EFFECT OF VIRGIN COCONUT OIL IN PLAQUE RELATED GINGIVITIS

Running Title: Virgin coconut oil Vs plaque related gingivitis

ABSTRACT

Introduction

In all individuals oral health is important. Irrespective of nationality, oral hygiene habits are taught in childhood itself. Tooth cleaning by the mechanical method is the most accepted method in the maintenance of oral hygiene worldwide. Presently to reduce plaque formation chemotherapeutic agents are used. Oil pulling is used for many years for strengthening gums, teeth and to prevent oral malodor and bleeding gums. coconut oil is consumed as a staple diet. Coconut oil contains 50% of Lauric acid and 92% of saturated acid. The lauric acid contains anti-inflammatory properties.

Aim

This study aimed to find out the efficacy of virgin coconut oil in plaque-related gingivitis.

Materials and method

The sample size used for the study is 108, A self-structured questionnaire has been prepared and uploaded in Google forms. This standard questionnaire in Google forms is being circulated among the sample study population and at the end of the survey, all the data were collected and the data is been analyzed by using Chi-square analysis. The Chi-square analysis was done using the software IBM SPSS Software Version 23.

Result

The Chi-square analysis was done and the association between gender and improvement in gingival health after oil pulling in the South Indian population was found to be statistically significant. Chi-square value:11.77 and p-value:0.038,($p<0.05$) hence a statistically significant decrease in gingival and plaque was noticed during the study period.

Conclusion

In summary, using Virgin coconut oil pulling could be an effective procedure in decreasing plaque-related gingivitis. This preliminary study shows that coconut oil is easily usable, cost-effective, and safe with minimal side effects which are used as an adjuvant in oral hygiene maintenance. Further studies on the antimicrobial potency of coconut oil are required for the use of coconut oil as an effective oral antimicrobial agent.

Keyword

Virgin coconut oil, oil pulling, plaque-related gingivitis, and lauric acid.

INTRODUCTION

In all individuals oral health is important. Irrespective of nationality, oral hygiene habits are taught in childhood itself. Tooth cleaning by the mechanical method is the most accepted method in the maintenance of oral hygiene the world over. Presently to reduce plaque formation chemotherapeutic agents are used (1)(2). In Ayurveda, Oral hygiene maintenance is recommended by procedures like Kavala Graha or Gandoosha which are mentioned elaborately in Sushruta Samhita and Charaka Samhita text. It is explained as a procedure in which a comfortable amount of oil is taken and swishes the oil in the mouth. Spit out the oil when it turns milky white without swallowing (3)(4).

Dr.F. Karach claimed that several illnesses like oral disease can be cured by oil pulling (5)(6). Recently sesame oil (7)(8) and sunflower oil (9,10) were used in oil pulling therapy and decreases in plaque-related gingivitis were found. To date, no studies have mentioned the benefits of coconut oil used in oil pulling. Coconut oil is consumed as a staple diet which is edible oil. The medium-chain fatty acid is the predominant component of coconut oil. 50% of lauric acid and 92% of saturated acids is present in coconut oil.(11) The only natural occurring which contains Lauric acid in high concentration is Human breast milk. Anti Inflammatory and antimicrobial effects were found in the Lauric acid(12).

The prime factor in periodontal disease development is the accumulation of pathogenic microorganisms on the tooth surface (13)(14)(15). Proper tooth cleaning by daily removal of plaque can be an important factor in preventing periodontal disease (16)(17). The alternative used to avoid the accumulation of plaque is the usage of chemical antimicrobial agents (18)(18,19), (20).

Frequently used oils for oil pulling are sesame oil and coconut oil. Antioxidative properties are found in sesame oil. Sesamolin, sesamin, and sesamol are the components of sesame oil(21)(22). Coconut oil also has antimicrobial activity against microorganisms like Escherichia vulneris, Enterobacter spp., Helicobacter pylori, Staphylococcus aureus, Candida spp., including C. albicans, C. glabrata, C. tropicalis, C. parapsilosis, C. stellatoidea, and C. krusei (20,23)(24)(25). No previous study has been done on the effect of virgin coconut oil pulling which inhibits plaque(26)(27). Therefore, this study was conducted to find out the efficacy of virgin coconut oil on plaque formation and plaque-related gingivitis(28)(29).

