

## A RETROSPECTIVE ESTHETIC OUTCOME RELATED DATA ANALYSIS IN PATIENTS UNDERGOING VITAL BLEACHING IN UNIVERSITY SETUP

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### ABSTRACT

**Introduction:** Nowadays, cosmetic dentistry has become one of the most important sections of dentistry because patients care about the appearance of their smile with their general health. However there are no previous studies to encounter the clinical outcome after vital bleaching. Hence, the present study was conducted to find out the aesthetic outcome after vital bleaching.

**Aim:** To find out the aesthetic clinical outcome of vital bleaching in a private dental hospital

#### **Materials and methods:**

A total of 134 patients who had undergone vital bleaching were included in the study. The collected data was subjected to data analysis.

**Results and Discussion:** Satisfactory outcome was seen in 84.3% of patients who have undergone vital bleaching. 15-25 years is the most common age group who have undergone vital bleaching (73.9%); Male have more commonly undergone vital bleaching (71%) than females; Sextant 2 is the most common tooth region which has undergone vital bleaching; p value :0.044 (>0.05) proving that there is no significant association between the outcome of bleaching and the teeth region which has undergone vital bleaching; p value :0.095 (>0.05) proving that there is no significant association between the outcome of bleaching and the age groups

**Conclusion:** The present study suggests that vital bleaching has proven to produce satisfactory clinical aesthetic outcome. This study will shed light for future studies that study an even larger population prospective RCTs are needed to further support our evidence.

**Keywords:** bleaching, aesthetic, outcome, retrospective, innovation, Dental innovation

### **Introduction:**

Currently, tooth whitening is one of the most popular aesthetic procedures in dentistry.[1] Dental market offers a variety of products, and literature shows different successful techniques for tooth whitening. Clinicians may have the difficulty to decide the most suitable treatment for

each case.[2] Vital tooth bleaching refers to the clinical application of a chemical solution to a tooth surface in order to achieve a lightening effect. Despite the large number of techniques described in the literature concerning the external bleaching of vital teeth, all are based on the direct use of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) or its precursor, carbamide peroxide.[3]

The apparent color of a tooth is a combination of its innate color along with the stains present within and on the tooth surface. The chromogens when deposited on the surface of the tooth or within the pellicle layer discolor the tooth and are termed extrinsic stains. [4,5] Extrinsic stains occur when chromogens such as tobacco, tea, coffee, red wine, medicines, spices, and plaque attach directly to the tooth. Chromogens such as polyvalent metal salts such as iron supplements and cation antiseptics such as chlorhexidine may combine with tea and attach to the tooth indirectly, creating black or brown characteristic stains.[6] Prophylactic procedures may remove extrinsic stains; however, the more persistent stains respond successfully to bleaching. Fluorosis may be depicted with varying severities. Discolorations due to simple-to-moderate fluorosis can be treated with bleaching. [7] Hypomineralization when it reaches the dentinoenamel junction may result in post eruptive breakdown (PEB), staining the tooth dark brown to black. PEB-stained teeth require a combination of bleaching, microabrasion, followed by veneers to camouflage the discoloration.[8] Bleaching, though promising, may not guarantee success in all cases or may fail to satisfy a patient's high expectations. The indications and contraindications are basically the same for both in-office and home bleaching. Patient's lifestyle, current levels of tooth sensitivity, the type of discoloration, baseline shade of the teeth, and time available for bleaching are important factors to be contemplated while selecting the bleaching technique. Patients with decay, periapical lesion, and sensitivity should seek treatment for the same prior to bleaching. Bleaching is contraindicated in pregnant women as the effects of bleaching materials on the fetus are yet to be investigated. [9] Among various aspects to be considered, the long-term effect of bleaching is an important factor that might be decisive for treatment's choice. There are no previous studies to encounter the clinical outcome after vital bleaching. With this background in mind, the current study fulfills this lacunae and aims to find out aesthetic clinical outcomes among the patients following the treatment of vital bleaching.

