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Distribution of discoloured central incisors among students of delta state University, in Abraka, Nigeria

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Abstract
Objective: The study aim was to evaluate the distribution of discoloured central incisors among students of Delta State University, Abraka.
Materials and Methods: This study employed a cross-sectional study design and multistage sampling was used to sample 384 students (138 males and 146 females). Prior to the collection of data, ethical approval was obtained from Delta State University, Research and Ethics Committee of Human Anatomy Department. Data were obtained via self-administered questionnaires. Chi-square test of association was used to assess categorical variable and probability was ascribed at value < 0.05.
Results: Findings observed from the study was that 56 (14.6%) of the entire sample had discolouration of the central incisors tooth. Results showed females (61.0%) having a higher distribution of discoloured central incisors compared with male (39.0%) but no significant (p>0.05) gender association was observed. Findings showed that frequency of brushing has a significant association (p<0.05) with discoloration of central incisors. The findings also revealed no significant association (p>0.05) between certain variables (occurrences of plagues, dental caries, root canal therapy, scaling and polishing, bad breath, taking of tea, coffee and iron containing solutions) and discoloration of central incisors.
Conclusion: Distribution of discoloured central incisors among the studied sample was 14.6% and there was no considerable gender association as regards discolouration of central incisors. Regularity of tooth brushing has a significant association with the occurrences of discoloured central incisors.

Keywords: Distribution, tooth, discoloration, central incisors

Introduction

Tooth discoloration is a displeasing aesthetic condition of the tooth which is characterised by a change in the colour, hue or transparency of the external surface of the tooth/teeth. The tooth as masticatory structure is fixed to the jaw, and teeth are numbered 32 when fully grown [1]. Teeth are categorized into various types which are incisors, canine, pre-molar and molar with various functions and structural configuration [2]. The tooth according to Ghom, is an anatomical structure which is divided into three parts, which are; a crown (projecting above or inferior to the gum), a root (embedded in the jaw beneath the gum) and a neck (between the crown and root and surrounded by the gum) [3].

Tooth discoloration according to Ten and Coops, is influenced by the surface morphology of the tooth/teeth such as accumulation of extrinsic stains on either smooth surfaces or rough surfaces with few or no cervices [4]. Studies have shown that this condition is characterized to two main causative factors such as extrinsic factors such as metallic or non-metallic stains which is grouped based on its origin or intrinsic factors such as congenital, systemic or genetic influences which in summary is the number of chromogens deposited within the tooth bulk [5].

Other etiological agents have been attributed to this condition such as diet as stated by Faezeh et al., who observed that intake of substances such as tea, coffee and other beverages actually lead to the deposition of tannins which result in the development of stains which are brown in colour on the teeth surfaces [6]. Study conducted by Carranza and Newnian, it was reported that accumulation of food particles, dental plaques can result to brown or black satins on the tooth/teeth surfaces, it was also discovered that chromogenic bacteria were also attributed to be causative factors of tooth discoloration with the stains produced been situated at the gingival margin of the tooth [7]. Factors such as lifestyle have also been implicated to discolour tooth. Smoking or chewing tobacco or cigarettes have been attributed to cause black or dark brown stains on the cervical one-third of the tooth [8]. It was also observed that chewing of pan was also cause of tooth discolouration which was red-black in colour caused by the production of blood red saliva [9].

Studies have shown that medications such as cationic antiseptics after prolonged use can cause tooth discoloration, with an example of such antiseptics been chlorhexidne which is attributed to black or brown tooth discoloration [8]. It has been observed that the absorption of cations from precipitated anionic dietary chromogens is the likely cause of tooth staining. In a study conducted by Dayan et al., it was observed that industrial exposure to certain trace elements such as iron, manganese, silver can result in black coloured tooth, with mercury and lead resulting in blue-green tooth discoloration [10]. Genetic factors have also been observed to be causative

factor in tooth discoloration, such genetic conditions include Vitamin D dependent rickets, Epidermolysis bullosa etc [10]. Despite the alarming level of etiological factors certain management techniques haven been developed which are dependent on the causative factor of tooth discoloration. Examples include extrinsic stains such as metallic stains which can be cleansed by scaling and polishing the affected tooth/teeth using prophylactic paste [11]. The displeasing nature of this condition has led to the development of this study which is aimed at evaluating the distribution level of tooth discoloration among students of Delta State University, Abraka.

Materials and Methods

Study Design and Sample Size: A cross-sectional study design was adopted for this study.

Sample and Sampling Technique: Multistage sampling was use for sample collection with a sample size of 384 students, (138 males and 246 females).

Ethical Approval: Ethical clearance for this study was issued by the Research and Ethics Committee of Human Anatomy Department, Faculty of Basic Medical Sciences, Delta State University, Abraka.

Data Collection and Statistical Analysis: Self-administered questionnaire detailing the following data: age, gender, presence of discoloured central incisors, drinking of tea, coffee, iron containing substances, regularity of brushing, presence of plaques, presence of bad breath and dental caries was employed as the protocol for collection of data. Data were analysed using Statistical Package of the Social Sciences version 23. Results were presented in tables and chi-square was engaged as test association between observed variables and tooth discoloration.

Results and Discussion

From table 1, it was observed that the distribution level of tooth discoloration in the studied population reached 56(14.6%), with majority 328(85.4%) of the population not having this condition.

Table 2 showed the female subjects, exactly 34(60.7%) having a higher incidence level of tooth discoloration when compared against their male counterparts 22(39.3%).

