KNOWLEDGE OF TOOTH DISCOLORATION AND TOOTH BLEACHING AMONGST ADULT PATIENTS VISITING A DENTAL HOSPITAL IN KATHMANDU, NEPAL

Rojin Joshi, Suman Gautam, Barsha Joshi

Department of Conservative Dentistry and Endodontics, Nepal Medical College Teaching Hospital, Attarkhel, Gokarneshwor-8, Kathmandu, Nepal

ABSTRACT

A beautiful smile increases the self-confidence and well being of an individual. Tooth discoloration is one of the cause for a patient to stop smiling, be less interactive with other people and the person might feel neglected from the society. Many people don't know about the various causes of tooth discoloration and the treatment options. Bleaching is a very conservative method to whiten the teeth. Until now limited studies have been done to assess the knowledge of tooth discoloration and vital tooth bleaching in context to Nepal. Hence, the objective of this study was to assess the knowledge of tooth discoloration and tooth bleaching amongst adult patients. This cross sectional study was done on 326 patients of 18 years and above. Personal interviews using a structured and validated questionnaire were conducted to collect the following information: demographic data, the participant's level of satisfaction of their tooth color, the participant's level of knowledge on tooth discoloration and tooth bleaching. Data were analyzed using Chi square test and descriptive statistics were calculated. It was found that majority of the study participants (63.8%) were satisfied with the color of their teeth and most of them (58.9%) had not heard about tooth bleaching. It was seen that there was no association of different aspects of bleaching as well as etiology of tooth discoloration with gender, age group, level of education and marital status.

KEYWORDS

Bleaching, knowledge, tooth discoloration

***Received on**: December 27, 2023*
***Accepted for publication**: April 11, 2024*

CORRESPONDING AUTHOR

Dr. Rojin Joshi
Associate Professor,
Department of Conservative Dentistry and Endodontics,
Nepal Medical College Teaching Hospital,
Gokarneshwor-8, Kathmandu, Nepal
Email: rozinjoshi@yahoo.com
Orcid No: https://orcid.org/0000-0003-3914-3837
DOI: https://doi.org/10.3126/nmcj.v26i2.67189

INTRODUCTION

The demand for aesthetic smile has grown over the last few years. The patient's perception of teeth appearance is associated with their general health and well-being.[1] Large majority of patients are not happy with the appearance of their teeth, the main complaint being the color.[2] The appearance of the natural teeth and smile is of great concern to a large number of people, especially young females and people working in the entertainment industry and has a great impact on the society as well.[3]

Tooth bleaching or whitening is one of the easiest and cost effective methods that people often consider for treating tooth discoloration.[4] Tooth discoloration has been classified into intrinsic and extrinsic discoloration; it could develop either at the time of tooth formation or after tooth formation.[5] Extrinsic discoloration lies on the tooth surface or in the acquired pellicle. The intrinsic discoloration occurs when the chromogens are deposited within the bulk of the tooth, which maybe of local or systemic origin.[6] Extrinsic discoloration mainly happens due to environmental factors, including smoking, pigments in beverages and foods, medications, mouthwashes and metals such as iron or copper.[7] Accumulations of dental plaque, calculus and food particles cause brown or black stains. Chromogenic bacteria is an etiological factor in the production of stains at the gingival margin of the tooth.[6] Chewing of pan results in the production of blood red saliva that results in a red-black stain on the teeth, gingiva and oral mucosal surfaces.[8] Most extrinsic tooth discoloration can be removed by oral prophylaxis. When the discoloration ages it darkens and becomes more resistant, but it is still highly responsive to bleaching.[9]

Intrinsic tooth discoloration can be either a genetic or an acquired abnormality. It usually occurs because of a change in the structure and appearance of the dentine or enamel. Genetic conditions such as amelogenesis imperfecta, dentinogenesis imperfecta and dentine dysplasia have been associated with intrinsic staining which occurs during the tooth development stages. They result in a yellowish brown and bluish brown staining.[5] Some medicaments like tetracycline a broad spectrum antibiotic if prescribed during tooth development can cause discoloration of the tooth. Tetracycline staining results from systemic administration of the drug which chelates with the calcium ions on the surface of the hydroxyl apatite crystals as a stable orthophosphate complex. Teeth affected by tetracycline have a yellowish or brown grey appearance which is worse on eruption and diminishes with time.[10] Dental fluorosis is the most common cause of intrinsic tooth discoloration. The most important risk factor for fluorosis is the total amount of fluoride consumed from all sources during the critical period of teeth development. A daily fluoride intake of more than the optimum of 0.05-0.07 mg fluoride/kg body weight/day is thought to cause dental fluorosis.[11]

