Research Article

Comparison of Efficiency of Two Different Mouth Washes of Complementary and Alternative Medicine Source with Chlorhexidine Mouth Wash-A Randomized Control Trial

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ABSTRACT:

Background- Plaque control and removal of bacterial biofilm are essential components in preventing and treating gingival disease. Mouthwashes improve oral health care by inhibiting bacterial adhesion, colonization, and metabolic activity. The study was aimed to assess and compare the plaque formation, gingival inflammation, and gingival bleeding.

Materials & Methods- The study was designed as a randomized clinical study where clinical parameters such as gingival index, plaque index, and modified sulcular bleeding index were recorded immediately and 15 days after oral prophylaxis. The subjects in this study included 80 gingivitis patients who are divided into four groups of 20 patients in each group. Group A was given chlorhexidine mouthwash, group B was given Hiora, group C was given Perio Aid and group D was given distilled water.

Results- In each of the study groups, there was a significant reduction in gingival, plaque, and modified sulcular bleeding index scores from baseline to 15 days. The chlorhexidine group demonstrated significantly lesser mean gingival, plaque, and modified sulcular bleeding index scores compared to all other three groups.

Conclusion- Within the limits of this study, it can be concluded that all three types of mouthwashes are effective in reducing dental plaque and gingivitis adjunctive to scaling. Herbal mouthwashes are comparable to chlorhexidine in terms of plaque reduction and reduction of gingival inflammation.

KEYWORDS: Hiora, Perioaid, Chlorhexidine, Plaque index, Gingival index.

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INTRODUCTION:

GINGIVITIS is an inflammatory reaction to a dental plaque whereas Periodontitis is a destructive inflammatory disease of the supporting tissues of the tooth resulting in progressive destruction of the periodontal ligament, and alveolar bone with pocket formation and recession.[1] Periodontal disease is induced by bacterial infections in which microbial plaque plays a crucial role. Plaque control and removal of bacterial biofilm are essential components in the prevention and treatment of periodontal disease.[1] Plaque reduction has been the hallmark of preventive dentistry since the advent of antibiotics and the realization that bacteria are possible causative agents of the major dental diseases, caries and periodontal disease.[1] Dental plaque biofilm cannot be eliminated permanently. The pathogenic nature of dental plaque

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biofilm can be reduced by reducing the total microbial load. Both chemical and mechanical oral hygiene aids are used for removal and prevention of plaque. Even though the toothbrush is the most widely used oral hygiene aid, a majority of the population is not able to perform mechanical plaque removal effectively.[2] Hence, there is a need for chemical plaque control. Chemical methods of reducing plaque, such as mouthwashes, are therefore appealing as they can provide significant benefits to patients.[3] These are simple and widely accepted method to deliver the anti-microbial agent (after toothpastes), which can be used by the patient as an oral hygiene aid. Various mouth rinses are available in the market, amongst which Chlorhexidine is the most popular. It is recognized as the primary agent for chemical plaque control, its clinical efficacy being well known to the profession.[3] But it cannot be used on a long-term basis because of various side effects like brown discoloration, taste perturbation, oral mucosal lesions, parotid swelling, enhanced supragingival plaque formation and sometimes unacceptable taste. Given the advantages of herbal compounds and their fewer side effects compared to their chemical counterpart, herbal mouthwashes are considered as a viable alternative to chlorhexidine mouthwash.[4] HIORA is phytopharmaceutical dental preparation to maintain and enhance oral hygiene by providing antiseptic, refreshing and antimicrobial properties.[1] PERIOAID contain Calendula officinalis which works as a remarkable healing agent and consists of triterpenoids which are important anti-inflammatory and anti-edematous components in plant. Taking into consideration the side-effects of chlorhexidine, and the penchant of people for herbal/natural products, the present study was conducted with an aim to compare the anti-plaque efficacy of 0.2% chlorhexidine gluconate mouthwash and the herbal mouthwashes such as Hiora and Perioaid with distilled water as control.

