

Knowledge And Awareness About Tooth Whitening And Its Deleterious Effect Among Young Adults

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ABSTRACT

Background

In today's society, everyone wishes to have whiter, properly arched, and bright teeth. The demand for tooth whitening treatment in dental practice has increased exponentially over the last decade. This study explains the knowledge about tooth whitening by providing a survey-based review of current literature. The study aims to determine the knowledge and awareness about tooth whitening and its deleterious effect among young adults.

Materials and method

A questionnaire containing 12 questions was created using Google forms. The questionnaire was thoroughly verified. The purpose of this validation was to ensure that the questions were not ambiguous. The modifications suggested by the panel regarding the arrangement and the structure of questions were carried out. The link to the questionnaire survey was circulated to all the young adults across Chennai by email. One hundred and thirteen responses were received and at the end of the survey, all the responses that were received were tabulated. The frequencies and percentages were calculated. Based on these calculations, the results were analyzed by using Chi-square analysis. The Chi-square analysis was done using the software IBM SPSS Software Version 23.

Results

In our study, 38.94% of responders were aware of the tooth whitening procedures and 36.28% of responders were not aware of the tooth whitening procedures. 39.82% of responders experienced dry mouth after the tooth whitening treatment. whereas, 32.74% of responders did not experience dry mouth after the tooth whitening treatment. 45.13% of responders had experienced sensitivity after tooth whitening treatment and 54.87% reported that they had never

experienced any sensitivity after the tooth whitening procedure. About 31.86% of females were satisfied with the results of tooth bleaching which is greater than males 23.89%. The chi-square test was done and the association was found to be statistically significant, the p-value is 0.045($p < 0.05$).

Conclusion

In conclusion, tooth whitening under the guidance of a dental professional is recommended to reduce the potential risk and maximize the benefits. Home bleaching has gained popularity in dentistry during the last two decades. There is no evidence of a long-term risk based on the data gathered. As a result, tooth whitening is both safe and effective when H₂O₂ is used appropriately. As a result, after the tooth whitening procedure, the patient must be evaluated to identify and correct any negative effects that may have occurred as a result of the procedure.

Keywords:- Dry mouth, Home bleaching, Sensitivity, Novel method, Tooth whitening.

INTRODUCTION

In today's society, everyone wishes to have whiter, properly arched, and bright teeth(1). The demand for tooth whitening treatment in dental practice has increased exponentially over the last decade. Hydrogen peroxide (H₂O₂) usage for tooth whitening is traced back more than a century(2,3). Only in dental practices, the procedure was practiced primarily. In 1989 home tooth whitening was first introduced by Haywood and Heymann(4,5). Due to the increasing quest for tooth whitening, tooth bleaching has become a more popular aesthetic procedure in dental practices (4,6,7)).

Recent tooth bleaching materials contain carbamide peroxide and H₂O₂ as ingredients in tooth bleaching (8)(9)(10,11). The chemical composition of carbamide peroxide consists of 6.5 parts of urea and 3.5 parts of H₂O₂. So that around 3.5% H₂O₂ will be present in 10% carbamide peroxide in a bleaching gel. Hence H₂O₂ is considered as the active ingredient in tooth whitening. 3-9% H₂O₂ concentration is contained at home formulation whereas in-office bleaching the H₂O₂ concentration ranges from 25-40%(12,13). Recently up to 15%, H₂O₂ concentration is available now for home use directly (6,14)

Young adults and adolescents are concerned more about dental esthetics, which can be a factor that leads to the improvement in tooth color (2,15). Due to the increase in availability, variety, and popularity of products in whitening, young people show more interest in whitening their teeth which are recognized by the American Academy of Pediatric Dentistry (15,16). Hence for yellowed teeth, tooth whitening is considered an invasive esthetic procedure (15,17).

In recent years, Requests for tooth bleaching reported by pediatric patients are in greater numbers (18,19). More teenage patients complain about tooth sensitivity during tooth whitening when compared to 7 to 11 years patients who undergo tooth whitening procedures(20). Usage of home bleaching agents gives faster results (18,21). Tooth whitening undertaken by dentists became legal

and less than 6% H₂O₂ containing materials can be used (22,23). However, bleaching for under-18 is still restricted, tooth whitening materials should contain less than 0.1% H₂O₂(24). The General Dental Council (GDC) states that a person under-18 years of age cannot use the products containing 0.1% and 6% H₂O₂ because such use can be intended for treating or preventing disease (25). Our team has extensive knowledge and research experience that has translated into high quality publications (26),(27),(28),(29),(30),(31),(32),(33),(34),(35),(36),(37),(38),(39),(40),(41),(42),(43),(44). The study aims to determine the knowledge and awareness about tooth whitening and its deleterious effect among young adults.

MATERIALS AND METHODS

A questionnaire containing 12 questions was created using Google forms. The questionnaire was thoroughly verified. The purpose of this validation was to ensure that the questions were not ambiguous. The modifications suggested by the panel regarding the arrangement and the structure of questions were carried out. The link to the questionnaire survey was circulated to all the young adults across Chennai by email. One hundred and thirteen responses were received and at the end of the survey, all the responses that were received were tabulated. The frequencies and percentages were calculated. Based on these calculations, the results were statistically analyzed by using the SPSS software Version 23. The study was approved by SRB (Scientific Review Board) Saveetha Dental College. Participants of age between 12-22 years were included with a diagnosis of altered colour on the teeth and participants with good oral hygiene (no plaque accumulation or inflammation) and good general health (no medication or no serious medical disease)were included in our study whereas the participants with poor oral hygiene, allergy history, advanced periodontal diseases and those under medications were excluded. Participants with dental anomalies like carious lesion and malformation were also excluded from the study

The questionnaire comprised a series of 12 questions including their demographic characteristics like age and gender. The other questions are as follow:

1. Are you aware of tooth whitening procedures?
2. If Yes, have you undergone tooth whitening treatment?
3. Have you tried tooth whitening at home?
4. Did you experience dry mouth after tooth whitening?
5. How frequently have you undergone tooth bleaching?
6. Do you experience any sensitivity after tooth bleaching?

7. Are you aware of the material used for tooth bleaching?
8. What is the reason to opt for tooth bleaching?
9. Are you satisfied with the results of tooth bleaching?
10. Do you experience headaches due to tooth sensitivity after tooth bleaching?

RESULTS

In our study, about 38.94% of responders were aware of the tooth whitening procedures and 36.28% of responders were not aware of the tooth whitening procedures. 39.82% experienced dry mouth after the tooth whitening treatment. Whereas, 32.74% of responders did not experience dry mouth after the tooth whitening treatment. 45.13% had experienced sensitivity after tooth whitening treatment and 54.87% reported that they had never experienced any sensitivity after the tooth whitening procedure. 30.97% of respondents reported that due to yellow discoloration of the tooth, they opted for tooth bleaching whereas 28.32% reported that they opted for tooth bleaching due to aesthetic concern. Finally, in this study, 55.75% of responders were satisfied with the results of tooth bleaching whereas 23.01% of responders were dissatisfied with the results of the tooth bleaching procedure. 23.89% of males experience sensitivity after tooth bleaching which is greater than females 21.24%. A chi-square test was done and the association was found to be statically not significant. p -value is 0.97($p>0.05$). About 31.86% of females were satisfied with the results of tooth bleaching which is greater than males 23.89%. The chi-square test was done and the association was found to be statistically significant, the p -value is 0.045($p<0.05$). Above 18.58% of males experience headache due to tooth sensitivity after tooth whitening treatment which is greater than females 16.81%. The chi-square test was done and the association was found to be statically not significant. p -value is 0.166($p>0.05$).