Our team has extensive knowledge and research experience that has translate into high quality publications[10–19],[20–23],[24–28],[29]

## **Materials and methods:**

### **Study designs and Study setting**

The present study was conducted in the 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. This retrospective study was carried out with the help of digital case records of 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 134 patients were reviewed and then extracted. All patients who have undergone vital bleaching in the given duration of time period were evaluated. Only relevant data was included to minimize sampling bias. Simple random sampling method 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 2019 to March 2021. For the present study, inclusion criteria was data of patients who had undergone vital bleaching treatment and who had reported for follow up. Data obtained were age, gender, teeth region, clinical aesthetic outcome present. 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 AND DISCUSSION:**

In this study we found out that the 15-25 years is the most common age group to undergo the treatment of vital bleaching. Similar findings were seen in the study conducted by Rezende et al. The reason for this finding is the very obvious fact that esthetics play a very vital role in this age group. People's concerns about their esthetics have increased in recent years due to the media and their advertisements. Next, the simplicity of the procedure and speedy result of tooth bleaching lead to improved patient attitudes and feelings toward esthetic dentistry in this age group. [30]

It is commonly thought that women are more interested in their appearance than men. [31] Contradicting this, in our study Male patients were found to be more concerned with their dental appearance than females since they have undergone the treatment for vital bleaching. The reason for this may be males are most commonly exposed to extrinsic stains due to tobacco usage etc. Similar results were seen in the study conducted in Sweden found that men regarded dental appearance as more important than women while other studies found that the differences were not significant.[32,33] Gender associated differences in satisfaction with dental appearance may require further investigations.

The most important finding of this study was that most patients (84.3%) felt a satisfactory outcome after the vital bleaching technique. Only a minimal percentage of patients (15.7%) felt not satisfactory over clinical outcome from vital bleaching. Similar results were seen in the study conducted by Lee Boushell et al., [34]

To minimize the risks, the involvement of dental professionals, the prevention of using of OTC bleaching products and the reduction of overused of bleaching products are necessary. In

addition to that interval of 2 weeks post-bleaching procedure is found to be adequate to avoid adverse effects on the polymerization.

Finally, Clinicians should inform their patients about the possible changes that may occur on their dental restorations during bleaching procedure as well as the possibility of replacement of the bleached restorations at the end of bleaching treatment. It is important that Dentists handle the peroxides with the essential knowledge, because it is demonstrated that satisfactory final results of this technique depend on the correct diagnosis of stains, management of the substrates (enamel and dentin) and as well sensitivity. [35]

The strength of this study was that the records of patients seen during the period of study were used; therefore there was no issue regarding declined participation from patients and in addition there was no issue regarding improper patient selection. The weakness of the study being a retrospective study, there was no possibility for direct interaction with the patients and the study relied only on the case sheets, reviews and the sample size was also limited. However this study will shed light for future studies that study an even larger population prospective RCTs are needed to further support our evidence.

#### **CONCLUSION:**

The present study suggests that vital bleaching has proven to produce satisfactory clinical aesthetic outcome. This study will shed light for future studies that study an even larger population prospective RCTs are needed to further support our evidence.

#### **AUTHOR CONTRIBUTIONS:**

Shruthi.M: Literature search, data collection, analysis, manuscript drafting.

Dr. Kavalipurapu Venkata teja: Data verification, manuscript drafting.

#### **ACKNOWLEDGEMENT:**

The authors would thank all the participants for their valuable support and authors thank the dental institution for the support to conduct.

#### **CONFLICT OF INTEREST:**

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

#### **SOURCE OF FUNDING:**

The Present project is supported and funded by

- Saveetha institute of Medical and Technical Sciences
- Saveetha Dental College and Hospitals
- Saveetha University.
- Office Needs inc.