MATERIALS AND METHODS

A cross-sectional survey was conducted among the population with a sample size of 100. A self-administered structured questionnaire was prepared based on visual pollution and consisted of 14 questions. It was circulated to participants through an online platform (google form). The statistics were done using SPSS software, a chi-square test was used to check the association, and a P-value of 0.05 was said to be statistically significant. The pros of the survey are that the adolescents of different lifestyles and cultures were surveyed. Children and adults were excluded from the survey. The simple random sampling method was the sampling method used to minimize the sampling bias. A population under the age between 10-45, Subjects with plaque-induced gingivitis and with the presence of signs of gingivitis like swelling, bleeding, and edema were included in this survey. Subjects with Antibiotics usage for the past 3-4 weeks and with dental treatment history in the past one month were excluded from this survey

RESULTS AND DISCUSSION

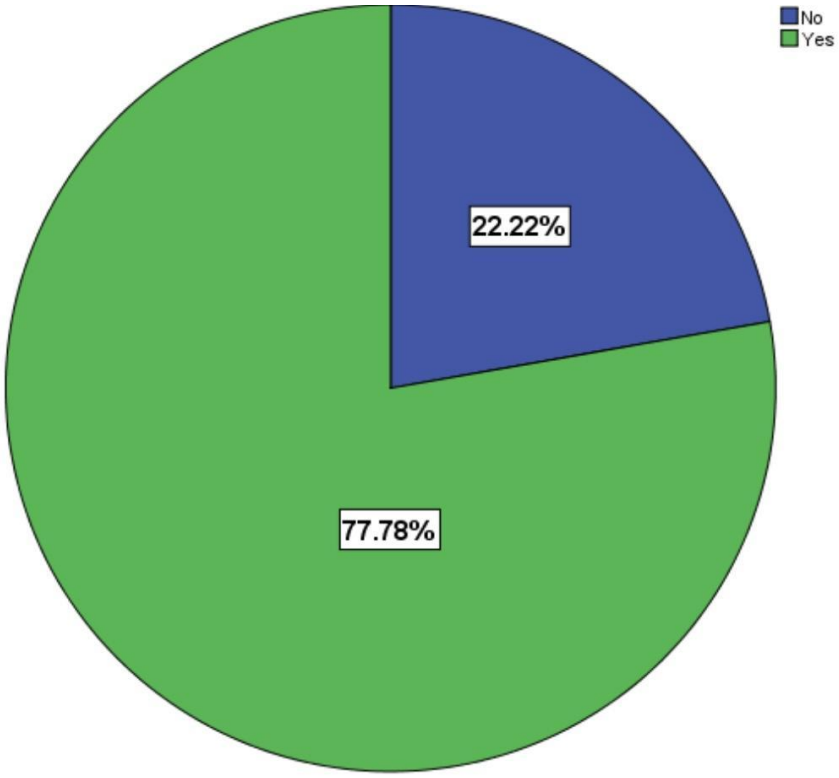

Figure 1: Pie chart showing the percentage distribution of awareness about oil pulling in the South Indian population. wherein, the green color represents yes (77.78%) and the blue color represents no (22.22%).

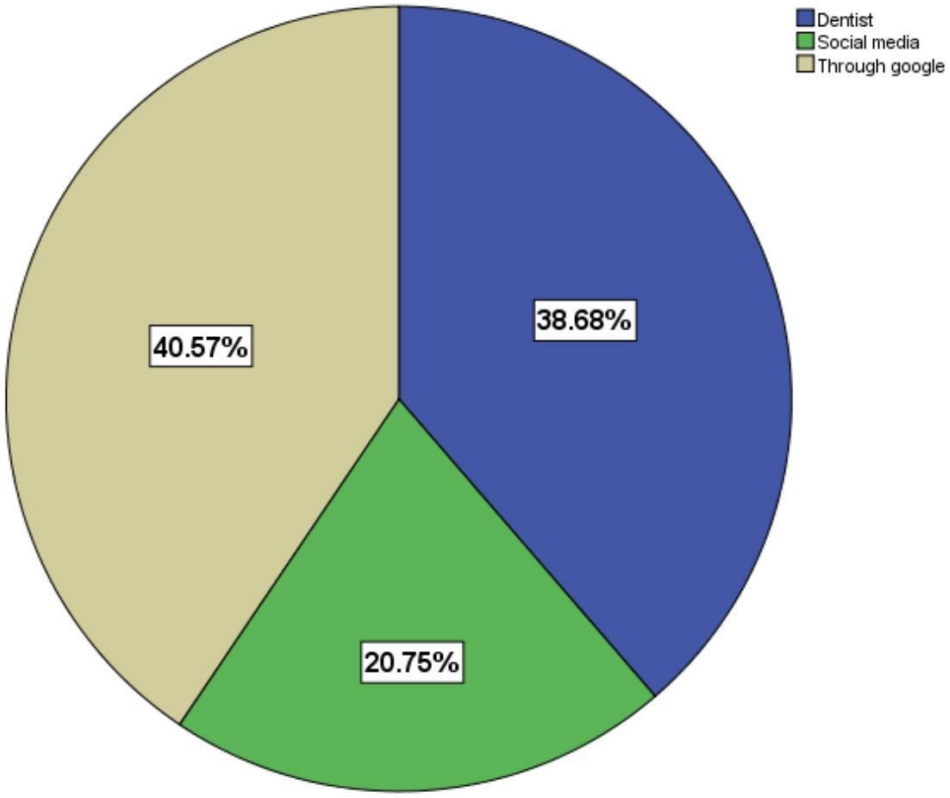

Figure 2: Pie chart showing the percentage distribution about the mode of knowledge about oil pulling in the South Indian population. wherein, the beige color represents through google (40.57%), the blue color represents through dentist (38.68 %) and green color represents through social media (20.75%).