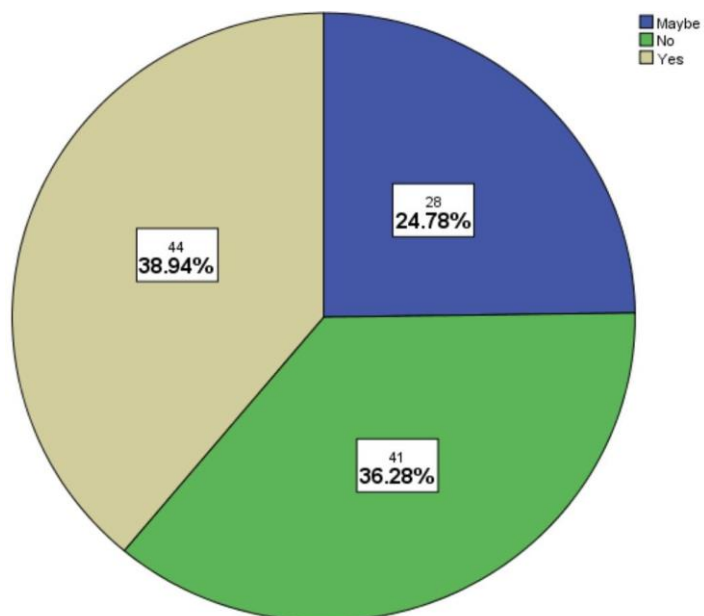


Figure-1: Pie Chart showing the percentage distribution about the awareness of tooth whitening procedure among young adults. 38.94%(Beige) of participants answered yes, 36.28%(Green) of participants answered no and 24.78%(Blue) of participants answered maybe. The majority of the participants were aware of the tooth whitening procedure.

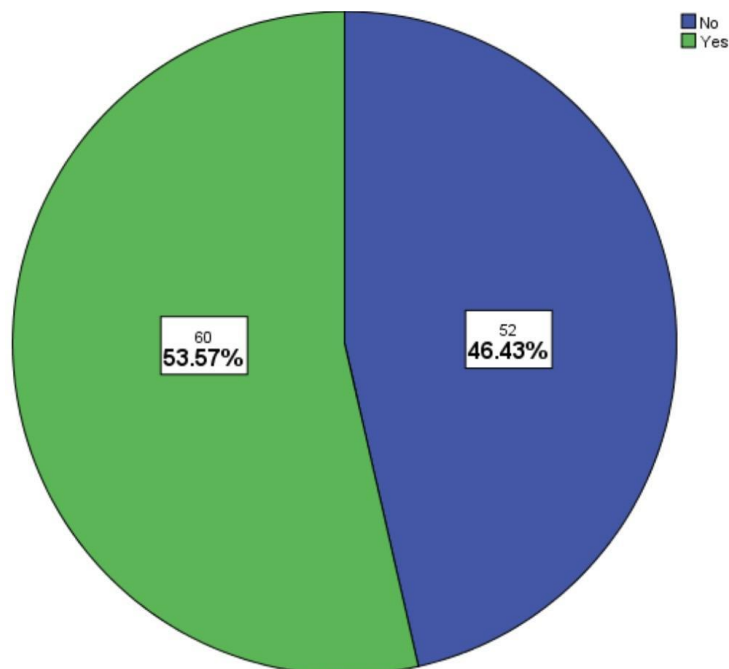


Figure-2: Pie Chart Showing the percentage distribution about the number of participants who had undergone tooth whitening treatment. 53.57%(Green) of participants answered yes and 46.43%(Blue) of participants answered no. The majority of the participants had undergone tooth whitening treatment.

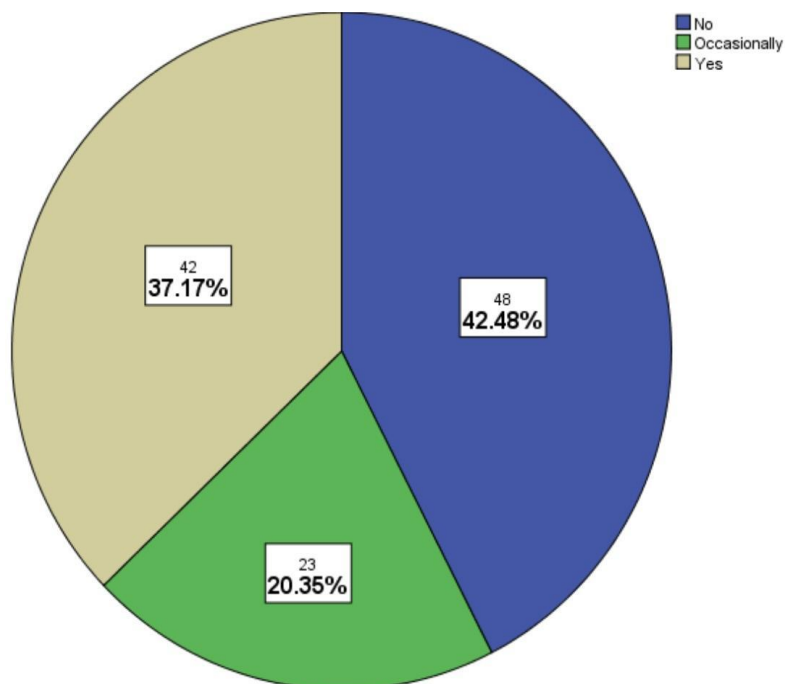


Figure-3: Pie Chart Showing the percentage distribution about the number of participants who had tried home tooth whitening. 37.17%(Beige) of participants answered yes, 42.48%(Blue) of participants answered no, and 20.35%(Green) of participants answered occasionally. The majority of the participants had not tried home tooth whitening.

