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A Comparative Clinical Evaluation Of The Effect Of Chlorhexidine Mouthwash And Distilled Water On Gingival Health Among Visually Impaired Patients

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Abstract

Aim*:* Oral hygiene is considered of paramount importance for visually impaired individuals. Because of the challenges they have in maintaining proper oral hygiene in terms of education, physical fitness, and social interactions. Consequently, the delivery of sufficient instruction and training on oral health and the chemical role mouthwashes is necessary for this social group. This study compares the impact of different mouthwash brands on gingival health in people with vision impairments.

Materials and Method*:* 86 students with a vision impairment of ages between (10-20) years suffering from gingivitis caused by dental plaque accumulation were included in this research. The sample was divided into 2 groups according to the type of used mouthwash as follows:
Chlorhexidine group, Distilled water group
Dental plaque index (PI) and gingival index (GI) were recorded before the initiation of the treatment and after 15 days.

Results: CHX groups have improved the dental plaque index (PI) without significant statistical differences. CHX group have proven superiority over the distilled water group which was statistically significant. Gingival index (GI) has improved in the CHX groups without any statistical differences.

Conclusion*:* Within the limitation of our study, we concluded that CHX mouthwashes can be used in controlling plaque accumulation and gingival inflammation among visually impaired persons.

Keywords: Knowledge, Oral health education, Oral hygiene, Students

Introduction

The general health of any person, especially those with visual issues[1], is greatly influenced by their oral health[2]. Visual impairment, sometimes referred to as lack of vision or blindness, is a decrease in vision that causes complex issues that are unresolvable with standard treatments like wearing glasses[3].

Maintaining dental health is a daily struggle for visually impaired people, and it has a significant impact on their social and psychological well-being[4]. Visual representations, dental plaque detectors, and recurring dental clinic rehearsals are examples of conventional oral health care techniques. Unfortunately, visually handicapped people cannot benefit enough from these solutions[5]. The inability to undertake brushing and other regular oral health procedures is the main distinction between them and other people who do not have this disability.

Additionally, despite following oral care instructions, visually impaired people cannot see dental plaque, which causes it to continuously accumulate and is linked to the development of periodontal pockets and gingival bleeding[6]. Therefore, it is imperative to enhance and make these instructions easier for this group of people[7].

It is strongly advised that visually impaired individuals use mouthwashes as an additional means of preventing dental plaque buildup[8].

Chlorhexidine is an antiseptic chemical solution that belongs to the biguanides family, and it is considered to be of low toxicity[9]. It has a wide bacterial spectrum that includes Gram-positive and Gram-negative bacteria, yeasts, a group of fungi strains and some viruses[10]. Chlorhexidine mouthwash has been shown to reduce the formation of dental plaque and gingival inflammation[11]. However, it can cause teeth discoloration, loss of appetite, xerostomia, hypogeusia and other undesirable side effects[12]. Staining of the teeth is the most undesirable adverse effect of using CHX mouthwash for an extended period of time and is the primary factor that limits its use. This occurs as a result of the Maillard reaction, as well as the generation of coloured metal sulphide formation in the pellicle[13]. In addition, some studies have shown that some bacteria have developed resistance to CHX.

For almost 20 years, chlorhexidine (CHX) has been a popular mouthwash. 0.2% CHX kills bacteria faster than conventional oral antiseptics[14]. It inhibits salivary bacteria for at least 7 hours[15].

Materials And Methods:

Study Design : A single-blind randomized clinical trial was performed to compare the effect of Chlorhexidine mouthwash and distilled water in preventing dental plaque accumulation and gingival inflammation among visually impaired individuals. Before the study began, the college's ethics committee gave its permission for the study protocol. Informed and written consent was also taken from authority of school and local guardian. The current study was in accordance with Declaration of Helsinki guidelines.

A total of 86 children were screened for eligibility. Out of which 40 children meeting the inclusion criteria were included in the study.

Their age ranges between 10-20 years, including both genders chosen from schools for the rehabilitation of the blind in Gandhinagar city. Following are the selection criteria of the present study:

Inclusion Criteria:

1. Visually Impaired Children Having Plaque Index Score And Gingival Index Score More Than (1).
2. Capability To Use The Mouthwash Without Swelling.
3. Children Aged 6 To 12 Years With Minimum Of 20 Teeth Present.
4. Children Who Have Not Undergone Oral Prophylaxis In Past 6 Months.
5. Children Identified With Mild To Moderate Type Of Gingivitis.

Exclusion Criteria

1. Medically compromised subjects.
2. Children undergoing any other dental treatment.
3. Children with a known history of chemical or herbal product allergies.