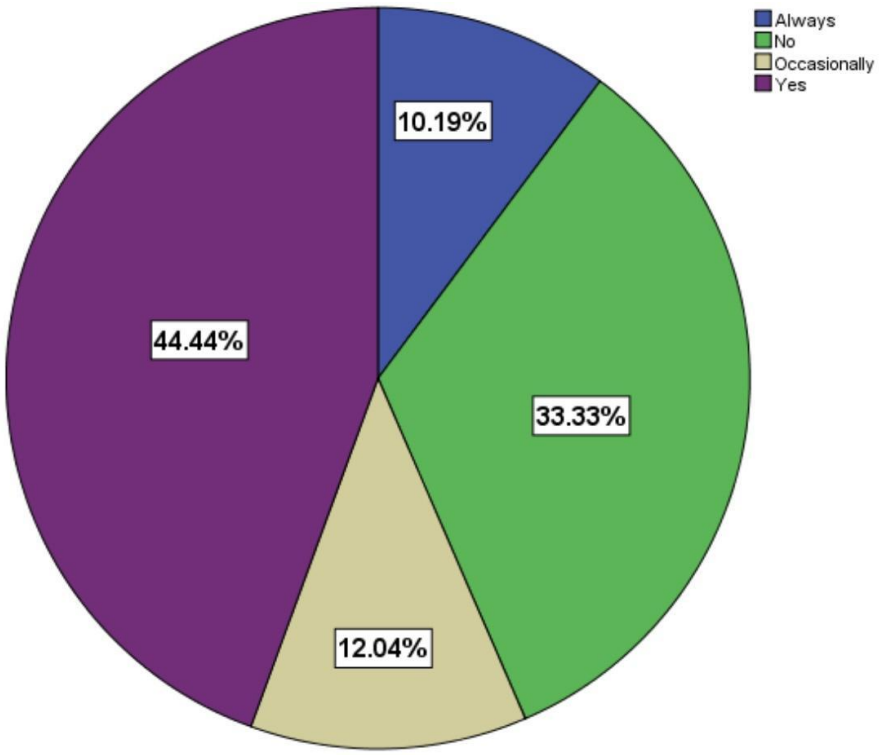

Figure 3: Pie chart showing the percentage distribution about bleeding gums in the South Indian population. wherein, purple color represents yes (44.44%), green color represents no (33.33%), beige color represents occasionally (12.04%) and blue color represents always (10.19 %).