Several treatment options are available for both extrinsic and intrinsic tooth discoloration. Some of the treatment options are crowns and veneers. These treatment procedures are more invasive compared to bleaching. It is found that upto 15.6% of teeth restored with metal ceramic crowns became non-vital within 10 years following active treatment.[12] Lower levels of pulpal damage should be expected for veneers where less tooth tissue is removed and preparations should not invade dentine. Other options available can be seen to preserve tooth tissue including microabrasion and bleaching for vital and non vital teeth.[13] Tooth bleaching is a minimally invasive procedure. It has some side effects like sensitivity, gingival irritation, effect on hard tissue and restoration and cervical resorption on non vital bleaching procedures.[13,14]

Tooth bleaching can be performed by practitioners in the dental office or by using over-the-counter products purchased by the patient and used at home (toothpaste, rinsing solutions, strips containing whitening agents, chewing gum etc). The most widely used method of tooth bleaching is recommended and supervised by a doctor followed by continued treatment by the patient at home.[15]

MATERIALS AND METHODS

This cross sectional study was performed in the Department of Conservative Dentistry and Endodontics at Nepal Medical College and Teaching Hospital, Kathmandu, Nepal from May 2023 to July 2023 after receiving ethical approval from Nepal Medical College Institutional Review Committee (reference no.59-079/080). The participants were informed about the study and written consent was taken from participants who were willing to participate in the study. The sample size was calculated by using the formula, $n=Z^2 pq/d^2$.Where, n was the required sample size, Z=1.96 at 95% confidence interval, p=26% was the prevalance of study participants who had heard about bleaching taken from a study by Laxmi *et al*,[16] q=1-p, d=margin of error i.e 5%. A

10% non response rate was added and the final sample size of 326 was taken. Participants who were above 18 years of age, willing to answer the questionnaire and give consent were included in the study. Those who were edentulous, not willing to answer the questionnaire and give consent were excluded from the study.

Personal interviews using a structured and validated questionnaire were conducted to collect the following information: demographic data, the participant's level of satisfaction of tooth color, the participant's level of knowledge on tooth discoloration and tooth bleaching adopted from a study by Alamassi *et al*.[17]

There were 11 questions regarding participant's knowledge on tooth discoloration and 12 questions regarding participant's knowledge of tooth bleaching. All the questions had dichotomous options (yes/no).

The responses "yes" were scored as 1 (correct) and "no" as 0 (incorrect) for all knowledge related questions on tooth discoloration and tooth bleaching except for question numbers 1, 7, 9 and 12 of tooth bleaching in which the responses "no" were scored as 1 (correct) and "yes" were scored as 0 (incorrect).

If the mean score for knowledge related questions on tooth discoloration and tooth bleaching was ≥50% then knowledge was considered to be adequate and if the mean score was <50% then the knowledge was considered to be inadequate.[18]

RESULTS

The data were entered in Microsoft Excel version 2013 and were analyzed using SPSS-16. Descriptive statistics were presented in the form of frequency, percentage, mean and standard deviation. Chi-square test was used to find the association of knowledge related questions on tooth discoloration and bleaching with age group, gender, marital status and level of education. Level of significance was set at p-value <0.05.

A total of 326 study participants were included in the study of which majority 200 (61.3%) were female. The age of the study participants ranged from 18 to 81 years with mean age 34.26±14.62 years. Majority were of the age group 18-29 years (39.9%), level of education was intermediate level and below (99.4%) and married (62.6%) (Table 1).

Majority of the study participants 208 (63.8%) were satisfied with the color of their teeth and most of them 192 (58.9%) had not heard about tooth bleaching.

