

Research



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Perception about tooth colour and appearance among patients seen in a tertiary hospital, South-West, Nigeria

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Abstract

Introduction: patients' satisfaction with their dental appearance and tooth colour is often influenced by certain factors which need to be addressed periodically among different populations. **Methods:** a self-administered questionnaire consisting of sociodemographic data, questions on patients' satisfaction with tooth colour, perceived malalignment of teeth, non-aesthetic anterior tooth-coloured restoration and presence of tooth fracture were distributed. Data collected was analysed using Statistical Package for Social Sciences (IBM, SPSS version 20). Chi square was used to test the statistical differences at a significance of $p > 0.05$. **Results:** a total of 410 patients (M=147, F=263) participated in the study. About 73% had tertiary education while 36.3% were within the modified ISCO-08 Group 2. The respondents that were satisfied with the general dental appearance and tooth shade were 66.3% and 63.5% respectively. More males (65.1%) than females (62.7%) were satisfied with tooth colour while more females (69.1%) were satisfied with dental appearance. The older age group were more satisfied with dental appearance and tooth colour. Awareness of tooth whitening (Over 80%) and the desire to undergo tooth whitening was more among the post-secondary individuals. More of dental patients (73.1%) than medical (59.2%) were satisfied with teeth appearance ($p=0.003$). **Conclusion:** patients are increasingly aware of their dental appearance/tooth colour and the need to improve it with tooth bleaching and/or orthodontic treatment. Female were more dissatisfied with their tooth colour but more satisfied with their dental appearance than the male. Older people were more satisfied with their dental appearance and tooth colour compared to younger age group.

Introduction

Aesthetics is an important aspect of modern society because it defines one's personality. Individuals with positive attitude towards their teeth (colour and shape), and smile may show confidence and be

extroverts while individuals with discoloured, missing or fractured teeth may on the other hand be withdrawn because of their teeth appearance. Recently in dental treatment, increasing emphasis is being laid on aesthetics [1] with the ultimate objective of creating a beautiful smile. This is to provide teeth of pleasing inherent proportions to one another, and a pleasing tooth arrangement in harmony with the gingiva, lips and face of the patient. Dental appearance being an important determinant in attractiveness of the face plays a key role in human social interactions; and among significant factors affecting the dental appearance are tooth colour, shape, quality of restoration, position and general arrangement of the teeth especially in the anterior region [2]. Natural tooth colour ranges from greyish white to yellowish white, however, a lot of people desire brighter white teeth, which shows that tooth colour is a very important factor determining patients' satisfaction with dental appearance [2,3]. Also, the outward appearance and colour of teeth, both natural and artificial may be determined by the face and lips. Studies amongst adult population in UK, [2] USA, [4] and China [5] reported varying percentages of people's dissatisfaction with their colour and appearance which ranged from 28% to 52.6%, however, a study [6] conducted in Nigeria showed that 79.4% of the studied population was satisfied with their dental appearance. Though various groups of patients have different attitudes towards the appearance of their teeth, studies [7,8] have found out that females care more about their dental appearance than males making males to be more satisfied with their teeth appearance than females.

The arrangement of teeth, shape and form, untreated dental caries and non-aesthetic or discoloured anterior teeth restorations as well as missing anterior teeth lead to dissatisfaction with dental appearance. [3,9] Though tooth misalignments are not regarded as serious enough dental problem to necessitate treatment by some people, [10,11] others show high need for rearrangement of their teeth to boost their appearance [12]. Similarly, different treatments

being sought to improve dental aesthetic such as bleaching/tooth whitening, aesthetic restoration in anterior teeth have been found to increase patient quality of life and psychological status [13,14]. When a patient's smile is destroyed by dental diseases which include tooth fracture, discoloration, malalignments, caries etc., the result often is loss of self-esteem and possibly damage to his or her overall physical and mental health. It is thus paramount to assess in any population the view or perception of individuals about their dental appearance in order to improve and/or restore their lost self-esteem and improve their quality of life. The assessments of patients' satisfaction with their dental appearance, and teeth colour as well as the determination of the factors that influence these variables were the objectives of this study.

Methods

This was a questionnaire-based cross-sectional study, which made use of the modified version of the questionnaires used by Tin OO *et al.* [1] and Poonam [8]. The self-administered questionnaire consisted of questions on sociodemographic, including gender, age, and level of education, as well as question on patients' satisfaction with current general dental appearance including satisfaction with tooth colour, perceived malalignment of teeth (crowding, poorly aligned or protruding), presence of caries in anterior teeth, non-aesthetic anterior tooth-coloured restoration and presence of tooth fracture. Study participants included all patients attending 2 outpatient clinics at the University College Hospital Ibadan; the General Out Patient clinic (GOPD) and Dental Centre (a first point of call and sorting out clinic for patients presenting for the first time with non-emergency medical ailments/diseases and the first point of call for all dental cases presenting in the University College Hospital respectively). All completed questionnaires were retrieved from the two clinics. Grossly inadequately filled questionnaires were excluded. A modified socioeconomic class grouping based on International Standard Classification of Occupation

2008 (ISCO-08) [15] was used for occupational stratification. The modified socioeconomic class categorization consisted of 4 groups: group I - chief executives, managers, professionals and high-profile businessmen. Group II - technicians (pharmacy, engineering, and medical) Information Communication Technologists, clerks, secretaries and skilled agricultural workers. Group III - cooks, waiters, all artisans, casual workers and traders. Group IV - unemployed graduates, dependents and housewives.

Ethical approval was obtained from the University of Ibadan/University College Hospital Institutional Review Board (UI/UCH IRB) with approval number: UIUCH/EC0155. The data collected was analysed using Statistical Package for Social Sciences (IBM, SPSS version 20). Descriptive statistics was employed and chi square used to test the statistical differences of some responses at a significance of $p=0.05$.

