree of that pain?

Fot the third question “If you have felt pain, what is the degree of that pain?” , most of the participants felt mild pain followed by participants who felt moderate and mild pain respectively.

4- Have the tooth whitening procedure caused any gingival bleeding?

For the fourth question “Have the tooth whitening procedure caused any gingival bleeding?”, the percentage of participants who didn’t suffer from gingival bleeding was slightly more than those who those who had gingival bleeding (52.6 versus 47.4).

5- If you experienced gingival bleeding following tooth whitening procedure, what is its degree?

For the fifth question “If you experienced gingival bleeding following tooth whitening procedure, what is its degree?”, majority of participants who experienced gingival bleeding , had it in mild form and the rest experienced moderate gingival bleeding and none of the participants had severe gingival bleeding.

6- If you have used at home tooth whitening technique, how long did you use it?

For the sixth question “If you have used at home tooth whitening technique, how long did you use it?”, most of the patients who had at home bleaching, applied it for less than 2 weeks.

7- Are you satisfied with the results you got?

For the seventh question “Are you satisfied with the results you got?” , the percentage of participants who are satisfied with the bleaching results is slightly higher than those who are not satisfied with the results.

8- If needed, would you retry the same tooth whitening technique again?

For the eighth question “If needed, would you retry the same tooth whitening technique again?”, majority of the participants have the will to retry bleaching procedure again.

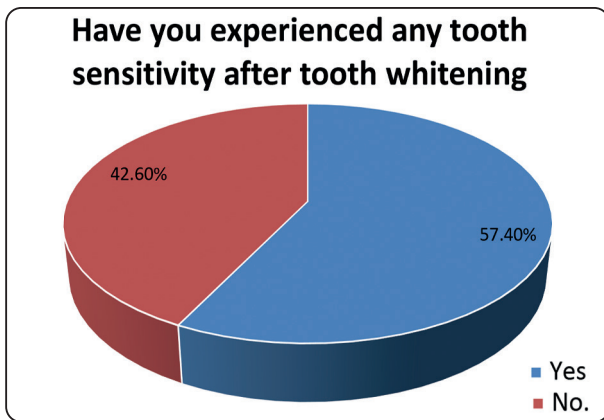


Fig. (4)

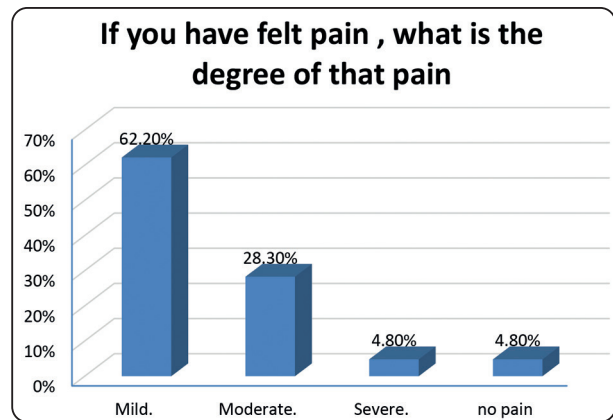


Fig. (5)

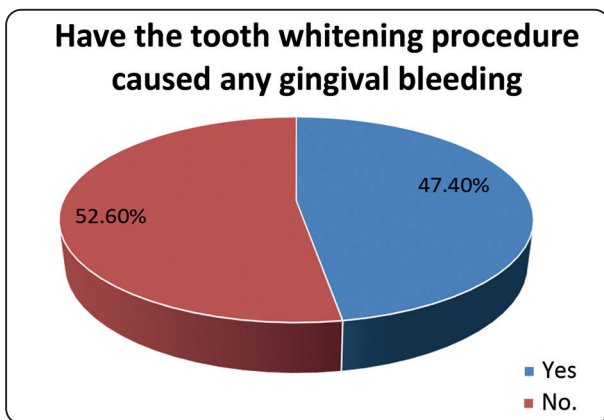


Fig. (6)