MATERIALS & METHODS:

This study was undertaken in the outpatient at the Department of Periodontics, GSL Dental College, Andhra Pradesh, India. The study sample consisted of 80 patients who were diagnosed as having gingivitis. They were randomly divided into four groups, Group A, B, C and D. Group A patients were prescribed with Chlorhexidine mouthwash, Group B patients were prescribed with Hiora mouthwash, Group C patients prescribed with Perioaid and Group D prescribed with distilled water. Patients having systemic disease, pregnancy, and who were undergoing antimicrobial therapy were excluded from the study. The study was presented to the Institutional Scientific Review Board and got approved. Informed consent was obtained from the patients after explaining the details of the study.

Study procedure:

This study was designed as a double-blind, randomized, control trial comparing the efficacy of three mouthwash solutions. In this study, eighty patients of age group between 18-25 years were selected through purposive sampling and then were randomly divided into four groups: the chlorhexidine group (n =20), Hiora group(n=20), Perioaid group(n=20) and the distilled water group (n = 20). The demographic data such as name, age, and gender were collected for each patient in all the four groups. Clinical assessments were performed by examiner A (Jagannadha Raju) using mouth mirror and probe. Oral prophylaxis was not performed so that the study could begin with the existing oral hygiene status of the subjects. Pre-operative measurements were recorded which included gingival index (GI), plaque index (PI) and modified sulcular bleeding index (mSBI). Oral prophylaxis was performed after the initial clinical assessment. After oral prophylaxis, the patients were then prescribed a mouthwash based on their respective categorized group by Examiner B (Ashok KP). Examiner A was not aware of the mouthwash prescribed to the patient.0.2%chlorhexidine mouth wash was given to group A. They were asked to use 10 ml 2 times a day in an interval of 12 hours for 15 days and instructions were given not to rinse their mouth for half an hour. Hiora (ayurvedic mouth wash) was given to group B and they were asked to use 10ml twice daily in an interval of 12 hours for 15 days and instructions were given not to rinse their mouth for half an hour. Perioaid (homeopathic mouth wash) was given to group C and they are asked to use 6 drops in ¼ th cup of water twice daily in an interval of 12 hours for 15 days and instructions were given not to rinse their mouth for half an hour. Distilled water was given to group D and they are asked to use twice daily in an interval of 12 hours for 15 days and instructions were given not to rinse their mouth for half an hour. The labels were removed from the bottles before they were given to the patients. The patients were asked to report to the clinic after 15 days from the date of the initial examination. Examiner A, who was trained and calibrated to record the plaque, gingival and bleeding index scores, recorded the findings at both intervals and for all the four groups. Examiner A was blinded to the type of the mouthwash used by participants. The collected data were subjected to statistical analysis.

Table 1: Comparison of gingival index scores at baseline and 15 days between the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	*f*-value	*p*-value
Baseline	Chlorhexidine	20	1.03	0.40	0.09	0.84	1.22	3.11	0.071
	Hiora	20	0.98	0.25	0.06	0.76	1.00		
	Perioaid	20	1.04	0.35	0.08	0.87	1.20		
	Control	20	1.24	0.45	0.10	1.03	1.45		
15 days	Chlorhexidine	20	0.41	0.34	0.07	0.25	0.56	8.01	<0.001 *
	Hiora	20	0.53	0.27	0.06	0.40	0.65		
	Perioaid	20	0.61	0.29	0.06	0.48	0.75		
	Control	20	0.87	0.34	0.07	0.71	1.02		

One way analysis of variance; $p \leq 0.05$ considered statistically significant; * denotes significance

STATISTICAL ANALYSIS:

Data were analyzed using IBM SPSS version 20 software. Descriptive statistics, one-way analysis of variance, and paired t-tests were done to analyze the study data. Bar charts and line diagrams were used for data presentation.