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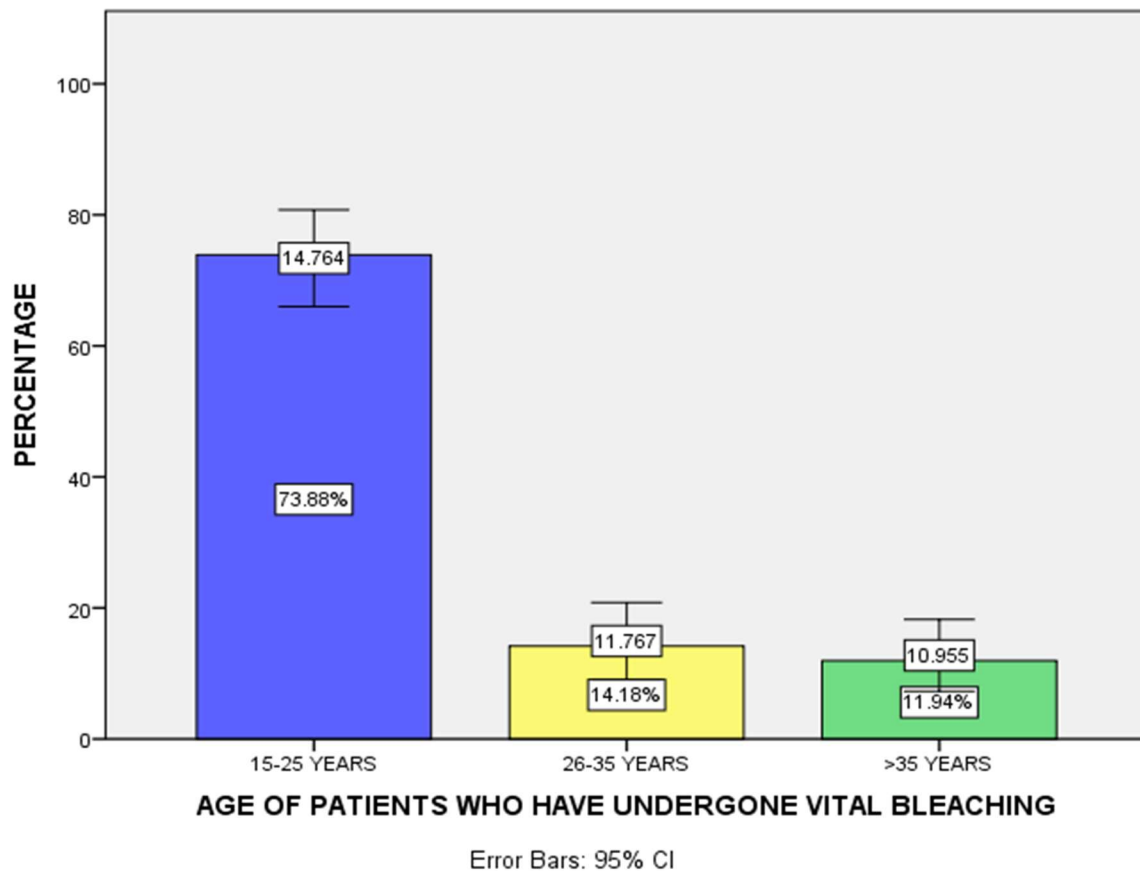
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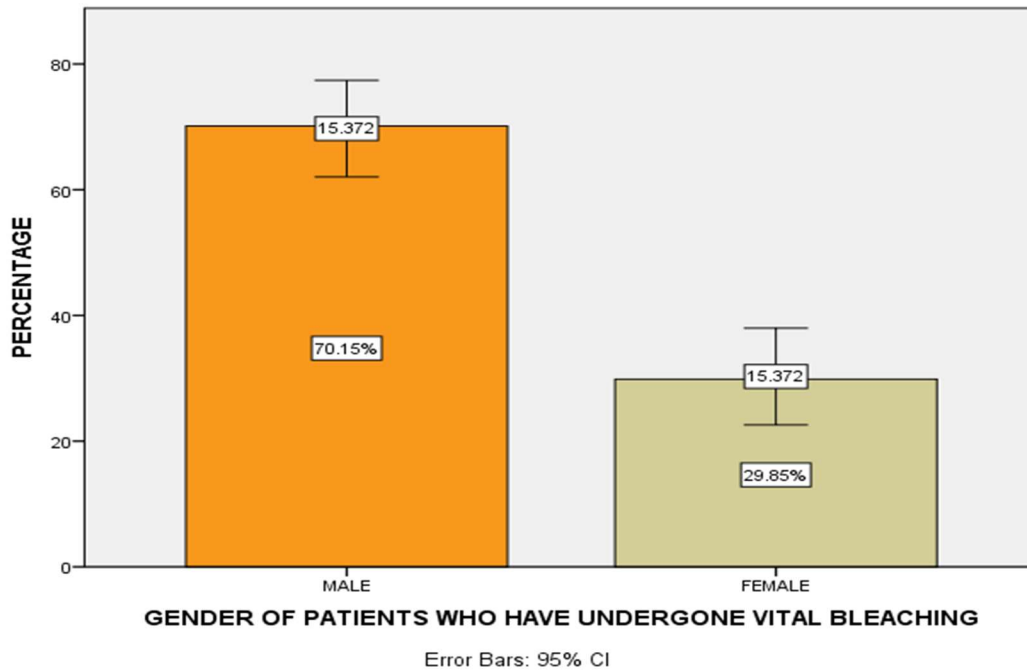
## **FREQUENCY DISTRIBUTION OF DIFFERENT AGE GROUP OF PATIENTS WHO HAVE UNDERGONE VITAL BLEACHING**



