

# PATIENTS' PERCEPTIONS AND KNOWLEDGE ON TOOTH BLEACHING

Original Article

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## ABSTRACT

The main objective of this study was to assess knowledge on tooth bleaching among patients visiting dental health care centres in Klang Valley. A total of 200 patients were conveniently selected and interviewed using structured questionnaires. Among the 200 respondents, 75.5% knew about bleaching. There was no statistically significant difference in knowledge of bleaching in relation to age, gender, ethnic group and income level of the patients interviewed ( $p>0.05$ ) but the education level had a significant influence ( $p=0.049$ ). Respondents with tertiary education had better knowledge about tooth bleaching as compared to those respondents without tertiary education. The sources of information about bleaching came from advertisements on electronic media (65.5%), articles in newspapers and magazines (14.7%), dentists (10.9%) and family and friends (8.8%). Out of the 75.5% of respondents who knew about bleaching, 18.2% had tried bleaching their teeth using either over-the-counter products or had undergone professional bleaching treatment. The commonest reasons cited for bleaching treatment were to remove coffee and tea stains (70%) and cigarette stains (16.7%). 73.3% of these patients were satisfied with the results achieved after bleaching. However, the majority of these patients (59.6%) were unsure of the safety of these bleaching products/procedures. In conclusion, 75.5% of patients interviewed in this study knew that bleaching is one of the treatment options available to improve dental aesthetics but only 18.2% have tried bleaching their teeth. Their main source of knowledge about bleaching came from advertisements on electronic media.

Key words: bleaching, discolouration, knowledge, aesthetics.

## INTRODUCTION

Since the introduction of a tooth whitening technique that uses custom tray loaded with 10 percent carbamide peroxide 15 years ago, the demand for information and treatment on tooth bleaching has increased (1). In recent years, the introduction of over-the-counter bleaching gels has multiplied the popularity of tooth whitening (2).

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Tooth bleaching has changed patients' attitudes and feelings towards dentistry with a new appreciation of how easily their aesthetics can be improved.

According to a study carried out in the United States of America, the demand for tooth bleaching among Americans had increased 300% over the past 5 years among patients aged 20 to 50 years (3). In 2003, the American Dental Association conducted a public opinion survey to determine the concerns of the population regarding their oral health. This survey showed that 19.3% of the participants asked questions about tooth whitening, which was up to 8.3% as compared to a 2001 survey. This survey also revealed that the top issue that patients discussed with their dentists was tooth whitening or bleaching (4).

In 1987, a study was carried out regarding patients' attitudes to tooth bleaching at the Medical University of Lodz, Poland (5). A total of 313 patients seeking tooth bleaching treatment were interviewed using structured questionnaires. 74.1% of the patients interviewed were in the age range of 18-30, with twice as many females as males. The survey showed that 61.0% were not happy with the appearance of their teeth and 89.1% had tried to improve the appearance of their teeth by using whitening dentrifices. A small percentage used professionally-applied (5.5%) or self-applied (7.5%) bleaching agents. Only 8.6% were highly satisfied with the results achieved. About 50% expressed concerns about the safety of the bleaching procedures.

Numerous studies have evaluated the safety of these bleaching agents on both hard and soft tissues in the oral cavity as well as the dental pulp. Studies by Leonard et al 1997 (6), Ritter et al 2002 (7), and Rosenstiel et al 1997 (8) concluded that tooth sensitivity was present in most patients during and

shortly after bleaching treatments. However, the sensitivity regressed slowly after treatment was completed. According to Haywood and Heymann 1991 (1), the sensitivity of the tooth is attributed to the freely diffusible nature of the material rather than the pH of the solution. It has long been determined that peroxide solutions flow freely through enamel and dentin. This free movement is due to the relatively low molecular weight of the peroxide molecule (30g per mol).