Table 1: Distribution of study participants according to sociodemographic variables (n=326)

Sociodemographic variables		n (%)
Gender	Male	126 (38.7)
	Female	200 (61.3)
Age (years)	18-29	130 (39.9)
	30-44	99 (30.4)
	45-59	54 (16.5)
	60-74	16 (4.9)
	≥75	27 (8.3)
Level of education	Intermediate level and below	324 (99.4)
	High school	2 (0.6)
Marital status	Married	204 (62.6)
	Unmarried	122 (37.4)
Total		**326 (100.0)**

Table 2: Knowledge of study participants about different etiologies of tooth discoloration (n=326)

n	Which of the following could cause tooth discoloration?	Yes n (%)	No n (%)
1.	Drugs during childhood	67 (20.6)	259 (79.4)
2.	Illness during childhood	78 (23.9)	248 (76.1)
3.	Aging	209 (64.1)	117 (35.9)
4.	Smoking	286 (87.7)	40 (12.3)
5.	Tea and coffee	226 (69.3)	100 (30.7)
6.	Trauma to the teeth	144 (44.2)	182 (55.8)
7.	Excessive fluoride in drinking water	130 (39.9)	196 (60.1)
8.	Hereditary causes	147 (45.1)	179 (54.9)
9.	Some antimicrobial mouthwashes	86 (26.4)	240 (73.6)
10.	Bacteria playing a role in teeth discoloration	175 (53.7)	151 (46.3)
11.	Endodontic materials	76 (23.3)	250 (76.7)

Table 3: Knowledge of study participants about the different aspects of bleaching (n=326)

n	Questions	Yes n (%)	No n (%)
1.	I should consult a dentist before starting any type of home bleaching.	293 (89.9)	33 (10.1)
2.	Bleaching can whiten both the teeth and old restorations.	140 (42.9)	186 (57.1)
3.	Smoking and drinking tea and coffee should be avoided after bleaching	194 (59.5)	132 (40.5)
4.	Bleaching will remove a thin layer from the tooth structure.	149 (45.7)	177 (54.3)
5.	The color achieved after bleaching will last forever.	60 (18.4)	266 (81.6)
6.	In case of relapse, the color of the teeth will be darker than the original	102 (31.3)	224 (68.7)
7.	Bleaching agents should not come in contact with the gingiva.	152 (46.6)	174 (53.4)
8.	All types of tooth discoloration could be treated by tooth bleaching.	105 (32.2)	221 (67.8)
9.	Excessive use of bleaching products could be harmful.	197 (60.4)	129 (39.6)
10.	Some remedies can be effective for tooth bleaching.	131 (40.2)	195 (59.8)
11.	Dental bleaching can improve the smell of the oral cavity.	107 (32.8)	219 (67.2)
12.	I should not rely on the information mentioned in advertisements on tooth bleaching.	125 (38.3)	201 (61.7)

Table 4: Dental bleaching side effects known by the study participants (n=326)

Side effects	Yes n (%)	No n (%)
Sensitivity	219 (67.2)	107 (32.8)
Gingival irritation	181 (55.5)	145 (44.5)
Effect on the teeth structure	145 (44.5)	181 (55.5)
Effect on restorative materials	105 (32.2)	221 (67.8)
No side effects	59 (18.1)	267 (81.9)

Table 5: Knowledge of study participants about discoloration and bleaching (n=326)

Knowledge	Adequate n (%)	Inadequate n (%)
Discoloration	136 (41.7)	190 (58.3)
Bleaching	145 (44.5)	181 (55.5)

Regarding the knowledge of study participant's about different etiologies of tooth discoloration. Majority of the participants didn't know that drugs during childhood (79.4%), childhood illness (76.1%), trauma to the teeth (55.8%), excessive fluoride in drinking water (60.1%), hereditary causes (54.9%), antimicrobial mouthwashes(73.6%), endodontic materials (76.7%) caused tooth discoloration. While majority of them knew that aging (64.1%), smoking (87.7%), tea and coffee (69.3%), bacteria (53.7%) caused tooth discolouration (Table 2).

