

## BLEACHING KNOWLEDGE AMONG YOUNG FEMALES IN SECONDARY SCHOOLS IN RIYADH, SAUDI ARABIA

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### ABSTRACT

*This study was done to assess the knowledge and beliefs of young females in secondary schools about teeth bleaching in Riyadh, Saudi Arabia, and to investigate the source of their knowledge together with any natural or home remedies that they might be using. A specially designed self-administered questionnaire was distributed among 6 randomly selected female secondary schools in Riyadh. Out of 1046 surveyed students, 97.5% have heard of tooth bleaching; only 28.1% were satisfied with the color of their own teeth, and 67% wanted to bleach their teeth. With regards to bleaching knowledge, nearly half of the respondents knew that the aim of bleaching was to whiten the teeth, 37% stated correctly the causes of teeth discoloration and 22.5% identified the side effects of bleaching. Only 3.6% of the respondents knew the action of bleaching agents while 8.5% knew the expected duration of bleaching results. About 37% of the respondents stated that family and friends were their main source of information. This study demonstrated that although the majority of the respondents have heard about bleaching, correct knowledge among female secondary school students was low and is inadequate compared to the interest that has been shown by the participants. More effort should be carried out to provide young females with proper information so that any decision made by them regarding teeth bleaching would be based on sound foundation.*

**Key words:** Knowledge, Bleaching, Females, Secondary Schools

### INTRODUCTION

The lightening of the color of a tooth through the application of a chemical agent to oxidize the organic pigmentation in the tooth is referred to as bleaching<sup>1</sup>. People's concern about the color of their teeth dates back to more than 2000 years<sup>2</sup>. Some ancient Asians intentionally stained their teeth black or inlaid them with precious stones as signs of nobility<sup>3</sup>. First century Romans brushed their teeth with urea "Portugues" to give them whiter color. In the 1300s, Barber surgeon applied "aquafortis", a nitric acid solution, to whiten

their teeth after abrading them<sup>2</sup>. At the beginning of the 20<sup>th</sup> century, people started to use hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) as a bleaching agent. The American Journal of Dental Science first published this technique, along with hydrochloric acid micro abrasion technique in 1895.

In recent years, the people's concerns about cosmetics have increased, due to the media and their advertisements. This led to an increased demand for esthetic dentistry. People now are more concerned about having their teeth well arranged, straight, and

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free of stains, chips or imperfections. Dunn et al.<sup>4</sup> reported that of the factors comprising an attractive smile, tooth shade was the most important. A recent study showed that people with whiter teeth were considered healthier and more attractive<sup>5</sup>. It was also found that a healthy smile will improve self-esteem and confidence and is very important to people in both their personal and professional lives<sup>6-9</sup>.

Dental offices in turn, have responded to this increased concern and offered a variety of tooth whitening options which included: in-office bleaching, dentist-supervised bleaching, dentist-provided bleaching and over the counter products<sup>10</sup>.

The choice of any of these methods depends on many factors including dentist and patients' preference, economic and time factors and most importantly, type and cause of the discoloration<sup>1</sup>. In general, tooth discoloration is classified into two types: extrinsic stains which might be caused by food, smoking and aging, and intrinsic stains which might occur due to a variety of causes including fluorosis, trauma, iatrogenic stains, systemic conditions, heredity and caries<sup>12</sup>.

For the previous conditions, bleaching is considered the simplest, most conservative and least expensive treatment option compared to restorations, veneers and tooth crowning. Although, it is considered to be safe, tooth bleaching may have some side effects of which the patient should be warned about, including acute inflammatory response of the gingiva,<sup>13,14</sup> changes in pulpal tissues,<sup>15-18</sup> tooth sensitivity, root resorption and adverse effects on tooth structure<sup>19-22</sup>.

In Saudi Arabia, as in many other countries, many young females long to have a perfect smile with white and straight teeth. However, no information is available regarding their level of knowledge about tooth bleaching.

The aim of this study is to assess the knowledge and beliefs of young females in secondary schools in Riyadh, Saudi Arabia about teeth bleaching, and to investigate the source of their knowledge together with any natural or home remedies that they might be using.

