TEETH WHITENING AMONG CLINICAL YEAR MEDICAL AND DENTAL STUDENTS AT THE UNIVERSITY OF GHANA

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ABSTRACT

BACKGROUND: The use of professional and self-prescribed methods of whitening teeth has become more common among young people. This may be due to psycho-social influences. The knowledge individuals have on teeth whitening is limited because professionals may not necessarily be the primary source, and most practices are anecdotal and not fully backed by scientific research.

AIM: To assess the knowledge, practices, and attitudes of clinical year medical and dental students of the University of Ghana towards teeth whitening.

METHODOLOGY: The study was a cross-sectional study with 214 clinical year students (51 dental and 163 medical) at the Korle-Bu Teaching Hospital, Accra. The data was collected using a structured online questionnaire and summarised using descriptive statistics with tables and charts. Data was analysed using Chi-Square ($\chi 2$) tests from Statistical Package for Social Sciences (SPSS) version 26, and the level of significance was set at $P<0.05$.

RESULTS: There were 214 participants in the study: 123(57.5%) females and 91(42.5%) males. Most of the respondents were medical students, 163(76.2%), while 51(23.8%) were from the dental school. Teeth whitening was the least likely reason (1.90%) for visiting the dentist, even though most respondents (77.1%) were interested in whitening their teeth. The internet and social media were the main sources of information about whitening (32.4%). Self-prescribed bleaching procedures were preferred among a majority (84.1%) of respondents, while only 15.9% had sought professional teeth whitening.

CONCLUSION: Generally, respondents had good knowledge about tooth whitening and its related side effects. Though teeth whitening was the least common reason for attendance at the dental clinic, most people were dissatisfied with their dental appearance, especially tooth colour. Respondents mostly resorted to at-home whitening methods or methods they had seen online. Females were more likely to undergo self-prescribed whitening methods. More than half of respondents knew of whitening side-effects, mainly teeth sensitivity, and relapse to previous tooth colour.

KEYWORDS: Teeth whitening, bleaching, dental aesthetics, tooth shade.

INTRODUCTION

Discontentment with tooth colour by patients has been investigated in studies[1-6]. This has led to the development of products to whiten teeth either at home or in the office[7]. There are many ways to improve the shade of the teeth[8], using different methods such as scaling, fabrication of veneers, crowns, and tooth whitening. Teeth can be whitened by the removal of the stain or through the application of a chemical agent, such as hydrogen peroxide and carbamide peroxide, to oxidize the organic pigmentation in the tooth[9]. 'Whitening' and 'bleaching' are two different terms that are often interchanged; however, teeth can be whitened by other means other than bleaching[10,11].

In a survey by the American Academy of Cosmetic Dentistry (AACD), there has been an increasing trend in the number of patients seeking to whiten their teeth since the introduction of teeth-whitening agents in the early 1980s[11]. As such, many people have resorted to both professional and at-home treatments to whiten their teeth.

The main clinical indication for whitening teeth is staining. Staining is an alteration in the normal shade of teeth and is caused by intrinsic and extrinsic staining[12]. Patients may still seek to whiten their teeth even in the absence of obvious staining. There are psycho-social reasons why people want white teeth[13]. The teeth are the first thing recognised during a smile; therefore, most people with discoloured teeth tend to feel uneasy when they have social interactions[14]. Misconceptions about the right colour of teeth have influenced the dissatisfaction most people have with their teeth[15]. Other factors causing dissatisfaction with overall dental appearance are teeth arrangement, shape, and size[16]. The age group that seeks cosmetic treatments the most seems to be adolescents and young adults[17]. This age group is the one that is known to struggle most with their identity and how they perceive their physical appearance[18]. This demographic is also the group that has the most access to social media and maybe most susceptible to targeted advertisements that promote whitening services. This may have contributed to people posing to be dentists (quacks) to swindle people out of money in exchange for a whiter smile[19]. The portrayal of pearly white teeth may affect how people see their natural teeth, prompting them to seek treatment[20]. Gender has been shown to influence the desire for whiter teeth, with females reporting a higher desire to have whiter teeth[16].