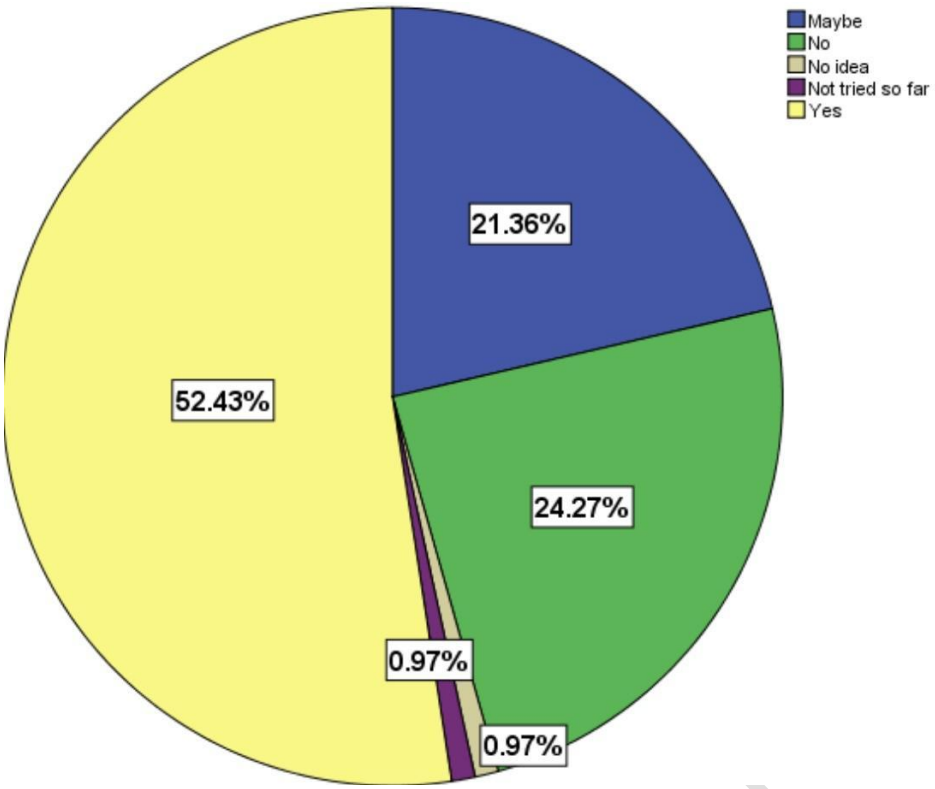

Figure 4: Pie chart showing the percentage distribution about improvement in gingival health after oil pulling in the South Indian population. wherein, yellow color represents yes (52.43%), green color represents no (24.27%), blue color represents maybe (21.36%), beige color represents no idea (0.97%) and purple color represents not tried so far (0.97%).

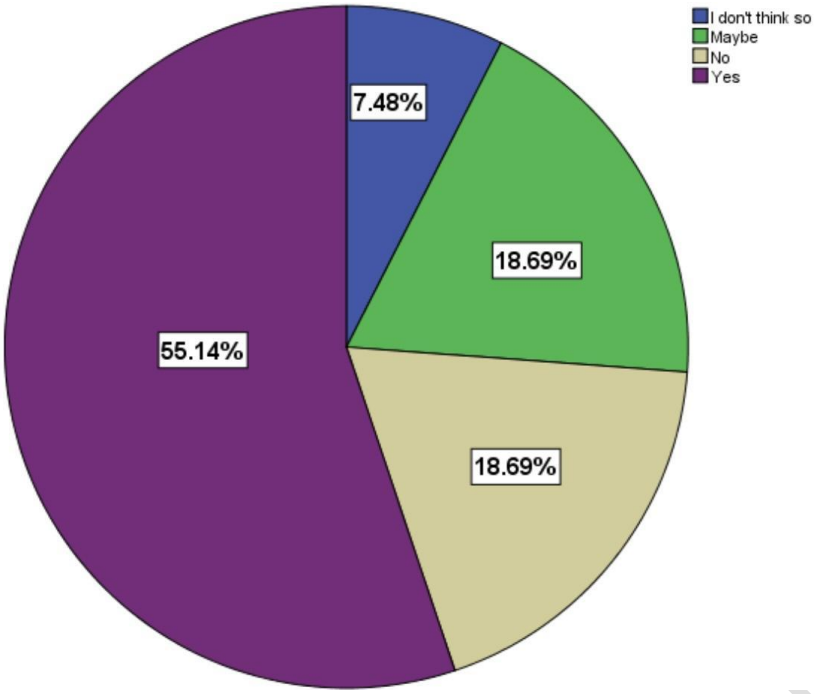

Figure 5: Pie chart showing the percentage distribution about the effectiveness of coconut oil in decreasing the plague in the South Indian population. wherein, purple color represents yes (55.14%), beige color represents no (18.69 %), green color represents maybe (18.69%) and blue color represents I don't think so (7.48%).