## SUBJECTS AND METHODS

In the year 2006/2007, there were 132 governmental and 91 private secondary schools for girls in the

urban region of Riyadh. These schools are distributed in the five educational zones (south, north, east, west and center). A list of all the female secondary schools was provided by the Ministry of Education together with the school identification number, the telephone number and the zone where the school was located. One governmental school was chosen randomly from each educational zone for this study. In addition, one private school was selected to ensure the representation of all levels of the society giving a total number of six schools. Students enrolled in the 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> grades were included in the study and the number of the students selected from each school was based on the density of the population occupying that zone.

Data on bleaching knowledge, experience, beliefs and source of information were obtained through the distribution of a self-administered questionnaire among the students. The questionnaire was pre-tested on a group of students who were not included in the main study and appropriate modifications were made.

The questionnaire covered the following areas:

- 1 Demographic information such as age, nationality, grade, location of school, and mothers' level of education which was categorized into four levels: illiterate, secondary school or less, bachelor degree and postgraduate studies.
- 2 Students satisfaction with the color of their teeth, any previous experience with tooth bleaching and how it was done: at the dental office, using home bleaching products, using whitening toothpastes or some home remedies, and if no previous attempts to whiten their teeth was done, would they like to do it?
- 3 Knowledge about teeth bleaching which was evaluated by the following questions: the causes of teeth discoloration, the aim of dental bleaching, the action of dental bleaching agents, the expected duration of bleaching results and what are the side effects of bleaching.
- 4 Beliefs about teeth bleaching which were assessed through the use of a set of questions inquiring if the participants thought that bleaching would increase their beauty, confidence, social acceptance and provide them with more opportunities.

5 Source of information on bleaching including; the dentist, mass media (television, magazines and newspapers), internet, family and friends or other sources.

At the end of the questionnaire the participants were asked to list any home remedies they knew or have used to whiten their teeth.

All the data were entered in to a computer and analyzed using the Statistical Package for the Social Sciences (SPSS, Vr.12) program. Frequency distribution was used for the descriptive analysis of the data and the Chi-square test at 5% significance was used for the statistical relationship between the variables.

**RESULTS**

One thousand and forty six female students were included in this study. The students' age ranged between 15 and 18 years with the highest percentage (36%) being 16 years old (Fig. 1). More than two thirds of the participants (70.2%) were Saudis. The highest percentage (59.1%) of students had mothers with an educational level of secondary school or less, whereas only 3.3% had mothers with post graduate studies (Fig. 2).

Ninety seven and a half percent of the respondents heard about tooth bleaching before, 67% of them wished to bleach their teeth and only 28.1% were satisfied with the color of their own teeth. Nearly 22% of the students reported previous experience with tooth bleaching. Over half of those used whitening toothpaste, 34% had their teeth bleached at the dental clinic, 10% have used some home remedies and only

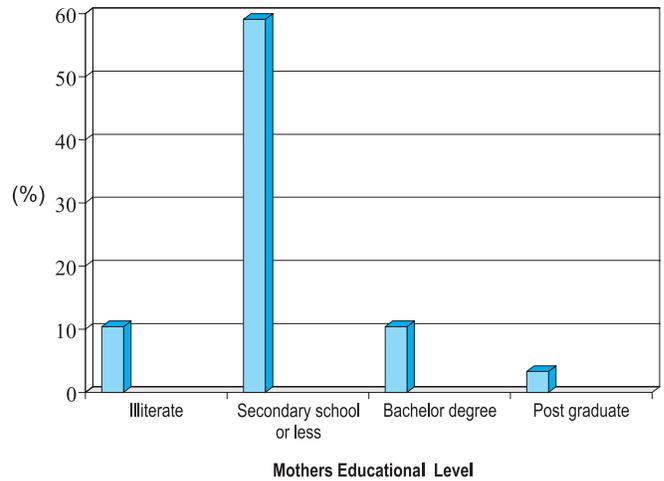


Fig. 2. Percentage Distribution of the Mothers' Level of Education.