Results

Four hundred and ten patients participated in the study (M=147, F=263) with a mean age of 36.8 ± 14.03 years. Although there were more females than males generally, the M: F among the dental patients was 1: 2.5 compared to 1: 1.3 among the medical patients. The highest proportion (73%) had tertiary education while most of the participants (36.3%) were within the modified ISCO-08 Group 2 which comprised of Technicians, Clerks, Secretaries, Skilled Agricultural workers (Table 1). The findings as shown in Figure 1 revealed that not all the 410 patients in this survey responded to all the questions probing their satisfaction with dental appearance and colour. About 66.3% of those that responded (404) were satisfied with the general dental appearance and almost equal proportion 63.5% of 406 were satisfied with tooth shade. When asked about the teeth arrangement, 26.7%, 17.1% and 14.7% respectively felt that their teeth were crowded, poorly set and had anterior teeth proclination. Relating the gender to the different variables studied as presented in Table 2, more males than

females were satisfied with tooth colour (65.1% versus 62.7%), felt teeth were crowded (19.6% versus 15.7%), poorly set (28.3% versus 15.7%), protruding/bulging in the anterior region (16.4% versus 13.8%); had holes (26.7% versus 16.2%, $p=0.01$); had fractured or missing anterior teeth. However, more females were satisfied with dental appearance (69.1% versus 61.4%) and knew discoloured teeth could be whitened (82.5% versus 79.0). Nevertheless more males had desires to undergo either restorative orthodontic or aesthetic treatment. The wish to have fractured anterior teeth restored was the most common desired among the patients ($M=67.4\%$, $F=68.0\%$).

It seems the older the age, the greater is the satisfaction with either the dental appearance or tooth colour. The feeling of having protruded anterior teeth was seen more among the youngest age group studied (< 20) compared to other age groups, this was found to be statistically significant ($p=0.005$). The desire to undergo orthodontic treatment was equally high among the very young and the very old. However, the knowledge of tooth whitening was highest among the youngest age group (Table 3). The association between different educational levels and satisfaction with dental appearance, tooth colour, feeling of presence of crowded teeth as well as presence of missing anterior teeth were all statistically significant ($p=0.013$, 0.001 , 0.000 , 0.031 respectively) with greater tendency to have satisfaction with dental appearance and colour seen among the primary and secondary school holders respectively while feeling of crowded teeth and presence of missing anterior teeth were more in those with post-secondary. The least percentage of missing anterior teeth was seen in people with tertiary education. Over 80% of those with post-secondary/tertiary education knew discoloured teeth could be whitened, however, the desire to undergo orthodontic treatment, tooth whitening and crowning was more among the post-secondary individuals than the others (Table 4). Satisfaction with dental appearance and tooth colour was more prevalent among the occupational group 3, so also was the desire to undergo tooth whitening, dental

crowning, tooth colour fillings ($p=0.02$) and replacement of missing teeth. Comparing dental appearance with tooth colour satisfaction level of dental and medical patients, there were significant differences only with the general dental appearance ($p=0.003$), the feeling of having poorly set teeth, (0.000), and feeling of having bulging or protruding teeth ($p=0.001$) between these two groups of patients. More of dental patients (73.1%) than medical (59.2%) were satisfied with teeth appearance whereas more of medical than dental felt they had poorly set teeth (Medical= 35.6%, Dental=18.6%), protruding front teeth (Medical=20.5% Dental =9.3%). Fractured front teeth (Medical=22.3%, Dental 12.3%) (Table 5). The wish to undergo orthodontic treatment crowning of teeth and missing tooth replacement was greater among the medical patients and these associations were statistically significant ($p=0.018$, 0.009 , 0.000 respectively). The perception of fractured front teeth was also significantly more among the medical patients ($p=0.005$) (Table 6).

Discussion

Dental aesthetics has increasingly become a concern among patients and clinicians. This is because physical appearance plays a key role in social interaction and the smile and teeth are important features in determining facial attractiveness [16]. Evaluating the level of satisfaction with dental appearance and tooth shade by the patients though subjective, may give an idea of how much individuals place on their dental aesthetics. The present study revealed that the level of satisfaction with dental appearance and aesthetics among the participants was 66.3%. This finding is similar to what was recorded by Qualtruogh *et al.* [2] (62.7%) but higher than the observation of Tin-Oo *et al.* [1] (47.2%), Akarslan *et al.* [9] (57.3%) and Strajnic *et al.* [17] (58.1%). However Azodo *et al.* [6] in Nigeria reported 79.4% and Meng *et al.* [18] in Florida and Alkhatib *et al.* [19] in the UK found it to be 76% and 75% respectively. In Nigeria, many people tend to be satisfied with their teeth appearance, possibly due

to financial incapability or unaffordability of aesthetic dental treatment. On the other hand, people in developed countries like USA and UK with stable economy could afford orthodontic treatment and other aesthetic procedures early enough to correct any teeth derangement and discolouration, and therefore will more likely be satisfied with their dental appearance at a later age. Furthermore, this disparity in satisfaction in different population may also be possibly related to the fact that the perception of dental appearance may be influenced by cultural factors and can even be changed within the same population over time [20]. The dissatisfaction with tooth shade in this study was found to be 36.5% which is closely related to 34% seen in adults in the USA [4] and 31.6% seen in North America [21]. The main reason for dissatisfaction with dental appearances among participants in some studies [1,3,22] was tooth colour dissatisfaction. This factor in addition to improved awareness of tooth bleaching may have contributed to increasing prevalence of the population seeking tooth whitening. Our finding of higher prevalence of dissatisfaction with tooth colour among females than male is in agreement with previous studies [1,9,17]. Though in contrast, the satisfaction with dental appearance was higher in females than in males. This latter finding is in agreement with previous authors [3] but in disparity with most studies where females were found to be less satisfied with dental appearance [1,7,17]. No significant difference was found in some studies [5,9,20]. However, psychological research on general body satisfaction has found females to be more sensitive regarding their own appearance than males [23].

