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A preliminary report on ethnomedicinal uses of different plants for oral care in Kalahandi district, Odisha

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Abstract

There is a long history of the use of plants to improve dental health and promote oral hygiene and is still commonly practiced among Indian communities. Pencil sized sticks are used from certain plant parts and are chewed on one end until they become soft into a brush and the brush end is used to clean the teeth in a similar manner to the toothbrush. The plant parts when used in these manners are commonly referred as the “chewing stick” or “Tooth stick”. So, to describe the different uses of different plant parts in dental care, an ethnobotanical study was conducted from October 2019 to March 2020 to investigate the use of different plant species for dental care (tooth ache, tooth decay, pyorrhea, foul smell and as tooth brush). These plant species are arranged alphabetically with their local names, botanical names, family and followed by the method of uses for dental care. In this present paper we had reported about 49 species of medicinal plants belong to 42 genus and 29 families.

Keywords: ethnobotanical, foul smell, pyorrhea, tooth ache, tooth brush, tooth decay

1. Introduction

Teeth are very hard but sensitive organs which are entrenched in the jaw bones. They not only help in the biting and grinding of food but also are aid to speech. Any disease of the gums or fault of the teeth also disturbs the process of food digestion. So these ethnomedicinal plant species were found to be used for dental care like tooth ache, tooth decay, pyorrhea, foul smell and as tooth brush to clean teeth by the tribal and local people (Singh and Krishna, 2012)^[7]. Generally, the fresh tender sticks about 12-15 cm long and 0.5-1.0 cm in diameter are either collected directly from the plants or purchased from local vendors by the people of these districts. It is locally known as Kathi. The stick is crushed at one end by the molar teeth and made in to a brush. Flexible fibers of the crushed end of the stick are used for cleaning the teeth surface and teeth crevices (Singh and Krishna, 2012)^[7].

Kalahandi district is one of the tribal dominant districts of the south-western Odisha. The rural people of Kalahandi district rely on plant resources for their domestic and primary health care needs. They collect the useful plants and their parts from various habitats such as forests, grasslands, cultivated fields, wetlands and riverbanks and use those following traditional practices. Sahu *et al.* 2017^[6] reported about a total of 57 different plant species used by the native of Bargarh district, Western Odisha, India. During the survey of the ethnobotanical plants of Kalahandi district, the authors have also collected and documented some ethnobotanical plants used for dental care with the objectives of documentation of the useful species and their indigenous uses before some of these are eliminated, or before the inhabitants of the watersheds abandon their traditional practices.

2. Materials and methods

2.1 Location and Study Area

Kalahandi experiences a rich biodiversity and is an underdeveloped and poverty stricken district in western Odisha, inhabiting a number of different communities like *kandha*, *ganda sabara*, *harijana*, *lohara*, *kandra*, *brahmin*, *gouda*, and *mali* (Panda and Padhy, 2007; Sahu

et al. 2020) [1, 2, 5]. Kalahandi lies in between 19.3 N and 21.5 N latitudes and 82.20 E and 83.47 E longitudes and occupies the south western portion of Odisha, bordered to the north by the Balangir district and Nuapada district, to the south by the Nabarangpur district, Koraput district and Rayagada district, and to the east by the Rayagada district, Kandhamal district and Boudh district. It has an area of 8,364.89 square kilometres. Bhawanipatna and Dharamgarh are two sub-divisions of Kalahandi. *Tel* is the main river of Kalahandi. The topography of Kalahandi consists of plain land, hills & mountains. Its border with Nabarangpur, Koraput, Rayagada and Kandhamal districts are hilly and mountainous. The district is primarily agricultural, with over one third of the district area covered with dense jungle forest. Industry is very limited, but bauxite and graphite deposits can be commercially exploited (Panda and Padhy, 2007; Sahu *et al.* 2020) [1, 2, 5].

2.2 Methodology

Several extensive herbal ethnomedicinal surveys had been done by visiting the study area with 25 villages. Indigenous traditional herbal practitioners, chiefs of local communities, some household heads, old men of communities and patients, accounting to 500 persons in total were interviewed in their non-common local languages, irrespective of sex. The first hand information and views given by them were recorded as data. With the help of herbal medicinal practitioners and some knowledgeable aged people, plant specimens were collected according to their local name and their taxonomic identifications were done (Singh and Krishna, 2012) [7].

2.3 Enumeration

During the field survey, ethnobotanical data of 49 species of plants belonging to 29 families were gathered from various habitats of the study areas and each was documented with regard to its local name, part used, collection, mode of administration and habitats of the species. The prevalent oral health problems in the surveyed villages are dental caries and periodontal diseases (gingivitis and pyorrhoea) and sores. In the following enumeration, the species are arranged alphabetically, botanical name and family name in parenthesis, followed by local name in inverted comma and the mode of utilization. The histogram for number of species vs family and number of species vs habits were drawn by using MS-EXCEL.