RESULTS:

Gingival index scores of the patient at baseline and 15 days among four different study groups state that there was significant difference with chlorhexidine group showing greater reduction in mean values from 1.22 at base line to 0.56 after 15 days compared to other three study groups (Table 1; Figure 1). The plaque index scores of the patient at baseline and 15 days among four different study groups state that there was significant difference with chlorhexidine showing greater reduction in mean value from 1.48 at base line to 0.47 after 15 days compared to other three study groups with least reduction seen in control group where mean reduction value seen from 1.72 at base line to1.26 after 15 days (Table 2 ; Figure 2). Modified sulcular bleeding index scores of the patients among the four different study groups establish that there was significant difference with chlorhexidine showing greater reduction in mean values from 0.77 at base line to 0.18 after 15 days compared to other three study groups with least reduction seen in control group with mean values from 0.71 at base line to 0.53 after 15 days (Table 3 ; Figure 3). Intra group comparison of gingival index, plaque index and modified sulcular bleeding index scores between baseline and 15 days in each of the study groups demonstrate that mean values were found to be significantly lower than the pre-operative mean values. At the end of 15 days, almost comparable reduction in the amount of plaque and gingivitis was found in all the four groups (Table 4,5,6 ; Figure 4,5.6). There were no significant differences in mean gingival, plaque, and modified sulcular bleeding index scores at baseline between the study groups.

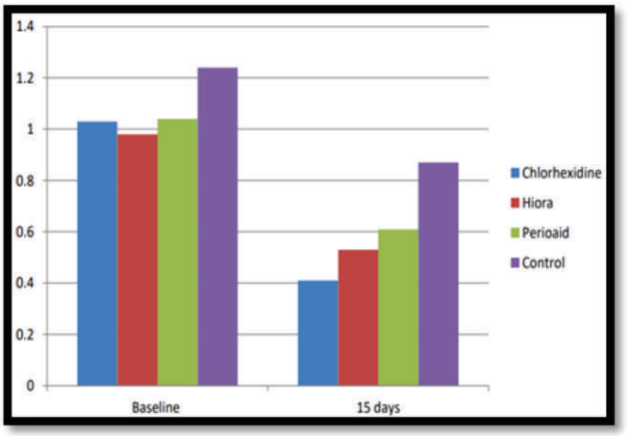

Figure 1: Comparison of gingival index scores at baseline and 15 days between the study groups.

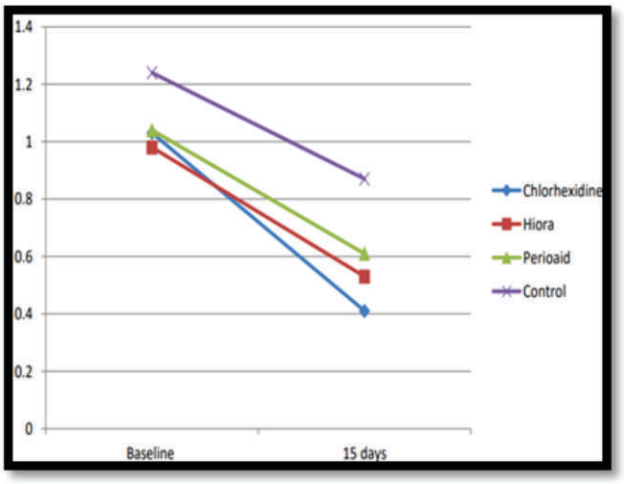

Figure 2: Comparison of plaque index scores at baseline and 15 days between the study groups.

Table 2: Comparison of plaque index scores at baseline and 15 days between the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	*f*-value	*p*-value
Baseline	Chlorhexidine	20	1.44	0.31	0.07	1.29	1.58	7.63	0.079
	Hiora	20	1.34	0.32	0.07	0.99	1.29		
	Perioaid	20	1.42	0.32	0.07	1.27	1.58		
	Control	20	1.59	0.27	0.06	1.46	1.72		
15 days	Chlorhexidine	20	0.33	0.30	0.07	0.19	0.47	15.93	<0.001 *
	Hiora	20	0.69	0.37	0.08	0.51	0.86		
	Perioaid	20	0.80	0.25	0.06	0.68	0.92		
	Control	20	1.07	0.41	0.09	0.87	1.26		

One way analysis of variance; $p \leq 0.05$ considered statistically significant; * denotes significance