It could be deduced that the higher dissatisfaction with dental appearance among males could be due to tooth arrangement problems as more males than females, felt that their front teeth were crowded, poorly set or bulging consequently, they were more willing to undergo orthodontic, restorative or any aesthetic treatment. This is not unexpected since malocclusion could also determine dental appearance. Teeth arrangement is a factor correlated to a harmonious smile and

attractiveness [24] and divers types of malocclusion could produce dissatisfaction with dental appearance [25]. The findings from this study is in agreement with some previous studies [19,18] which reported that the older patients were more satisfied with their dental appearance or tooth colour. This is probably due to the fact that older people may care less about their appearance, placing priority or emphasis on other issues of life which they might count to be of more importance. Meng *et al.* [18] found that 75% of older respondents were satisfied with appearance and colour. Therefore, age had an impact on dissatisfaction with dental aesthetics, with younger age groups being more dissatisfied, probably as a result of cognitive factors other than social and cultural ones [19]. This may also be caused by media influences, since the young adults are more vulnerable to the effects of the media than older generations [16]. The greater tendency to have satisfaction with both dental appearance and tooth colour seen among the primary and secondary school holders could be due to the low level of exposure. This finding is however not in agreement with the previous studies [5,9] where patients with high level of education were found to be more satisfied with the colour of their teeth, though study by Tin OO *et al.* [1] did not observe any impact of education on satisfaction with tooth colour or dental appearance. As expected, those with tertiary education had the least number of missing anterior teeth. Spaces created by missing anterior teeth could be so unsightly that this should be a major concern to people irrespective of level of education. Nevertheless, individual's perception of what contributes to facial attractiveness differs. Furthermore, patients with post-secondary education had the greatest desire to undergo orthodontic treatment, tooth whitening and crowning possibly because of the greater perception of crowded teeth, poorly set teeth, carious anterior teeth, fractured and missing anterior teeth. This felt need may motivate them to willingly undergo the dental treatment if they have the economic power.

This study also evaluated the correlation between occupation and the parameters studied which may not have been previously recorded. It was found that 59.2% of the executives and high-profile professionals and business tycoons were satisfied with their teeth appearance as compared to 72.7% in Group 3. One reason for this may be the caliber of people or the company of peoples those in Group 1 are likely to be relating with. Though the occupational group 4 had many features of unacceptable occlusion the desire to undergo orthodontic treatment was very low (38.5%) among them and this may not be unconnected to their possible low economic status. Findings in this study also show that there were significant difference in the satisfaction of dental and medical patients as more of dental patients than medical patients were satisfied with teeth appearance. More of medical patients felt they had poorly set and protruding front teeth. These observations pointed to the fact that the dental health of the dental patients appeared to be better than that of those patients that were attending the hospital for medical reasons. This is probably because the dental patients are more aware and possibly have started receiving aesthetic dental treatments that have improved their dental appearance to certain extent.

Conclusion

Within the limitations of this study, it could be concluded that: patients are increasingly aware of their dental appearance/tooth colour and the need to improve it with tooth bleaching and/or orthodontic treatment; female are more dissatisfied with their tooth colour but more satisfied with their dental appearance than the male; older people are more satisfied with their dental appearance and tooth colour compared to the younger age group.

What is known about this topic

- *Studies have shown that males are more satisfied with their tooth colour and appearance whereas females are more conscious and difficult to satisfy;*

- *Dental treatments that improve anterior teeth aesthetics have been found to improve the quality of life and psychosocial well-being of people.*

What this study adds

- *Satisfaction with dental appearance is better in patients that are aware and seek dental treatment than those that are not;*
- *In this study, medical patient showed a greater desire to have dental treatment that will improve aesthetic such as restoration and orthodontic treatment. Thus, this shows the need for more dental education and information in our environment.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Deborah Mojirade Ajayi and Shakeerah Olaide Gbadebo both conceptualized the idea, were involved in data collection, data analysis and interpretation, manuscript writing, review, final drafting and approval of version to be published. Gbenga Emmanuel Adebayo assisted in data collection, analysis and write up. All the authors have read and approved the final version of this manuscript.

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Figure 1: patients' satisfaction with dental appearance and colour

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Table 1: sociodemographic characteristics of the patients