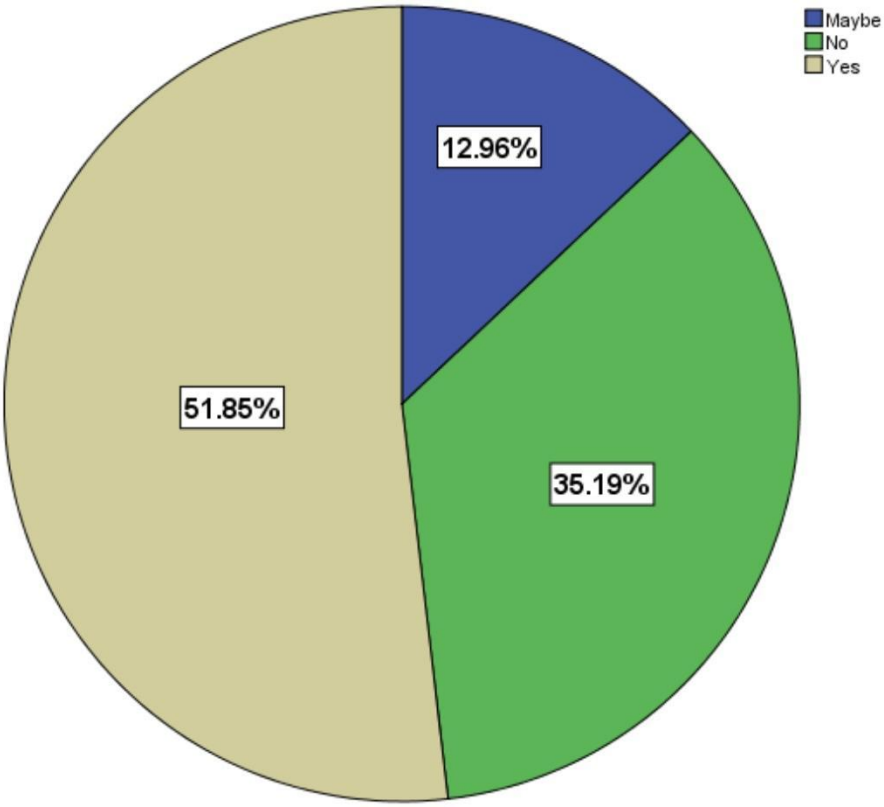

Figure 6: Pie chart showing the percentage distribution about anti-inflammatory properties of oil pulling in the South Indian population. wherein, beige color represents yes (51.85%), green color represents no (35.19%) and blue color represents maybe (12.96%).

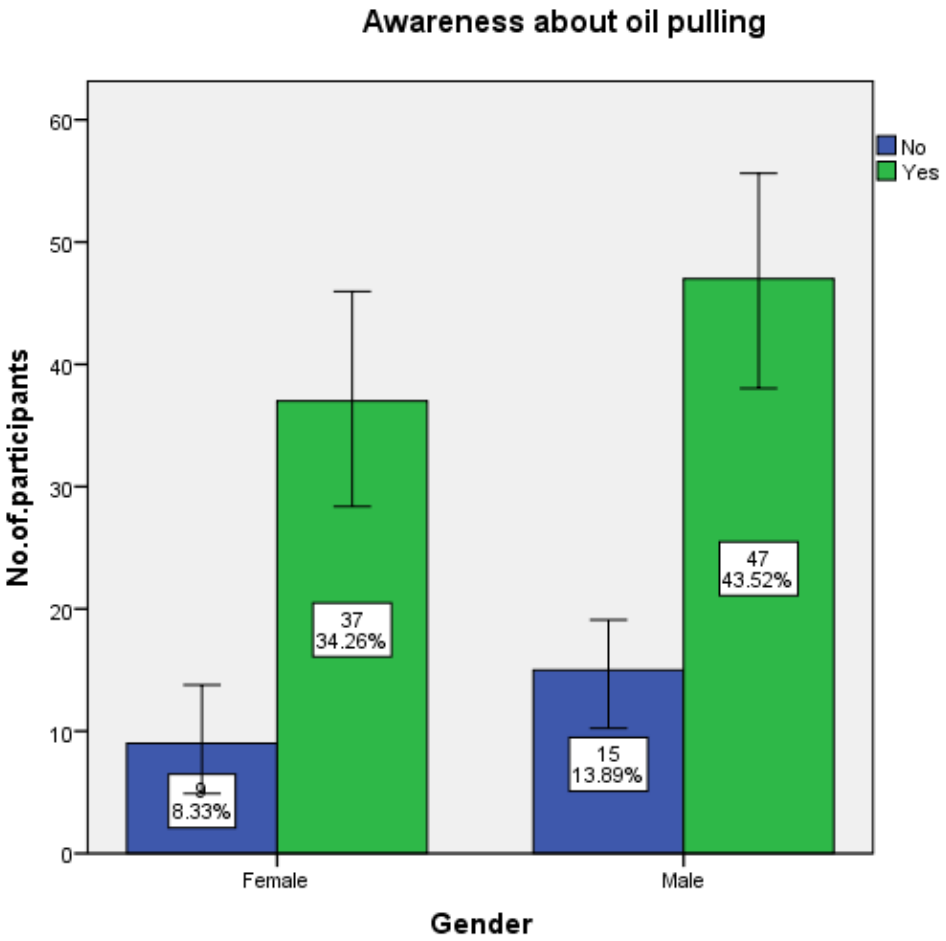

Figure 7: Bar graph showing an association between gender and awareness about oil pulling in the South Indian population. The X-axis represents gender and Y-axis represents the count for awareness about oil pulling. (34.26%) of females reported yes and (43.52%) of males reported yes. Blue denotes no and green denotes yes. A Chi-square test was done and the association was found to be statistically not significant.Chi-square value:0.327 and p-value:0.567,($p>0.05$) hence statistically not significant.