Concerning the knowledge of study participants about the different aspects of bleaching. Majority of the participants knew that they should consult a dentist before starting any type of home bleaching (89.9%), smoking and

Table 6: Comparison of knowledge of study participants about different etiologies of tooth discoloration according to socio-demographic characteristics (n=326)

Variables		Adequate n (%)	Inadequate n (%)	p-value
Gender	Male	50 (39.7)	76 (60.3)	0.554
	Female	86 (43.0)	114 (57.0)	
Age group	18-29	51 (39.2)	79 (60.8)	0.355
	30-44	49 (49.5)	50 (50.5)	
	45-59	18 (33.3)	36 (66.7)	
	60-74	7 (43.8)	9 (56.2)	
	≥75	11 (40.7)	16 (59.3)	
Level of education	Intermediate level and below	135 (41.7)	189 (58.3)	>0.99
	High school	1 (50.0)	1 (50.0)	
Marital status	Married	87 (42.6)	117 (57.4)	0.660
	Unmarried	49 (40.2)	73 (59.8)	

*Chi-square test, p-value<0.05 statistically significant**

Table 7: Comparison of knowledge of study participants about the different aspects of bleaching according to socio-demographic characteristics (n=326)

Variables		Adequate n (%)	Inadequate n (%)	p-value
Gender	Male	57 (45.2)	69 (54.8)	0.827
	Female	88 (44.0)	112 (56.0)	
Age group	18-29	61 (46.9)	69 (53.1)	0.453
	30-44	43 (43.4)	56 (56.6)	
	45-59	24 (44.4)	30 (55.6)	
	60-74	9 (56.2)	7 (43.8)	
	≥75	8 (29.6)	19 (70.4)	
Level of education	Intermediate level and below	144 (44.4)	180 (55.6)	>0.99
	High school	1 (50.0)	1 (50.0)	
Marital status	Married	94 (46.1)	110 (53.9)	0.452
	Unmarried	51 (41.8)	71 (58.2)	

*Chi-square test, p-value<0.05 statistically significant**

drinking tea and coffee should be avoided after bleaching (59.5%), excessive use of bleaching products could be harmful (60.4%). While they disagreed that bleaching can whiten both the teeth and old restorations (57.1%), bleaching will remove a thin layer from the tooth structure (54.3%), the color achieved after bleaching will last forever (81.6%), in case of relapse the color of the teeth will be darker than the original (68.7%), all types of tooth discoloration could be treated by tooth bleaching (67.8%), dental bleaching could improve the smell of the oral cavity (67.2%), some remedies could be effective for tooth bleaching (59.8%). They didn't know that bleaching agents should not come in contact with the gingiva (53.4%), they should not rely on the information mentioned in advertisements on tooth bleaching (61.7%) (Table 3).

Majority of the study participants knew that bleaching caused sensitivity (67.2%) and gingival irritation (55.5%) whereas they didn't know that bleaching had an effect on the teeth structure (55.5%) and restorative materials (67.8%) and that it had side effects (81.9%) (Table 4).

Majority of the study participants (58.3%) had inadequate knowledge about tooth discoloration. Most of the study participants (55.5%) had inadequate knowledge about tooth bleaching.

There was no statistically significant association of different etiologies of tooth discoloration with gender (p-value 0.554), age group (p-value 0.355), level of education (p-value >0.99) and marital status (p-value 0.660) (Table 6).

There was no statistically significant association of different aspects of bleaching with gender (p-value 0.827), age group (p-value 0.453), level of education (p-value >0.99) and marital status (p-value 0.452) (Table 7).

DISCUSSION

An individual's appearance plays a key role in their social interactions; subsequently, the color of teeth is the most important determinant of patient satisfaction.[19] This study was done to evaluate the knowledge about tooth discoloration and tooth bleaching amongst adult patients visiting a dental hospital in Kathmandu, Nepal.

In our study, 63.8% of the participants were satisfied with the color of their teeth which was similar to certain studies done in Jorden 69.3% and UK 76% by Maghaireh *et al*[20] and Alkhatib *et al.*[21] Some previous studies done by Al-Zarea *et al*[22] 43.1%, Yu *et al*[23] 42.8%, Nomay[24] 32.0% had a lower percentage of satisfaction of tooth colour. This may be related to the fact that the perception of dental appearance may be affected by individual and cultural factors and can change in the same population over time.[22]

In our study majority of the participants 58.9% had not heard about tooth bleaching. This is in contrast to a study done by Nomay[24] where 75% had heard about bleaching.

In this study 69.3% knew that consuming tea and coffee caused tooth discoloration, this percentage was higher than in a study conducted by Mary *et al*[25] where only 56.3% knew about this fact. A total of 87.7% of the study participants knew that smoking caused tooth discoloration. This percentage was higher than in a study conducted by Mary *et al*[25] where 68.4% knew that smoking caused tooth discoloration. This shows that most of the participants were aware that smoking leads to teeth staining.