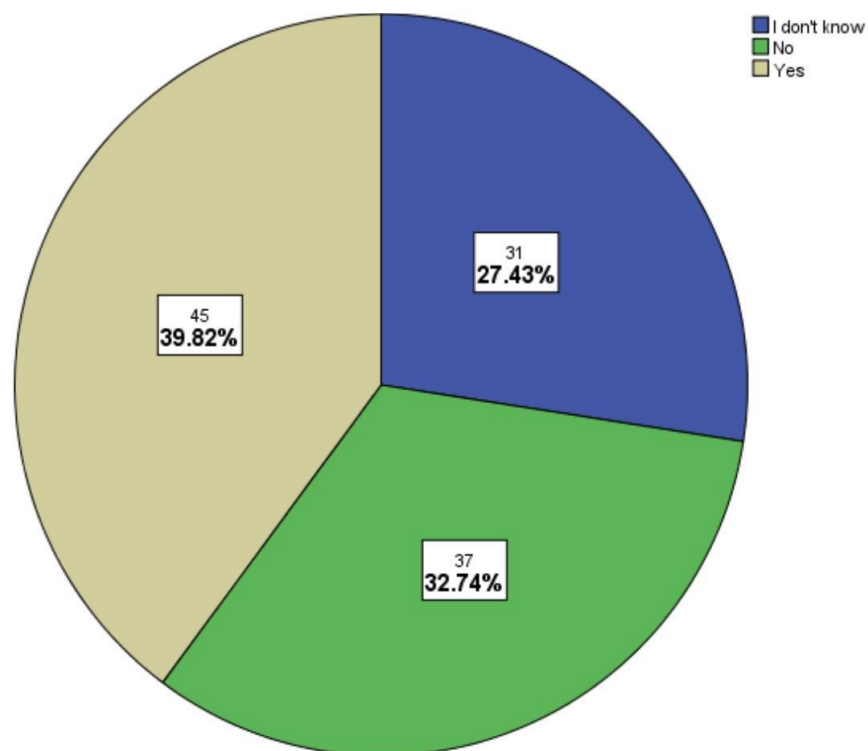


Figure-4: Pie Chart Showing the percentage distribution about dry mouth experience after the tooth whitening treatment. 39.82%(Beige) of participants answered yes, 32.74%(Green) of participants answered no, and 27.43%(Blue) answered, “ I don’t know. The majority of the participants had the experience of dry mouth after the tooth whitening treatment.

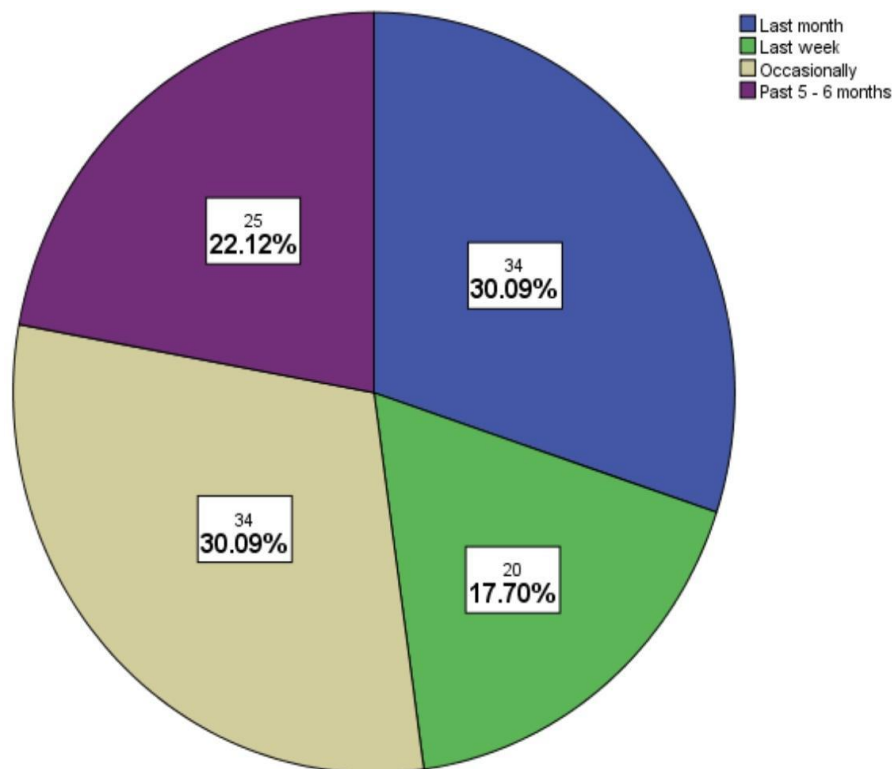


Figure-5: Pie Chart Showing the percentage distribution about the duration of undergoing tooth bleaching. 30.09%(Blue) participants answered last month, 17.70%(Green) participants answered last week, 22.12%(Violet) participants answered the past 5-6 months, and 30.09%(Beige) participants answered occasionally. The majority of the participants had undergone tooth bleaching occasionally and last month.

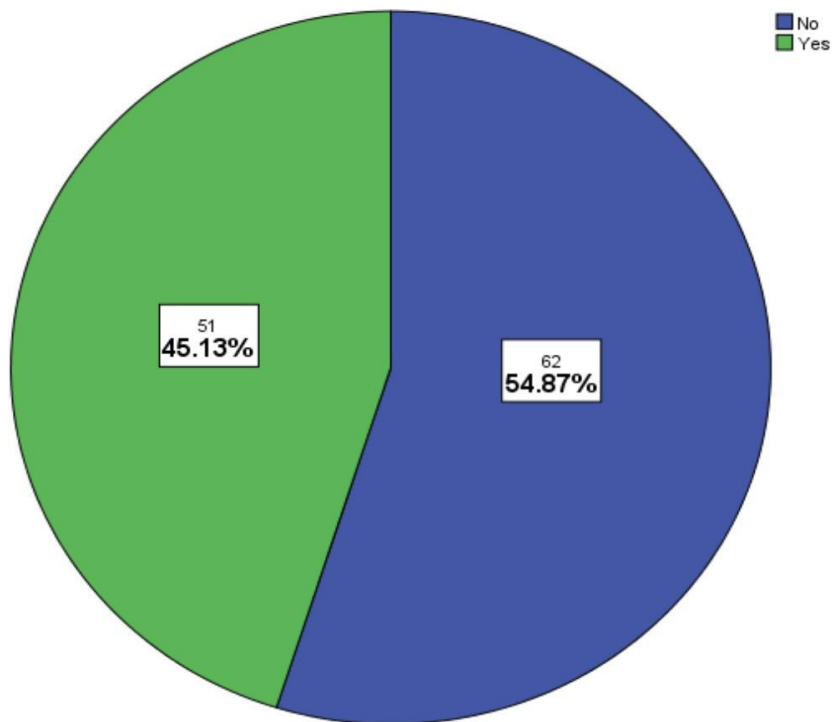


Figure-6: Pie Chart Showing the percentage distribution about the experience of sensitivity after tooth bleaching. 54.87%(Blue) participants answered no and 45.13%(Green) participants answered yes. The majority of the participants had not experienced sensitivity after tooth bleaching.