Results from Table 3 depicts the distribution level of tooth discoloration based on age groups with participants within the ages of 21-23years 23(41.1%) having the highest prevalence level which was closely followed by those within ages of 24-26years precisely 19 (32.2%), with the age groups 17-20years and 27-30years with the least prevalence level of 7(12.5%).

Evaluation from table 4 showed tooth discoloration having no significant association with age (0.682), occurrence of plaques (0.089), dental caries (0.377), root canal therapy (0.553), scaling and polishing (0.432), bad breath (0.280), taking tea, coffee, iron containing solutions (0.727) and gender (0.634). It was also observed from the table that regularity of tooth brushing had a significant association compared with the occurrences of tooth discoloration.

The human tooth as anatomical feature also possesses aesthetic feature which plays an imperative role in the modern society but this feature is often marred in certain individuals as a result of a condition known as tooth discoloration (12). According to Ten and Coops, it is believed to be influenced by the surface morphology of the tooth/teeth such as accumulation of extrinsic stains on either smooth surfaces or rough surfaces with few or no cervices [4]. Certain etiological factors lead to discolouration of tooth, such examples include; lifestyle, diet, genetic factors, environment/occupation factors and also medications [13].

Results observed in a study by Ghalayani and Alizadeh, among Iranian school children showed tooth discoloration having a prevalence level of 14.8% which were similar to findings in the current study [14]. The low level of prevalence could be associated to the high exposure level of individuals to various awareness schemes put in place to avoid tooth discoloration. It was also observed that these finding were in agreement to results obtained from a study conducted by Mithra et al., which also showed a low prevalence level of 17.4% [15].

Findings from this study were in harmony with those observed in a study conducted by Alkhatib et al., who depicted females (857) having a higher prevalence of tooth discoloration than males (743) [16]. Similar findings to our study was also observed from that of Chi et al., who submitted that there is no significant association between gender and the occurrences of tooth discoloration [17].

On further observation of results obtained in our study, it was observed that similar results were reported by Ghalayani and Alizadeh, which showed the drinking of tea, coffee and other iron containing solution having no significant association with tooth discoloration, but the result of this current study is not in concordance with those observed by Mohammed et al., which showed tooth discoloration and intake of tea, coffee and other iron containing solution having a significant association [14, 18].

It was also observed in a study conducted by Mohammed et al., which had similar results with this study that smoking has no significant association with tooth discoloration [18].

The result of the current study is similar to the submission of Joiner, who observed that frequency of brushing one's teeth had a significant association with tooth discoloration while our result contradicts that of Mohammed et al., which depicted no significant association between frequency of brushing one's teeth and tooth discoloration [19, 18].

Our results conform to the observation of Manuel et al., who reported no significant association between presence of dental caries and tooth discoloration, but our findingwas in contrast with the submission of Tirth et al., which showed tooth discoloration has a significant association with presence of dental caries [20, 21]. Results obtained from this study showed concordance with those observed in a study conducted by Grossman, which showed root canal therapy has no significant association with tooth discolouration [22].

Tables

Table 1: Distribution level of Tooth Discoloration

Tooth Discoloration	Frequency (%)
No	328 (85.4)
Yes	56 (14.6)
Total	384 (100.0)

Table 2: Distribution of tooth discolouration according to gender group

Gender	Frequency (%)
Male	22 (39.3)
Female	34 (60.7)
Total	56 (100.0)

Table 3: Distribution of tooth discolouration according to age group

Age group (years)	Frequency (%)
17-20	7(12.5)
21-23	23(41.1)
24-26	19(32.2)
27-30	7(12.5)
Total	56(100.0)

Table 4: Chi-square test of association between observed variables and tooth discoloration.

Variables		Tooth discoloration		Chi-square	Df	P-value
		Yes	No			
Gender	Male	22(15.9)	116(84.1)	0.319	1	0.572
	Female	34(13.8)	212(86.2)			
Age group(years)	17-20	7(16.3)	36(83.7)	1.500	3	0.682
	21-23	23(12.4)	162(87.6)			
	24-26	19(17.4)	90(82.6)			
	27-30	7(14.9)	40(85.1)			
Drinking Tea, Coffee & Iron containing Solutions	Yes	29(13.2)	191(86.8)	0.812	1	0.367
	No	27(16.5)	137(83.5)			
Root Canal Therapy	Yes	10(12.5)	70(87.5)	0.352	1	0.553
	No	46(15.1)	258(84.9)			
Scaling and Polishing	Yes	6(9.8)	55(90.2)	1.312	1	0.252
	No	50(15.5)	273(84.5)			
Regularity of Brushing	Don't Brush	7(14.9)	40(85.1)	10.300	3	0.016
	Once Daily	24(10.4)	206(62.8)			
	Not Daily	1(14.3)	6(85.7)			
	2-3times daily	24(24.0)	76(76.0)			
Presence of Plaques	Yes	6(7.2)	77(92.8)	4.849	2	0.089
	No	77(92.8)	231(83.7)			
Presence of Bad Breath	Yes	3(7.3)	38(92.7)	2.545	2	0.280
	No	51(15.2)	284(84.8)			
	Don't Know	2(25.0)	6(75.0)			
Presence of Dental Caries	Yes	6(9.1)	60(90.9)	1.950	2	0.377
	No	42(15.8)	223(68.0)			
	Don't Know	8(15.1)	45(84.9)			

Conclusion

Distribution of discoloured central incisors was observed to be 14.6% of the sample studied and the occurrence this condition is not associated with tooth plaques, dental caries, root canal therapy, scaling and polishing, bad breath, taking tea, coffee, iron containing solutions, gender or age. Regularity of tooth brushing has a significant association with the occurrences of discoloured central incisors

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