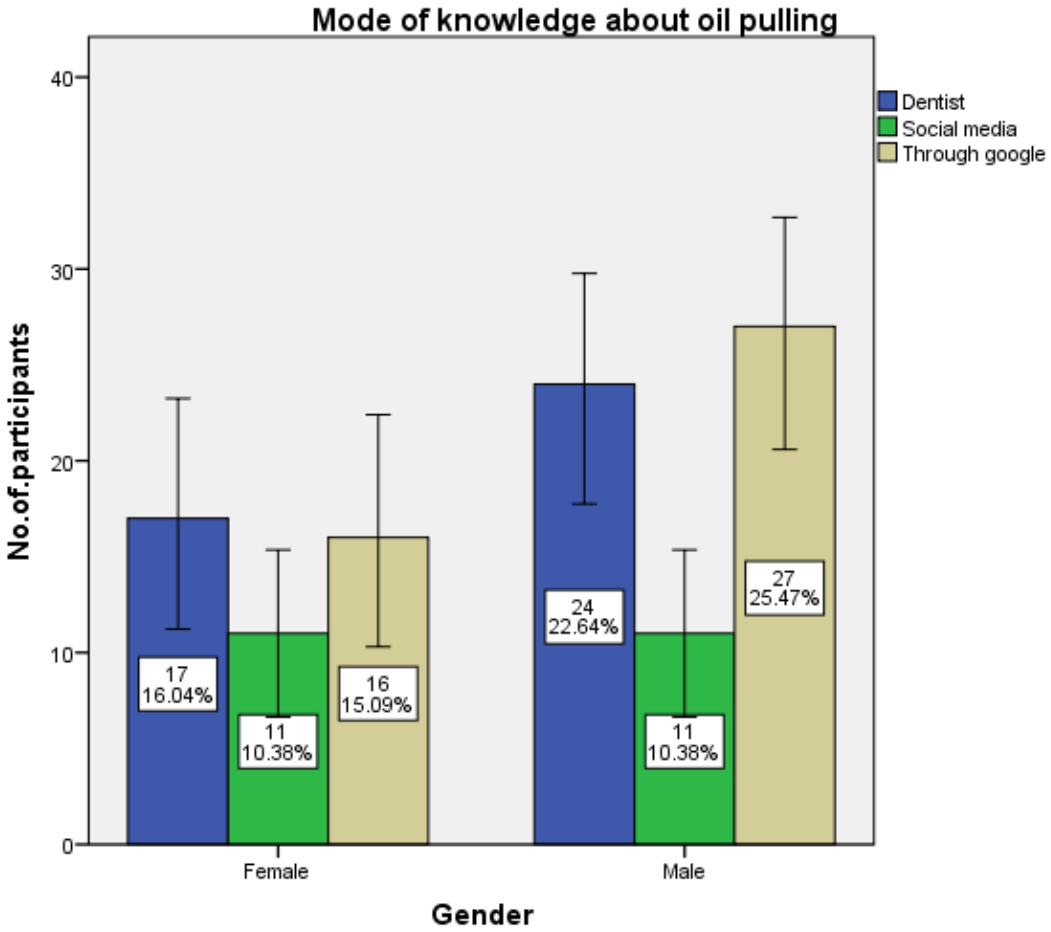

Figure 8: Bar graph showing an association between gender and mode of knowledge about oil pulling in the South Indian population. The X-axis represents gender and the Y-axis represents the count for the mode of knowledge about oil pulling. (16.04%) of females reported through the dentist and(25.47%) of males reported through google. Blue denotes through the dentist, green denotes through social media and beige denotes through google. A Chi-square test was done and the association was found to be statistically not significant.Chi-square value:3.720 and p-value:0.293,($p>0.05$) hence statistically not significant.