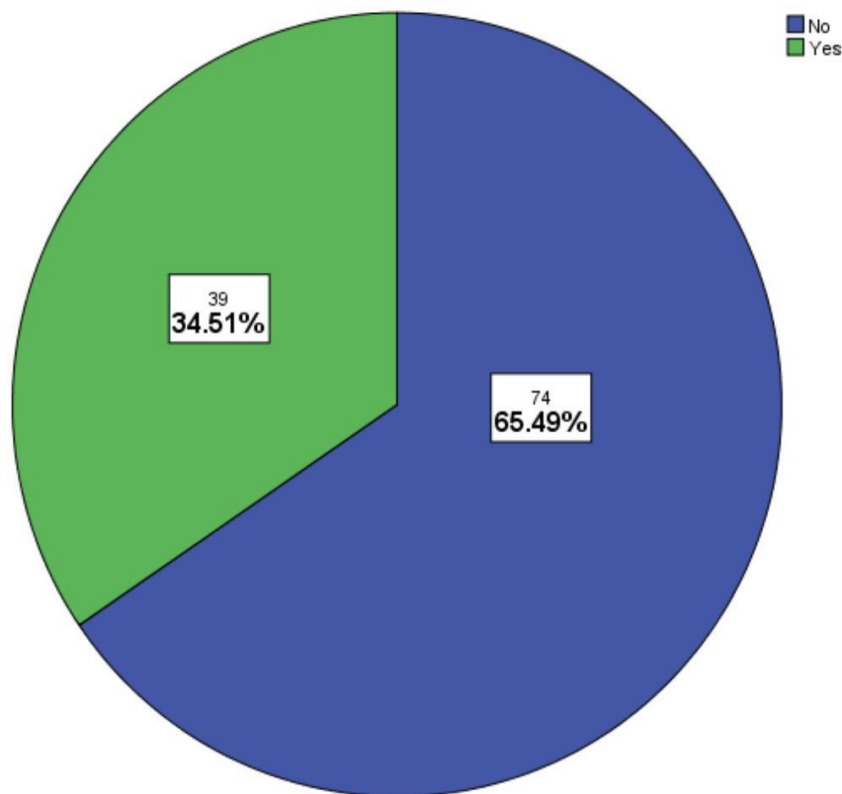


Figure-7: Pie Chart Showing the percentage distribution about the awareness of the materials used for tooth bleaching. 65.49%(Blue) of participants answered no and 34.51%(Green) of participants answered yes. The majority of the participants are not aware of the materials used for tooth bleaching.

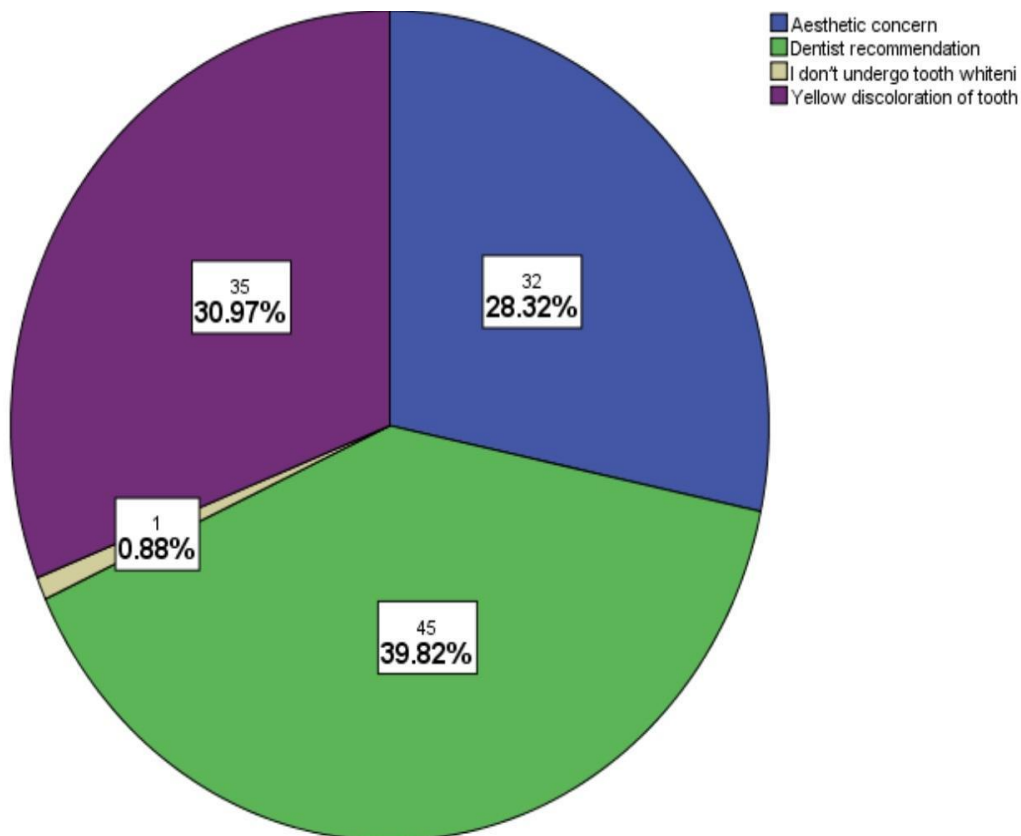


Figure-8: Pie Chart Showing the percentage distribution about the reason to opt for tooth bleaching. 39.82%(Green) of participants answered due to dentist recommendation, 30.97%(Violet) participants answered due to yellow discoloration of the tooth, 28.32%(Blue) participants answered due to aesthetic concern, and 0.88% (Beige) participants answered I never underwent tooth whitening procedure. Beige indicates those who have never undergone a tooth whitening procedure, green indicates dentist recommendation, blue indicates aesthetic concern and violet indicates yellow discoloration of tooth. The majority of the participants are opting for tooth bleaching due to dentist recommendations.

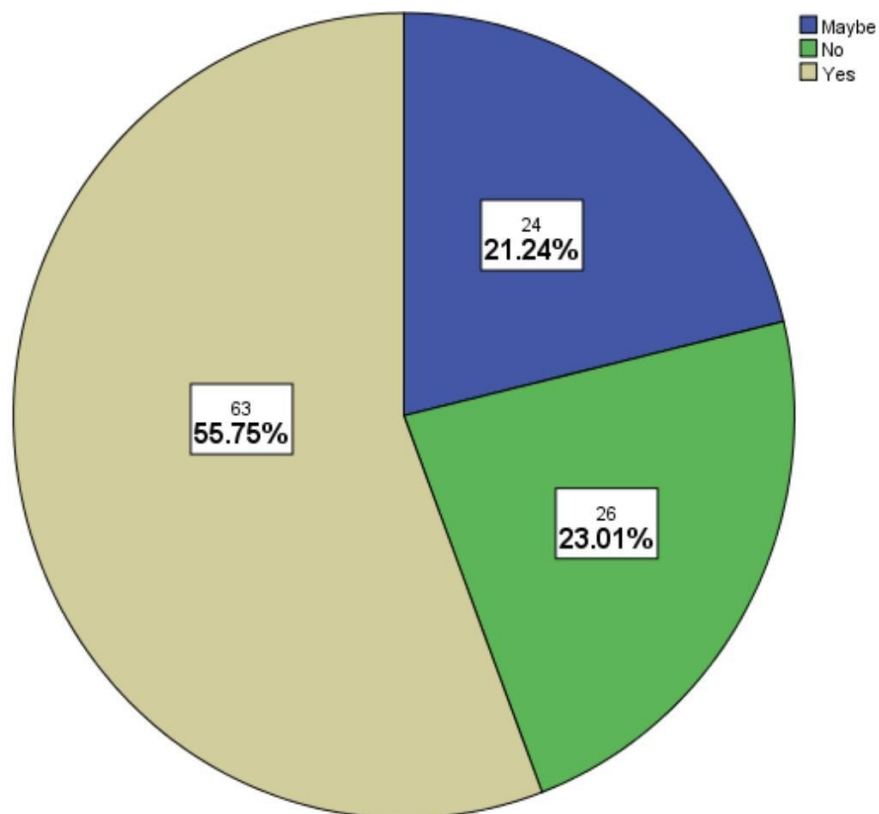


Figure-9: Pie Chart Showing the percentage distribution about the number of participants who are satisfied with the results of tooth bleaching. 55.75%(Beige)of participants answered yes, 23.01%(Green) of participants answered no, and 21.24%(Blue) of participants answered maybe. The majority of the participants are satisfied with the results of tooth bleaching.