There are significant side effects of tooth whitening, such as the relapse of the teeth to the previous shade, sensitivity, or sometimes exacerbations of underlying pulpal disease[21]. Most people tend to regret treatment, especially when they experience side effects such as sensitivity, which prompts further dental treatment.

The purpose of the study was to assess the knowledge, practices, and attitudes of clinical year medical and dental students of the University of Ghana towards teeth whitening.

MATERIALS AND METHODS

The research was a descriptive cross-sectional study

involving two hundred and fourteen clinical-year students, of which 51(24%) were clinical-year dental students and 163 (76%) were clinical-year medical students. Together 123(57.5%) were females and 91(42.5 %) were males. The students were from the University of Ghana Medical and Dental schools situated at the Korle-Bu Teaching Hospital, Accra-Ghana.

A structured online questionnaire was developed and administered to the participants to obtain information on variables of interest. The questionnaire was pre-tested using a group of preclinical dental and medical students. It entailed data on participant's demographic characteristics, knowledge, practices, and attitudes toward teeth whitening among the participants.

Statistical Analysis

Data was captured using Microsoft Access to organize, process, and store. Means and standard deviations were calculated for all quantitative variables. Categorical variables will be summarized as proportions and percentages. Chi-square tests (at a significance level of $p < 0.05$).

From Statistical Package for Social Sciences (SPSS), version 26. The Chi-square test was used to determine the association between dependent and independent variables.

ETHICAL CONSIDERATIONS

Ethical approval was sought from the Ethical Review Board of the College of Health Sciences to permit this study to be carried out. The study was approved with ID Number CPDD/010/02/2021.

RESULTS

Table 1 below indicates the demographic characteristics of the participants. Two hundred and fourteen clinical year students, of which 163(76.2%) were Medical students and 51(23.8%) were Dental Students. The majority of the participants were females; 123 (57.5%) and 91(42.5%) were males. The ages of the participants were between 19 to 36 years, with the mean age being 23.02 ± (2.218 years). Most participants, 81(37.9%), were in their final year, followed by 77 (36.4%) in their second year and 56 (25.7%) in their first clinical year. Of most of the respondents, 157(73.4%) had visited a dentist, and only 57 (26.6%) had never been to a dentist.

Among the participants who had visited a dentist in the past, a majority of them, 70 (43.2%), had their visit more than two years ago. About twenty-three percent had their last dental appointment up to one year ago, 23 (14.2%) within the previous six months and 32 (19.8%) within the previous three months. A significant proportion of Dental students had visited the dentist more recently than the medical students (p=0.002)

Table 1: Socio-demographic characteristics of participants

Variables	Frequency	Percentage		
Age				
19-21	46	2.5		
22-25	149	69.6		
26-29	15	7		
30 and above	4	1.9		
Gender				
Male	91	57.5		
Female	123	42.5		
School				
Dental	51	23.8		
Medical	163	76.2		
Clinical Year				
Final	81	37.9		
Second	77	36		
First	56	26.2		
History of previous dental attendance				
No	Yes			
73.4%	26.6%			
Period since last visit between schools				
School	**More than 2 yrs**	**Up to 6 months**	**Up to a year**	**Within 3 months**
Dental	28.6%	21.4%	14.3%	35.7%
Medical	48.3%	11.7%	25.3%	14.2%

The commonest reason for presenting to the dental clinic was for scaling and polishing (cleaning), followed by Toothache, Routine Dental visits, and Orthodontics. Tooth whitening was the most unlikely reason for a dental visit.