Fugaro et al (9) evaluated the histological changes in dental pulp after nightguard vital bleaching with 10% carbamide peroxide gel. Fifteen patients between 12 and 26 years of age with caries-free first premolars scheduled for orthodontic extraction were treated with 10% Opalescence (Ultradent Products, Inc). Pulp reactions were semi-quantitatively graded as none, slight, moderate and severe. Slight pulpal changes were detected in 16 of the 45 bleached teeth. Neither moderate nor severe reactions were observed. The findings indicate that the slight histological changes sometimes observed after bleaching tend to resolve within two weeks post-treatment. Heymann 1997 (10) reported that this inflammation happened because the bleaching agent dissolves rapidly through the cemento-enamel junction into the pulp, thus resulting in reversible pulpitis. This condition is enhanced if the dentinal tubules are already exposed pre-operatively before the bleaching treatment is done.

Haywood and Heymann 1991 (1) also reported that the most common ill effect noted by patient is minor ulceration or irritation of gingiva or mucosa during the initial course of bleaching treatment. Often, the only treatment needed is a reduction in time of exposure to the bleaching medium. Leonard et al 2001 (11) and 2002 (12), reported that no significant changes resulting from bleaching treatment were found in pulpal vitality, sulcus depth or Gingival Index measurements.

Significant systemic and soft tissue consequences following exposure to hydrogen and carbamide peroxide had been demonstrated in animal and in vitro studies. For example, acute toxicological effects were seen in rats that had ingested 5g of tooth whitener (containing 35% carbamide peroxide)/kg fasting body weight (13-14). These studies infer that ingestion of a very large amount of carbamide peroxide is potentially hazardous for humans. However, the estimated total ingestion of 10% carbamide peroxide by humans during a typical bleaching treatment provides a calculated safety factor of 239 for the no-observable adverse effect level (15). Therefore, acute toxicity following material ingestion should not be a clinical problem when adults used home bleaching products with 10% carbamide peroxide as directed.

There have been many studies (16-20) done regarding the clinical efficacy of tooth bleaching and

post treatment colour stability. Their results have shown that the active 10% carbamide peroxide solution used in nightguard bleaching worn for 7 to 8 hours daily for 4-6 weeks was effective in lightening teeth, and this effect was sustained at a mean period of up to 47 months post treatment. Teeth stained by aging, brown fluorosis, trauma or inherent discolouration were successfully lightened by the bleaching treatment, but teeth stained by tetracycline did not lighten as much as teeth stained by other means.

There have not been any study done in Malaysia so far regarding public awareness and their perceptions towards bleaching treatment or products. However, lately, the electronic media in particular has advertised numerous bleaching products that are available in the market and hence may have enhanced the public's knowledge in this subject. Therefore the authors felt that a study is needed to (i) assess knowledge about tooth bleaching, (ii) determine the level of satisfaction with the results after bleaching treatment, and (iii) assess knowledge on the safety issues of bleaching products and procedures, among patients attending dental health centers in Klang Valley.

## MATERIALS AND METHODS

This study was a cross-sectional study carried out in dental health centers in Klang Valley and was based on a structured questionnaire in a face to face interview with the patients. A convenient sample comprising 200 adults aged 18-61 years old attending several private and government clinics in the Klang Valley were selected for this study. They were categorised into four age groups consisting of 18-28 years old; 29-39 years old; 40-50 years old and 51-61 years old. Three government clinics/ hospitals and seven private dental clinics in several areas in Klang Valley were willing to participate in this study.

The questionnaire for this study was designed based on a reference to literature on past study on patient's oral health survey (21). The questionnaire was prepared in two languages, English and Bahasa Melayu. The questionnaire consisted of three parts:

### Part A: Socio-economic status of patient

In this part, information regarding age, gender, ethnic group, marital status, total family income, occupation and level of education were sought.

### Part B: Patients' perception about their oral health and habits

Participants were asked about how they perceived their oral health in general. They were also asked about the appearance of their teeth stating specifically what the problem was if they were not happy with their teeth. They were asked if they

smoke or had smoked in the past and if they drink tea or coffee, how many cups do they consume on average per day.