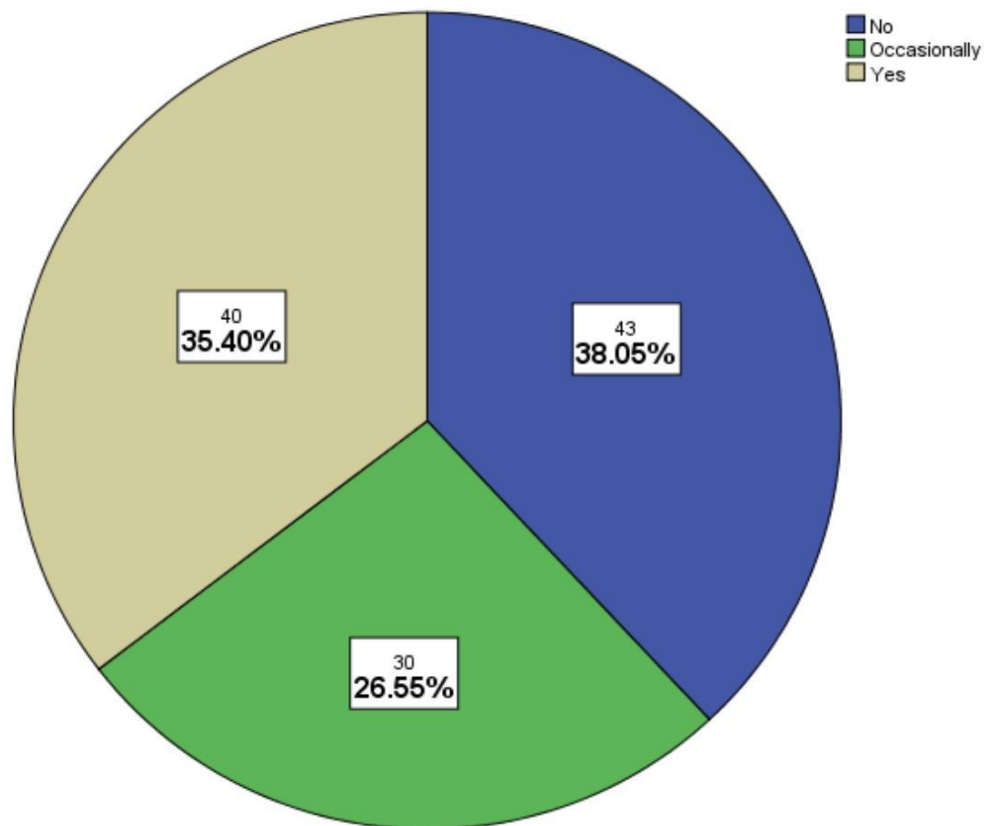


Figure-10: Pie Chart Showing the percentage distribution about the number of participants who had experienced headache due to tooth sensitivity after tooth bleaching. 38.05%(Blue) of participants answered no, 35.40%(Beige) of participants answered yes and 26.55%(Green) of participants answered occasionally. The majority of the participants had not experienced headaches due to tooth sensitivity after tooth bleaching.

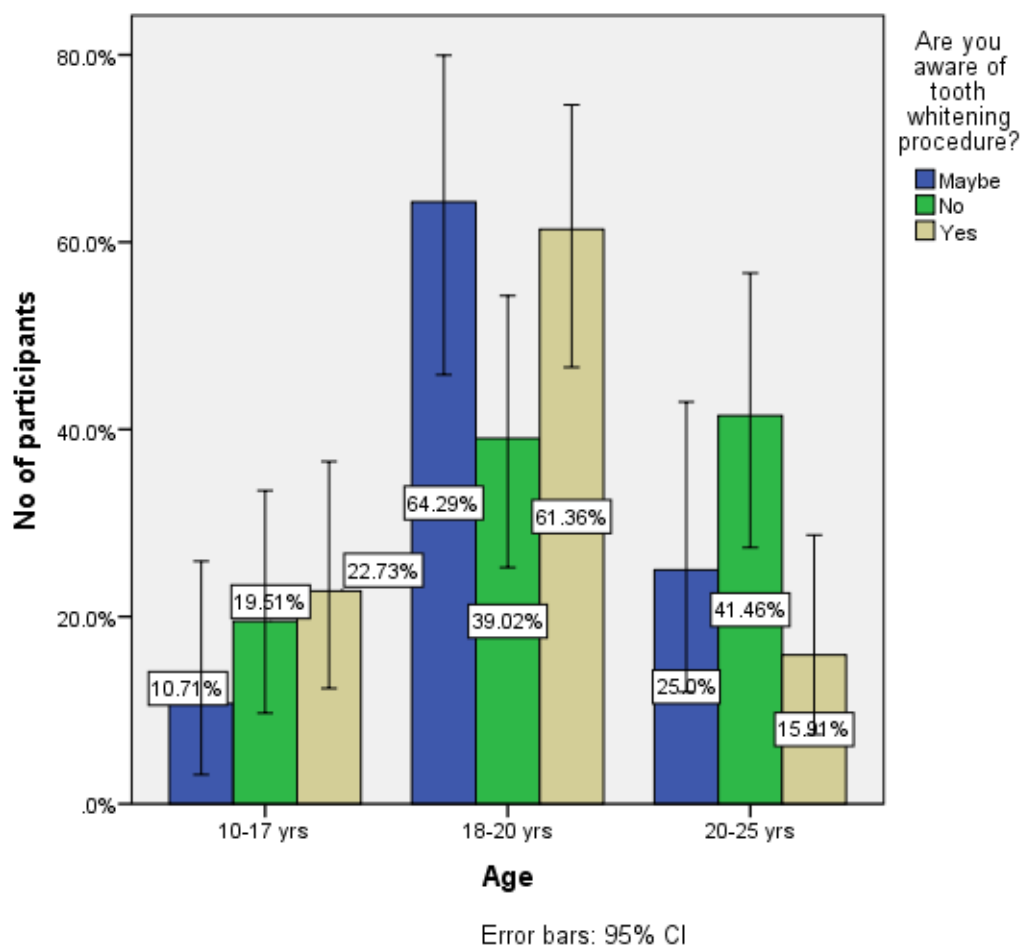


Figure-11: The bar graph represents the association between age and awareness of the tooth whitening procedure. The X-axis represents the age and Y-axis represents the percentage of responses for the awareness of tooth whitening procedure. (Beige indicates yes, green indicates no, and blue indicates maybe). About 8.85%(Beige) of people aged 10-17years reported yes, 23.89%(Beige) of people aged 18-20 years reported yes, and 15.04%(Green) of people aged 20-25 years reported no. The Chi-square analysis was done and the association was found to be statistically not significant. Pearson Chi-square value : 9.18,df:4, p-value:0.057($p > 0.05$) hence statistically not significant.