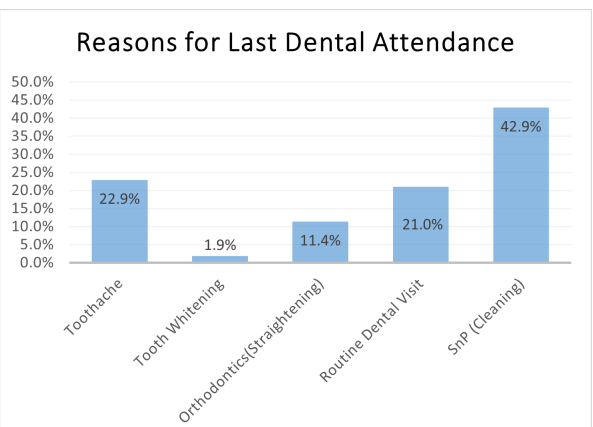

Fig 1: Reason for Previous Dental Visit

The commonest reason given by participants for not visiting a dentist before was "no particular reason." Some of the participants had no time for dental appointments, while others were greatly influenced by the cost. Others felt they had no dental pain and, therefore, it was unnecessary.

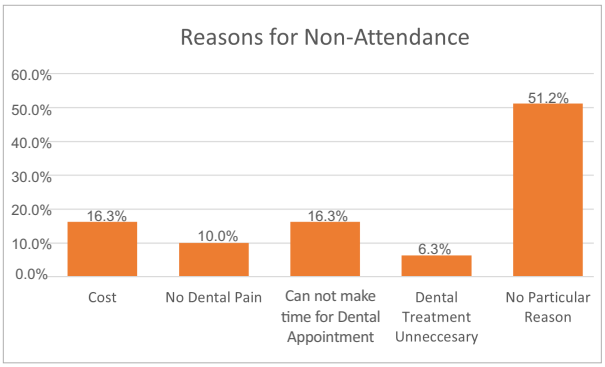

Fig 2: Reason for Not Visiting a Dentist

Out of 214 participants, more than half were not satisfied with their dental appearance, while less than half were satisfied with their dental appearance. As indicated in Fig. 4, almost half of the participants said teeth colour was the reason for dissatisfaction with dental appearance, while 31.4% of participants said teeth arrangement was the reason for dissatisfaction with dental appearance. The rest of the participants cited teeth size and shape as dissatisfaction with dental appearance.

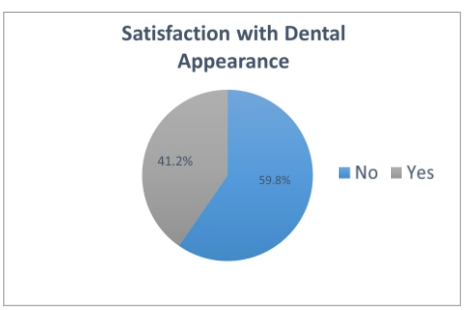

Fig 3: Satisfaction with Dental Appearance

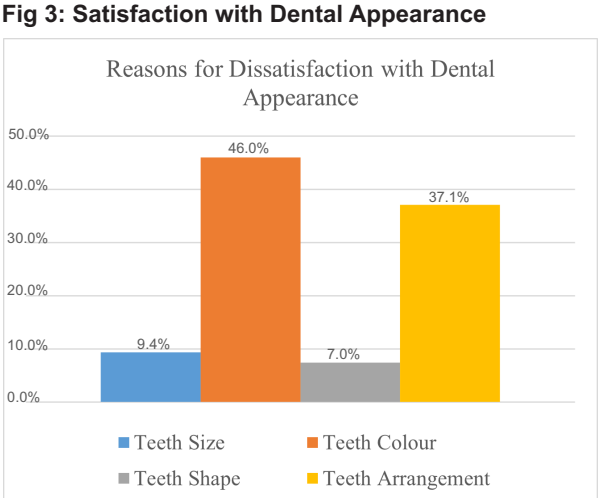

Fig 4: Reasons for Dissatisfaction with Dental Appearance

Teeth Whitening

Almost all the participants had knowledge of teeth whitening before, while the rest either had no knowledge of the term or were unsure. A lot of participants obtained knowledge on teeth whitening from the Internet and social media, Television, Friends and Peers, Schools, Dental Clinics, and the radio, respectively. Sources of Information on Teeth Whitening among Dental and Medical Students demonstrated that a significant proportion of Dental students had heard about Teeth Whitening from School. p=0.006.

