Original Article

Effect of Herbal Medicinal Plants in Oral Hygiene -An Experimental Study

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Abstract

The study was aimed to evaluate the effect of the fine powder of Neem (*Azadirachta Indica*) and Babul (*Acacia Arabica*) on plaque, gingival index and Oral hygiene index. 60 individuals with mild or moderate gingival score were divides in two groups. Experimental group was given a fine powder of the bark of *Neem* and *Babul* taken in equivalent quantity, for *Dantadhavana* (tooth brushing) twice daily for 30 days, and control group was administered a standard commercial tooth paste for brushing the tooth. All the indices, Plaque index, gingival index, bleeding index, probing depth of the pocket index debris index and oral hygiene index were assessed before starting the therapy and after the completion of 30 days. Paired 't' test was applied for all the indices. Statistically significant reduction in plaque index, gingival index, debris index, and oral hygiene index was found in experimental group than in control group. Conclude that *Neem* and *Babul* bark powder are more effective in maintaining oral hygiene and in gingivitis and thereby preventing other complications like severe Gingivitis or Periodontitis.

Key words: *Neem*, *Babul*, Oral hygiene, Gingivitis.

Introduction:

The goal of Ayurveda is healthy span without the need of cure of diseases. It does not aim at creating only the health of individual but simultaneously provide prescription and prohibitions for the maintenance of healthy leaving. For that Ayurveda spells out the ethics, moral code of conduct, daily and seasonal regimen in the form of *Dincharya* and *Ritucharya* which are the most important factor constituting the health of the individual as well as society. In that view oral hygiene is very much important to remain healthy, as many of the infection starts from there.

Plaque is the hallmark in preventive dentistry. There are many chemical methods are used for reducing plaque like certain mouthwashes. In Ayurveda *Dantadhavana* with the twig of Neem, and Babul are very popular. The stem of Neem contains nimbin, nimbinin and nimbidin which have anti-inflammatory and broad spectrum antimicrobial activity. Neem has antihelminthic, antifungal, antibacterial and antiviral activity.

Chewing of fresh bark of Babul tree helps in strengthen loose teeth and arrest any bleeding from the gums. Bark of Babul contains tannin and garlic acid. It also known as Kikar in India.

A review on previous work revealed very few in vivo studies worldwide assessing the effect of Neem and Babul individually. But there was

no report on combine effect of the fine powder of the bark of Neem and Babul on plaque and gingiva. Hence this study was planned to evaluate the effect of Neem and Babul powder for Dantadhavana on plaque, gingival score and oral hygiene index.

Material and Methods:

Present study was a randomized controlled trial conducted at Govt. dental college Nagpur, to evaluate the combine effect of two herbal medicinal plants (Neem and Babul) on plaque, gingival and oral hygiene index.

Study protocol

60 individuals were randomly selected from the eligible population who fulfilled the inclusion criteria and randomized into two groups Group A (Neem and Babul powder group) and Group B (commercial standard tooth paste group) by using lottery method.

All the individuals in group A were administered a fine powder of the bark of Neem and Babul trees for Dantadhavana (tooth brushing) by using finger tips twice daily at morning and after dinner for 30 days.

The individuals in group B were advised to use the commercial standard tooth paste for brushing the teeth twice daily at morning and after dinner for 30 days. They were advised not to drink or eat anything for at least 20 minutes after *Dantadhavana.* Follow up was taken 15 day after starting the study. All the parameters were assessed before starting the *Dantadhavana* and after the completion of the therapy i.e. after 30 days.

Preparation of the powder:

The small branches of the Neem and Babul tree were freshly cut. Leaves were removed and the branches measuring 12 *Anguli* long and width as little finger [1,2,3] were cut and dried till the sticks were completely dehydrated and easily breakable. Now their powder was prepared by using electric grinder then it is filtered by using sterile cotton cloth 2 to 3 times till we get the fine powder fulfilling the *Rekhapurnatva* property.

Inclusion criteria:

Patients aged between 25 to 55

Free from systemic diseases.

Having mild or moderate gingival score and those who were willing for the study and follow up.

Exclusion criteria:

Those who were suffering from diseases which might affect the salivary flow.

Currently using any mouth washes or has used the mouth wash in the past one month.

h/o antibiotic therapy in the previous 1 month prior to the study.

Criteria of assessment:

Seven indices were used for the assessment of the study.

The degree of inflammation of the gingival tissue i.e. Gingival Index (GI).

The amount of Plaque accumulated i.e. Plaque Index (PlI).

The gingival bleeding index (BI)

Periodontal attachment loss or Probing depth of the pocket.

Calculus index (CI).

Debris index (DI)

Green and Vermillion's Oral Hygiene index. (OHI).

These indices were carried out according to their methodology before and after the therapy.