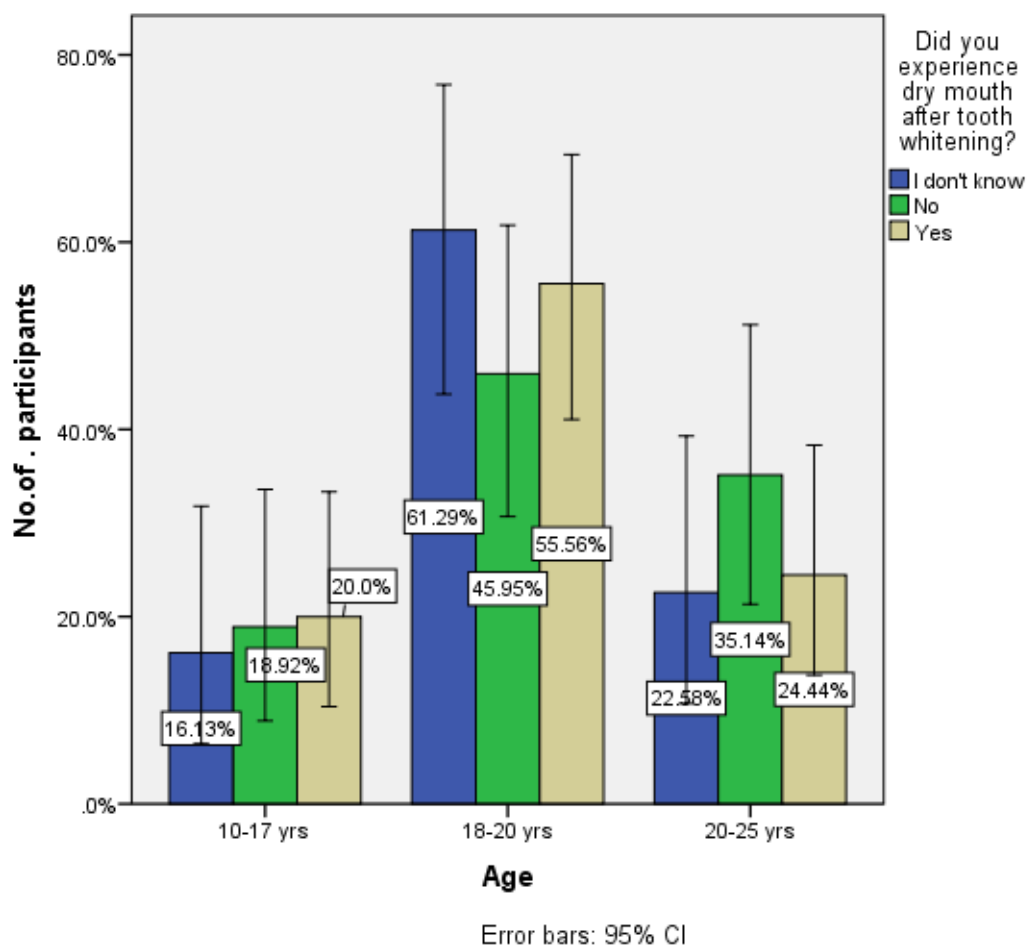


Figure-12: The bar graph represents the association between the age and experience of dry mouth after the tooth whitening procedure. The X-axis represents the age and the Y-axis represents the percentage of responses for dry mouth experience after the tooth whitening procedure. (Beige indicates yes, green indicates no, and blue indicates I don't know). About 7.96% (Beige) of people aged 10-17 years reported yes, 22.12% (Beige) of people aged 18-20 years reported yes, and 11.50% (Green) of people aged 20-25 years reported no. The Chi-square analysis was done and the association was found to be statistically not significant. Pearson Chi-square value : 2.134, df:4, p-value: 0.711 ($p > 0.05$) hence statistically not significant.

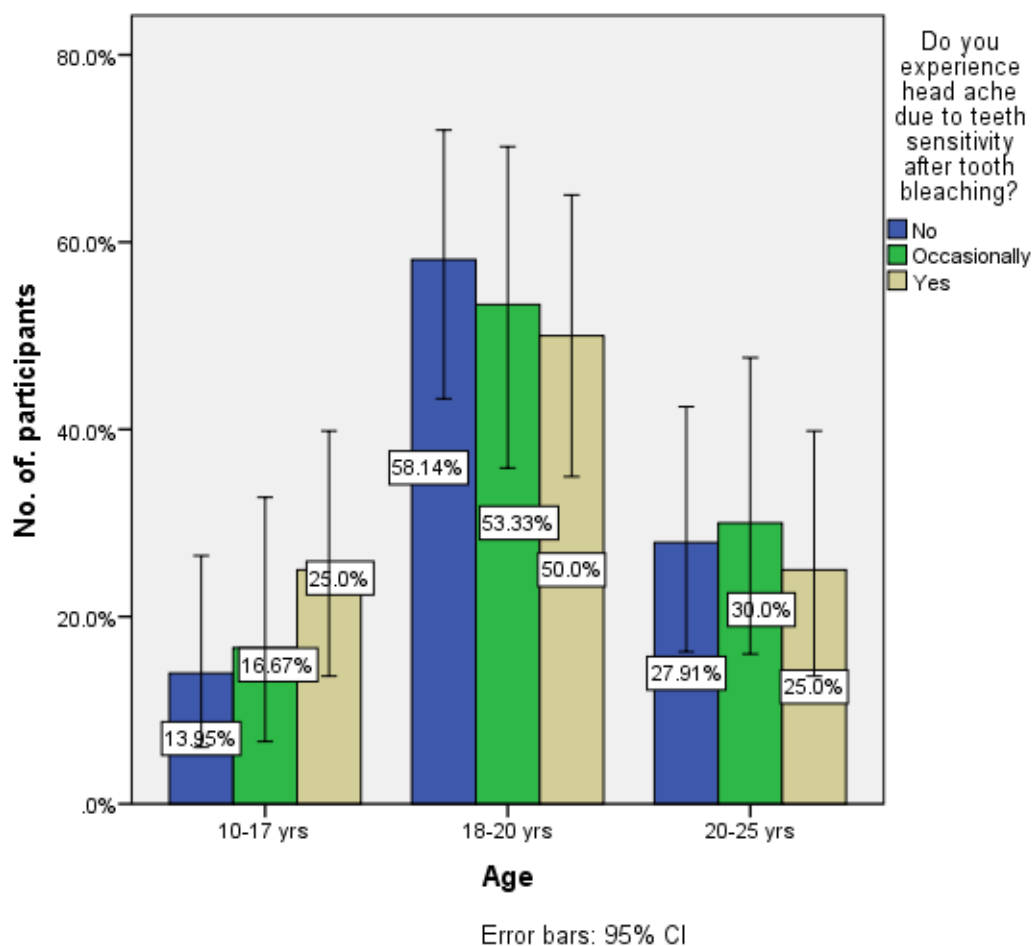


Figure-13: The bar graph represents the association between the age and experience of headache after the tooth whitening procedure. The X-axis represents the age and Y-axis represents the percentage of responses for the experience of headache after the tooth whitening procedure. (Beige indicates yes, green indicates occasionally and blue indicates no). About 8.85% (Beige) of people aged 10-17 years reported yes, 22.12% (Blue) of people aged 18-20 years reported no, and 10.62% (Blue) people aged 20-25 years reported no. The Chi-square analysis was done and the association was found to be statistically not significant. Pearson Chi-square value :1.86, df:4, p-value:0.761 ($p > 0.05$) hence statistically not significant.