**Part C: Patients' knowledge about tooth bleaching.**

In this part, the questionnaire ends at question 1 if the patients have not heard about tooth bleaching. Questions 5 to 8 were only asked to patients who have either undergone in-office bleaching treatment or have used self applicable bleaching agents. Questions asked in this part of the questionnaire are listed below:

1. Have you heard about tooth bleaching?
2. How did you know about tooth bleaching?
3. Have you heard about these bleaching products? Colgate Simply White Gel? Quantum Showcase Tooth Whitening System? Pearl Drop whitening gel? Pro White Dental Bleaching?
4. Have you ever tried using bleaching products or undergone tooth bleaching treatment in dental clinics?
5. What are the reasons for using the bleaching products / treatment?
6. How long did you use the products / treatment before you noticed the results?
7. How often do you use the bleaching products / how often do you see your dentist for the bleaching treatment?
8. How would you rate your satisfaction regarding the results of using the bleaching products/ treatment?
9. Do you think the bleaching products/ treatment are safe?
10. Do you intend to use any bleaching products / treatment in the future?
11. What do you think about the prices of these teeth bleaching treatment options?
12. Would you recommend to your friends and family to use these bleaching products / treatment?

Data obtained from the survey was analyzed descriptively. Chi-Square test was performed to determine if there were any relationships between knowledge of bleaching with socio-demographic factors. The significance level for the analysis was set at  $p < 0.05$ .

**RESULTS**

**A) Socio-Demographic Profile Of Patients.**

Respondents from the young age group (18-28 years old) were predominant in the survey by 51.5%. This was followed by respondents aged 29-39 years old, with 19.0%, middle age group (40-50 years old) by 16.0% and the elderly group (51-61 years old) by 13.5%. 33.5% were government servants or pensioners, 25.5 % were private sector workers, 25.0% were college or university students, 10% were unemployed while 6% were self-employed. About half of total respondents had tertiary education. Slightly more than half of the participants were in the middle income group of between RM 1000-RM 4999 per month. 28.5% earned less than RM 1000 and about 15 % earned more than RM 5000 per month.

**B) Self Perceptions About Oral Health**

Only 9.5% of the respondents thought that they had very good oral health while 46.0% thought that they had good oral health. 35.0% of the respondents felt that their oral health was fair while 9.5% felt that their oral health was poor. 46.5 % of the patients were satisfied with the appearance of their teeth while 53.5% were dissatisfied with the appearance of their teeth due to various reasons like colour, irregular shape and crowding.

**C. Knowledge About Bleaching**

Out of the 200 participants interviewed, 75.5% (151) had some knowledge about bleaching. Figure 1 displays their sources of information. Advertisement in the electronic media was the most popular source, followed by articles in newspapers

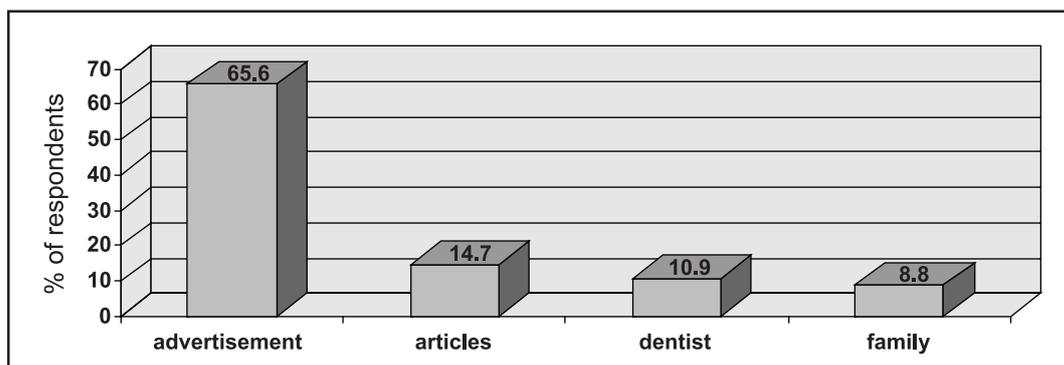


Figure 1: Source of knowledge about bleaching.

and magazines. Dentist's recommendation formed only the third popular source of knowledge.