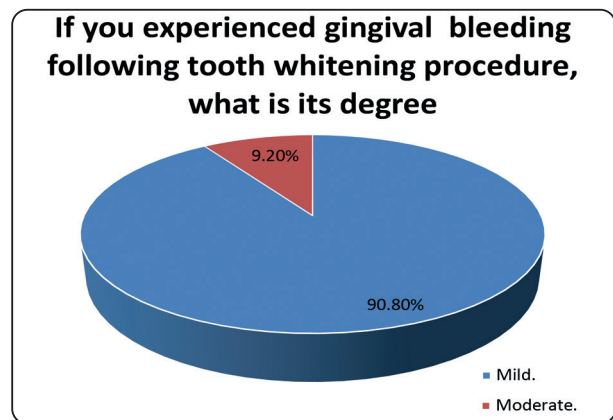


Fig. (7)

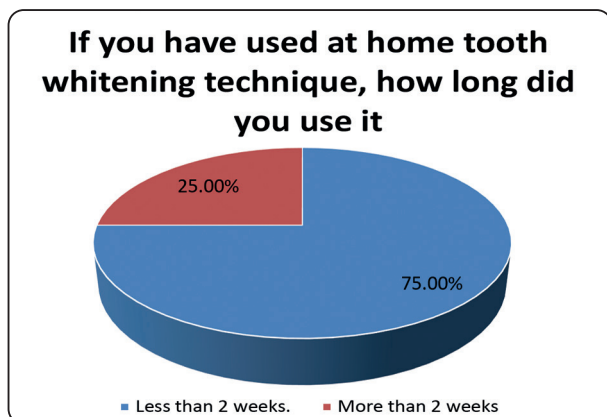


Fig. (8)

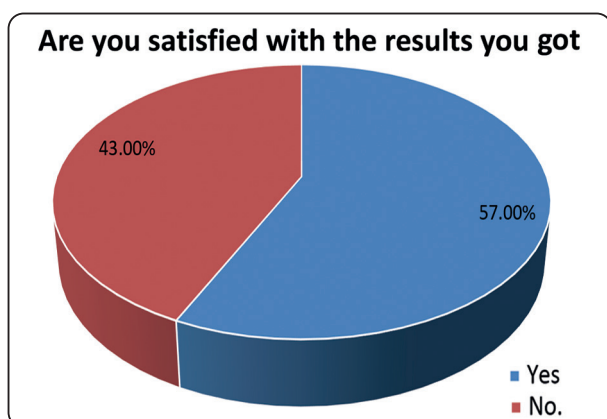


Fig. (9)

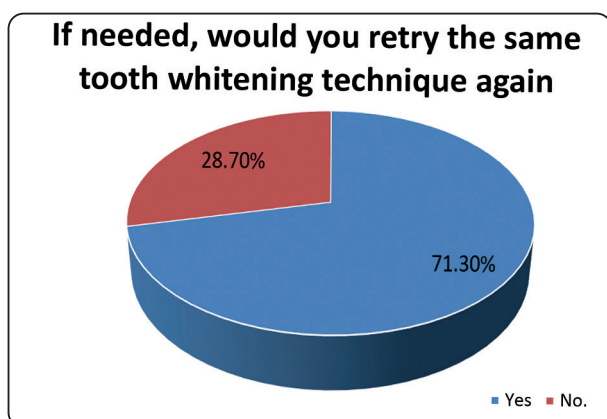


Fig. (10)

DISCUSSION

In contemporary dental practice, esthetic procedures are highly sought after. There has been a notable increase in patients desiring an attractive smile, particularly regarding tooth color (Mailart et al., 2021). Dental bleaching is

favoured for treating tooth discoloration due to its non-invasive nature and lower cost compared to other cosmetic dental procedures (Meireles et al., 2022). Tooth discoloration can stem from various causes, requiring thorough evaluation for accurate diagnosis. Discolorations are classified as either extrinsic or intrinsic (Kwon and Wertz 2015, Alkahtani et al., 2020).

Extrinsic discoloration results from the accumulation of chromogenic substances on the tooth’s surface, often due to the consumption of items like wine, coffee, tea, carrots, oranges, chocolate, tobacco, certain mouthwashes, or poor oral hygiene habits. These stains can typically be removed through professional prophylaxis treatments. Intrinsic discoloration, however, arises from changes in the dental tissues’ structure or thickness, caused by systemic factors (such as drug use like tetracycline) or local factors (Nathoo, 1997, Viscio et al., 2000, Alqahtani et al., 2014).