| | Total (N=410) | | Dental (N=212) | | Medical (N=198) | |
|----------------------------|---------------|------|----------------|------|-----------------|------|
| | N | % | N | % | N | % |
| Gender | | | | | | |
| Male | 147 | 35.9 | 60 | 28.3 | 87 | 43.9 |
| Female | 263 | 64.1 | 152 | 71.7 | 111 | 56.1 |
| Age Group | | | | | | |
| ≤ 20 | 48 | 11.7 | 22 | 10.4 | 26 | 13.1 |
| 21-40 | 208 | 50.7 | 112 | 52.8 | 96 | 48.5 |
| 41-60 | 121 | 29.5 | 69 | 32.5 | 52 | 26.3 |
| ≥ 61 | 21 | 5.1 | 5 | 2.4 | 16 | 8.1 |
| No response | 12 | 2.9 | 4 | 1.9 | 8 | 4.0 |
| Educational status | | | | | | |
| Primary | 32 | 7.8 | 22 | 10.4 | 10 | 5.1 |
| Secondary | 50 | 12.2 | 30 | 14.2 | 20 | 10.1 |
| Post-Secondary | 24 | 5.9 | 14 | 6.6 | 10 | 5.1 |
| Tertiary | 292 | 73.4 | 140 | 66.0 | 152 | 76.8 |
| No response | 12 | 2.9 | 6 | 2.8 | 6 | 3.0 |
| Occupational Status | | | | | | |
| Group 1 modified ISCO-08 | 49 | 12 | 16 | 7.5 | 33 | 16.7 |
| Group 2 modified ISCO-08 | 149 | 36.3 | 84 | 39.6 | 65 | 32.8 |
| Group 3 modified ISCO-08 | 80 | 19.5 | 54 | 25.5 | 26 | 13.1 |
| Group 4 modified ISCO-08 | 129 | 31.5 | 56 | 26.4 | 73 | 36.9 |
| Missing | 3 | 0.7 | 2 | 0.9 | 1 | 0.5 |
| Religion | | | | | | |
| Christianity | 323 | 78.8 | 153 | 72.2 | 170 | 85.9 |
| Islam | 82 | 20.0 | 56 | 26.4 | 26 | 13.1 |
| Others | 5 | 1.2 | 3 | 1.4 | 2 | 1.0 |
| Tribe | | | | | | |
| Yoruba | 314 | 76.6 | 159 | 75.0 | 155 | 78.3 |
| Igbo | 68 | 16.6 | 34 | 16.0 | 34 | 17.2 |
| Hausa | 4 | 1.0 | 4 | 1.9 | 0 | 0 |
| Nigerian/others | 4 | 1.0 | 1 | 0.5 | 3 | 1.5 |
| Missing | 20 | 4.9 | 14 | 6.6 | 6 | 3.0 |
| Marital Status | | | | | | |
| Single | 181 | 44.1 | 83 | 39.2 | 98 | 49.5 |
| Married | 209 | 51.0 | 120 | 56.6 | 89 | 44.9 |
| Separated | 4 | 1.0 | 1 | 0.5 | 3 | 1.5 |
| Divorced | 1 | 0.2 | 6 | 2.8 | 1 | 0.5 |
| Widowed | 10 | 2.4 | 2 | 0.9 | 4 | 2.0 |
| Missing | 5 | 1.2 | - | - | 3 | 1.5 |

Table 2: dental appearance and Tooth colour among gender

| Variable | Gender | | | | | X2 | P Value |
|---|--------|-----|--------|-----|------|-------|---------|
| | Male | | Female | | | | |
| | n | % | n | % | | | |
| Satisfied with teeth appearance | YES | 89 | 61.4 | 179 | 69.1 | 2.489 | 0.115 |
| | NO | 56 | 38.6 | 80 | 30.9 | | |
| Satisfied with tooth colour | YES | 95 | 65.1 | 163 | 62.7 | 0.228 | 0.633 |
| | NO | 51 | 34.9 | 97 | 37.3 | | |
| Felt teeth were crowded | YES | 27 | 19.6 | 40 | 15.7 | 0.953 | 0.329 |
| | NO | 111 | 80.4 | 215 | 84.3 | | |
| Felt teeth were poorly set | YES | 41 | 28.3 | 67 | 25.9 | 0.275 | 0.600 |
| | NO | 104 | 71.7 | 192 | 74.1 | | |
| Felt front teeth were protruding /bulging | YES | 23 | 16.4 | 35 | 13.8 | 0.505 | 0.478 |
| | NO | 117 | 83.6 | 219 | 86.2 | | |
| Felt dental caries/holes in teeth | YES | 39 | 26.7 | 42 | 16.2 | 6.527 | 0.011 |
| | NO | 107 | 73.3 | 218 | 83.8 | | |
| Had non aesthetic restoration in the anterior teeth | YES | 11 | 7.60 | 16 | 5.8 | 0.294 | 0.588 |
| | NO | 133 | 92.4 | 241 | 94.2 | | |
| Perceived fractured front teeth | YES | 32 | 21.9 | 38 | 14.5 | 3.626 | 0.057 |
| | NO | 114 | 78.1 | 224 | 85.5 | | |
| Had missing front teeth | YES | 18 | 12.3 | 22 | 8.4 | 1.607 | 0.205 |
| | NO | 128 | 87.7 | 239 | 91.6 | | |
| Wish to restore back fractured teeth | YES | 95 | 67.4 | 170 | 68.0 | 0.016 | 0.899 |
| | NO | 46 | 32.6 | 80 | 32.0 | | |
| Do you know discoloured teeth can be whitened | YES | 113 | 79.0 | 207 | 82.5 | 0.710 | 0.399 |
| | NO | 30 | 21.0 | 44 | 17.5 | | |
| Wish to undergo orthodontic treatment | YES | 60 | 46.2 | 83 | 35.6 | 3.876 | 0.049 |
| | NO | 70 | 53.8 | 150 | 64.4 | | |
| Wish to undergo tooth whitening treatment | YES | 89 | 63.1 | 142 | 57.5 | 1.181 | 0.277 |
| | NO | 52 | 36.9 | 105 | 42.5 | | |
| Wish to have dental crown if needed | YES | 43 | 32.6 | 63 | 28.1 | 0.787 | 0.375 |
| | NO | 89 | 67.4 | 161 | 71.9 | | |
| Wish to have tooth colour fillings | YES | 51 | 37.5 | 75 | 32.1 | 1.137 | 0.286 |
| | NO | 85 | 62.5 | 159 | 67.9 | | |
| Wish to have missing teeth replaced | YES | 46 | 33.8 | 65 | 27.8 | 1.497 | 0.221 |
| | NO | 90 | 66.2 | 169 | 72.2 | | |