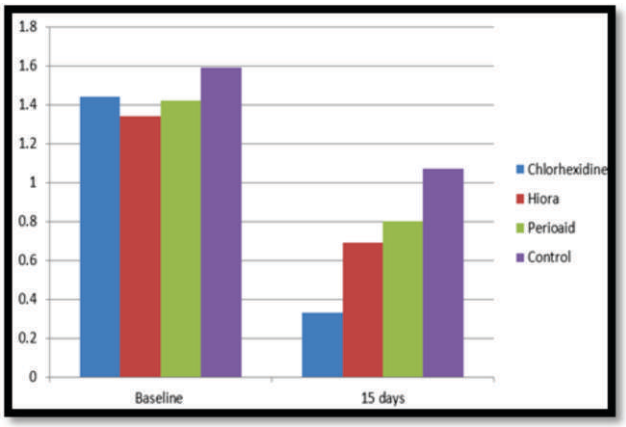

Figure 3: Comparison of modified sulcular bleeding index scores at baseline and 15 days between the study groups.

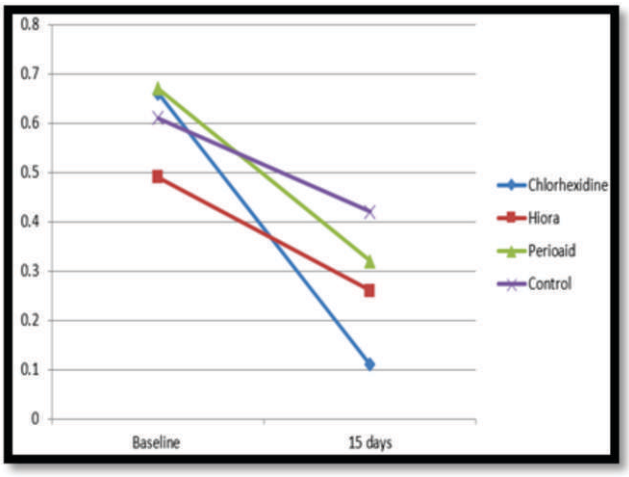

Figure 4: Comparison of gingival index scores between base line and 15 days in each of the study groups.

At the 15 days follow-up, chlorhexidine group demonstrated significantly lesser mean gingival, plaque and modified sulcular bleeding index scores. In each of the study groups, there was a significant reduction in the mean values of gingival, plaque, and modified sulcular bleeding index scores from baseline to 15 days.

DISCUSSION:

Maintenance of good oral hygiene is the key to the prevention of dental disease. Several researchers have suggested the application of chemotherapeutic agents as adjuncts to mechanical plaque control. Furthermore, chemical agents have the ability to reach the interproximal areas that are difficult to clean and inhibit bacterial growth and subsequent biofilm formation on the soft tissue.[2] Application of these chemical agents is safe and seems to have no effect on increasing resistant species.[5]

Chlorhexidine gluconate has a broad spectrum of antibacterial effects because of its bactericidal and bacteriostatic activity and its high oral substantivity.[6,7] Chlorhexidine binds to the phospholipids in the inner cell membrane of the bacterial cell wall and leads to leakage of lesser molecular weight components and sublethal reversible bacteriostatic action.[8] In the present study, reduction in amount of plaque was found to be statistically significant in chlorhexidine group. This well corroborates with the results obtained in the previous studies carried out by Léo, and Lang et al., and Sharma et al. also found significant amount of plaque reduction in the children who used 0.2% chlorhexidine mouthwash.[9,10,11]

PERIOAID contains Polysaccharides which demonstrated strong bio-adhesion to buccal membranes when compared to dextran and 9 other plant extracts. They decrease local inflammation by shielding tissue from irritants and facilitating tissue hydration.[12] also contains ECHINACEA

Table 3: Comparison of modified sulcular bleeding index scores at baseline and 15 days between the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		*f*-value	*p*-value
						Lower Bound	Upper Bound		
Baseline	Chlorhexidine	20	0.66	0.23	0.05	0.56	0.77	2.31	0.082
	Hiora	20	0.49	0.30	0.07	0.35	0.63		
	Perioaid	20	0.67	0.23	0.05	0.56	0.77		
	Control	20	0.61	0.21	0.05	0.51	0.71		
15 days	Chlorhexidine	20	0.11	0.15	0.03	0.04	0.18	7.19	<0.001 *
	Hiora	20	0.26	0.24	0.05	0.14	0.37		
	Perioaid	20	0.32	0.25	0.05	0.20	0.43		
	Control	20	0.42	0.22	0.05	0.32	0.53		

