



Efficacy of *Triphala* Extract Mouth Rinse AGAINST Plaque Accumulation and Gingival Inflammation after Impacted Third Molar Surgery

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ABSTRACT

Aim: To know the efficacy of *Triphala* extract and Chlorhexidine mouth rinse against plaque and gingival inflammation.

Materials and Methods: A double blinded parallel arm randomised control trial was done among 60 participants aged 18-24 years. Participants were randomly allotted to three groups with 20 participants in each group of 0.6% *triphalal*, 0.12% chlorhexidine and control group. Study was done in 2 phases of 21 days duration. During the experimental period, participants rinsed with the allocated mouth rinse 10ml twice daily for 30 seconds without any supervision. The plaque and gingival status were assessed using Silness et al. at baseline and end of the phase. Statistical Analysis Used: The results were analysed using ANOVA (Analysis of Variance), Wilcoxon sign rank test and post hoc test with significant level at P value<0.05.

Results: *Triphala* and Chlorhexidine showed significant reduction in plaque and gingival scores as compared to Control group ($P < 0.001$). No significant difference was found between the plaque and gingival scores obtained with *triphalal* extract and chlorhexidine mouth rinse.

Conclusion: In *triphalal* group, patients did not complain about any side effects and had no adverse effects and were readily available at affordable prices in this geographical location for future use. Chlorhexidine has been considered the best antiplaque and ant gingivitis agent, but now, it is time to acknowledge the value of natural herbs such as *triphalal*, known to have many useful properties and no side effects. *Triphala* Extract mouth rinse was effective in reducing plaque accumulation and gingival inflammation with reported no side effects.

Key words Chlorhexidine, Dental plaque, Gingival inflammation, *Triphala*

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INTRODUCTION

Mouthwash has been used for therapeutic and cosmetic purposes for generations, but in recent years, scientific research and clinical trials have been conducted to determine the rationale behind the usage of chemical substances [1]. Ayurveda means "science of life" in Sanskrit. The old Indian health-care system was based on how people saw themselves and their illnesses. *Triphala* is a well-known powdered concoction used in Ayurveda from ancient times in the Indian System of Medicine. *Triphala* consists of equal parts of the *Emblica officinalis* (Amalaki), *Terminalia chebula* (Haritaki), and *Terminalia belerica* (Bibhitaki) [2].

Dental cavities, spongy and bleeding gums, gingivitis, and stomatitis are all disorders of the mouth that *T. chebula* can help prevent and treat. The extract effectively prevented plaque formation on the tooth's surface by

inhibiting sucrose-induced adhesion and glucan-induced aggregation, two mechanisms that promote the organism's colonisation on the surface of the tooth. As a result of its potential to suppress the growth and accumulation of *Streptococcus mutans* on the surface of the tooth, *T. chebula* extract may be a beneficial agent in the treatment of carious teeth. This would prevent the accumulation of acids on the tooth's surface, resulting in additional demineralization and enamel deterioration [3].

Antimicrobial and antioxidant effects of *triphalal* have been proven in vitro as it has been shown to inhibit at concentrations as low as 50 g/ml, *S. mutans* can be found. This antiplaque effect is likely due to the tannic acid in *triphalal*, which binds to the groups on the surface of bacterial cells, causing protein denaturation and, eventually, bacterial cell death [4].

Triphala presented an antiplaque efficacy similar to that of chlorhexidine (CHX) and was more effective in inhibiting plaque formation with lesser or no side effects [5]. CHX is a cationic bisbiguanide that kills Gram-positive and Gram-negative bacteria, as well as fungus, yeast, and viruses. It is

considered the “gold standard” antiplaque treatment and is very helpful in the treatment of gingivitis. It's usually used at a 0.2 percent concentration (0.12 percent) [6]. Most doctors, however, do not recommend using CHX as a mouthwash on a daily basis. This is primarily due to its negative side effects, which include an unpleasant taste, tooth discolouration, desquamation, and oral mucosa pain [7].

Other agents may have to be used as mouthwash to address the shortcomings of CHX. In this instance, mouthwash containing *tripphala* extract could be a suitable option with no known negative effects.

As a result, this study was conducted to evaluate the effect of 0.6 percent *tripphala* extract mouth rinse against plaque accumulation and gingival inflammation in 18–24 year old study participants, as well as to compare the effect of 0.12 percent CHX mouth rinse against plaque accumulation and gingival inflammation.

MATERIALS AND METHODS

To examine the effect of 0.6 percent *tripphala* and 0.12 percent CHX on oral health and to compare the effect of *tripphala* with CHX and the control group in terms of plaque build up and gingival inflammation, a double-blinded parallel arm randomised controlled experiment was undertaken.

The Institutional Review Board granted ethical approval, and the study subjects gave their informed permission.