Methodology: The study was conducted for 15 days. Plaque removal and Scaling were carried out in the institute infirmary. The study participants were randomly allocated into two groups (20 persons who fulfilled the selection criteria in each group) through the lottery method, as the following:

Group A: Distilled water (control group)

Group B: 0.2% Chlorhexidine gluconate mouthwash (test group)

Plaque index, (PI) and gingival index (GI) scores were recorded at baseline and after 15 days using the UNC-15 periodontal probe.

All the children were gathered in a hall and were educated about the oral hygiene practice in day- to-day life. The instructions of oral health care maintenance, how to brush and how to use 10 ml of the mouthwashes twice daily were explained through (touch-feel-hear) technique. Moral reinforcement and motivation were presented to ensure that the instructions are carried out, in the presence of the responsible social counselor, to provide the feeling of security and confidence. Clinical examination was done in hall with adequate illumination and diagnostic instruments.

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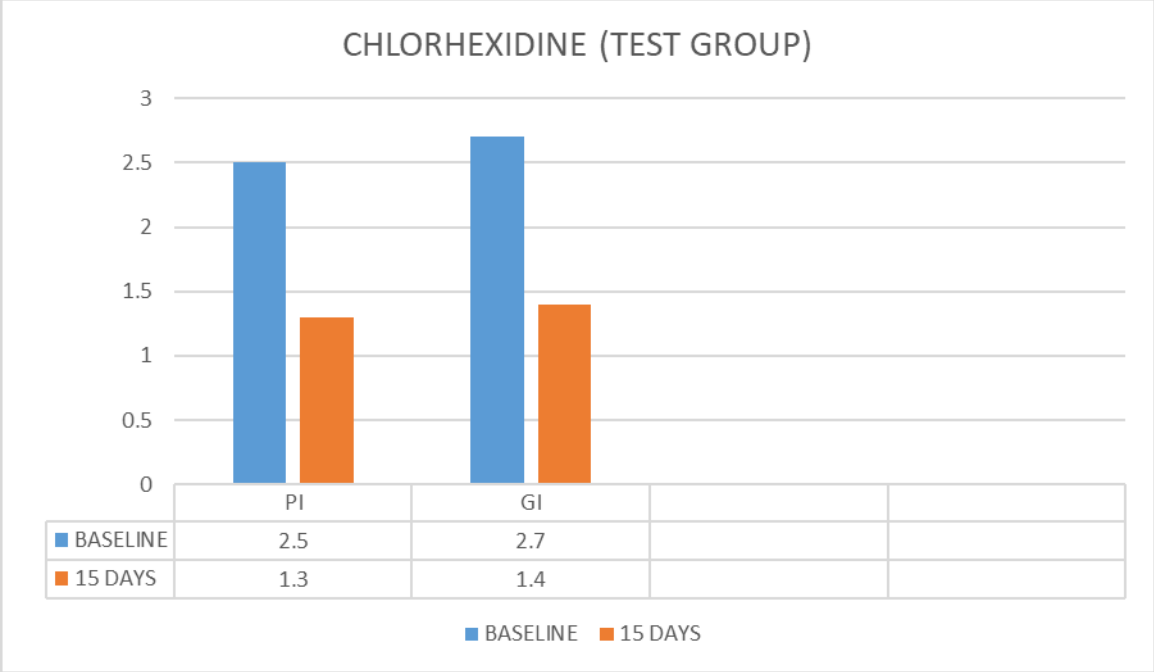
Tell-feel-do technique was used before introducing instruments into child's mouth which reduces their fear of unknown and makes the child feel more familiar with the whole procedure. Also, patience is needed by repeating information, and allowing the visually impaired to touch and feel the tools to recognize them while applying the instructions.

According to the recommendations provided by the manufacturer, 10 millilitres of a chlorhexidine mouthwash containing 0.2 percent chlorhexidine was used for group B.

After brushing their teeth for at least 30 minutes, each subject was advised to rinse their mouth with the mouthwash provided twice daily for 20 seconds. After using the mouthwash for 20 minutes, they were allowed to rinse their mouth with water. Silness-Loe Plaque index and Loe-Silness Gingival index were measured with William Probe at baseline and then it was compared for the effectiveness of mouthwash after 15 days.

Results: A total of 86 visually impaired individuals between 10-20 years participated in our study. The results of 46 participants were excluded due to the research procedures. Thus, the study sample became 40 participants, both males, and females were distributed into 2 groups according to the type of mouthwash.