Majority of the study population didn't know that drugs during childhood, childhood illness, trauma to the teeth, excessive fluoride in drinking water, hereditary causes, antimicrobial mouthwashes, endodontic materials caused tooth discoloration. These results were similar to a study conducted by Allamasi *et al.*[17] This emphasizes the need to educate patients about the different aspects, medications and conditions that could affect the teeth during early childhood.

In our study, 89.95% of the study participants knew that they should consult a dentist before doing any bleaching procedure which was similar to a study conducted by a Mary *et al,*[25] where 80.3% knew about this fact. This percentage was higher than in a study done by Alamasi *et al*[17] where only 40.4% were aware. This maybe because the study participants preferred to consult the dentist rather than try home techniques.

In our study, majority of the study participants thought that they should rely on the information mentioned in advertisements on tooth bleaching which was similar to studies of Ahmad *et al*[26] and Theobald *et al*[27] where advertisements on electronic media were the main sources of knowledge about bleaching.

A majority of 67.2% of our study participants knew that bleaching caused tooth sensitivity. The result was similar to a study conducted by Jaha *et al*[28] where 64.0% knew about this adverse effect. People need to understand these adverse effects well in advance to prepare themselves, thus minimizing the complaints about treatments done by dentists.[28] Tooth sensitivity is one of the most common side effects of tooth bleaching procedure due to the action of oxygen free radicals resulting from the decomposition of the carbamide peroxide.[15]

Of the total, 55.5% knew that gingival irritation was a side effect. This percentage was higher than a study done by Alamasi *et al*[17] where only 27.9% were aware.

The socio-demographic factors like age and gender did not have a significant association with the participant's knowledge on bleaching. This was similar to a finding achieved by Laksmi *et al.*[16] In this study, it is seen that females and young individuals are not critical and concerned about dental aesthetics. But this is contrary to findings reported by Nomay.[24] There was no significant association between level of education and bleaching which is similar to the results achieved by Alamasi *et al.*[17] Where as Akarslan *et al*[29] found that higher educational level had a positive association towards bleaching.

In conclusion, the results of our study showed that majority of the participants were satisfied with the colour of their teeth and had not heard about tooth bleaching. They also knew that drinking tea, coffee and smoking caused tooth discoloration. But they didn't know that drugs during childhood, childhood illness, trauma to the teeth, excessive fluoride in drinking water, hereditary causes, antimicrobial mouthwashes, endodontic materials also caused tooth discoloration. They also knew that they should consult a dentist before doing a bleaching procedure and it causes sensitivity and gingival irritation. They relied on information from advertisement. The participants had an inadequate knowledge of tooth discoloration and bleaching. The socio-demographic factors like age, gender, level of education and marital status did not have a significant association with the participant's knowledge on etiology of tooth discoloration and bleaching.

AKNOWLEDGEMENTS

We would like to acknowledge Dr. Anju Khapung for helping with the statistical analysis and all the patients who were willing to take participate in the study.

Conflict of interest: None

Source of research fund: None

REFERENCES

1. Alshara S, Lippert F, Eckert G *et al*. Effectiveness and mode of action of whitening dentifrices on enamel extrinsic stains. *Clin Oral Investig* 2014; 18: 563-9.
2. Alshamrani A, Wahid A. General public perceptions and knowledge on tooth bleaching in Riyadh, KSA. *Egyp J Hos Med* 2018; 71: 2727-37.
3. Alotaibi G, Almutairi MS, Alshammari MZ, Aljafar M, Almaraikhi TF. Prevalence and public knowledge regarding tooth bleaching in Saudi

Arabia. *J Family Med Prim Care* 2020; 9: 3729-32.