**Figure 1** Image representing the frequency distribution of different age groups of patients who have undergone vital bleaching . X-axis shows the different age groups while Y-axis shows the percentage of patients. This graph shows that Higher number of patients in the age group of 15-25 years have undergone vital bleaching 73.9%(n=99); followed by the age group of 26-35 years 14.2% (n=19); >35 years 11.9% (n=16).

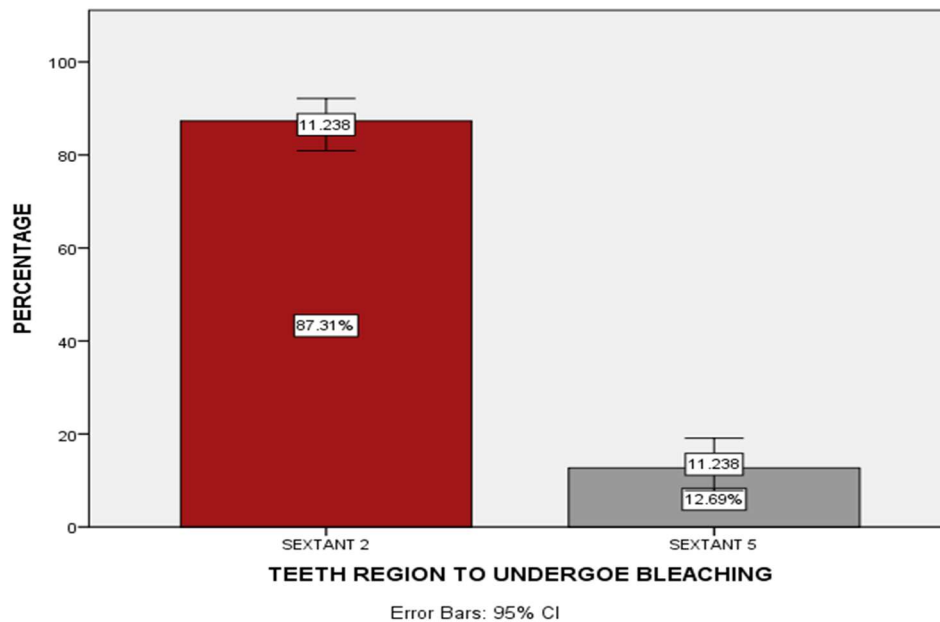
### **FREQUENCY DISTRIBUTION OF MALES AND FEMALES PATIENTS WHO HAVE UNDERGONE VITAL BLEACHING**





