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Efficacy of chlorhexidine, darolac and mint water in reducing gingivitis: A clinical study

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Abstract:

Data on the probiotic action in the oral cavity is limited. Therefore, it is of interest to evaluate the clinical efficacy of chlorhexidine mouth rinse and darolac probiotic in reducing gingivitis involving school children. Hence, 45 subjects were randomly divided into three groups, Group A (probiotic/Darolac), Group B (chlorhexidine) and Group C (mint water/control). Results show that darolac is effective in reducing gingival inflammation occurring in school children.

Keywords: Darolac, probiotic, chlorhexidine, mint water

Background:

Gingivitis and periodontitis are prevalent periodontal conditions associated with dysbiosis of the oral cavity, which leads to inflammation and bleeding of gums, loss of tooth attachment and degradation of the underlying bone structure [1]. It has been established that the primary cause of periodontal disease start and progression is dental plaque. Thus, the prevention and treatment of periodontal diseases are based on plaque control and antimicrobial therapies [2]. Mouthwashes are commonly used as adjuncts to mechanical oral hygiene practices such as Toothbrushing and flossing. They offer benefits such as reducing plaque accumulation, controlling oral malodor and providing antimicrobial effects. Chlorhexidine (CHX), a commonly used antibacterial agent, is well-known for its effectiveness in regulating the pH of the oral cavity among the different kinds of mouthwashes that are available. But long-term use of chlorhexidine has various detrimental effects on dental tissues such as tooth staining, unpleasant taste, altered taste sensation *etc.*, so there is a need of alternate mouthwashes that could give similar results with minimal side effects [3, 4]. Probiotic technology represents a breakthrough approach to maintaining oral health by utilizing natural beneficial bacteria commonly found in healthy mouths to provide a natural defense against those bacteria thought to be harmful to teeth and gums [5]. Darolac, a probiotic-based mouthwash, may harness natural antimicrobial properties and maintain pH thus reducing plaque formation and dental caries [3]. Therefore, it is of interest to report the effectiveness of a probiotic and chlorhexidine mouth rinse in lowering plaque accumulation and gingival inflammation among schoolchildren due to the paucity of research on the probiotic action in the oral cavity.

Materials and Methods:

A double-blind, randomised controlled trial was conducted in Department of Dentistry at Pragiyotishpur Medical College and

Hospital to assess the effects of a probiotic mouth rinse and a CHX mouth rinse on plaque and gingivitis in 45 healthy children aged 6-10 years. Ethical clearance had been obtained from ethical clearance committee. Informed consent had been obtained from the parents. The subjects and the examiner were blinded regarding the product allocation. The participants were randomly divided into three groups (15): Group A (probiotic/Darolac), Group B (chlorhexidine) and Group C (mint water/control). Using a mouth mirror and a blunt WHO periodontal probe, the children's gingival inflammation and plaque build-up was evaluated. Gingival and plaque statuses were assessed using Loe and Silness's gingival index (GI) and Silness and Loe plaque index (PI), respectively [6]. Making and using a probiotic mouthwash. The probiotic utilised was Darolac (Lallemand Health Solutions, India), which is sold commercially and comes in individual sachets. Two grams of powder containing 2.5 billion freeze-dried bacteria, such as *Saccharomyces cerevisiae*, *bifid bacterium longum* and *Lactobacillus rhamnosus* (LGG), are included in each sachet. One sachet's contents required to be dispensed in 20 millilitres of filtered water in a measuring beaker in order to make the probiotic mouthwash fresh. The kids were instructed to rinse with 20 millilitres of plain-filtered water for two days prior to receiving the probiotic mouthwash. After that, the kids were given the probiotic mouthwash. The kids were told to consume the solution after rinsing with five millilitres of it for a minute. This was done repeatedly until all of the preparation's contents-20 milliliters-had been swallowed. The child was forced to repeat the procedure if they anticipated the answer. For 14 days, mouth washing was done one hour after lunch. The probiotic rinse was stopped after this time of mouth washing and the kids were instructed to keep cleaning their teeth as directed.

CHX administration:

Children were instructed to rinse chlorhexidine for 60 sec once a daily about 30 min after toothbrushing with 15 ml of the solution with 1:1 dilution followed by expectoration of residual mouth rinse. This was followed by full mouth prophylaxis again. The parents were asked to supervise the children during the use of mouth wash. Evaluation of PI and GI Scores was done on 14 th days.