4. Diklic D, Sever EK, Galic N, Spajic J, Prskalo K. Attitudes of students of different schools of University of Zagreb on tooth bleaching. *Acta Stomatol Croat* 2016; 50: 301-9.
5. Sulieman M. An overview of tooth discoloration: extrinsic, intrinsic and internalized stains. *Dent Update* 2005; 32: 463-71.
6. Manuel ST, Abhishek P, Kundabala M. Etiology of tooth discoloration- a review. *Nigeria Dent J* 2010; 18: 56-63.
7. Carey CM. Tooth whitening: What we now know. *J Evid Based Dent Pract* 2014; 14: 70-6.
8. Norton SA. Betel: consumption and consequences. *J Am Acad Dermatol* 1998; 38: 81-8.
9. Haywood VB, Robinson FG. Vital tooth bleaching with night guard vital bleaching. *Curr Opin Cosmet Dent* 1997; 4: 45– 52.
10. Sanchez AR, Rogers RS, Sheridan PJ. Tetracycline and other tetracycline-derivative staining of the teeth and oral cavity. *Int J Dermatol* 2004; 43: 709-15.
11. Burt BA. The changing patterns of systemic fluoride intake. *J Dent Res* 1992; 71: 1228-37.
12. Cheung GS, Lai SC, Ng RP. Fate of vital pulps beneath a metal ceramic crown or a bridge retainer. *Int Endo J* 2005; 38: 521–30.
13. Hatherell S, Lynch CD, Burke FM, Ericson D, Gilmour AS. Attitudes of final-year dental students to bleaching of vital and non-vital teeth. *J Oral Rehab* 2011; 38: 263-9.
14. Pretty IA, Brunton P, Aminian A, Davies RM, Ellwood RP. Vital tooth bleaching in dental practice: biological, dental and legal issues. *Dent Update* 2006; 33: 422–32.
15. Moldovan AM, Popescu V, Ionescu CV *et al*. Various aspects involved in the study of tooth bleaching procedure: A questionnaire–Based study. *Int J Environ Res Public Health* 2022; 19: 3977-91.
16. Lakshmi LG. Evaluation of knowledge of tooth bleaching among patients - a questionnaire based study. *Int J Res Social Sci* 2017; 7: 616-29.
17. Alamassi BY, AbuMostafa A, Alkhaldi SA, Aljeri NK, Alahmadi YM. Perception and knowledge of adult Saudi patients about tooth discoloration and vital bleaching. *Int J Dent Health Sci* 2017; 4: 476-89.
18. Khapung A, Pandey N, Gupta S. Knowledge and preparedness for medical emergencies in dental settings among the dental interns. *J Nepal Dent Assoc* 2022; 22: 25-32.
19. Tin-oo MM, Saadki N, Hassan N. Factor influencing patient satisfaction with dental appearance and treatments they desire to improve aesthetics. *BMC Oral Health* 2011; 11: 1-8.
20. Maghaireh GA, Alzraikat H, Taha NA. Satisfaction with dental appearance and attitude toward improving dental esthetics among patients attending a dental teaching center. *J Contemp Dent Pract* 2016; 1: 16-21.
21. Alkhatib MN, Holt R, Bedi R. Age and perception of dental appearance and tooth colour. *Gerodontol* 2005; 1: 32-6.
22. Al-Zarea BK. Satisfaction with appearance and the desired treatment to improve aesthetics. *Int J Dent* 2013; 2013: 1-7.
23. Yu H, Cheng SL, Zhou JY, Cheng H. A survey on general knowledge and influencing factors of dental aesthetics among three universities students in Fuzhou city. *Shanghai J Stomatol* 2017; 26: 510-15.
24. Nomay N. Public attitude and awareness towards their teeth color and dental bleaching in Saudi Arabia: A cross-sectional survey. *J Pub Health Epidemol* 2016; 8: 45-52.
25. Vinita Mary A, Kesavan R, Bhavani M, Blessy Melba D, Deepiha D, Monisha Shrinidhi S. Awareness about teeth whitening among young adults in south Indian population. *Int J Advan Res Ideas Innov Tech* 2020; 6: 20-4.
26. Ahmad R, Ariffin EHM, Vengrasalam I, Kasim NHA. Patient's perceptions and knowledge on tooth bleaching. *Annal Dent Univ Malaya* 2005; 12: 24–30.
27. Theobald AH, Wong BK, Quick AN, Thomson MW. The impact of the popular media on cosmetic dentistry. *NZ Dent J* 2006; 102: 58–63.
28. Jaha HS, Alhejoury HA, Fayad AA *et al*. Knowledge, practices and perceptions about tooth whitening among female population in Saudi Arabia – A crosssectional study. *J Pharm Bio Sci* 2021; 13: 817-20.
29. Akarslan ZZ, Sadik B, Erten H, Karabulut E. Dental esthetic satisfaction, received and desired dental treatments for improvement of esthetics. *Indian J Dent Res* 2009; 2: 195-200.