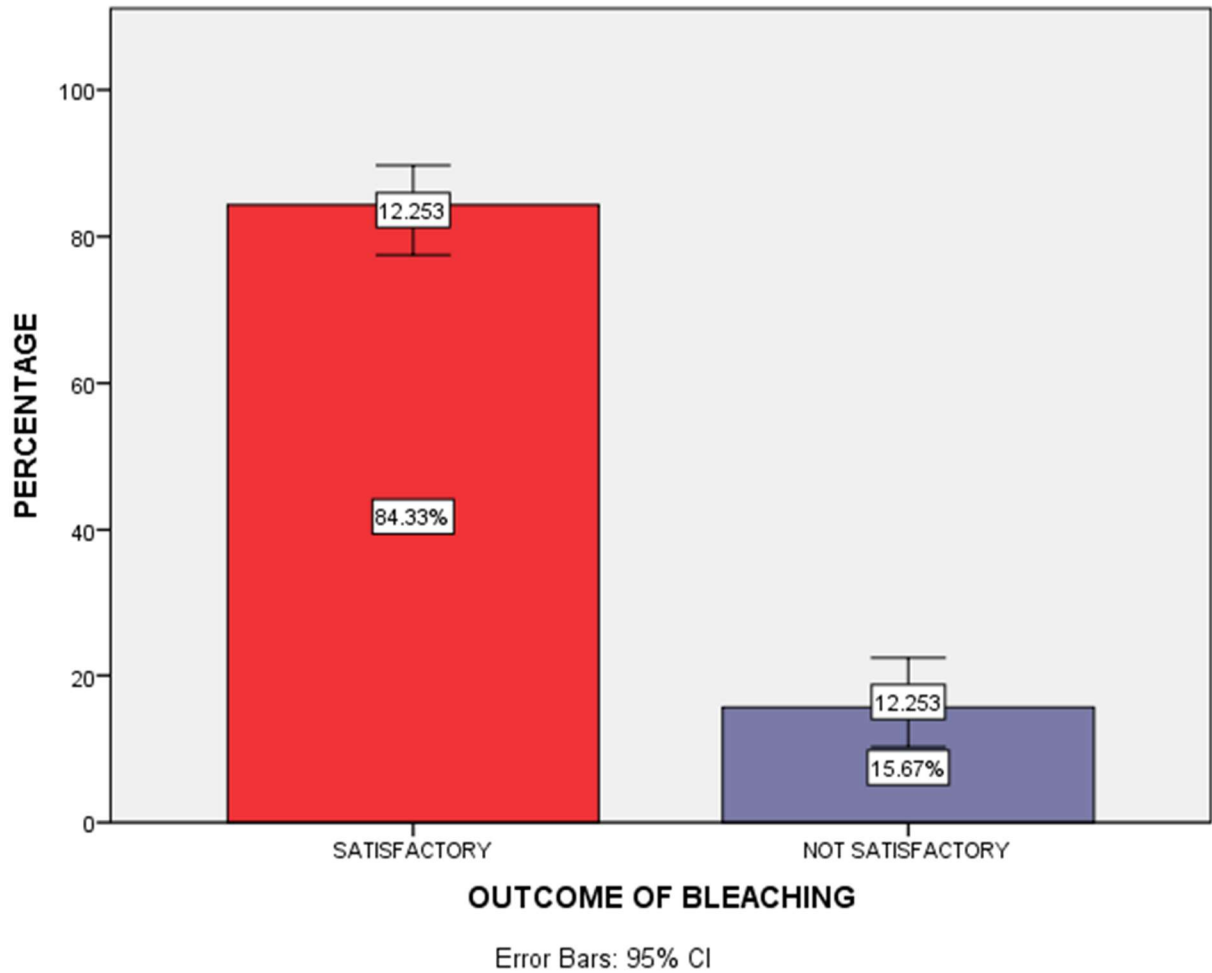
**Figure 2** Image representing the frequency distribution of males and females who have undergone vital bleaching. X-axis shows the gender while Y-axis shows the percentage of patients who have undergone vital bleaching. Higher number of male patients 70.1% (n=94) have undergone treatment of vital bleaching than male patients 29.9% (n=40).