Figure 2 shows the different reasons for bleaching teeth as stated by patients. Majority of patients tried bleaching treatment to remove coffee/tea and cigarette staining. Only a small minority wanted to try the bleaching products out of curiosity.

Figure 3 shows the level of satisfaction of respondents who had undergone bleaching treatment or used bleaching products. Only 13.3% were highly satisfied with the results obtained while 60% were satisfied with the results. A total of 26.7% of the respondents were not satisfied with the results achieved.

It can be seen from Figure 4 that 31.6% of respondents thought that bleaching products are safe to use while only 8.6% believed that these products are not safe. However, a high percentage of respondents (59.6%) were not sure of the safety aspect of these products.

The bleaching product most popularly known to the respondents was the Colgate Simply White Gel. The majority of respondents who were interested to try bleaching treatment/products in the future preferred to have the treatment done in the dental office while only 30.6% preferred self applicable tooth bleaching products.

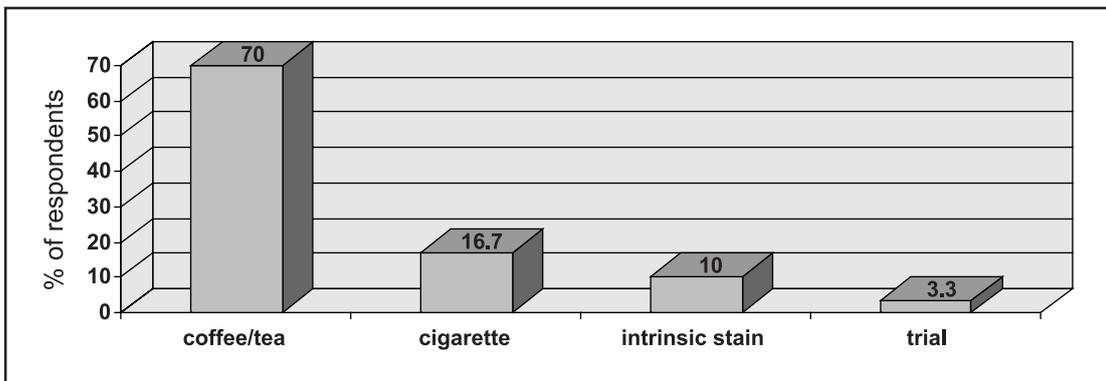


Figure 2: Reasons for using bleaching products or undergoing bleaching treatment.

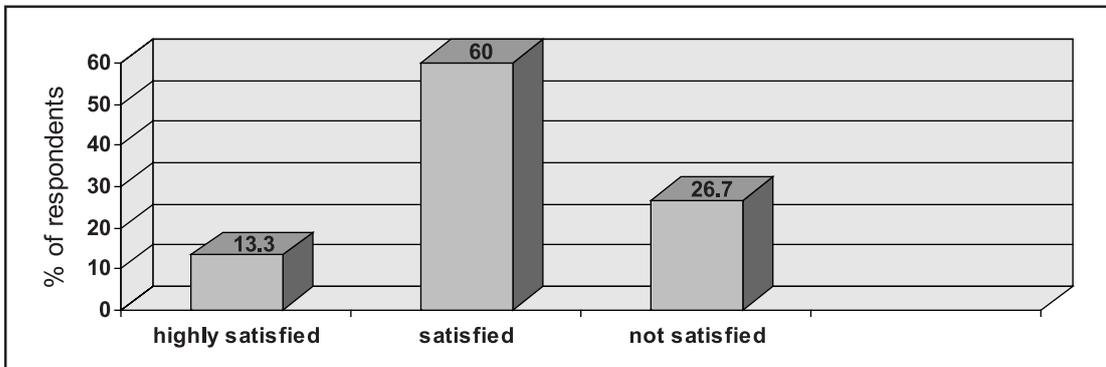


Figure 3: Level of satisfaction with bleaching product / treatment.