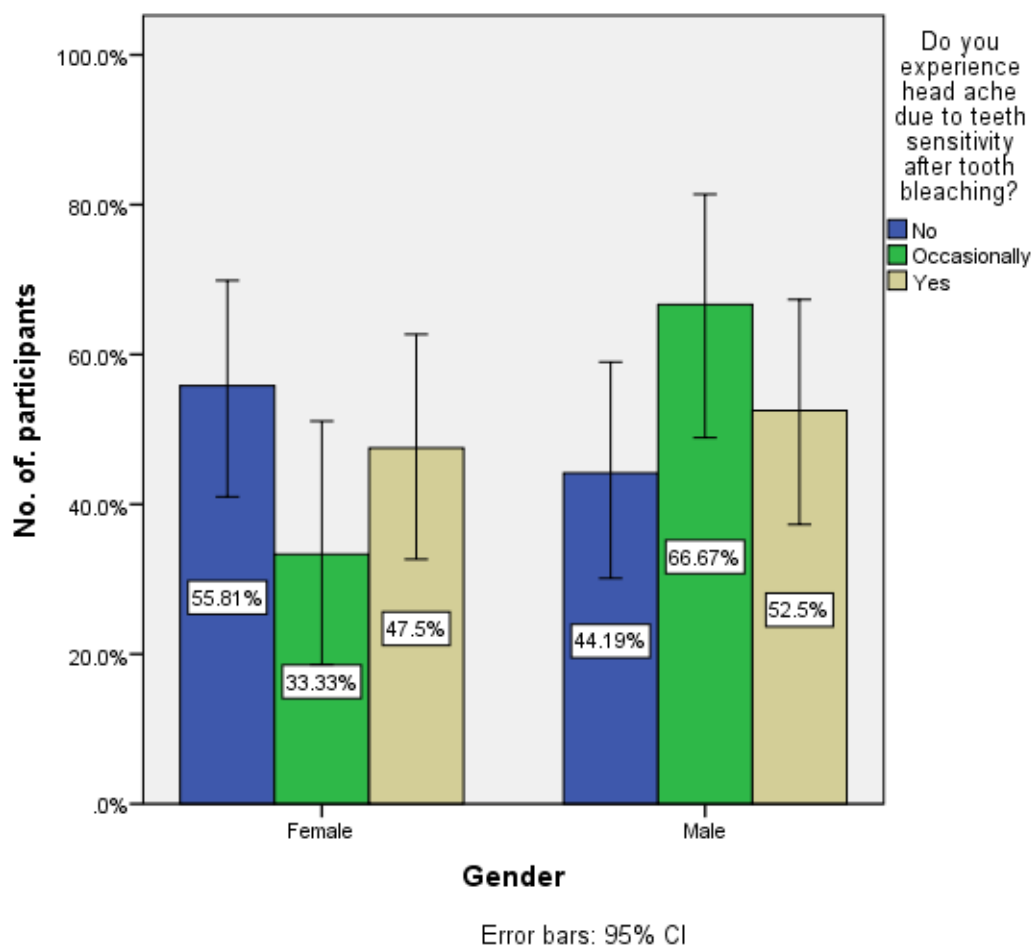


Figure-14: The bar graph represents the association between gender and experience of headache after the tooth whitening procedure. The X-axis represents the gender and Y-axis represents the percentage of responses for the experience of headache after the tooth whitening procedure. (Beige indicates yes, green indicates occasionally and blue indicates no). About 21.24% (Blue) of females reported no and 18.58% (Beige) of males reported yes. The Chi-square analysis was done and the association was found to be statistically not significant. Pearson Chi-square value :3.59, df:2, p-value:0.166 ($p > 0.05$) hence statistically not significant.