Local causes include pulp necrosis, intrapulpal hemorrhage, remnants of pulp tissue post-root canal treatment, root canal filling materials, some restorative materials, enamel microcracks, caries, and aging. These types of discolorations are addressed using tooth bleaching techniques (Dodson and Bowles 1991).

So, the current study had investigated levels of knowledge, awareness and practice regarding teeth bleaching among Egyptian patients and it showed that percentage of participants who did teeth bleaching in office was more than those who did bleaching at home. This may be attributed to disadvantages of at-home teeth bleaching technique. The benefits of this technique are self-administration by the patient, reduced time in the dental chair, high safety, fewer adverse effects, and low cost. However, it requires significant patient cooperation as the results depend on how well the instructions are followed. Overuse or extended use may lead to increased tooth sensitivity and soft tissue irritation. In addition this technique also needs dentist supervision. (Haywood 1992; Setien et al., 2008)

In the current study, more participants have experienced increased teeth sensitivity than those who didn't. Hypersensitivity indicates inflammatory changes in the dental pulp. This sensitivity is usually mild and temporary; lasting 2 to 3 days, but it may discourage patients from continuing treatment. The exact mechanism behind tooth sensitivity after bleaching is still unclear. The prevailing explanation in the literature is the hydrodynamic theory, which suggests that fluid movement within the dentinal tubules stimulates receptors in the pulp dentin area, causing pain. (*Dahl and Pallesen 2003; Markowitz 2010*)

Also the present study showed that most of the participants didn't suffer from gingival bleeding and most those who did, had mild gingival bleeding. Local side effects on oral soft tissues caused by peroxides from bleaching systems are documented in the literature as gingival irritations, including burning or erosions (*Walsh, 2000, Tredwin et al., 2006, Curtis et al., 1996*).

As confirmed by many studies, Bleaching has been noted to cause various side effects (*Almas et al., 2003, Auschill et al., 2005, Hannig et al., 2007, Leonard et al., 2007*), the most common being tooth

hypersensitivity and gingival irritation (*Browning et al., 2007, Ziebolz et al., 2007*). These effects are linked to factors such as the pH and peroxide concentration of the bleaching gel, as well as the number and duration of applications, among other factors. Most observed and reported oral adverse reactions are mild and temporary (*Gurgan et al., 2009*).

Most of the participants in the current study who used at home bleaching technique, applied it for less than 2 weeks due to the compatibility factor (*Zhao et al., 2023*). The present study also showed that most of patients are satisfied with the treatment outcomes and would repeat it if needed (*Mailart et al., 2021*).

CONCLUSION

The present study revealed that Egyptian patients have high knowledge, awareness and practice scores regarding teeth bleaching procedure.

RECOMMENDATIONS

Regarding teeth bleaching procedure, more surveys with larger numbers are needed to ensure the knowledge level among Egyptian patients.

QUESTIONNAIRE

1	What is the method of teeth whitening you did? At home. <input type="checkbox"/> In office. <input type="checkbox"/>
2	Have you experienced any tooth sensitivity after tooth whitening? Yes. <input type="checkbox"/> No. <input type="checkbox"/>
3	If you have felt pain, what is the degree of that pain? Mild. <input type="checkbox"/> Moderate. <input type="checkbox"/> Severe. <input type="checkbox"/>
4	Have the tooth whitening procedure caused any gingival bleeding? Yes. <input type="checkbox"/> No. <input type="checkbox"/>
5	If you experienced gingival bleeding following tooth whitening procedure, what is its degree? Mild. <input type="checkbox"/> Moderate. <input type="checkbox"/> Severe. <input type="checkbox"/>
6	If you have used at home tooth whitening technique, how long did you use it? Less than 2 weeks. <input type="checkbox"/> More than 2 weeks <input type="checkbox"/>
7	Are you satisfied with the results you got? Yes. <input type="checkbox"/> No. <input type="checkbox"/>
8	If needed, would you retry the same tooth whitening technique again Yes. <input type="checkbox"/> No. <input type="checkbox"/>

* Means that this question is mandatory.

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