Statistical analysis:

SPSS 17.0 was used to statistically analyse the collected data. ANOVA was used to evaluate continuous data and the chi-square test was used for categorical data, depending on the type of data. At the 5% threshold of significance (p<0.05), significance was evaluated.

Results:

Gingival bleeding and plaque accumulation significantly improved in all three groups after 14 days, as indicated by **Table 1** 0.001* intragroup comparison. On comparing the mean values of variables across three groups. The three mouthwashes' effects on plaque build-up and gingival health did not differ significantly, according to the ANOVA test (p>0.05).

Table1: Intragroup comparison of mean values of variables at baseline and day 14

Probiotic / Darolac	Baseline	Day 14	P value
PI	0	0.03±0.04	0.001*
GI	0.18±0.10	0.03±0.02	0.001*
Chlorhexidine			
PI	0	0.03±0.06	0.001*
GI	0.17±0.08	0.04±0.03	0.001*
Mint water			
PI	0	0.07±0.01	0.001*
GI	0.14±0.039	0.06±0.01	0.001*

Discussion:

Probiotics, defined as “live microorganisms that, when administered in adequate amounts, confer a health benefit on the host”. [1]. Even though CHX is a gold standard material for its remarkable anti-plaque, anti-gingivitis efficacy, its disadvantages on long term usage such as bitter taste, staining, burning of oral mucosa, *etc* prompt researchers to search for alternative materials which are safe without side effects [7]. Probiotic mouthwashes, on the other hand, lack the side effects and are very safe for usage in all the age groups [8]. However, data are still sparse on the probiotic action in the oral cavity. Hence, the present study was conducted that compared the efficacy of probiotic, CHX mouthwashes and mint water on oral health using two variables PI and GI among schoolchildren 6-10 years of age. Gingival bleeding and plaque accumulation significantly improved in all three groups after 14 days, according to the results, however there was no discernible difference between probiotic and CHX mouthwashes or between control and probiotic mouthwashes. This is explained by CHX's antibacterial qualities. The bacterial cell membrane is attacked by CHX, which results in cellular contents leaking or precipitating. In particular, it prevents plaque colonisation and decreases pellicle formation by binding to salivary mucins. Additionally, it attaches itself to microorganisms and prevents them from

adhering to teeth. Furthermore, it was stated Darolac sachets used in the present study, showed antiplaque activity because of the synthesis of compounds like bacteriocin or biosurfactant and inhibition of cell association, colonization and invasion by pathogenic bacteria that are responsible for the anti-plaque action of probiotics like Darolac [9]. Similar results were reported by Bande *et al.* [6] , wherein statistically significant difference was noted between mean PI and mean GI score of control group when compared with probiotic and chlorhexidine after 14 days in comparison to baseline (P < 0.001). On the fourteenth day of the examination, there was no discernible difference between the probiotics and chlorhexidine in terms of mean plaque build-up or gingival irritation. Therefore, probiotic mouthwash was successful in lowering gingival inflammation and plaque build-up in children aged 6 to 8 years. Shirbhate *et al.* [5] in their review have described the efficacy of a probiotic in reducing plaque and gingival accumulation in children. Salmiah *et al.* 2022 [10] in their study reported that probiotic mouthrinses were more effective than green tea and chlorhexidine 0.2% mouthrinses in reducing *Streptococcus mutans* colony counts (one of the plaque forming microorganism) in children aged 12-15 years old and potentially safe anti-plaque agent in comparison to chlorhexidine which was not in accordance to that reported in present study. Probiotics have been linked to periodontal disease and have been shown to significantly reduce gingivitis, bleeding on probing and plaque indices. However, the antiplaque and anti-inflammatory properties of probiotics and chlorhexidine mouthwash have only been studied in a few clinical trials [2]. Therefore, present study was conducted to compare the efficacy of Darolac probiotic; CHX mouthwashes and mint water on oral health using two variables PI and GI among schoolchildren 6-10 years of age. Gingival bleeding and plaque accumulation significantly improved in all three groups after 14 days, according to the results. However there was no discernible difference between probiotic and CHX mouthwashes or between control and probiotic mouth washes. Hence, Darolac mouth rinse was effective in reducing plaque accumulation and gingival inflammation school children.

Conclusion:

Darolac probiotic showed efficacy comparable to chlorhexidine in reducing plaque and gingival inflammation, making it a promising alternative for children. Its use highlights the potential of natural oral care approaches in pediatric populations. Further research is warranted to optimize probiotic-based strategies for improving oral health outcomes.

Conflict of interest: None

Financial support: Nil

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