Data were collected from 18 to 24 years old female undergraduates, based on inclusion and exclusion criteria.

Inclusion criteria

- Participants were female undergraduates between the ages of 18 and 24, having a minimum of 20 teeth.
- Participants with gingival and plaque index (PI) score of ≥ 1 in 10% of the sites
- Participants who are willing to stick to the scheduled appointments.

Exclusion criteria

- Participants with any systemic conditions.
- Participants with any allergies or infectious conditions are not permitted to participate.
- Participants receiving antibiotic therapy or any medication within the past 6 months.
- Participants already using any mouth rinse.
- Participants wearing an orthodontic appliance or removable partial denture.

All of the university's undergraduate students were screened. The selected sixty participants were randomly allotted to three groups of twenty participants in each group using a lottery method. Group 1 - *Triphala*, Group 2 - CHX, and Group 3 - Control group.

Sample size determination

Simple random sampling method was followed. Based on the secondary data, the sample size was estimated to be 60. The estimated sample size was 19 and this was rounded off to 20 for each group, and total sample size was 60. Ethical committee approval for this study was obtained from the Institutional Ethics Committee with the following ethical approval number. SDC/SIHEC/2020/DIASDATA/0619-0320.

Preparation of the mouth rinse

Commercially available *tripphala* powder was taken. An alcoholic extract of *tripphala* was obtained using cold maceration technique with 97% ethanol as the solvent. By combining 100 g of *tripphala* extract with 1 L of sterile distilled water, a 10% *tripphala* mouth rinse was created. A 1:1 concentration of a commercially available 0.2 percent CHX solution (Hexidine ICPA Health Products; Mumbai, Maharashtra, India) was used. Sterile distilled water with a coloring agent was used as the control. Every week, all of the mouth rinses were manufactured from scratch, and the solutions were all the same colour and taste to eliminate bias. The contents of the solutions were known to the person who made them and were revealed to the researcher at the conclusion of the study.

Method of data collection

Demographic information and oral examination were done to record the gingival index (GI) and PI, according to Loe et al. criteria to assess the plaque accumulation and gingival inflammation at baseline [8,9].

The mouth rinse was given to the participants, along with instructions to use 10 mL twice day for 30 seconds for 21 days and to avoid eating or drinking for 30 minutes after using it. Mouth rinsing was done on a daily basis without any monitoring.

The subjects continued to practise their normal self-performed oral hygiene practises throughout the trial. To avoid any associated bias in any of the groups, no instructions were given to any of the participants regarding oral hygiene practises. Participants were re-examined after 21 days, and the same examiner performed an oral examination to record gingival and plaque scores. The Wilcoxon signed rank test was used to compare baseline and post rinsing results within each group, and the Analysis of Variance (ANOVA) test was used to find significant differences between the study groups' averages with a P 0.05 significance level.

RESULTS

All the study participants (n=60) who completed the study were females with a mean age of 20.23 years. Mean PI score according to the Silness and Loe index for each group was recorded at the baseline. The mean score for the *tripphala* group was 1.231 (standard deviation [SD]: 0.21), CHX 1.2215 (SD: 0.188), and control 1.229 (SD: 0.19). There was no statistically significant difference.

Mean gingival score according to Loe and Silness index for each group was recorded at the baseline. The mean score for the *triphalala* group was 1.248 (SD: 0.27), CHX 1.236 (SD: 0.29), and control 1.2365 (SD: 0.185). There was no statistically significant difference.

The mean plaque score for each group was recorded after 21 days. There was a statistically significant difference among scores of the three groups ($P < 0.001$).

Mean gingival score for each group was recorded after 21 days. There was a statistically significant difference among scores of the three groups ($P < 0.001$).

Plaque and gingival scores of *triphalala* and CHX group at baseline and after 21 days using Wilcoxon signed-rank test showed statistically significant reduction within *triphalala* and CHX groups.

Plaque and gingival scores of the control group at baseline and after 21 days using Wilcoxon-signed rank test showed no significant reduction.

The percentage mean reduction for plaque scores and gingival scores from baseline to post rinsing is higher compared to CHX and Control group

There was statistically significant reduction observed from baseline to post rinsing for plaque scores and gingival scores among *triphalala* and CHX groups.

No significant result was observed from baseline to post rinsing for plaque and gingival scores among control groups (Figures 1 and Figure 2).