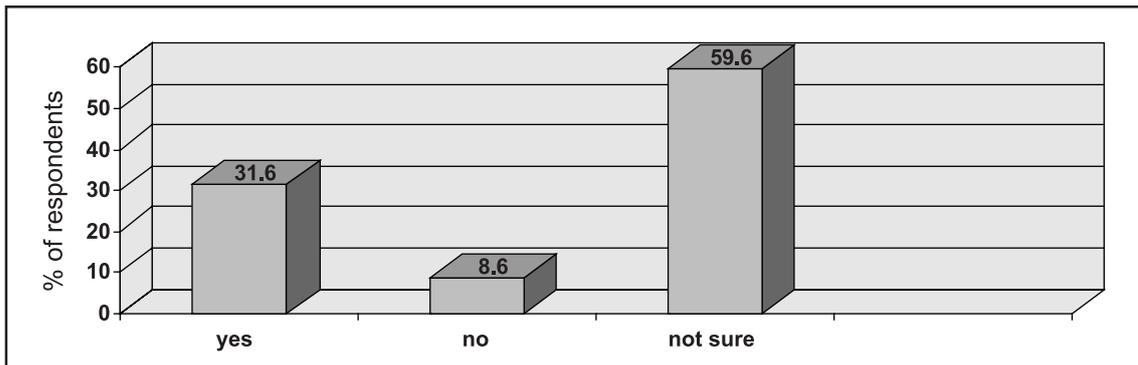


Figure 4: Safety of bleaching products.

#### D. Cross- relation Between Socio-demographic Status and Knowledge of Bleaching

The number of respondents who knew about bleaching was calculated for each category of the socio-demographic factors as shown in Table 1. Pearson Chi-Square tests were carried out to determine if there were any relationships between knowledge of bleaching with each of the socio-demographic factors.

Looking at the age of respondents and their knowledge on bleaching, the middle age group (40-50 years old) showed the highest knowledge of bleaching (84.4%). This is followed by the young age group (18-28 years old) with a percentage of 78.6%. The older respondents (51-61 years old) had the least knowledge of bleaching (55.6%). However, there was no significant difference in the knowledge of bleaching within the age groups ( $p = 0.052$ ) when chi-square test was applied to the data.

There was also no significant difference within the ethnic groups ( $p = 0.711$ ), gender (Fisher's Exact Test,  $p = .409$ ) and income levels ( $p = 0.244$ ) in relation to knowledge of bleaching.

However, when the education levels were analysed, participants with tertiary education have

significantly better knowledge about bleaching than those without tertiary education (Fisher's Exact Test,  $p = .049$ ). Respondents without tertiary education were those with either primary or secondary school education or received no formal education at all. They were grouped into a single category as the number of respondents with no education or received primary school education only was too small to be considered as separate categories for Chi-Square analysis.

#### DISCUSSION

This study revealed that among the 200 respondents interviewed, 75.5% have some knowledge about bleaching. The socio-demographic factors like age, gender, ethnic group and income level did not influence the participants' knowledge on bleaching. However, the level of education had a significant influence, those with tertiary education knew better than those without. This observation is probably due to better access and exposure to information in the well educated group.

The main source of information came from advertisements on electronic media such as television and radio (65.5%). Advertisements are repeated frequently and therefore are able to reach a wide audience. The articles in newspapers and magazines accounted for only 14.7% of the total source of information about bleaching which is probably due to lack or infrequent publication of such information in this form of media.

Only 10.9% of source of knowledge about bleaching came from the dentists. This shows that there may be lack of communication between the dentists and the patients on this topic. This result is in agreement with a survey reported by Christensen in 1998 (22) on tooth bleaching that dental practitioners did not play an active part in educating their patients about this type of treatment.

The dentists should educate their patients routinely about bleaching so that the information they get is more accurate than what can be obtained from the electronic media. The dentists should also update themselves and their auxiliary staff to be able to accomplish all aspects of bleaching. Bleaching is a viable treatment option that is relatively inexpensive as compared to other procedures such as crowns and veneers especially when it involves multiple teeth. The bleaching procedure is also less invasive as it does not require any tooth structure removal as compared to those of crowns or veneers.