Table 3: dental appearance, tooth colour and desired aesthetic treatment among age groups

| Variable | Age Group | | | | | | | | | χ ² | P Value |
|---|-----------|---------|------|------------|------|------------|------|---------|-------|----------------|---------|
| | | ≤ 20YRS | | 21 - 40YRS | | 41 - 60YRS | | ≥ 61YRS | | | |
| | | n | % | n | % | n | % | n | % | | |
| Satisfied with teeth appearance | YES | 24 | 51.1 | 144 | 69.9 | 79 | 66.4 | 16 | 80.0 | 7.742 | 0.052 |
| | NO | 23 | 48.9 | 62 | 30.1 | 40 | 33.6 | 4 | 20.0 | | |
| Satisfied with tooth colour | YES | 27 | 56.2 | 135 | 65.5 | 76 | 63.9 | 15 | 71.4 | 1.963 | 0.580 |
| | NO | 21 | 43.8 | 71 | 34.5 | 43 | 36.1 | 6 | 28.6 | | |
| Felt teeth were crowded | YES | 12 | 25.5 | 32 | 15.9 | 16 | 13.9 | 6 | 33.3 | 6.643 | 0.84 |
| | NO | 35 | 74.5 | 169 | 84.1 | 99 | 86.1 | 12 | 66.7 | | |
| Felt teeth were poorly set | YES | 15 | 31.9 | 57 | 27.8 | 24 | 20.0 | 7 | 35.0 | 4.245 | 0.236 |
| | NO | 32 | 68.1 | 148 | 72.2 | 96 | 80.0 | 13 | 65.0 | | |
| Felt front teeth were protruding/ bulging | YES | 14 | 29.2 | 24 | 12.1 | 17 | 14.8 | 0 | 00.0 | 12.755 | 0.005 |
| | NO | 34 | 70.8 | 175 | 87.9 | 98 | 85.2 | 20 | 100.0 | | |
| Felt dental caries/holes in teeth | YES | 4 | 8.30 | 43 | 21.0 | 25 | 20.8 | 7 | 33.3 | 6.578 | 0.087 |
| | NO | 44 | 91.7 | 162 | 79.0 | 95 | 79.2 | 14 | 66.7 | | |
| Had non aesthetic restoration in the anterior teeth | YES | 4 | 8.30 | 12 | 5.90 | 8 | 6.90 | 2 | 9.5 | 0.699 | 0.873 |
| | NO | 44 | 91.7 | 192 | 94.1 | 108 | 93.1 | 19 | 90.5 | | |
| Perceived fractured front teeth | YES | 7 | 14.6 | 33 | 16.0 | 22 | 18.2 | 7 | 33.3 | 4.294 | 0.231 |
| | NO | 41 | 85.4 | 173 | 84.0 | 99 | 81.8 | 14 | 66.7 | | |
| Had missing front teeth | YES | 4 | 8.5 | 20 | 9.70 | 12 | 10.0 | 3 | 15.8 | 0.570 | 0.903 |
| | NO | 43 | 91.5 | 187 | 90.3 | 108 | 90.0 | 18 | 84.2 | | |
| Wish to restore back fractured teeth | YES | 32 | 68.1 | 134 | 67.3 | 75 | 65.8 | 15 | 78.9 | 1.297 | 0.730 |
| | NO | 15 | 31.9 | 65 | 32.7 | 39 | 32.2 | 4 | 21.1 | | |
| Do you know discoloured teeth can be whitened | YES | 42 | 91.3 | 164 | 81.2 | 89 | 76.7 | 16 | 84.2 | 4.712 | 0.194 |
| | NO | 4 | 8.70 | 38 | 18.8 | 27 | 23.3 | 3 | 15.8 | | |
| Wish to undergo orthodontic treatment | YES | 19 | 44.2 | 74 | 39.4 | 36 | 35.3 | 8 | 44.4 | 1.309 | 0.727 |
| | NO | 24 | 55.8 | 114 | 60.6 | 66 | 64.7 | 10 | 55.6 | | |
| Wish to undergo tooth whitening treatment | YES | 27 | 58.7 | 119 | 60.1 | 65 | 57.5 | 11 | 57.9 | 0.212 | 0.976 |
| | NO | 19 | 41.3 | 79 | 39.9 | 48 | 42.5 | 8 | 42.1 | | |
| Wish to have dental crown if needed | YES | 11 | 26.2 | 62 | 34.6 | 26 | 24.8 | 4 | 22.2 | 4.017 | 0.260 |
| | NO | 31 | 73.8 | 117 | 65.4 | 79 | 75.2 | 14 | 77.8 | | |
| Wish to have tooth colour fillings | YES | 10 | 23.3 | 61 | 32.4 | 40 | 37.0 | 9 | 47.4 | 4.365 | 0.225 |
| | NO | 33 | 76.7 | 127 | 67.6 | 68 | 63.0 | 10 | 52.6 | | |
| Wish to have missing teeth replaced | YES | 11 | 25.6 | 58 | 30.7 | 31 | 28.7 | 9 | 50.0 | 3.891 | 0.274 |
| | NO | 32 | 74.4 | 131 | 69.3 | 77 | 71.3 | 9 | 50.0 | | |