Table 2: Participants knowledge and sources of information on teeth whitening

Knowledge of the term 'Teeth Whitening.'					
YES	No	Not sure			
97.7%	1.4%	0.9%			
Sources of Information on Teeth Whitening					
School	TV	Internet & social media	Friends & Peers	Dental Clinic	Radio
16.3%	19.9%	32.4%	18.5%	7.3%	5.7%
Sources of Information on Teeth Whitening among Dental and Medical Students					
Information source	**Proportion of dental students**	**Proportion of medical students**			
School	52.94%	38.03%			
Tv	62.75%	47.24%			
Internet & social media	78.43%	84.05%			
Friends & peers	43.14%	48.67%			
Dental clinic	29.41%	15.34%			
radio	11.76%	15.34%			

More than half of the participants desired to have their teeth whitened; however, the rest were split between not wanting to whiten the teeth and being unsure about teeth whitening.

Table 3: Participants desire to whiten teeth

Desire to Have Teeth Whitened			
Yes	No	Unsure	
51.4%	22.9%	25.7%	
Desire to Whiten Teeth Among Dental and Medical Students.			
School	Unsure	No	Yes
Dental	19(37.20%)	16(31.40%)	16(31.40%)
Medical	35(21.50%)	33(20.30%)	95(58.20%)

p=0.003

A significantly higher number of medical students wanted to whiten their teeth when compared to dental students. p=0.003

In Fig. 5, most of the participants considered teeth whitening because they wanted to look better; other participants were discontent with the current look, and others considered it a confidence booster and the fact that whitening looks attractive.

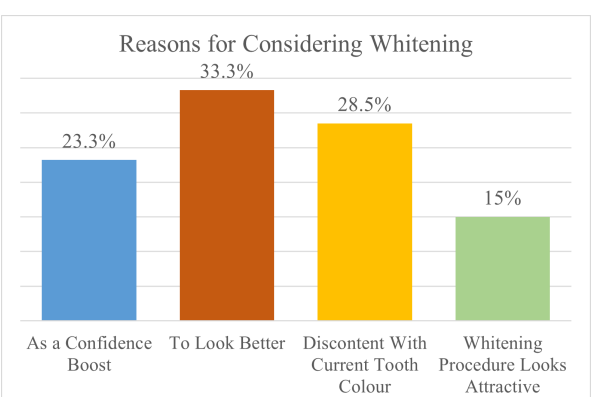

Fig 5: Reasons for Considering Teeth Whitening

Most participants had not attempted whitening their teeth, while the remaining 37.4% had attempted to whiten their teeth in the past. As indicated, a significant number of females had attempted in the past to whiten their teeth. A significantly higher number of females attempted to whiten their own teeth. p=0.029. Among participants who had attempted whitening in the past, an overwhelming majority used self-prescribed methods, while a few had their teeth professionally whitened. Almost all the participants responded that a dentist carried out the procedure, while 7.9% responded that a dental hygienist could carry out the procedure. A little more than half of the participants described teeth whitening as a procedure for "Making Teeth Whiter"; others described it as "Changing tooth colour," "Replacing Teeth with white ones," and "Nicely rearranging teeth". Charcoal was the commonest aid in teeth whitening, closely followed by whitening toothpastes. Whitening mouthwashes, laser and bleaching strips and other methods were also used but not popular among participants. More than half of the respondents felt teeth whitening had some side effects; the rest were unsure and felt there were no adverse effects associated with teeth whitening.

The commonest known side effect was post-whitening sensitivity, followed by relapse to previous shade, gingival irritation, and altered taste, while a few of the responses were none of the above.