- *Abutilon indicum* (L.) Sweet (Malvaceae) 'Kuthelchitra' Uses: Small stem is used as tooth brush to clean the teeth and tongue cleaner.
- *Acacia catechu* (L. f.) Willd (Fabaceae) 'Khayar' Use: Powder of stem bark is used to cure bleeding gums and sores. Young twigs also used as tooth brush.
- *Acacia nilotica* (L.) Willd. Ex Delile) (Fabaceae) 'Bamur' Uses: Small stem is used as tooth brush to clean the teeth in village area.
- *Achyranthes aspera* L. (Amaranthaceae) 'Kukurdanti' Uses: Stem is used as tooth brush; mixture of the twig is also used as a wash to get relieve form tooth pain.
- *Aegle marmelos* L. (Rutaceae) 'Bael' Uses: In the village areas small stem is used as tooth brush to clean the teeth and to get relieve from bad smell of mouth.
- *Allium cepa* L. (Liliaceae) 'Uel' Uses: Bulb juice is used to cure toothache, bleeding gums.
- *Alstonia scholaris* L. R. Br. (Apocynaceae) 'Chatiana' Uses: Milky juice of stem bark used on toothache in order to get relive from pain.
- *Annona squamosa* L. (Annonaceae) 'Sitaphal' Uses: Small stem is used as tooth brush to clean the teeth.
- *Azadirachta indica* A. Juss. (Meliaceae) 'Neem' Uses: Twigs are used as tooth brush to get relieve from bad smell.
- *Bambusa arundinacea* (Retz.) Roxb. (Poaceae) 'Baunsa' Uses: Small stem is used as tooth brush to clean the teeth.
- *Barringt-onia acutangula* L. (Barringtoniaceae) 'Hinjal' Uses: Decoction of stem bark is used as mouth wash to cure toothache and gum problem.
- *Buchaania lanzan* Spreng. (Anacardiaceae) 'Char' Uses: Twigs are used as tooth brush to clean the teeth.
- *Butea monosperma* (L.) Taub. (Fabaceae) 'Palsa' Uses: Young twigs are used as tooth brush to clean the teeth.
- *Cajanus cajan* (L.) Millsp. (Fabaceae) 'Kandul' Use: Young stem are used as tooth brush to clean the teeth.
- *Calotropis gigantean* R.Br. (Apocynaceae) 'Arakh' Use: Latex is used to cure from gum pain.
- *Capsicum frutescens* L. (Solanaceae) 'Mircha' Use: Fruit juice is applied to the tooth cavity for toothache.
- *Carica papaya* L. (Caricaceae) 'Amrutabhandha' Use: Milky juice mixed with black salt and applied two times per a day to stop bleeding in gums.
- *Citrus limon* (L.) Burm. f. (Rutaceae) 'Kagjilembu' Uses: Leaves and fruit juice used for scouring teeth and good as a mouth freshener
- *Citrus medica* Linn. (Rutaceae) 'Lembu' Uses: Leaves and rind of fruits recommended for scouring teeth along with a pinch of rock salt. Fruit juice used for teeth whitening.
- *Cocos nucifera* L. (Areaceae) 'Nadia' Use: Roots are boiled and used as mouth rinse for treating toothache and tooth sensitivity.
- *Embllica officinalis* Gaertn (Euphorbiaceae) 'Anla' Uses: Small stem is used as tooth brush to clean the teeth; the fruits are a good source of Vitamin-C and used to treat bleeding gums.
- *Ficus benghalensis* L. (Moraceae) 'Bar' Use: Leaf powder is applied against gum swelling till cure.
- *Ficus racemosa* L. (Moraceae) 'Dumer' Use: Latex is applied against gum swellings till cure. Small stem is used as tooth brush to make teeth stronger
- *Ficus religiosa* L. (Moraceae) 'Pipal' Use: Decoction of stem bark is used as mouth wash to remove the foul smell of breathing.
- *Hemidesmus indicus* (L.) R.Br. (Asclepiadaceae) 'Anantmoola' Use: Leaf juice used to relive toothache.
- *Hibiscus rosa-sinensis* L. (Malvaceae) 'Mandar' Use: Small stem is used as tooth brush to clean the teeth.
- *Jatropha curcas* L. (Euphorbiaceae) 'Ramjada' Use: Small stem is used as tooth brush to cure pyorrhoea and toothache.
- *Lawsonia alba* L. (Lythraceae) 'Benjati' Uses: Bark of stem is chewed and kept between the teeth for about 20 minutes to cure toothache. Small stem is used as tooth brush.
- *Madhuca longifolia* (Koenig.) Macbride (Sapotaceae) 'Mahul' Uses: Small stem is used as toothbrush to clean the teeth, emerging in mustard oil to cure toothache.