Table 4: self-reported dental appearance, teeth colour satisfaction and desired aesthetic among different educational level

| Variable | Educational level | | | | | | | | | X2 | P Value |
|---|-------------------|---------|------|-----------|------|----------------|------|----------|------|--------|---------|
| | | Primary | | Secondary | | Post-Secondary | | Tertiary | | | |
| | | n | % | n | % | n | % | n | % | | |
| Satisfied with teeth appearance | YES | 24 | 77.4 | 35 | 74.5 | 9 | 39.1 | 192 | 66.0 | 10.735 | 0.013* |
| | NO | 7 | 22.6 | 12 | 25.5 | 14 | 60.9 | 99 | 34.0 | | |
| Satisfied with tooth colour | YES | 26 | 74.3 | 40 | 80.0 | 10 | 41.7 | 174 | 60.4 | 16.331 | 0.001* |
| | NO | 6 | 25.5 | 10 | 20.0 | 14 | 58.3 | 114 | 39.6 | | |
| Felt teeth were crowded | YES | 9 | 30.0 | 12 | 26.1 | 8 | 40.0 | 35 | 12.2 | 18.711 | 0.000* |
| | NO | 21 | 70.0 | 34 | 73.9 | 12 | 60.0 | 252 | 87.8 | | |
| Felt teeth were poorly set | YES | 9 | 28.1 | 16 | 32.7 | 9 | 39.1 | 72 | 25.0 | 3.113 | 0.374 |
| | NO | 23 | 71.9 | 33 | 67.3 | 14 | 60.9 | 216 | 75.0 | | |
| Felt front teeth were protruding bulging | YES | 7 | 21.9 | 8 | 17.8 | 4 | 18.2 | 38 | 13.4 | 2.228 | 0.526 |
| | NO | 25 | 78.1 | 37 | 82.2 | 18 | 81.8 | 246 | 86.6 | | |
| Felt dental caries/holes in teeth | YES | 6 | 18.8 | 5 | 10.2 | 6 | 26.1 | 61 | 21.0 | 3.715 | 0.2943 |
| | NO | 26 | 81.2 | 44 | 89.8 | 17 | 73.9 | 229 | 79.0 | | |
| Had non aesthetic restoration in the teeth | YES | 3 | 9.40 | 1 | 2.10 | 4 | 17.4 | 18 | 6.20 | 6.345 | 0.96 |
| | NO | 29 | 90.6 | 47 | 97.9 | 19 | 82.6 | 270 | 93.8 | | |
| Perceived fractured front teeth | YES | 4 | 12.5 | 5 | 10.0 | 6 | 33.3 | 53 | 18.3 | 3.582 | 0.310 |
| | NO | 28 | 87.5 | 45 | 90.0 | 18 | 66.7 | 237 | 81.7 | | |
| Had missing front teeth | YES | 5 | 16.1 | 6 | 12.2 | 6 | 25.0 | 23 | 7.90 | 8.882 | 0.031* |
| | NO | 26 | 83.9 | 43 | 87.8 | 18 | 75.0 | 268 | 92.1 | | |
| Wish to restore back fractured teeth | YES | 17 | 58.6 | 32 | 68.1 | 15 | 62.5 | 193 | 68.7 | 1.501 | 0.682 |
| | NO | 12 | 41.4 | 15 | 31.9 | 9 | 37.5 | 88 | 31.3 | | |
| Do you know discoloured teeth can be whitened | YES | 21 | 70.0 | 38 | 79.2 | 17 | 85.0 | 234 | 82.4 | 3.043 | 0.385 |
| | NO | 9 | 30.0 | 10 | 20.8 | 3 | 15.0 | 50 | 17.6 | | |
| Wish to undergo Orthodontic treatment | YES | 14 | 48.3 | 15 | 40.5 | 11 | 52.4 | 98 | 36.7 | 3.258 | 0.353 |
| | NO | 15 | 51.7 | 22 | 59.5 | 10 | 47.6 | 169 | 63.3 | | |
| Wish to undergo treatment tooth whitened | YES | 18 | 60.0 | 27 | 56.2 | 16 | 72.7 | 163 | 58.6 | 1.885 | 0.597 |
| | NO | 12 | 40.0 | 21 | 43.8 | 6 | 27.3 | 115 | 41.4 | | |
| Wish to have dental crown if needed | YES | 5 | 17.9 | 13 | 28.9 | 9 | 47.4 | 75 | 29.5 | 4.752 | 0.191 |
| | NO | 23 | 82.1 | 32 | 71.1 | 10 | 52.6 | 179 | 70.5 | | |
| Wish to have tooth colour fillings | YES | 14 | 48.3 | 16 | 34.0 | 10 | 47.6 | 82 | 45.3 | 5.309 | 0.151 |
| | NO | 15 | 51.7 | 31 | 66.0 | 11 | 52.4 | 181 | 54.7 | | |
| Wish to have missing teeth replaced | YES | 13 | 46.4 | 17 | 37.0 | 5 | 22.7 | 73 | 27.7 | 5.906 | 0.116 |
| | NO | 15 | 53.6 | 29 | 63.0 | 17 | 77.3 | 191 | 72.3 | | |