Table 4: Knowledge of the effects teeth whitening and some products used

Previous attempt at teeth whitening					
Yes	37.4%				
No	62.6%				
Comparison of tooth whitening attempts among Sexes.					
Sex	No	Yes			
Female	66	57			
Male	68	23			
Professional Responsible for Teeth Whitening Procedure					
Dentist	Hygienist				
92.1%	7.9%				
Teeth Whitening Practices					
Professional	84.10%				
Self-prescribed	15.90%				
Description of Teeth Whitening.					
Making teeth white	Changing tooth colour	Replacing teeth with white ones	Nicely arranged teeth		
89.6%	8.3%	1.7%	0.4%		
Teeth Whitening Practices Among Males and Females.					
		Professional dentist	**Self-prescribed**		
Sex	**Male**	4.4%	26.4%		
	Female	8.1%	40.7%		
Self-prescribed bleaching methods					
Charcoal	**Mouthwash**	**Toothpaste**	**Lazer**	**Bleaching strip**	**other**
38.8	10.4	35.8	6	3	6%
Perception of Teeth Whitening Side Effects					
Yes	No	Maybe			
55%	9%	36%			
Knowledge on the Side Effects of Teeth Whitening					
Altered taste	Relapse to previous shade	Post whitening sensitivity	Gingival irritation	None	
6.2%	24.3%	42%	22.8%	4.7%	

Fig 6: Preferred Tooth Shade by Participants

The majority of dental and medical students opted for a lighter shade of teeth, that is, shade 5. There was a significant difference in the shades preferred by medical and dental students. p=0.045

Table 5: Preferred Tooth Shade by Medical and Dental Students.

Preferred Shade		**1**	**2**	**3**	**4**	**5**	**6**
School	**Dental**	13 (27.10%)	8 (16.7%)	0	0	23 (47.90%)	4 (8.3%)
	Medical	32 (19.90%)	10 (6.2%)	2 (1.20%)	3 (1.90%)	76 (47.20%)	38 (28.6%)

**P=0.045.*

DISCUSSION

The questionnaires were answered by a total of 214 clinical year students from UGDS and UGMS, the majority of whom were females. Kim Seon-Rye in Korea[22] and Diklic in Croatia[23] also had a majority of 154 (88%) and 112 (71.05%) of their participants to be female, respectively. An outstanding number of students (76.2%) were from the medical school, while the rest were from the dental school (Table 1). The age distribution of the study participants ranged from 19 to 36 years, with the mean age being 23.02 years ±2.218. In Nomay's study in Saudi Arabia, the majority of respondents (37.5%) were in the age group between 18-24 years[24]. The Dental and Medical schools comprise three clinical years. Most respondents were final year students (37.9%), followed by second clinical year students (36.4%), and the smallest group were first clinical year students.

A majority of the respondents (73.4%) in the study had visited the dentist before, with only 26.6% never having visited a dentist before. There were no statistically significant associations between gender and school and the number of people who had been to a dentist before. Close to half of respondents (43.2%) had their dental visit more than two years ago. This falls short of recommendations to have at least two routine visits in a year. When combined for the percentage of the respondents that have visited a dentist within one year, more dental students (71.4%) have been to the dentist than medical students (51.2%). These differences were statistically significant (p=0.002). It can be inferred that medical students have poorer oral health-seeking habits.

Yet, overall dental attendance within 6 months in both groups was only 25.7% (41.18% of Dental Students, 29.44% of medical students), and this suggests that the overall dental attendance is poor. This compares poorly to Diklić et al.[23], where nearly 6 in 10 students visited a dentist every 6 months.

More than half (59.8%) were dissatisfied with their dental appearance, while the rest did not have any complaints, with colour being the major cause of dissatisfaction (46.0%). This was different from Diklić et al.[23], among university students, where 45% of students were dissatisfied with their teeth. According to Enabulele and Omo[25], in a Nigerian context, the proportion of people dissatisfied with their dental appearance is 45.1%. Tin-Oo, Saddki, and Hassan[16] found that (52.8%) of patients were unhappy with their overall dental appearance, and tooth colour was the most prevalent cause of dissatisfaction (56.2%). A slightly higher prevalence of dissatisfaction is noted in this study, even though colour remains the concern for most of the respondents. The high prevalence of dissatisfaction could be explained by the more youthful nature of this study population. It has been shown by Odioso, Gibb, and Gerlach[26] that satisfaction with dental appearance is very much age-dependent.