Discussion:

There are various studies which have shown a high caries and periodontal disease prevalence in India [4]. It is a fact that majority of population gives a low priority to oral health, which leads to the high prevalence of oral diseases and basic oral health education and simple interventions are not available, especially to rural and underprivileged strata of the society.[5] Traditionally, in all parts of the world, mechanical removal of plaque is the most common method for preventing Periodontal diseases. But at the same time, evidence suggests that mechanical cleaning methods are inadequate.[6] Chemical anti plaque agents are a newer concept, but it is gradually taking roots. To large percentages of even the most affluent and developed societies, wholesale use of more expensive chemical anti plaque formulations would be quite restrictive due to high expense or ignorance.[7] The World Health Organization estimates that 65-80% of the world's population uses traditional medicine as the primary form of healthcare.[8] Babul is having *Kashaya Rasa* which stated as *Raktastambhak* in our ancient texts, it also

have the astringent effect due to which it is helpful to reduce the bleeding and infection also in gingivitis. The age group selected to carry out this study was 25-55 years. The adults in this age group are vulnerable to both caries and gingival and periodontal problems due to the changes in habits, addictions and lifestyle. [9] Neem gel was effective in reducing plaque scores in 3 and 6 weeks of evaluation in a study conducted by Pai et al.[10] Prashant et al., Wolinsky et al., Siswomihardjo et al., Bhuiyan et al., Almas et al., and Subramaniam et al. have carried out in vitro studies which showed the effectiveness of neem extract against plaque forming bacteria.[11,12,13] 50% extracts of Neem chewing sticks were found to be most effective in inhibiting Streptococcus mutans. Literature suggests that both Neem and Babul stick extracts have slightly acidic pH, but the pH is lesser than the tooth critical pH.[14,15] A study done by Siswomihardjo et al., showed that Neem stick extract had higher antibacterial properties than the leaves extract.[16] Hence, chewing sticks of Neem and Babul were preferred to prepare the powder over leaves. The combine effect of Neem and Babul fine powder shows the significant reduction in plaque index, gingival score, periodontal attachment lost and oral hygiene index.

Conclusion:-

This study suggested the significant reduction in Gingival Inflammation after completion of the treatment. Other indices i.e. Bleeding index, probing depth of the pocket, Debris index, Oral hygiene index also shows significant result in treated group as compared to the control group. This means the regular practice of *Dantadhavana* with Neem and Babul powder can cure many dental problems and could also prevent further complications.

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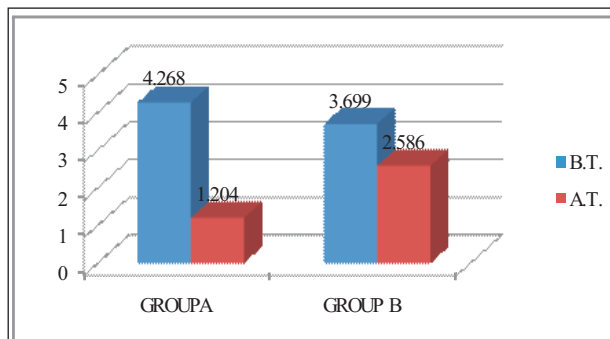

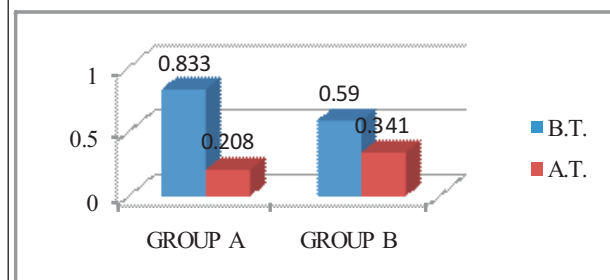Chart 1. The effect of therapy on Plaque Index (DI)

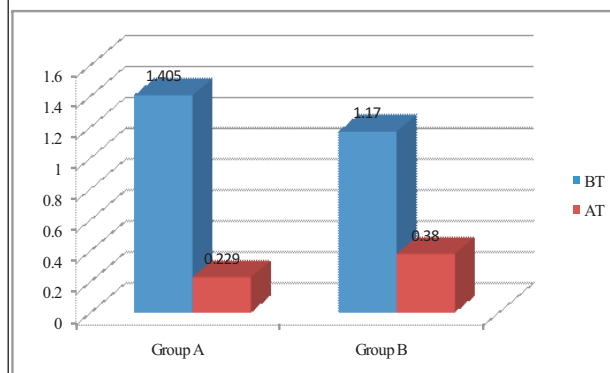Chart 2. The effect of therapy on Debris Index (DI)

Chart 3. The effect of therapy on Oral Hygiene Index (OHI)

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Table 1. showing the effect of therapy on Gingival Inflammation Index

Groups	T /t	Mean	S.D.	S.E.	S.D. (X1-X2)	S.E. (X1-X2)	't' value	Significance
A	B.T.	3.944	1.629	0.297	1.559	0.284	10.166	***
	A.T.	1.049	0.958	0.174				
B	B.T.	3.579	1.081	0.197	0.552	0.100	16.047	**
	A.T.	1.961	0.863	0.157				

Table 2. Showing the effect of therapy on Bleeding Index (BI)

Groups	T /t	Mean	S.D.	S.E.	S.D. (X1-X2)	S.E. (X1-X2)	't' value	Significance
A	B.T.	3.359	0.809	0.147	0.949	0.173	14.889	***
	A.T.	0.777	0.757	0.138				
B	B.T.	3.194	0.630	0.115	0.511	0.093	14.256	**
	A.T.	1.863	0.873	0.159				

Table 3. Showing the effect of therapy on Probing depth of the pocket

Groups	T /t	Mean	S.D.	S.E.	S.D. (X1-X2)	S.E. (X1-X2)	't' value	Significance
A	B.T.	4.122	1.200	0.219	1.192	0.217	10.262	***
	A.T.	1.887	0.971	0.177				
B	B.T.	3.537	0.732	0.182	0.392	0.072	12.435	**
	A.T.	2.641	0.892	0.163				