**FREQUENCY DISTRIBUTION OF DIFFERENT TEETH REGIONS UNDERGONE VITAL BLEACHING**



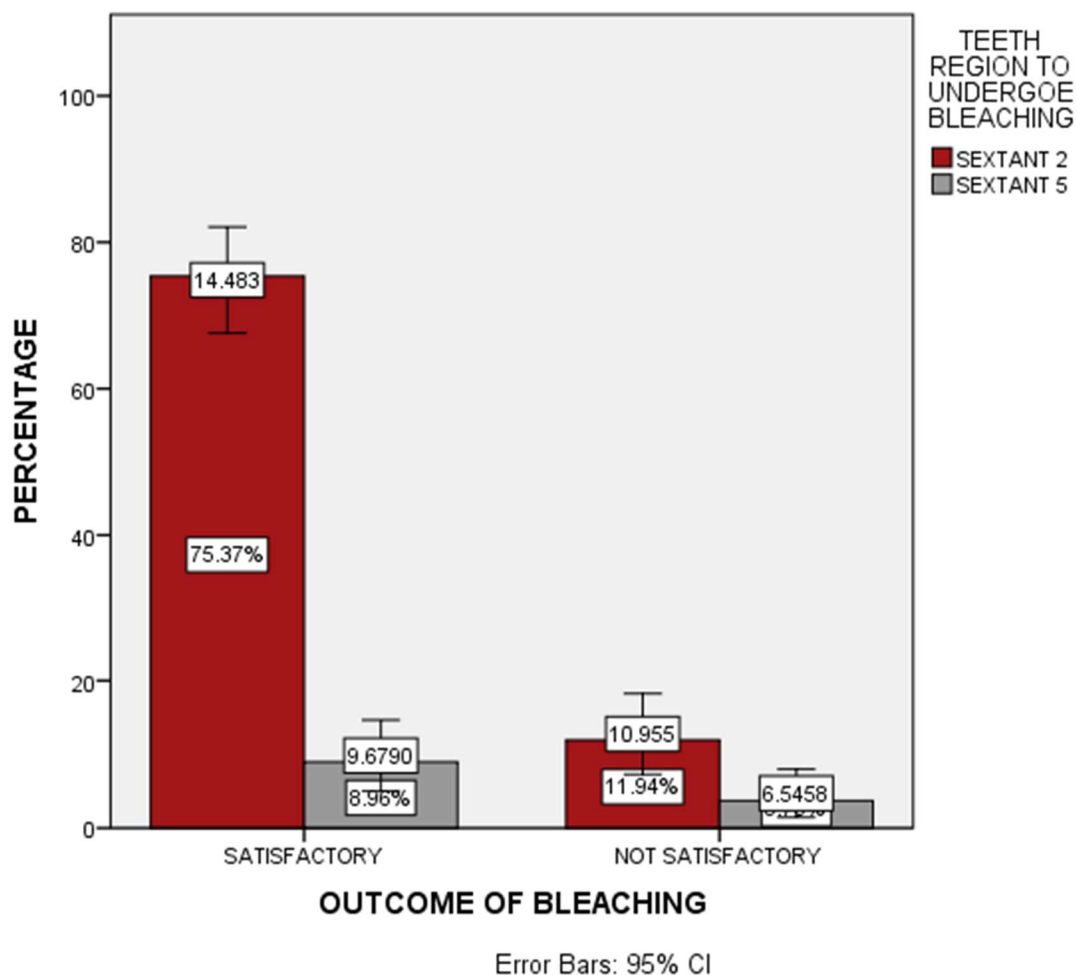
**Figure 3** Image representing the frequency distribution of different teeth regions which have undergone vital bleaching. X-axis shows the different teeth region while Y-axis shows the percentage of patients with vital bleaching. Higher number of patients had undergone vital bleaching in sextant 2 87.3% (n=117); followed by Sextant 5 12.7% (n=17).