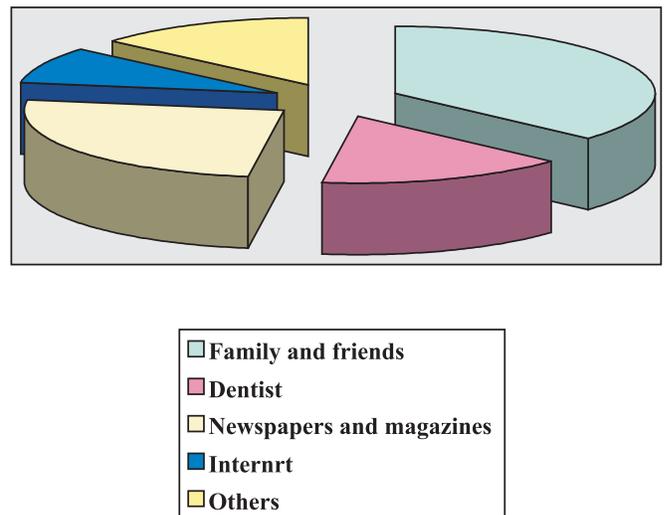


Fig. 3. Distribution of the Students by the Source of Bleaching Knowledge.

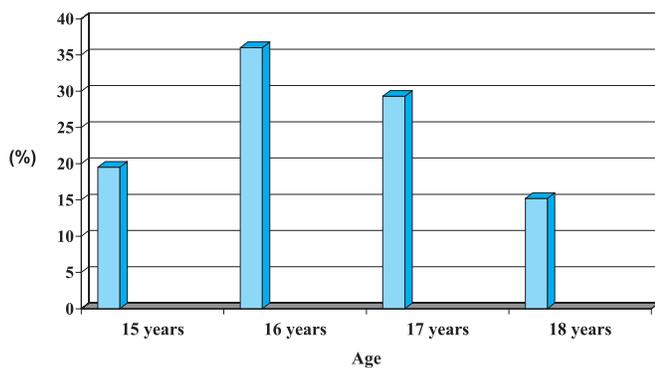


Fig. 1. Percentage Distribution of the Respondents by their Age.

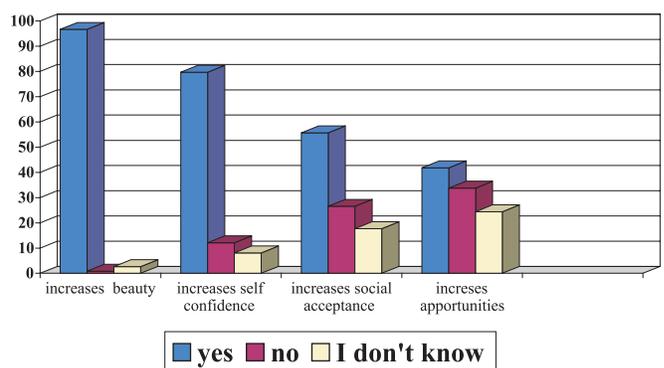


Fig. 4. Percentage Distribution of Stuent's by their Beliefs about Teeth Bleaching

Causes of teeth coloration											
Hereditary		Smoking		Drugs		Aging		All of the above		Others	
n	%	n	%	N	%	N	%	n	%	n	%
76	7.3	237	22.7	39	3.7	34	3.3	386	36.9	274	26.2

TABLE 1a: PERCENTAGE DISTRIBUTION OF THE PARTICIPANTS BY THEIR KNOWLEDGE OF THE CAUSE OF TEETH DISCOLORATION.

Goals of bleaching									
Whiten the teeth		Increases resistance to caries		Cures dental sensitivity		All of the above		I don't know	
n	%	n	%	N	%	n	%	n	%
520	49.7	31	3.0	5	0.5	367	35.1	123	11.8

TABLE 1b: PERCENTAGE DISTRIBUTION OF THE PARTICIPANTS BY THEIR KNOWLEDGE OF THE GOALS OF BLEACHING.

Bleaching techniques									
Removes outer layer of teeth		Supplies teeth with FI & Ca		Oxidation of stains		All of the above		I don't know	
n	%	n	%	N	%	n	%	n	%
275	26.3	132	12.6	38	3.6	256	24.5	345	33

TABLE 1c: PERCENTAGE DISTRIBUTION OF THE PARTICIPANTS BY THEIR KNOWLEDGE OF THE BLEACHING TECHNIQUES.

Bleaching effect lasts for							
3-6 months		1-3 years		Once & lasts for ever		I don't know	
n	%	N	%	n	%	n	%
326	31.2	89	8.5	52	5.0	579	55.4

TABLE 1d: PERCENTAGE DISTRIBUTION OF THE PARTICIPANTS BY THEIR KNOWLEDGE OF THE LASTING EFFECT OF BLEACHING.