Graph 1: Results of Chlorhexidine mouthwash from baseline and after 15days



Graph 1 shows the results of chlorhexidine mouthwash (test group) from baseline and after 15days. After 15 days, plaque index (PI) and gingival index (GI) was highly improved in the CHX group and this was statistically significant $p<0.05$.

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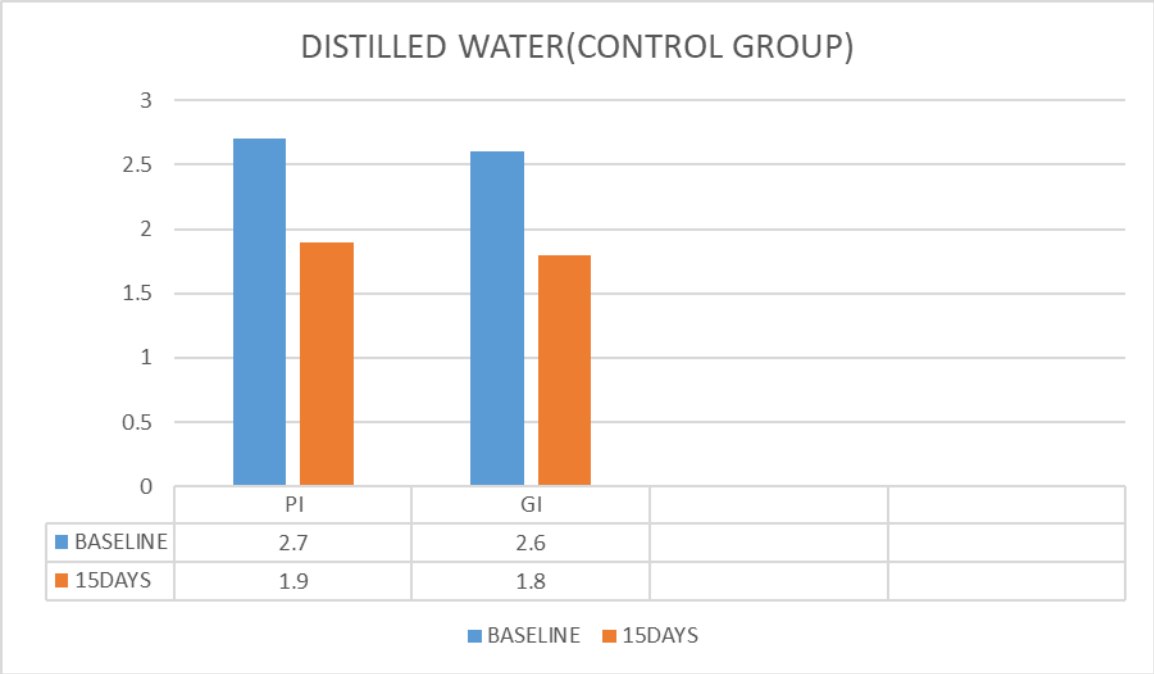
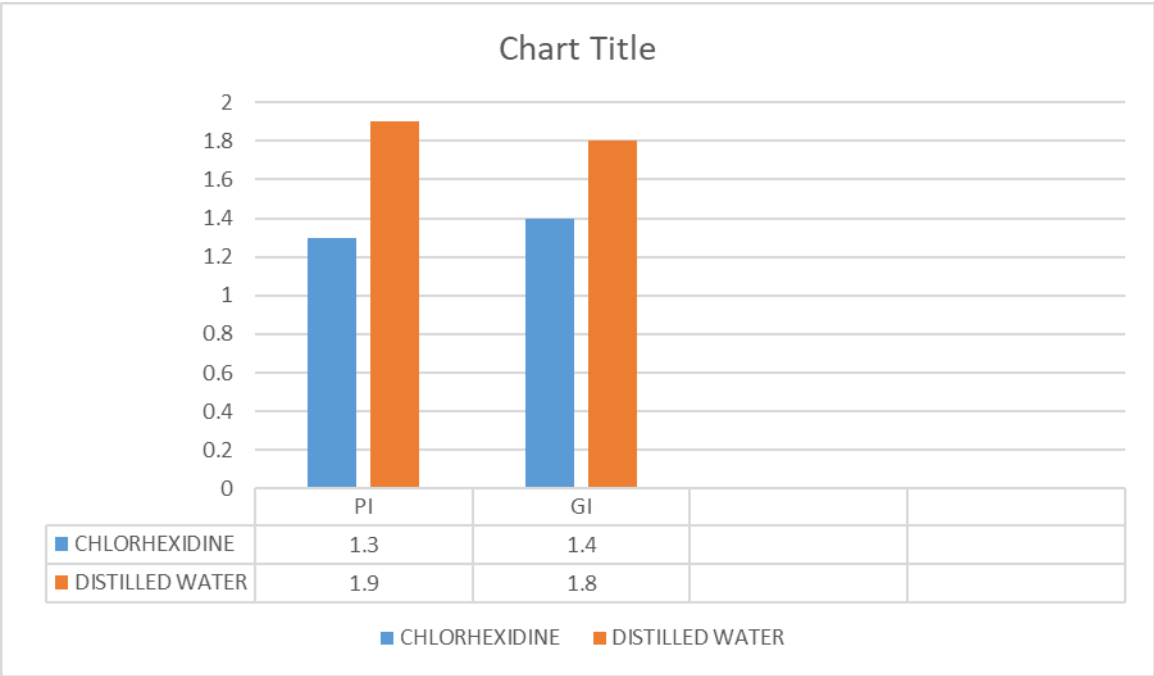
Graph 2: Results of distilled water from baseline and after 15days