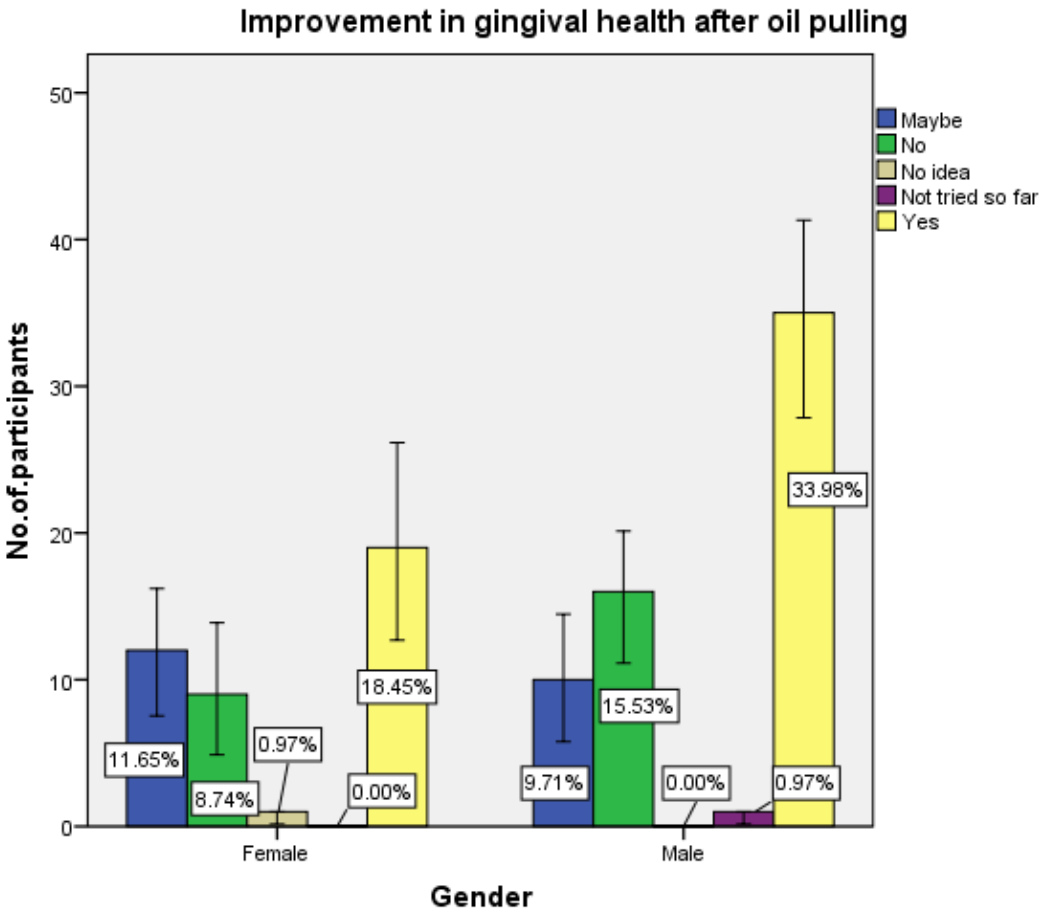

Figure 9: Bar graph showing an association between gender and improvement in gingival health after oil pulling in the South Indian population. The X-axis represents gender and the Y-axis represents the count for an improvement in gingival health after oil pulling. (18.45%) of females reported yes and (33.98%) of males reported yes. Yellow denotes yes, green denotes no, blue denotes maybe, beige denotes no idea, and purple denotes not tried so far. A Chi-square test was done and the association was found to be statistically significant. Chi-square value:11.77 and p-value:0.038,($p<0.05$) hence statistically significant