Bleaching Disadvantages							
Sensitivity		Returns to previous color		All of the above		I don't know	
n	%	n	%	n	%	n	%
167	16	258	24.7	235	22.5	386	36.9

TABLE 1e: PERCENTAGE DISTRIBUTION OF THE PARTICIPANTS BY THEIR KNOWLEDGE OF BLEACHING SIDE EFFECTS.

TABLE 2: PERCENTAGE DISTRIBUTION OF PARTICIPANTS' CORRECT ANSWERS TO KNOWLEDGE QUESTIONS ACCORDING TO MOTHERS' LEVEL OF EDUCATION.

Knowledge questions	Mothers Level of Education				P-value
	Illiterate	Secondary school or less	Bachelor degree	Post graduate	
Causes of teeth discoloration	9.3	56.2	31.3	3.2	0.147
Aim of bleaching	8.4	55.7	32.5	3.4	0.001*
Bleaching Technique	2.7	52.6	39.4	5.3	0.156
Bleaching side effects	8.9	54.2	33.1	3.8	0.103
Bleaching lasts for	8.9	58.1	28	4	0.876

\* Statistically significant

TABLE 3: PERCENTAGE DISTRIBUTION OF PARTICIPANTS' CORRECT ANSWERS TO KNOWLEDGE QUESTIONS ACCORDING TO AGE.

Knowledge questions	Age of Participation				P-value
	15 years	16 years	17 years	18 years	
Causes of teeth discoloration	17.8	39.8	31.5	10.8	0.008*
Aim of bleaching	21.7	36.7	27.2	14.4	0.187
Bleaching Technique	26.3	34.2	28.9	10.6	0.672
Bleaching side effects	23.4	40.3	26.8	9.7	0.017*
Bleaching lasts for	20.4	43.8	26.9	8.9	0.231

\* Statistically significant

TABLE 4: PERCENTAGE DISTRIBUTION OF PARTICIPANTS' CORRECT ANSWERS TO KNOWLEDGE QUESTIONS ACCORDING TO SCHOOL TYPE.

Knowledge questions	School Type						P-value
	Government					Private	
	North	South	East	West	Central		
Causes of teeth discoloration	6.7	20.4	18.6	19.4	10.6	24.3	0.063
Aim of bleaching	10.7	17.6	15.5	16.3	10.7	29.2	<0.0001*
Bleaching Technique	10.5	21.3	15.7	13.1	18.4	21.2	0.621
Bleaching side effects	8.4	19.5	14.4	13.6	9.7	34.4	<0.0001*
Bleaching lasts for	13.4	21.3	6.7	16.8	10.1	31.7	0.006*

\* Statistically significant

5.6% used over the counter bleaching products or used the ones seen in advertisements on the television.

When the surveyed students were asked about the causes of teeth discoloration, 22.7% of them believed that smoking was the main cause and nearly 37% stated correctly that all the mentioned factors (hereditary, smoking, drugs and aging) were significant causes

(Table 1a). About 26% of the participants mentioned other causes for discoloration such as; oral hygiene neglect, foods and drinks, chewing gums, type of tooth pastes, pregnancy and psychological factors.

Nearly half of the respondents stated correctly that the aim of bleaching was to whiten the teeth (Table 1b). Thirty three percent of the surveyed students didn't

know the action of the bleaching agent and only 3.6% of the students knew correctly that the bleaching agents oxidized the stains (Table 1c). Over half of the respondents didn't know how long the bleaching results are expected to last for and only 8.5% selected the right answers (Table 1d).

Sixteen percent of the participants were aware that teeth sensitivity was a side effect of bleaching, 24.7% knew that recurrence of the previous color was a problem and 22.5% knew correctly that both were side effects of bleaching (Table 1e).

When the participants were asked about the sources of their bleaching knowledge 36.8% stated that they obtained their information from their families and friends, and only 15.5% from their dentists. Combination of the previous sources was stated by 13.5% of the students (Fig.3).

Around 96.7% of the surveyed sample believed that bleaching would increase their beauty and 79.7% thought that it would increase their self confidence (Fig 4).

When the mothers' level of education was related to the students' selection of correct answers for the bleaching knowledge questions, statistically significant differences were found between the students only in the knowledge about the aim of bleaching ( $P=0.001$ ) (Table 2).

Statistically significant differences were found between the different age groups and the correct answers in the knowledge about causes of teeth discoloration and bleaching side effects ( $P=0.008$  and  $P=0.017$ , respectively) where the 16 year old students gave the highest percentage of correct answers compared to the other age groups.