- *Mangiferara indica* L (Anacardiaceae) ‘Amba’ Uses: Toothbrush of small stem is used to cure toothache; latex is applied to relieve gingivitis.
- *Millettia pinnata* (L.) Panigrahi (Fabaceae) ‘Karanj’ Uses: Small stem is used as tooth brush to clean the teeth. Tender leaf twigs are chewed and pressed between the teeth for about 15 minutes to cure toothache.
- *Mimusops elengi* L. (Sapotaceae) ‘Baul’ Uses: Twigs are used as tooth brush, Stem bark is mainly used in dental ailments like bleeding gums, pyorrhea, dental caries and loose teeth.
- *Morus indica* L. (Moraceae) ‘Tut’ Use: Twigs are used as tooth brush to clean the teeth and tongue cleaner.
- *Moringa oleifera* L. (Moringaceae) ‘Munga’ Use: Gum is used for dental care.
- *Mukia maderaspatna* (L.) Roem. (Cucurbitaceae) ‘Agak-maki’ Use: Root is chewed for about 15 minutes to relieve toothache.
- *Murraya paniculata* (L.) Jacq. (Rutaceae) ‘Kamini’ Use: Tooth brush of young stem is found to be effective to cure toothache.
- *Ocimum sanctum* L. (Lamiaceae) ‘Tulsi’ Uses: Whole plant powder is allowed to boil in one Liter of water, when it comes to half then used as mouth wash to relive toothache.
- *Phoenix sylvestris* Roxb. (Areaceae) ‘Khajur’ Use: Small stem is used as tooth brush to clean the teeth.
- *Psidium guajava* L. (Myteraceae) ‘Jam’ Uses: Small stem is used as tooth brush to cure pyorrhea and toothache; equal amount of leaf of *Mimusops elengi* and *Psidium guajav* are boiled in 500 ml of water and used as mouth wash to relive toothache.
- *Punica granatum* L. (Lythraceae) ‘Dalim’ Use: Powders of dry leaves are used to cure bleeding gums and sores.
- *Ricinus communis* L. (Euphorbiaceae) ‘Jada’ Use: Cotyledon is fried in mustard oil and the smoke is emitted by this process is inhaled through the mouth and kept closed for about ten minutes to relieve dental caries.
- *Shorea robusta* Roth (Dipterocarpaceae) ‘Sargi’ Use: Small stem is used as tooth brush to clean the teeth.
- *Sida acuta* Burm. f. (Malvaceae) ‘Bajarmuli’ Use: Small stem is used as tooth brush to clean the teeth.
- *Smilax zeylanica* L. (Smilacaceae) ‘Muturi’ Use: Small stem is used as tooth brush to cure toothache and pyorrhea.
- *Solanum virginianum* L. (Solanaceae) ‘Bhejari’ Use: Powder of dried fruit is used in cigarette and the smoke is kept inside the mouth for about 10 minutes to relieve dental caries.
- *Tamirindus indica* L. (Caesalpiniaceae) ‘Tentel’ Use: Small stem is used as tooth brush to clean the teeth.
- *Terminalia arjuna* Retz. (Combretaceae) ‘Kau’ Uses: Small stem is used as tooth brush to cure pyorrhea and toothache.
- *Vitex negundo* L. (Verbenaceae) ‘Nirgundi’ Uses: Small stem is used as tooth brush to cure pyorrhea and toothache.
- *Zingiber officinale* L. (Zingiberaceae) ‘Ada’ Use: Paste of rhizomes is used to treat toothache and tooth decay.

3. Results and Discussion

An aggregate of 49 plant species having a place with 42 genera and 29 families have been recorded to treat distinctive oral and tooth diseases (Fig 1). The distribution of plant species as habit, among 49 plant species, 31 numbers of tree (63%), 11 numbers of shrub (23%), five numbers of herb (10%) and only two plant species are climbers (4%) as shown in Fig 2. Greatest numbers of five species are from family Fabaceae, four species from family Moraceae, Rutaceae and three species each from Euphorbiaceae and Malvaceae. Two species were contributed each from six families; namely Anacardiaceae, Apocynaceae, Areaceae, Lythraceae, Sapotaceae, and Solanaceae. Rest, 20 families contributed one species each. Most of the plant parts were used as common brushing (Fig 3), with that crude leaf, bark, root and pericarp are chewed to evacuate the terrible breath and disease. In few cases the latex, juice or oil extricated from seeds are either specifically connected on the affected tooth and gums or murmured for relief of pain. Few plants parts were also used as mouth freshener in order to avoid bad smell.