Almost all the respondents are aware of teeth whitening. Similarly, Kim Seon-Rye's study in 2023 saw the majority of participants having adequate knowledge about teeth whitening[22]. The sources responsible for this knowledge on teeth whitening were the internet and social media (32.4%), closely followed by Television (19.9%), and Diklić et al.[23], Television was the main source of information on teeth whitening. There was a statistical difference (p=0.006) between the number of dental students who cited school as a source of information as well as dental clinics when compared to medical students who cited school and dental clinics. This could be explained from the established poor attendance of dental clinics by medical students and teeth whitening being one of the topics covered in the dental curriculum taught to dental students.

While a few of the respondents had no desire to whiten their teeth, the majority of respondents (77.1%) were either interested in whitening their teeth or unsure. Similarly, in Udani Jinta Prafulchandra27, Nomey[24], and Silva[28], 58.8%, 77.7%, and 85.9% of respondents would like to whiten their teeth. This greatly differs from Diklic [23], where fewer (34%) of respondents had a desire to whiten their teeth. The majority of respondents in Chisini's work also reported a desire for aesthetic dental treatment[29]. A greater number of these respondents were medical students, while only 23.8% were dental students. This difference proved statistically significant (p=0.003) and could be explained by dental students having more knowledge of what normal teeth color should be, hence, not having a stronger interest in whitening their own teeth as compared to medical students. Tin-Oo, Saddki, and Hassan[16] and Enabulele and Omo[25] showed gender as a predictor for wanting to whiten teeth; however, this was not accounted for in our study. According to Diklić et al.[23], 34% of students would like to whiten their teeth, and fewer male students (25%), compared to female students (39%), were interested in whitening their teeth. In Enabulele and Omo[25], a greater majority (67.3%) were interested in teeth whitening.

In choosing a shade of teeth, the majority (66.8%) chose artificially coloured white teeth, out of which half of dental students preferred artificially coloured teeth while more than half of medical students preferred artificial-looking shades. However, a lot more dental students preferred naturally looking teeth than medical students. These differences proved statistically significant (p=0.045). It could be explained that dental students have a better understanding of teeth shade, and so were content with more naturally appearing teeth shades.

Nearly 4 in 10 students had tried to whiten their teeth in the past; of this number, 71.25% were females, and the rest were males. This difference was statistically significant (p=0.002) and is similar to those seen in other studies, such as Tin-Oo, Saddki, and Hassan[16] and Enabulele and Omo[25]. There were no differences based on school. At-home bleaching procedures were preferred among an overwhelming majority of respondents. This contrasts with Diklić et al.[23], where 80% preferred to have their teeth whitened by a dentist. However, a study by Hatherell et al.[30] with students in Cork showed that they would use home whitening kits over in-office treatments. This could be explained by the cost-effectiveness of at-home whitening methods when compared to in-office whitening procedures.

The difference between females carrying out self-prescribed whitening methods and males was statistically significant (p=0.029). Some other methods of teeth whitening include baking soda and lime, ginger lemon, and turmeric. Half of the respondents knew that teeth whitening had some side effects. Diklić et al.[23] recorded that only 46% of respondents in their study knew about the side effects of teeth whitening. When people are not aware of the potential negative effects of procedures, they are more likely to seek out these treatments. The side effects were evenly distributed among genders and schools.

CONCLUSION

Most respondents in the study demonstrated a good understanding of whitening and its associated practices. A significantly high number of medical students desired artificially white teeth, and some have tried to whiten their teeth, with the majority using at-home whitening methods such as charcoal. The internet is the main source of information on whitening. Significantly more females have tried to whiten their teeth in the past, and almost all the respondents were aware of the side effects of whitening.

RECOMMENDATIONS

Oral health education is important and can be beneficial in improving ones' perception of their dental appearance and aid in prevention of side effects caused by potentially harmful dental products. Knowledge and awareness for oral health and oral hygiene should be incorporated into the medical school curricula.

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