One way analysis of variance; $p \leq 0.05$ considered statistically significant; * denotes significance

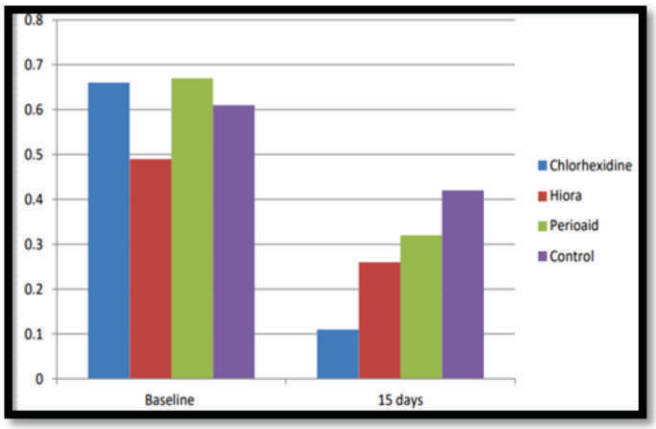

Figure 5: Comparison of plaque index scores between base line and 15 days in each of the study groups.

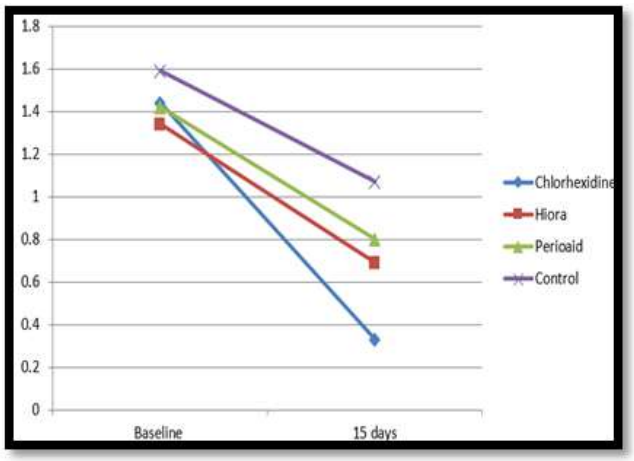

Figure 6: Comparison of modified sulcular bleeding index scores between baseline and 15 days in each of the study groups.

Table 4: Comparison of gingival index scores between baseline and 15 days in each of the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	*t*-value	*p*- value
Chlorhexidine	Baseline	20	1.03	0.40	0.09	8.16	<0.001 *
	15 days	20	0.41	0.34	0.07		
Hiora	Baseline	20	0.98	0.25	0.06	6.18	<0.001 *
	15 days	20	0.53	0.27	0.06		
Perioaid	Baseline	20	1.04	0.35	0.08	5.68	<0.001 *
	15 days	20	0.61	0.29	0.06		
Control	Baseline	20	1.24	0.45	0.10	6.38	<0.001 *
	15 days	20	0.87	0.34	0.07		

Paired t test; $p \leq 0.05$ considered statistically significant; * denotes significance

ANGUSTIFOLIA which stimulates the immune system to help fight infections. [13] Alkamides within echinacea help in reducing oxidative stress over the cell and work as an antioxidant to reduce inflammation. This is likely safe for most people using it in the short term.[14]According to a study by Safarabadi et al in 2017,comparing the Effect of Echinacea and Chlorhexidine Mouthwash on the Microbial Flora of Intubated Patients Admitted to the Intensive Care Unit stated that the echinacea solution was more effective in decreasing the oral microbial flora of patients in the intensive care unit. Given the benefits of the