**FREQUENCY DISTRIBUTION OF THE CLINICAL OUTCOME OF VITAL BLEACHING**



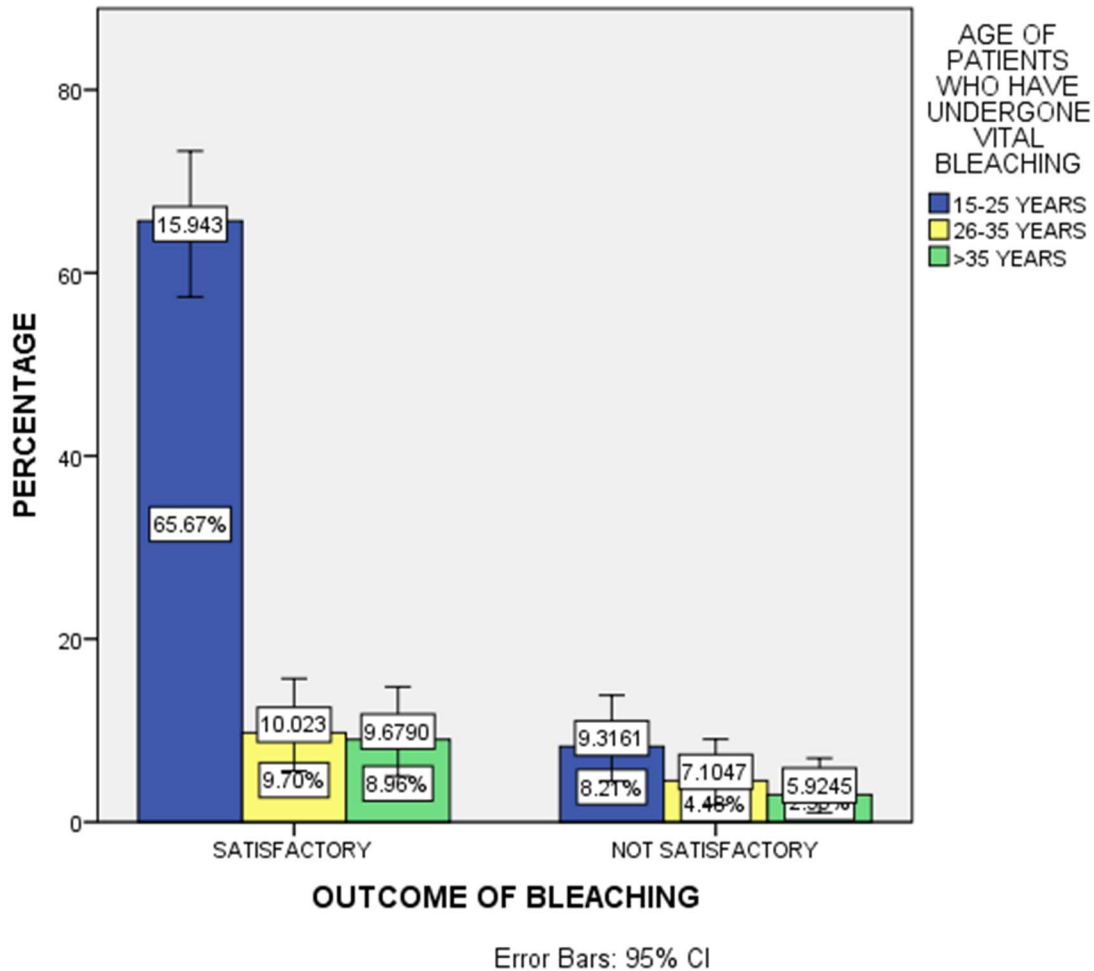
**Figure 4** Image representing the frequency distribution clinical outcome of vital bleaching. X-axis shows the clinical outcome while Y-axis shows the percentage. Higher number of patients felt a satisfactory outcome from vital bleaching 84.3% (n=113); 15.7% (n=21) felt not satisfactory over clinical outcome from vital bleaching.

**ASSOCIATION BETWEEN OUTCOME OF BLEACHING AND THE TEETH REGION**



*Figure 5 Image representing the association between outcome of bleaching and the teeth region . The X- axis represents the outcome of bleaching and the Y axis represents the number of sextants which have undergone vital bleaching. Blue colour represents sextant 2 and green colour represents sextant 5. Chi square test was done and the association was found out to be statistically significant. Pearson chi-square value :6.250, DF:2, p value :0.044 (>0.05) hence not statistically significant, proving that there is no significant association between the outcome of bleaching and the teeth region which has undergone vital bleaching.*

### **ASSOCIATION BETWEEN OUTCOME OF BLEACHING AND THE AGE OF THE PATIENTS**



**Figure 6** Image representing the association between outcome of bleaching and the age of the patients. The X- axis represents the outcome of bleaching and the Y axis represents different age groups who have undergone vital bleaching. Blue colour represents the age group of 15-25 years; green colour represents the age group of 26-35 years; grey colour represents the age group of >35 years. Chi square test was done and the association was found out to be not statistically significant. Pearson chi-square value : 2.781, DF:1, p value :0.095 (>0.05) hence not statistically significant, proving that there is no significant association between the outcome of bleaching and the age groups