*Statistically significant

Table 5: occupational level among dental and medical patients

| Variable | Occupation | | | | | | | | | X ² | P Value |
|---|------------|--------------------------|------|--------------------------|------|--------------------------|------|--------------------------|------|----------------|---------|
| | | Group 1 Modified ISCO-08 | | Group 2 Modified ISCO-08 | | Group 3 Modified ISCO-08 | | Group 4 Modified ISCO-08 | | | |
| | | n | % | n | % | n | % | n | % | | |
| Satisfied with teeth appearance | YES | 29 | 59.2 | 99 | 66.9 | 56 | 72.7 | 81 | 63.8 | 2.901 | 0.407 |
| | NO | 20 | 40.8 | 49 | 33.1 | 21 | 27.3 | 46 | 36.2 | | |
| Satisfied with tooth colour | YES | 29 | 60.4 | 87 | 59.2 | 56 | 70.9 | 83 | 64.3 | 3.260 | 0.353 |
| | NO | 19 | 39.6 | 60 | 40.8 | 23 | 29.1 | 46 | 35.7 | | |
| Felt teeth were crowded | YES | 4 | 8.30 | 18 | 12.4 | 13 | 18.6 | 30 | 23.6 | 8.895 | 0.031* |
| | NO | 44 | 91.7 | 127 | 87.6 | 57 | 81.4 | 97 | 76.4 | | |
| Felt teeth were poorly set | YES | 11 | 22.9 | 33 | 22.8 | 20 | 25.0 | 42 | 32.8 | 4.075 | 0.253 |
| | NO | 37 | 77.1 | 112 | 77.2 | 60 | 75.0 | 86 | 67.2 | | |
| Felt front teeth were protruding bulging | YES | 5 | 10.2 | 18 | 12.8 | 11 | 15.1 | 22 | 17.2 | 1.845 | 0.605 |
| | NO | 44 | 89.8 | 123 | 87.2 | 62 | 84.9 | 106 | 82.8 | | |
| Felt dental caries/holes in teeth | YES | 13 | 26.5 | 29 | 19.1 | 14 | 17.7 | 23 | 17.8 | 1.933 | 0.586 |
| | NO | 36 | 73.5 | 117 | 80.1 | 65 | 82.3 | 106 | 82.2 | | |
| Had non aesthetic restoration in the teeth | YES | 3 | 6.10 | 7 | 4.90 | 6 | 7.9 | 11 | 8.5 | 1.644 | 0.649 |
| | NO | 46 | 93.9 | 137 | 95.1 | 70 | 92.1 | 118 | 91.5 | | |
| Perceived fractured front teeth | YES | 11 | 22.4 | 27 | 18.2 | 11 | 13.8 | 21 | 16.4 | 1.777 | 0.620 |
| | NO | 38 | 77.6 | 121 | 81.8 | 69 | 86.2 | 107 | 83.6 | | |
| Had missing front teeth | YES | 5 | 10.2 | 10 | 6.70 | 13 | 16.5 | 11 | 8.70 | 5.830 | 0.120 |
| | NO | 44 | 89.8 | 139 | 93.3 | 66 | 83.5 | 116 | 91.3 | | |
| Wish to restore back fractured teeth | YES | 36 | 75.0 | 90 | 63.8 | 50 | 69.4 | 86 | 67.7 | 2.224 | 0.527 |
| | NO | 12 | 25.0 | 51 | 36.2 | 22 | 30.6 | 41 | 32.3 | | |
| Do you know discoloured teeth can be whitened | YES | 40 | 81.6 | 112 | 78.9 | 59 | 77.6 | 106 | 85.5 | 2.617 | 0.455 |
| | NO | 9 | 18.4 | 30 | 21.1 | 17 | 22.4 | 18 | 14.5 | | |
| Wish to undergo Orthodontic treatment | YES | 16 | 38.1 | 50 | 63.0 | 30 | 45.5 | 45 | 38.5 | 1.397 | 0.706 |
| | NO | 26 | 61.9 | 85 | 37.0 | 36 | 54.5 | 72 | 61.5 | | |
| Wish to undergo tooth whitening treatment | YES | 25 | 53.2 | 87 | 61.3 | 47 | 64.4 | 70 | 56.9 | 2.025 | 0.567 |
| | NO | 22 | 46.8 | 55 | 38.7 | 26 | 35.6 | 53 | 43.1 | | |
| Wish to have dental crown if needed | YES | 15 | 34.1 | 37 | 29.4 | 23 | 34.3 | 30 | 25.9 | 1.917 | 0.590 |
| | NO | 29 | 65.9 | 89 | 70.6 | 44 | 65.7 | 86 | 74.1 | | |
| Wish to have tooth colour fillings | YES | 16 | 35.6 | 43 | 31.9 | 34 | 47.9 | 30 | 25.9 | 9.883 | 0.020* |
| | NO | 29 | 64.4 | 92 | 68.1 | 37 | 52.1 | 86 | 74.1 | | |
| Wish to have missing teeth replaced | YES | 12 | 28.6 | 42 | 30.7 | 27 | 38.0 | 28 | 23.7 | 4.465 | 0.215 |
| | NO | 30 | 71.4 | 95 | 69.3 | 44 | 62.0 | 90 | 76.3 | | |

ISCO-08: International Standard of Classification of Occupations 2008 *Statistically significant

Table 6: self-reported satisfaction, presence of dental anomalies and desire to undergo aesthetic treatment among dental and medical patients