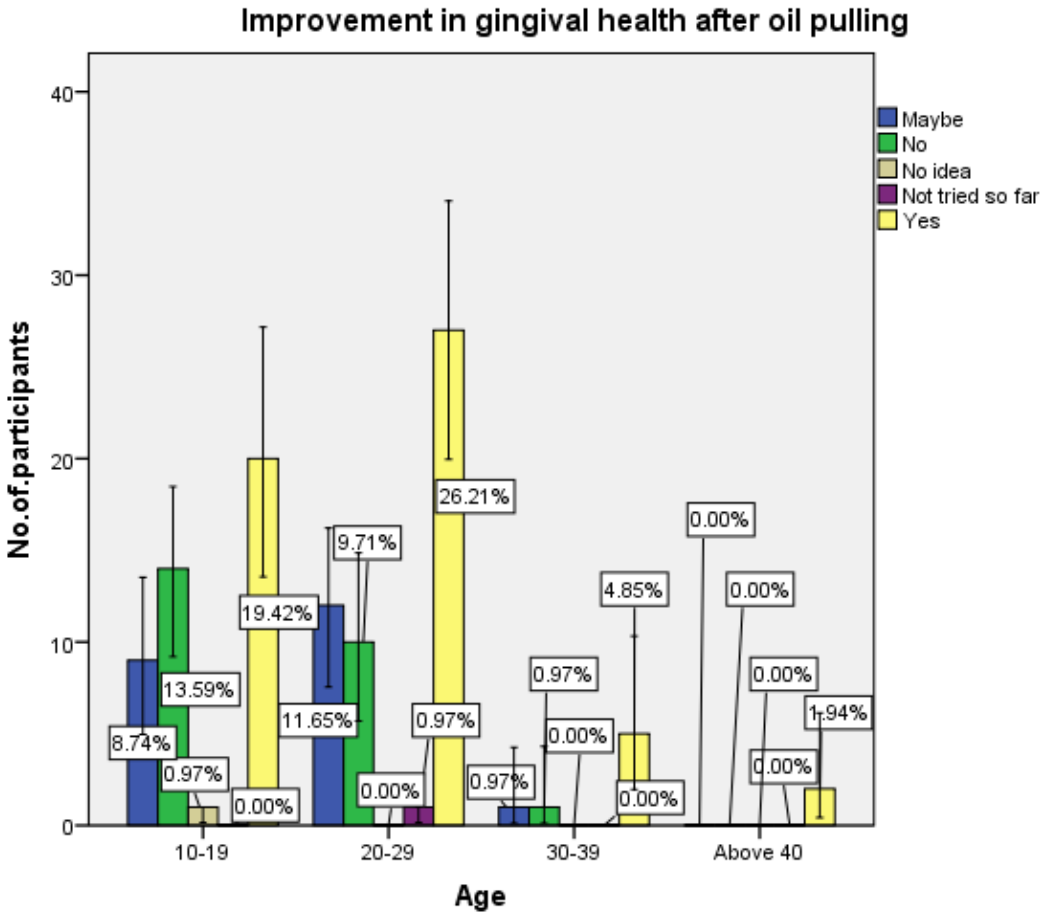

Figure 10: Bar graph showing an association between age and improvement in gingival health after oil pulling in the South Indian population. The X-axis represents age and Y-axis represents the count for an improvement in gingival health after oil pulling. (19.42%) of 10-19 yrs reported yes, (26.21%) of 20-29 yrs reported yes, (4.85%) of 30-39 yrs reported yes and (1.94%) of above 40 yrs reported yes. Yellow denotes yes, blue denotes maybe, green denotes no, beige denotes no idea, and purple denotes not tried so far. A Chi-square test was done and the association was found to be statistically not significant.Chi-square value:8.07 and p-value:0.92, (p >0.05) hence statistically not significant.

In our study, the majority of the participants were aware of oil pulling (77.78%), and 22.22% of them were not aware of it (figure-1). About 40.57% of the participants are aware of oil pulling through google, 38.69% through a dentist, and 20.75% through social media (figure-2). 44.44% of the participants had bleeding gums and 33.33% of them did not have any bleeding gums (figure-3). 52.43% of participants had shown improvement in gingival health after undergoing oil pulling whereas 21.36% of them had not shown any improvement in gingival health (figure-4). In 55.14% of participants, coconut oil is effective in reducing plaque-related gingivitis whereas in 18.69% of them it is not effective in reducing plaque-

related gingivitis(figure-5). About 51.85% of participants were aware of the anti-inflammatory property of oil pulling whereas 35.19% were not aware of it (figure-6). The association between gender and awareness about oil pulling was found to be statistically not significant.Chi-square value:0.327 and p-value:0.567,($p>0.05$) hence statistically not significant(figure-7). An association between gender and mode of knowledge about oil pulling was found to be statistically not significant. Chi-square value:3.720 and p-value:0.293,($p>0.05$) hence statistically not significant(figure-8), and the association between gender and improvement in gingival health after oil pulling in the South Indian population were found to be statistically significant. Chi-square value:11.77 and p-value:0.038,($p<0.05$) hence a statistically significant decrease in gingival and plaque was noticed during the study period (figure-9). The association between age and improvement in gingival health after oil pulling was found to be statistically not significant.Chi-square value:8.07 and p-value:0.92, ($p >0.05$) hence statistically not significant(figure-10).

The saponification value of coconut oil is high, hence it is used in making soaps. Hence the soap containing coconut oil can have high cleansing action. Sodium laureate is formed when sodium hydroxide in saliva reacts with Lauric acid present in the coconut oil which leads to cleansing action and a decrease in the accumulation of plaque (25,30)(31). A similar study was conducted by Srivastava et al in 2008 in animals where coconut oil was found to have an effective healing property for burn wounds (32)(33) and coconut oil contains antiseptic properties. Coconut oil can be used as a moisturizer and emollient also (34,35). Studies show that coconut oil is effective against C.albicans and S.mutans in an in vitro oral biofilm model. Another similar study conducted by Brecx M et al in 1992 was plaque related gingivitis can be reduced up to 50% which is lesser when compared to our study. In our study plaque, related gingivitis can be reduced up to 55.14% (figure-5). Mouthwash containing chlorhexidine was found to be more effective. Long-term use of chlorhexidine mouthwash forms brown staining on the teeth which is very difficult to remove and alters the sensation of taste and can also affect the tongue and the mucous membranes (36)(37). But in the virgin coconut oil pulling there is no reported staining or taste alteration was noticed.

Even though coconut oil pulling significantly reduces gingivitis and plaque, It can't be used as an alteration for tooth brushing, but can be considered a supplemental oral hygiene aid (9)(38). In our study, Limited samples were taken into consideration. Even though the results were promising, additional studies have to be done to understand the action of coconut oil pulling to get more statistically significant. The antimicrobial potency of coconut oil was not tested. Further studies with larger samples should be studied to find out the efficacy of virgin coconut oil in plaque-related gingivitis.

CONCLUSION

In conclusion, Using Virgin Coconut Oil Pulling as a treatment for plaque-related gingivitis could be beneficial. This pilot study demonstrates that coconut oil is simple to use, inexpensive, and safe with few negative effects when used as an adjuvant in dental hygiene maintenance. More research on its antibacterial effectiveness is needed for coconut oil to be used as an effective oil pulling method.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

NOTE:

The study highlights the efficacy of " Ayurveda " which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

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