The now day world markets are overwhelmed with assortment of tooth glues or pastes, tooth brushes, gels mouth wash fluids and corers of rupees are went through on their notice, circulation ,advancement advertisement. But, as distant as the fetched figure is concerned, few individuals in India can bear it when the population underneath destitution line in India and Odisha are 29.9 and 44.7 separately (Sahu and Sahu 2017)^[6]. The financial situation of other creating nations is no better than India. Besides, a few corrective and medication companies in Egypt, India, Pakistan, Switzerland and U.K. have too been connected this information for manufacturing tooth pastes. It is logically demonstrated to decrease tarter and plaque, battles germs and microbes to keep gums solid, makes a difference anticipate tooth rot, disposes of awful breath and guarantees solid teeth. The greatest and limited sources of India request the alternative way of medicinal and herbal treatment technology can be visualize and for implementation (Sahu and Sahu 2017, 2020)^[2, 6]. In this context, phytotherapy resources for herbal health care show up important because it requires no extraordinary property, sophistication or skill in generation, planning and utilization. So it has ended up a need to gather record and pharmacologically assess the valuable secondary metabolites like alkaloids, tannins, gums or any other useful plant item accessible from the neighborhood vegetation for superior herbal and dental care in Odisha. The herbal plants which make the spine of the ancient traditional medicine in the final few decades been the subject for exceptionally solid pharmacological studies; this has been brought around by the acknowledgement of the worth of therapeutic plants as expected sources of unused compounds of therapeutic value. Traditional pharmaceutical may be an ability practiced by few elderly individuals whose test information is acknowledged by everybody within the town. Plant-based traditional knowledge has gotten to be a standard instrument in hunt for modern sources of drugs, it is evident that these home grown solutions can offer a stage for advance inquire about in dentistry. During the survey time, it was too watched that elderly individuals have more information and knowledge almost these conventional home grown drugs. Recent research

uncovered that therapeutic plants proceed to play a major part in dental care needs of local people groups of Kalahandi area. Thus there's a pressing got to secure the biodiversity as well as the conventional information by rectify documentation and for assist inquire about in dentistry.

4. Conclusions

By taking the concept “more dental facility more dental problem” the authors had started a survey from October 2019 to March 2020 to investigate the use of different plant species for dental care like tooth ache, tooth decay, pyorrhoea, foul smell and as tooth brush. In this present paper we had reported about 49 species of medicinal plants belong to 42 genus and 29 families. There is no documentation of such knowledge and it is expected that with the death of elderly people the knowledge may be lost. Therefore, the present paper aims of documenting the traditional knowledge of oral health care in Kalahandi district, Odisha, India.

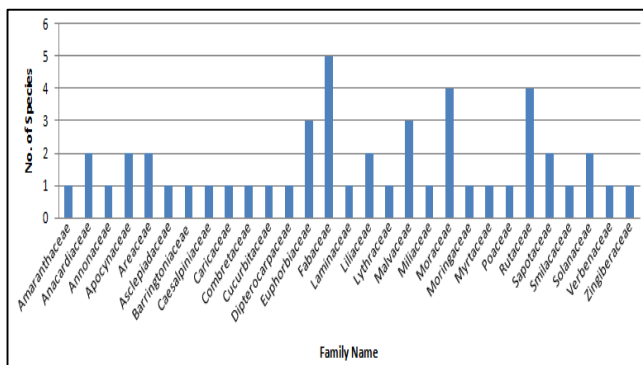


Fig 1: Contribution of different families of plant species

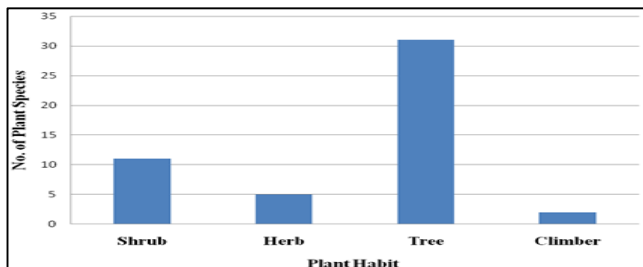


Fig 2: Habit wise distribution of plant species



Fig 3. Tender stem of Karanj (*Milletia pinnata*) in market of Bhawanipatna, Kalahandi (a), Tender stem of babul (*Acacia nilotica*) as chew stick (b) and a shopkeeper making chew stick from the stem of plants (c).

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