Bleaching knowledge was found to be higher among private school students compared to the governmental schools in 3 out of the 5 knowledge assessment questions ( $P \leq 0.0001$ ,  $P=0.006$ ,  $P \leq 0.0001$ ). Although only 2.4% of the surveyed students stated that they have used some home remedies, about 26.2% of the participants have described some remedies they knew for bleaching. These included the use of crushed carbon (char) alone or with honey, honey alone or with toothpaste, burned toast alone or with honey, lemon juice or crushed limes alone or with salt, crushed strawberry,

vinegar with lemon and salt, salt alone, salt with warm water, petroleum jelly, bleaching powder, detergents, meswak, derum, and sage. The surveyed students also gave instructions on how to use these home remedies; as how many times they should be used per day and for how many months.

## DISCUSSION

This study has provided an opportunity to assess the knowledge about bleaching among young females in Riyadh, Saudi Arabia. Knowledge is usually necessary to make intelligent decisions upon which to act. The sample was selected randomly to be representative of 15-18 year old females in the geographic study area. The data collection instrument was a questionnaire which was especially developed to be short and simple. The five questions designed to assess dental bleaching knowledge focused on basic information about bleaching of teeth. The majority of the respondents have heard about bleaching and this is expected because of the widespread programs and advertisement about this topic.

About three quarters of the respondents were not satisfied with the color of their own teeth. This agrees with the findings of another study which have shown that dissatisfaction with tooth color was a common finding<sup>23</sup>. The percentage of correct answers ranged between 3.6% and 49.7% indicating that knowledge about bleaching is considered inadequate. One quarter of the surveyed students believed that bleaching is done through removal of the outer layer of the teeth, which may explain their attempts to use hard abrasive materials as home remedies to whiten their teeth.

The surveyed students were more aware about the external causes of discoloration, which was shown by the selection of smoking as the main cause of tooth discoloration by 23% of the respondents and not aging or heredity. Also, when students were asked to state other causes, many of them pointed out food and drinks, type of toothpastes and oral hygiene neglect.

Analysis of the source of dental bleaching knowledge revealed that family and friends were the main source of information for the students. This is consistent with other studies that found the parents and

family were the main source of information about oral health<sup>24-26</sup>. This could explain the reason for the low level of information regarding teeth bleaching and the variety of home remedies explained by the students.

Correlation was found between mother's level of education and only one out of the five bleaching knowledge questions. This finding contradicts the findings of a previous study in which dental knowledge was found to be related to parents' educational level<sup>27</sup>.

The study also showed that dental knowledge differed among different age groups, which agrees with the findings of a previous study<sup>27</sup>. This finding however disagrees with the findings of Woolfolk and his colleagues who found no correlation between knowledge and age<sup>28</sup>. Females at the age of 16 scored the highest percentage of correct answers. This could be expected since several studies have documented the increased concern of adolescents about appearance and its relation to self-esteem<sup>29, 30</sup>. This concern reaches a peak at about 16 years of age and decreases significantly between 17 and 21<sup>31</sup>.

Private school students had better knowledge about teeth bleaching compared to the government school students. This could be explained by the higher socioeconomic status of these students and more frequent visits to the dental office thus the higher chance of obtaining more correct information regarding teeth bleaching.

Most of the participants believed that whiter teeth would increase their self-confidence and social acceptance. This agrees with the findings of many other studies which supported the idea that attractive appearance is a key element in social interaction and success<sup>32-38</sup>. They showed that those judged as more attractive were regarded as more popular, attributed more socially desirable characteristics, expected to be more intelligent, and have higher educational potentials. They were also more likely to receive peoples' assistance, and were more capable of influencing others.

This study showed that the correct knowledge of young females in secondary schools in Riyadh was inadequate compared to their high interest in teeth bleaching. More effort should be carried out to provide

them with proper information so that any decision made regarding teeth bleaching would be based on sound foundations. This could be accomplished by providing more accurate and basic information through the mass media and through professional educational lectures provided to the student in their schools.

## CONCLUSIONS

Based upon the results of this study it could be concluded that:

- The majority of the female students have heard about teeth bleaching before, and two thirds of them were not satisfied with their teeth color.
- The knowledge about teeth bleaching among young females in secondary schools in Riyadh was considered inadequate.
- Families and friends were the main source of bleaching information.

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