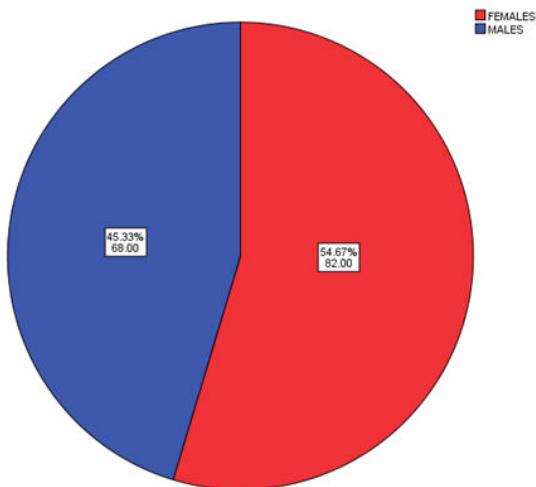


Figure 1: Pie diagram explaining gender Distribution of study population. Pie diagram shows males 45.33%, females 54.67%. From the graph it is observed that the prevalence of females is more compared to males.

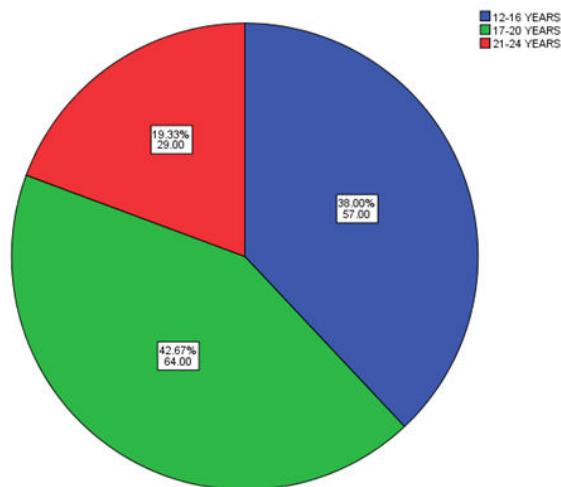


Figure 2: Pie diagram showing age distribution. This graph showed that patients in 12-16 years were 38.0%, patients in 17-20 years 42.67% and patients in age group of 21-24 years 19.33%. From the graph, it is found that the incidence of surgical removal of impacted teeth is more among patients of 17-20 age groups when compared to other age groups.

DISCUSSION

A randomized controlled trial was done to evaluate the effect of 0.6% *triphalala* extract and compare with 0.12% CHX mouth rinse on dental plaque accumulation and gingival inflammation. Study participants were randomly allocated into three groups [6]. At baseline and after washing, a clinical examination was performed to record plaque and gingival scores.

The purpose of recording was to observe any soft tissue changes such as increase or decrease in inflammation occurring due to the use of agents. Plaque and gingival scores were recorded for all participants on day 0 and 21 by trained examiner. *Triphala* had antiplaque efficacy comparable to CHX and was more effective in preventing plaque formation while having fewer or no side effects [5]. At follow-up, the CHX and *triphalala* groups had significantly lower mean gingival and PI scores than at baseline ($P < 0.001$), but no significant difference in the percentage change in the mean GI ($P = 0.826$). Bhattacharjee et al. conducted a study to evaluate the efficacy of *triphalala* mouth rinse (aqueous) in the reduction of plaque and gingivitis among children. The percentage change in the mean PI was significantly higher in the CHX group compared to the *triphalala* group ($P = 0.048$) [10].

Triphala contains hemostatic, anti-inflammatory, analgesic, and wound-healing qualities, according to the Sushruta Samhita. Haritaki is the most effective treatment for bleeding gums, gingival ulcers, and various teeth. On the other hand, Amalaki contains a large amount of Vitamin C, which is the most effective in preventing bleeding from gums. When *triphalala* was adsorbed on the tooth surface, it reduced the growth of S.

mutans and Gram-positive cocci implicated in plaque formation, according to Jagadish et al. [4].

Tandon et al. recommended using *triphala* mouthwash to prevent the formation of incipient lesions, claiming that it is less expensive than commercially available CHX mouthwash. It is safer for long-term use because it is an Ayurveda product with no negative effects [11].

It has no negative effects because it is an Ayurveda substance, thus it is safe to take for a long time [12]. Effectiveness of CHX can be attributed to its bactericidal and bacteriostatic effects and its substantively within the oral cavity (8 h after rinsing) CHX has often been used as a positive control. Hence, 0.12% concentration was used in this study as there were fewer side effects compared to 0.2%. At baseline, the CHX group's plaque and gingival scores were 1.22 0.18 and 1.23 0.298, respectively, and at post rinsing, they were 0.92 0.26 and 0.94 0.37. At baseline and after rinsing, there was a significant reduction of ores (P 0.009).

CONCLUSION

In the *triphala* group, patients did not complain about any side effects and had no adverse effects and were readily available at affordable prices in this geographical location for future use. CHX has been considered the best antiplaque and ant gingivitis agent, but now, it is time to acknowledge the value of natural herbs such as *triphala*, known to have many useful properties and no side effects. *Triphala* Extract mouth rinse was effective in reducing plaque accumulation and gingival inflammation with reported no side effects.

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