

Most Preferred Bleaching Agent for Vital and Non Vital Bleaching among Indian Dentist-Retrospective Study

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ABSTRACT

Introduction: Bleaching, although not new to dentistry, has gained much popularity in recent years.

It is the most preferred conservative method to lighten discolored teeth. The main goal of tooth bleaching is to whiten tooth tissues using oxidizing chemical agents that act both in enamel and dentin. Because tooth shade depends on the composition of tooth tissues, severe chemical, mechanical and biological changes can damage the esthetic equilibrium of the smile. Bleaching tooth structure is possible due to the noninvasive nature of the bleaching systems that offer treatment options capable of fulfilling expectations of the most demanding patients.

The purpose of this study was to evaluate the most preferred bleaching agent for vital and non-vital agents among Indian dentists.

Materials and methods: A total of 160 patients were included in the present study. Demographic details like age, gender, types of bleaching, bleaching agent of all patients were recorded. All the data was entered on the excel sheet. Data was analysed by the SPSS software version.

Results: Out of 160 patients, 70% were male and 30% were females. 15-25 yrs. were the most prevalent age group reporting to hospital for bleaching treatment. 65.63% of patients preferred vital bleaching techniques among Indian dentists. 33.74% sodium perborate was the most preferred bleaching agent used among Indian dentists for non-vital bleaching.

Conclusion: Within the limitation of the study, sodium perborate was the most preferred bleaching agent used for non-vital bleaching. 35% H2O2 were the most preferred bleaching agent used for vital bleaching techniques.

Key words: Cardiovascular disease, Communicable disease, Dietary factors

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INTRODUCTION

Discolored anterior teeth are often perceived as an esthetic detraction. Because of the growing need for beautiful, white teeth and the establishment of esthetic treatment methods, the bleaching of nonvital teeth has become increasingly important in recent years. In the middle of the 19th century, the first attempts were made to lighten discolored teeth using various bleaching agents. Initially, oxalic acid was used, until the tooth-

bleaching effect of hydrogen peroxide was discovered in 1884 [1].

Discolorations can be differentiated into extrinsic or intrinsic origin. External discolorations result from the consumption of certain food, beverages or tobacco products as well as from inadequate oral hygiene or certain oral hygiene products. Furthermore, a thinning of the dental enamel during aging also darkens the tooth [2]. An intrinsic discoloration is defined as one with its origin within the pulp chamber. This includes hemorrhage, necrosis, calcification, and iatrogenic discoloration due to dental treatment. Hemorrhage of the pulp is the most common etiology of discoloration after trauma [3].

Bleaching is the most preferred conservative method to lighten discolored teeth [4]. Bleaching agents contain either hydrogen peroxide or carbamide peroxide. One of the popular bleaching techniques is night guard

bleaching that utilizes 10% CP in a customized tray that is worn by the patient at night [5]. CP is formed from hydrogen peroxide and urea and about one-third of CP is released as hydrogen peroxide. The color change in enamel and dentin is the result of penetration of hydrogen peroxide through the enamel and break down of high molecular weight organic molecule into simpler low molecular weight molecules with lesser color reflectance [6]. However, its action is not restricted and could also contribute to protein damage and mineral loss [7].

Tooth bleaching agents are classified by the Federal Health Office of Switzerland and the Medications Institute Swiss medic as cosmetics. Hydrogen peroxide (H_2O_2) is an effective bleaching agent [8]. Nevertheless, high concentrations of H_2O_2 (30%) should be used in order to avoid increasing the risk of root resorption. Sodium perborate occurs in the form of mono-, tri- ($NaBO_2 \cdot H_2O_2 \cdot 3H_2O$) or tetra hydrate. Upon adding water, H_2O_2 is released. The bleaching effect is not weakened if sodium perborate is mixed with water instead of hydrogen peroxide [9,10].

Currently, there are very few studies on the use of sodium per carbonate ($2Na_2CO_3 \cdot H_2O_2$). This agent was long ignored, as its stability during storage was very poor. An in vitro study found the bleaching effect of sodium per carbonate (mixed with water) to be similar to that of 30% hydrogen peroxide [11]. However, clinical studies are still lacking. Carbamide peroxide ($CH_4N_2O \cdot H_2O_2$) is an organic compound containing hydrogen peroxide and urea. In an in vitro test, carbamide peroxide showed a bleaching ability equal to that of hydrogen peroxide [12]. Our team has extensive knowledge and research experience that has translate into high quality publications [13-32].

The aim of this study was to evaluate the most preferred bleaching agent for vital and non-vital agents among Indian dentists.

MATERIALS AND METHOD

Study designs and study setting

The present study was conducted in a university setting [Saveetha dental college and hospitals, Chennai, India]. Thus the data available is of patients from the same geographic location and have similar ethnicity. The retrospective study was carried out with the help of digital case records of 160 patients who reported to the hospital. Ethical clearance to conduct this study was obtained from the Scientific Review Board of the hospital.