| Variable | | Dental Patients | | Medical Patients | | X2 | P Value |
|---|-----|-----------------|------|------------------|------|--------|---------|
| | | n | % | n | % | | |
| Satisfied with teeth appearance | YES | 152 | 73.1 | 116 | 59.2 | 8.72 | 0.003* |
| | NO | 56 | 26.9 | 80 | 40.8 | | |
| Satisfied with tooth colour | YES | 131 | 62.4 | 127 | 64.8 | 0.255 | 0.344 |
| | NO | 79 | 37.6 | 69 | 35.2 | | |
| Felt teeth were crowded | YES | 34 | 16.7 | 33 | 17.5 | 0.44 | 0.470 |
| | NO | 170 | 83.3 | 156 | 82.5 | | |
| Felt teeth were poorly set | YES | 39 | 18.6 | 69 | 35.6 | 1.87 | 0.00* |
| | NO | 171 | 81.4 | 125 | 64.4 | | |
| Felt front teeth were protruding bulging | YES | 19 | 9.3 | 39 | 20.5 | 9.85 | 0.001* |
| | NO | 185 | 90.7 | 151 | 79.5 | | |
| Felt dental caries/holes in teeth | YES | 39 | 18.5 | 42 | 21.6 | 0.592 | 0.26 |
| | NO | 172 | 81.5 | 153 | 78.5 | | |
| Had non aesthetic restoration in the teeth | YES | 10 | 5.30 | 17 | 8.80 | 2.47 | 0.85 |
| | NO | 179 | 94.7 | 177 | 91.2 | | |
| Perceived fractured front teeth | YES | 26 | 12.3 | 44 | 22.3 | 7.19 | 0.005* |
| | NO | 185 | 87.7 | 153 | 77.7 | | |
| Had missing front teeth | YES | 16 | 7.50 | 24 | 12.3 | 2.49 | 0.79 |
| | NO | 195 | 92.5 | 172 | 87.8 | | |
| Wish to restore back fractured teeth | YES | 129 | 63.9 | 136 | 72.0 | 2.93 | 0.54 |
| | NO | 73 | 36.1 | 53 | 28.0 | | |
| Do you know discoloured teeth can be whitened | YES | 166 | 80.2 | 154 | 82.4 | 0.300 | 0.338 |
| | NO | 41 | 19.8 | 33 | 17.7 | | |
| Wish to undergo Orthodontic treatment | YES | 63 | 33.9 | 80 | 45.2 | 4.874 | 0.018* |
| | NO | 123 | 66.1 | 97 | 54.8 | | |
| Wish to undergo tooth whitening treatment | YES | 122 | 60.1 | 80 | 45.2 | 0.056 | 0.447 |
| | NO | 81 | 39.9 | 97 | 54.8 | | |
| Wish to have dental crown if needed | YES | 45 | 24.1 | 61 | 36.1 | 6.145 | 0.009* |
| | NO | 142 | 75.9 | 108 | 63.9 | | |
| Wish to have tooth colour fillings | YES | 68 | 34.9 | 58 | 33.1 | 0.123 | 0.405 |
| | NO | 12 | 65.1 | 117 | 66.9 | | |
| Wish to have missing teeth replaced | YES | 41 | 21.1 | 70 | 39.8 | 15.266 | 0.00 |
| | NO | 153 | 78.9 | 106 | 60.2 | | |

*Statistically significant

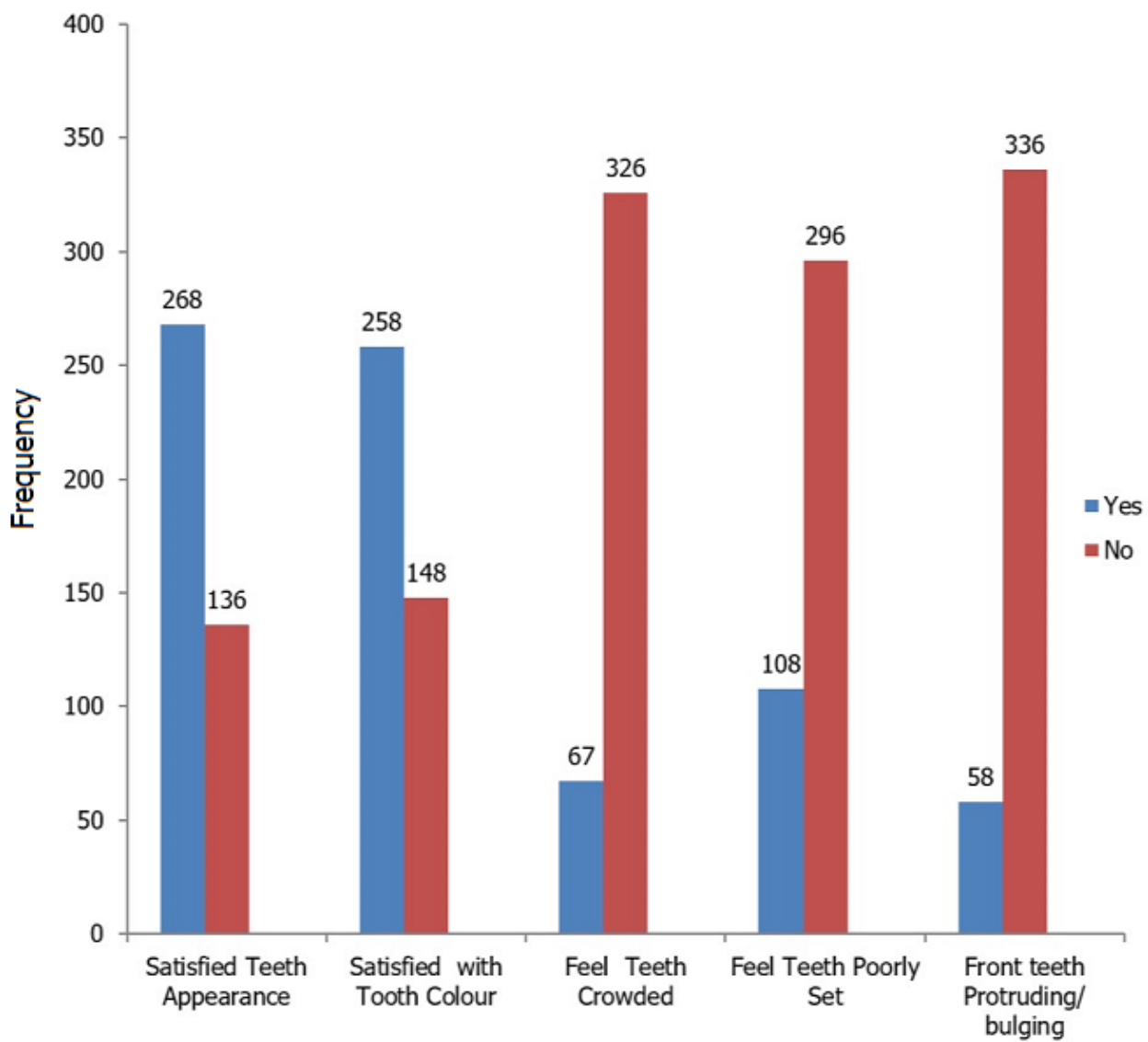


Figure 1: patients' satisfaction with dental appearance and colour