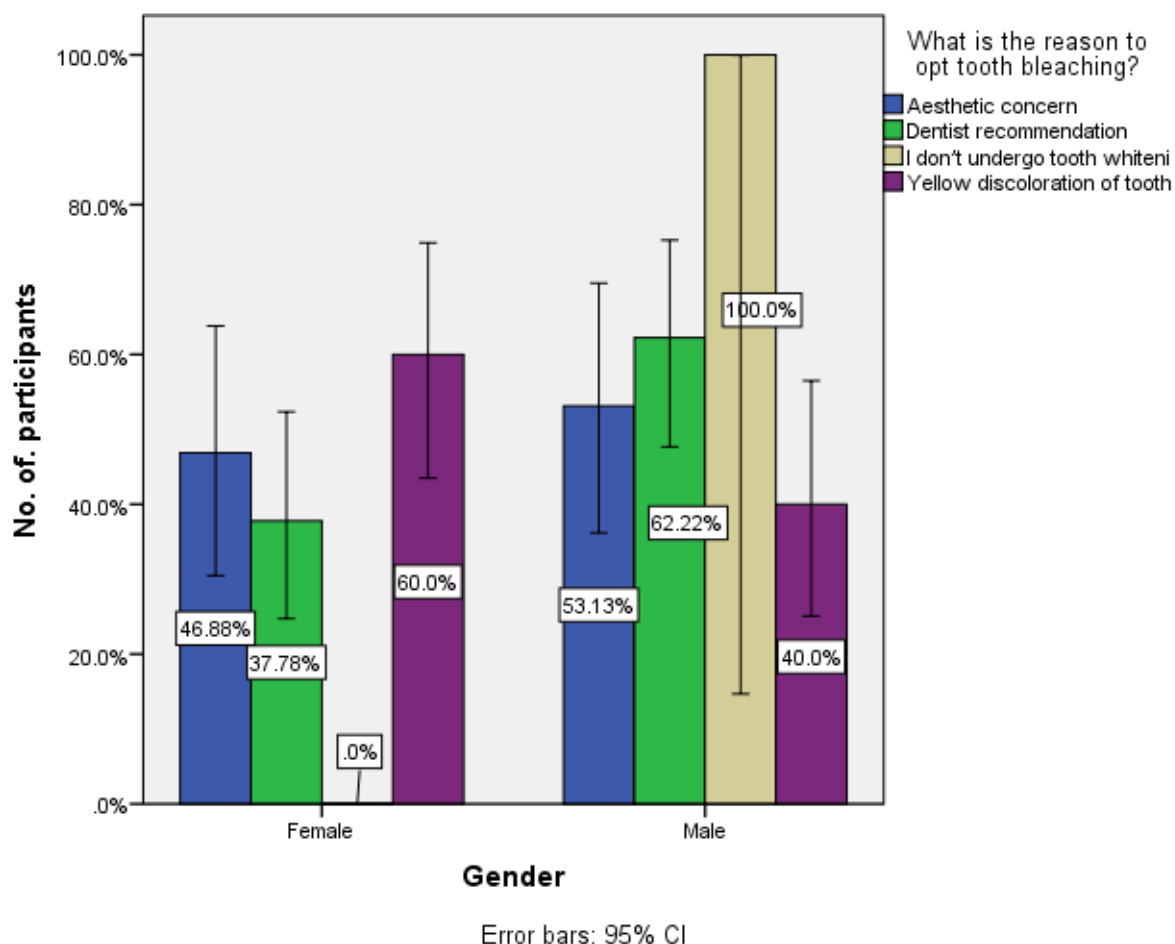


Figure-15: The bar graph represents the association between gender and the reason to opt for a tooth whitening procedure. The X-axis represents the gender and Y-axis represents the percentage of responses about the reason to opt for the tooth whitening procedure. (Beige indicates I never underwent a tooth whitening procedure, green indicates dentist recommendation, blue indicates aesthetic concern and violet indicates yellow discoloration of the tooth). About 18.58%(Violet) of females reported yellow discoloration of teeth and 24.78%(Green) of males reported dentist recommendations. The Chi-square analysis was done and the association was found to be statistically not significant. Pearson Chi-square value :4.799, df:3, p-value:0.187($p > 0.05$) hence statistically not significant.

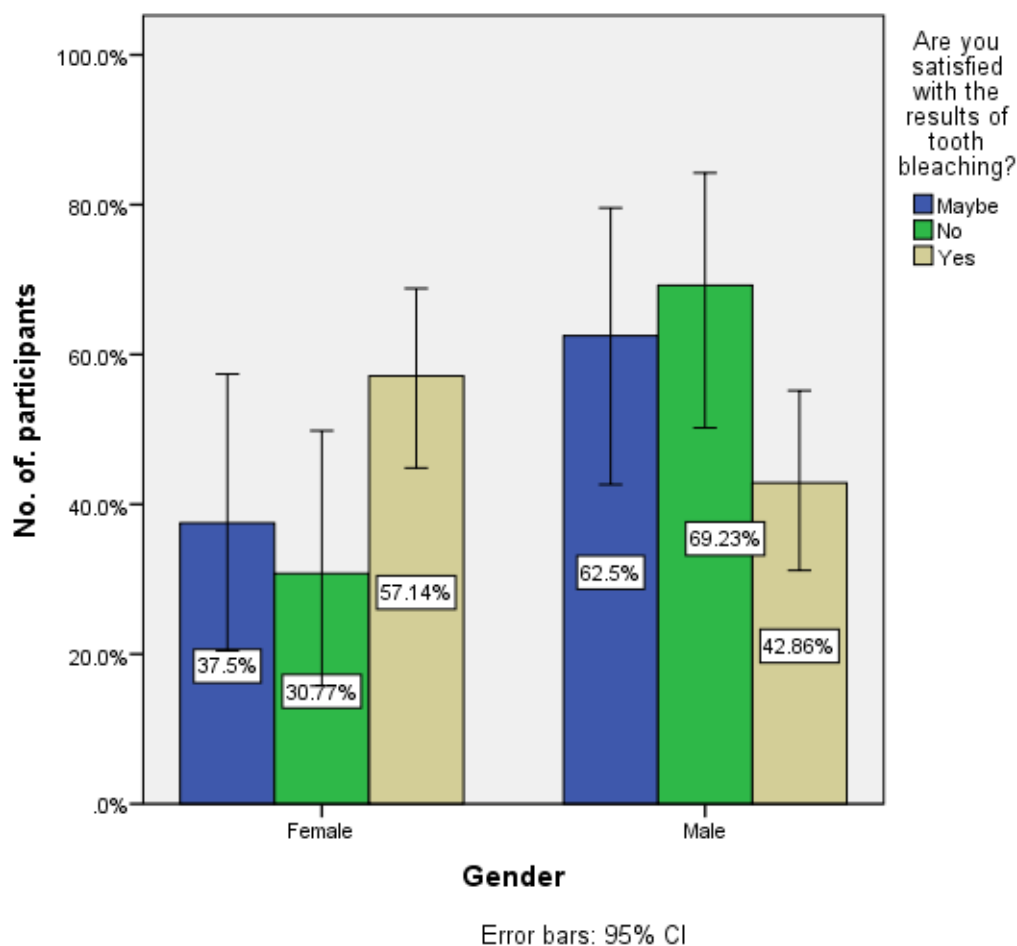


Figure-16: The bar graph represents the association between gender and the results of the tooth whitening procedure. The X-axis represents the gender and the Y-axis represents the percentage of responses about satisfaction with the results of the tooth whitening procedure. (Beige indicates yes, green indicates no, and blue indicates maybe). About 31.86% (Beige) of females reported yes and 23.89% (Beige) of males reported yes. The Chi-square analysis was done and the association was found to be statistically significant. Pearson Chi-square value :6.22, df:2, p-value:0.045 ($p < 0.05$) hence statistically significant.

DISCUSSION

In our study, 45.13% of responders had experienced sensitivity after the tooth whitening treatment. This finding is similar to another study conducted by Y. Li et al where Tooth sensitivity is a commonly observed clinical side effect during or after the bleaching of vital teeth, with an incidence up to 50% (6,40). In our study, 28.32% of participants opt for tooth whitening procedures due to aesthetic concerns. This finding is contradictory to another study conducted by Greenwall-Cohen et al where tooth whitening is done to improve a patient's self-esteem and self-confidence (22,45). In Y. Li et al

study, Tissue burns can be caused by office bleaching due to the use of a high concentration of H₂O₂. In case, a gel containing 25% H₂O₂ is applied to teeth, the soft tissue will be isolated with a light cure dam, and this tissue ulceration is referred to as “Tissue blanching”. To neutralize the damage the best treatment is to apply water immediately to the area(30,42). Vitamin E is recommended for healing ulceration (6,46). No other similar findings were supporting our study.

In our study, lesser sample sizes were addressed. In the short period of data collection, the number of questions in the questionnaire was limited. There is a possibility of bias because some responders do not have access to the internet to participate in online surveys. Finally, the online survey is limited. Further studies involving the tooth color scores in the baseline. Larger sample sizes are recommended. Related studies explaining the faster rate of whitening effect among young patients.

CONCLUSION

Tooth whitening under the guidance of a dental professional is recommended to reduce the potential risk and maximize the benefits. Home bleaching has gained popularity in dentistry during the last two decades. There is no evidence of a long-term risk based on the data gathered. As a result, tooth whitening is both safe and effective when H₂O₂ is used appropriately. As a result, after the tooth whitening procedure, the patient must be evaluated to identify and correct any negative effects that may have occurred as a result of the procedure.

AUTHORS CONTRIBUTION

Rakshitha V S: Literature search, data collection analysis, manuscript drafting.

Dr. Palati Sinduja: Aided in the conception of the topic, has participated in the study design, statistical analysis, and has supervised in preparation and final corrections of the manuscript.

Dr. Lakshmi T.A: Data verification, manuscript drafting, preparation of the manuscript.

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CONFLICT OF INTEREST

The author declares that there was no conflict of interest in the present study.

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