Sampling

Data of 160 patients [70 males and 30 females] were reviewed and then extracted. All patients with types of age, gender, bleaching agent, types of bleaching. Only relevant data was included to minimize sampling bias. Simple random sampling method was carried out. Cross

verification of data for error was carried out. Cross verification of data for error was done by presence of additional reviewer and by photographic evaluation. Incomplete data collection was excluded from the study.

Data collection

A single calibrated examiner evaluated the digital case records of patients who reported to Saveetha Dental College from June 2020 to March 2021. For the present study, inclusion criteria were data of patients with type of bleaching. Data obtained were age, gender, type of bleaching, bleaching agent. All obtained data were tabulated into Microsoft excel documents.

Statistical analysis

The collected data was tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 [SPSS Inc., Vancouver style] and results were obtained. Categorical variables were expressed in frequency and percentage. Chi square test was used to test association between categorical variables. Chi square tests were carried out using age, gender and as independent variables and dependent variables. The statistical analysis was done by pearson chi square test. P value < 0.05 was considered statistically significant.

RESULTS

Bar graph shows the frequency distribution of gender of the patients X axis denotes gender and Y axis denotes the percentage of patients participating in this study. From this study we observed that 70% were male and 30% were females (Figure 1). Bar graph shows frequency distribution of age of the patients. X axis denotes age groups and Y axis denotes the percentage of patients participating in this study. From this study we observed that (55.63% - 15 to 25 yrs.), (32.50% - 26 to 35 yrs.), (5.63% - 36 to 45 yrs.), (6.25% - 46 to 55 yrs.). 15-25 yrs. were the most prevalent age group participating in this study (Figure 2). Bar graph shows frequency distribution of type of bleaching in this study. X axis denotes types of

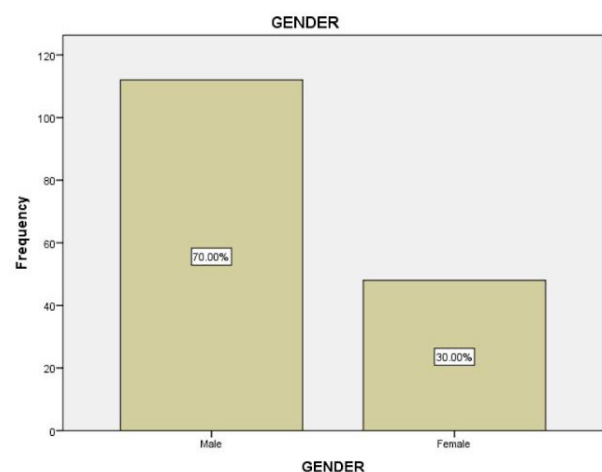


Figure 1: Bar graph shows frequency distribution of gender of the patients X axis denotes gender and Y axis denotes the percentage of patients participating in this study. From this study we observed that 70% were male and 30% were females.

bleaching and Y axis denotes the percentage of patients participating in this study. From this study we observed that 65.63% were vital bleaching, 34.38% were non vital bleaching. 65.63% were the most preferred vital bleaching technique among Indian dentists (Figure 3).

Bar graph shows frequency distribution of bleaching agents in this study. X axis denotes bleaching agent and Y axis denotes the percentage of patients participating in this study. From this study we observed that 33.74% - sodium perborate, 21.25% - sodium perborate 10% H2O2, 22% - 35% H2O2, 10.63%-McInnes, 8.75%-sodium perborate supercool, 3.13% - 10% H2O2, 2.50% - opalescence. 33.74% were the most preferred bleaching agent among Indian dentists (Figure 4). Bar graph showing the association between type of bleaching and bleaching agent. The X axis represents the type of bleaching and Y axis represents the bleaching

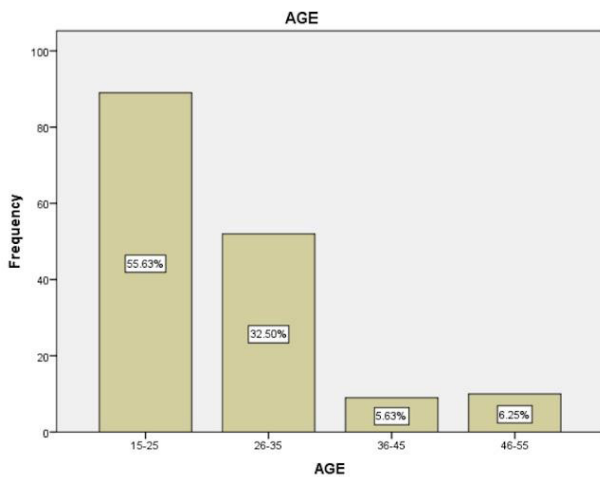


Figure 2: Bar graph shows frequency distribution of age of the patients. X axis denotes age groups and Y axis denotes the percentage of patients participating in this study. From this study we observed that (55.63% - 15 to 25 yrs.), (32.50%-26 to 35 yrs.), (5.63%-36 to 45 yrs.), (6.25% - 46 to 55 yrs.). 15-25 yrs were the most prevalent age group participating in this study.