Graph 2 shows the results of distilled water (control group) from baseline and after 15days. After 15 days, plaque index (PI) and gingival index (GI) was highly improved in the distilled water group and this was statistically significant $p<0.05$.

Graph 3: Results of chlorhexidine mouthwash and distilled water



Graph 3 shows the results of chlorhexidine mouthwash (test group) and distilled water (control group) from baseline and after 15days. After 15 days, plaque index (PI) and gingival index (GI) was highly improved in the CHX group as compared to distilled water group and this was statistically significant $p<0.05$.

Discussion:

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Traditional mechanical plaque control methods are widely used worldwide**,** but evidence points to their ineffectiveness.

Mechanical methods of removing plaque, such brushing and flossing, are not always successful since they depend on the dexterity and drive of the individual. In addition, tooth surfaces can get re-colonized by germs from sensitive tissues. Chemical plaque-controlling agents have shown improved efficacy in decreasing plaque and gingival irritation when used in combination with other therapies. Mouth rinses are useful tools for patients who are unable to keep up sufficient mechanical plaque management[16]. Sinha et al. 2021 did a study on visually impaired children to compare the effectiveness of three different dental aids (mouthwash, powered toothbrush, and manual toothbrush) on plaque and oral hygiene scores; the results showed that mouthwash was the most effective[17].

Those who are visually handicapped, in particular, have an additional difficulty keeping their mouths healthy since they are unable to detect the buildup of dental plaque[4]. Thus, brushing Adjunctive techniques, including mouthwashes, are necessary in addition to their teeth since they are user-friendly. The best clinical results in reducing tooth plaque and averting gingival irritation have been obtained with chlorhexidine[18]. Nevertheless, the long-term usage of CHX is restricted due to its numerous reciprocal adverse effects[19].

A comparison between the effect of distilled water and chlorhexidine mouthwash on gingival health among visually impaired was conducted in this research. There was a marked decline in plaque index values in CHX group without any significant difference. Meanwhile, the reduction was less important in the distilled water group. (GI) values showed a sharp reduction in the CHX group without any significant differences.

Chlorhexidine is a chemical agent that is frequently used to lessen the accumulation of dental plaque. Depending on its dosage, it may also be used as a disinfectant or sterilizant and is effective against a wide range of bacteria, fungi, and viruses[20].

Chlorhexidine damages bacteria by increasing their permeability and inhibiting their ability to adhere to the surfaces of teeth and oral mucous membranes. It include altering the osmotic balance and cell membranes. Furthermore, it inhibits yeast-positive and gram-negative bacteria alike[21].

The current research indicates that using normal distilled water mouthwash for an extended period of time considerably lowers both the PI and the GI index. Because of this, it may be used for extended periods of time in addition to routine mechanical oral hygiene procedures without having a discernible negative impact. To prevent dental cavities and periodontal disease, salt water rinses can be used on a regular basis. According to the findings of a study that was carried out by Gupta et al. 2014[22], the effectiveness of saline mouthwash in decreasing dental plaque was not on par with that of aloevera and chlorhexidine

mouthwash. On the other hand, because chlorhexidine has well-known adverse effects, it should only be used for a shorter amount of time. Similar results were also found in a study that was conducted by Aravinth et al 2017[23]. In this study, it was concluded that salt water rinses can be recommended for daily usage.

The study's main drawback is that its conclusions are restricted to a sample of kids from a certain region. The monitoring by the local guardians was accepted, but if a kid stopped using mouthwash during the study, this may add bias.

Conclusion: Distilled water is comparable to the gold standard chlorhexidine gluconate mouthwash. Distilled water mouthwash decreases plaque and gingival index over time. Due to cost and availability, this group of kids can utilize it regularly.

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