Moreover, bleaching procedure does not require special skills from the dentists and is relatively painless to the patients. If patients are well informed about the bleaching procedure, acceptance rate should be high. Out of the 53.5% of participants who reported that they were not happy about the

**Table 1.** Relationship between socio-demographic characteristic and knowledge on bleaching

| Characteristics            | No. of respondents | Knowledge of bleaching |      |
|----------------------------|--------------------|------------------------|------|
|                            |                    | N                      | %    |
| <b>A. Age group (ns)</b>   |                    |                        |      |
| 18-28                      | 103                | 81                     | 78.6 |
| 29-39                      | 38                 | 28                     | 73.7 |
| 40-50                      | 32                 | 27                     | 84.4 |
| 51-61                      | 27                 | 15                     | 55.6 |
| Total                      | 200                | 151                    |      |
| <b>B. Gender (ns)</b>      |                    |                        |      |
| Male                       | 87                 | 63                     | 72.4 |
| Female                     | 113                | 88                     | 77.9 |
| Total                      | 200                | 151                    |      |
| <b>C. Ethnic (ns)</b>      |                    |                        |      |
| Malay                      | 123                | 93                     | 75.6 |
| Indian                     | 35                 | 27                     | 77.1 |
| Chinese                    | 35                 | 27                     | 77.1 |
| Others                     | 7                  | 4                      | 57.1 |
| Total                      | 200                | 151                    |      |
| <b>D. Education (s)</b>    |                    |                        |      |
| No tertiary education      | 101                | 70                     | 69.3 |
| With tertiary education    | 99                 | 81                     | 81.8 |
| Total                      | 200                | 151                    |      |
| <b>E. Income (RM) (ns)</b> |                    |                        |      |
| < 1000                     | 57                 | 39                     | 68.4 |
| 1000 - 4999                | 112                | 86                     | 76.8 |
| 5000 above                 | 31                 | 26                     | 83.9 |
| Total                      | 200                | 151                    |      |

s =  $p < 0.05$   
ns =  $p > 0.05$

appearance of their teeth, most of them complained that their teeth were too yellow and would prefer to have them whitened.

Our study also shows that out of 59.9% of those patients who were interested to try bleaching treatment in the future, majority of them preferred in-office treatment by the dentist (69.4%) compared to self-application using over-the-counter products (30.6%).

Out of the 75.5% of respondents who knew about bleaching, 18.2% have tried bleaching their teeth using either over-the-counter products or had undergone professional bleaching procedures to remove caffeine or nicotine staining. 73.3% of these patients were satisfied with the results achieved after bleaching. However, when asked about the safety aspects of these bleaching products/procedures, the majority of these patients (59.6%) reported that they were not sure and would like to have more information on this issue. This finding is consistent with the results reported by Wisniewski et al, 2004 (5) that about 50% of their interviewed participants expressed concerns regarding safety of bleaching product.

Further research needs to be carried out to address the issue of safety of the bleaching products and procedures. Most of the studies conducted so far on safety of bleaching products were carried out on animals and their applications to humans are questionable (23).

Among the tooth bleaching products that are available in the Malaysian market such as Colgate Simply White Gel, Quantum, Pearl Drop and Pro White; respondents were most familiar with Colgate Simply White Gel since this product was widely advertised on Malaysian media. When asked about the prices of the bleaching products that were sold over-the-counter, most patients thought that the prices were too high. The same was perceived for the in-office bleaching treatment by the dentist. However, when prices of bleaching products were compared with other beauty products like facial whitening cream, the prices are within the same range. The respondents may also not be aware of the cost of alternative treatment for aesthetic dentistry like crowns or veneers and therefore thought that the in-office bleaching treatment is expensive.

## CONCLUSIONS

Within the limitations of this study, the following conclusions could be drawn:-

1. Knowledge of bleaching among dental patients in the Klang Valley was not related to age, gender, ethnic group or income level.
2. Patients with tertiary education are more knowledgeable about bleaching than those without tertiary education.

3. Most patients (75.5%) knew that bleaching is a treatment option to improve dental aesthetics.
4. The main source of knowledge concerning bleaching for patients in the Klang Valley is from advertisements on electronic media.

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