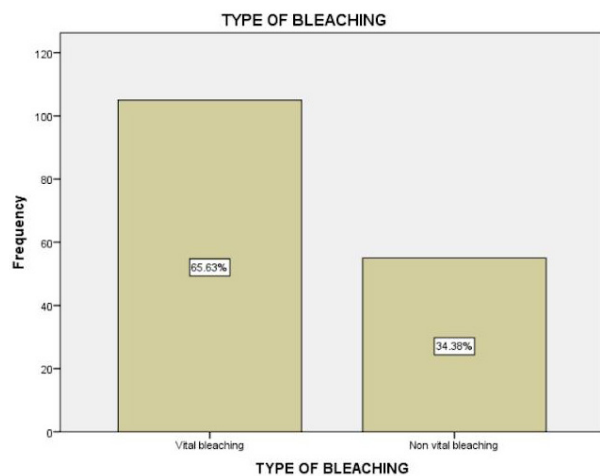


Figure 3: Bar graph shows frequency distribution of type of bleaching in this study. X axis denotes types of bleaching and Y axis denotes the percentage of patients participating in this study. From this study we observed that 65.63% were vital bleaching, 34.38% were non vital bleaching. 65.63% of patients preferred vital bleaching techniques among Indian dentists.

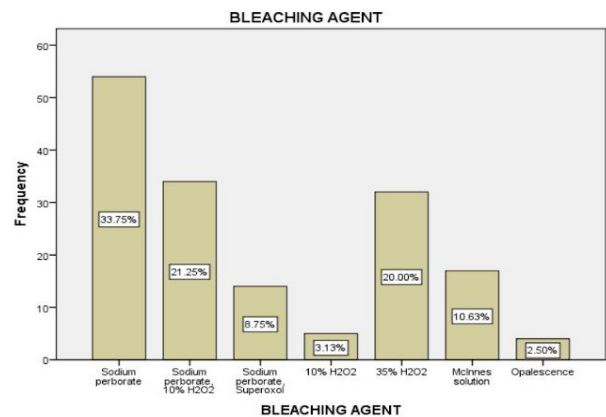


Figure 4: Bar graph shows frequency distribution of bleaching agents in this study. X axis denotes bleaching agent and Y axis denotes the percentage of patients participating in this study. From this study we observed that 33.74%-sodium perborate, 21.25%-sodium perborate 10% H2O2, 22%-35% H2O2, 10.63%-McInnes, 8.75% - sodium perborate supercool, 3.13% - 10% H2O2, 2.50%-opalescence. 33.74% sodium perborate was the most preferred bleaching agent used among Indian dentists.

agent. Sodium perborate, the most preferred bleaching agent used for non-vital bleaching. 35% H2O2 were the most preferred bleaching agent used for vital bleaching techniques. Chi-square test was done and the association between types of bleaching and bleaching agent was found to be statistically significant. Pearson's Chi-square value=25.591, df=6, p value 0.00 (>0.05).

DISCUSSION

The present study was conducted among 160 patients. 70% were male and 30% female. In this study, 33.74% - sodium perborate was the most preferred bleaching agent used among Indian dentists. Sodium perborate, the most preferred bleaching agent used for non-vital bleaching. 35% H2O2 were the most preferred bleaching agent used for vital bleaching techniques. Weiger reported the similar evidence that sodium perborate, which is frequently used in bleaching of non-vital teeth, decomposes in hydrogen peroxide after contact with water, releasing nascent oxygen [33].

Pearson reported the similar evidence that bleaching techniques were used for vital teeth by means of oxalic acid or pyrozone later with hydrogen peroxide, the use of concentrated hydrogen peroxide with a heating instrument was regarded as an acceptable method in dental clinics [34]. Sodium perborate release oxygen should be synergistic and more effective [35]. Rotstein, et al. [25] reported that sodium perborate with water presented similar effectiveness of bleaching compared to other bleaching materials, and also combination with 30% hydrogen peroxide or water resulted in similar esthetic results after bleaching [36].

CONCLUSION

Within the limitation of the study, sodium perborate was the most preferred bleaching agent used for non-vital bleaching. 35% H2O2 were the most preferred bleaching

agent used for vital bleaching techniques. The limitations of the study include short sample size, single centered study and don't represent ethnic groups or populations. The study should be carried out in larger populations.

AUTHORS CONTRIBUTION

Nivethitha R: Literature search, data collection, analysis, manuscript drafting.

Subash Sharma: Data verification, manuscript drafting.

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CONFLICT OF INTEREST

All the authors declare that there was no conflict of interest in present study.

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