Table 5: Comparison of plaque index scores between baseline and 15 days in each of the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	*t*-value	*p*-value
Chlorhexidine	Baseline	20	1.44	0.31	0.07	13.62	<0.001 *
	15 days	20	0.33	0.30	0.07		
Hiora	Baseline	20	1.34	0.32	0.07	6.36	<0.001 *
	15 days	20	0.69	0.37	0.08		
Perioaid	Baseline	20	1.42	0.32	0.07	11.43	<0.001 *
	15 days	20	0.80	0.25	0.06		
Control	Baseline	20	1.59	0.27	0.06	7.03	<0.001 *
	15 days	20	1.07	0.41	0.09		

Paired t test; $p \leq 0.05$ considered statistically significant; * denotes significance

Table 6: Comparison of modified sulcular bleeding index scores between baseline and 15 days in each of the study groups.

Time	Group	N	Mean	Std. Deviation	Std. Error	*t*-value	*p*-value
Chlorhexidine	Baseline	20	0.66	0.23	0.05	10.89	<0.001 *
	15 days	20	0.11	0.15	0.03		
Hiora	Baseline	20	0.49	0.30	0.07	5.43	<0.001 *
	15 days	20	0.26	0.24	0.05		
Perioaid	Baseline	20	0.67	0.23	0.05	9.14	<0.001 *
	15 days	20	0.32	0.25	0.05		
Control	Baseline	20	0.61	0.21	0.05	6.11	<0.001 *
	15 days	20	0.42	0.22	0.05		

Paired t test; $p \leq 0.05$ considered statistically significant; * denotes significance

components of the herb Echinacea, it can be suggested as a viable alternative to chlorhexidine.[15] The reduction in amount of plaque in the present study well corroborated with results obtained in this study.

HIORA contains Salvadora persica, Naga Valli, Pilu and Peppermint. Salvadora persica improves gingival health and inhibits growth of cariogenic bacteria.[16,17] Naga Valli (Piper Betle) shows anti-inflammatory, anti-oxidant, anti-microbial properties.[18] Pilu (Salvadora persica) shows anti-oxidant activity. It has peppermint that contains menthol, which activates cold-sensitive TRPM8 receptors in mucosa and it is also used as primary agent in toothpastes and chewing gums, peppermint.[19] In a study conducted by Bagchi S & Saha S in year 2015,90 nursing students were evaluated for efficiency of herbal mouth wash by Double blinded parallel randomized controlled trial technique. They were divided into three groups where group A was given chlorhexidine, group B was given Hiora mouth wash and group C was given distilled water. There was statistically significant reduction in plaque and gingival score from baseline to 21 days and no improvement seen in group C which was done using distilled water.[20] The results of present study were also similar. A study by Bioschi (2013) states that herbal and chlorhexidine mouthwash are equally effective in vitro suggesting that herbal mouthwashes may be used therapeutically in the future to inhibit microbial growth.[21] A study was conducted by Parwani et al. where 90 patients were divided into three groups with 30 patients in each group, namely: Normal saline group, Chlorhexidine group, and Hiora mouthwash group.[22] The results showed Chlorhexidine and Hiora mouthwash were superior to normal saline, but between Chlorhexidine and Hiora group there was non-significant improvement indicating Hiora mouth wash can be viable alternative for chlorhexidine. In the present study, the reduction in amount of plaque in hiora group well corroborates with the results obtained in this study done by Parwani et al. There was a significant difference in the reduction of dental plaque in all the four groups before and after the experimental period.

Chlorhexidine shows more reduction in dental plaque, gingival and bleeding scores compared to other three mouthwashes.

Limitations:

The present study was a short-term study employing commercially available mouth rinses. Though significant results were obtained, long-term clinical efficacy (6 months –as prescribed by ADA) and adverse effects associated with long-term usage could not be assessed. Microbiological assessment on the plaque or saliva of the participants was not performed.

CONCLUSION:

With in the limitations of the study, it can be concluded that all three mouth washes are effective in the treatment of gingivitis when used as an adjunct to oral prophylaxis. The herbal mouthwashes are comparable to chlorhexidine in terms of plaque reduction and reduction of gingival inflammation. Further, long-term research needs to be done to check the efficacy and effectiveness of these mouthwashes over standard drug regimes.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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