



Ethnomedicinal Plants Used for Oral Health in Ramshehar Tehsil of District Solan, Himachal Pradesh

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<i>Article History</i>	<i>Abstract</i>
Received 10th Dec 2023 Revised 26th Dec 2023 Accepted 17th Jan 2024	The present study was conducted in the Ramshehar tehsil of district Solan (H.P.) to record and compile the traditional ethnomedicinal knowledge used by the local inhabitants for oral health care. A total of 40 ethnomedicinal plants belonging to 25 families were reported from the study area. Direct interviews, group discussions, and pre-tested questionnaires from the respondents were used in the documentation of data. Most of the plant species reported from the study area belong to Fabaceae and Moraceae (4 species each), followed by the Euphorbiaceae, Lamiaceae and Rutaceae (3 species each). Maximum plant species collected from the study area were trees (50%), followed by shrubs (35%), herbs (12%) and climbers (3%). The twigs (34%) were the most used plant parts followed by leaves (18%) and latex (14%) for oral health care.
CC License CC-BY-NC-SA 4.0	Keywords: <i>Ethnomedicinal Plants, Traditional Knowledge, Oral Health, Himachal Pradesh</i>

Introduction

Primeval human communities have perpetually depended upon plants and plant products for several remedies (Kumar *et al.*, 2015). Worldwide, for the treatment of variety of illnesses, traditional medical systems like Chinese, Ayurvedic, Unani and Siddha etc. are beneficial in rural areas. Approximately 80% of the world's population still relies on traditional medicines primarily centred on herbal formulations (Singh & Singh, 2009). Almost all societies in the world have employed medicinal plants for economical healthcare. About 500 plant species are frequently used in the different indigenous medical systems that are practiced throughout the Indian subcontinent, despite the fact that about 2,000 plant species are known to be used for medicinal purposes there. Tribal people living in approximately 5,000 villages dominated by forests across the Indian subcontinent make 15% of the country's total land area (Thakur *et al.*, 2016). Indians societies are thought to rely on various facets of the conventional medical system to meet their healthcare needs since they have limited access to organized primary healthcare service facilities. India is widely recognized for its rich and varied social, cultural and regional legacy of indigenous medicine, which has been passed down through the ages without interruption (Kadhirvel *et al.*, 2010).

The North-Western Himalaya is a veritable treasure trove of diverse natural features, with the vegetation aspect being the most notable (Puri *et al.*, 2019). Himachal Pradesh is one of the hilly states in North India with a rich natural heritage and ethnobotanical flora. A vast diversity of forms, habitats, functions and phytochemicals can be found in plant species. Approximately 1,500 species of aromatic and medicinal value have been identified in Himachal Pradesh (Prakash & Aggarwal, 2010). The state spans 55,673 km² and is separated into 12 districts, 169 tehsils, and sub-tehsils. Its elevation ranges from 300 to 7,000 m above sea level. The state is divided geographically into three zones or regions: the greater Himalaya, the mid-hills, and the outer Himalaya (Raghuvanshi *et al.*, 2021).

Good oral hygiene is essential to one's overall health. Because oral diseases cause a great deal of pain and discomfort, they can have a substantial negative impact on a person's overall health and quality of life (Kumar, 2014). Food habits, lifestyle choices and bacterial infections are the root causes of oral diseases. The digestive process is disrupted by gum diseases and tooth problems. Poor oral hygiene, eating too much meat and sugary foods are the main causes of toothaches, pyorrhoea, bleeding gums and dental caries (Sahu & Sahu, 2017). Few studies related to dental problems have been carried out in Himachal Pradesh. One of such study was conducted in accordance with the guidelines of Helsinki Declaration for study on human subjects in which 10 out of 21 government senior secondary schools in Paonta Sahib Education Block were randomly selected for sampling. 1,120 children from 12-15 year age groups were selected as recommended by World Health Organization (WHO) for population-based surveys. The main barrier for seeking oral health care was lack of perceived need for dental treatment. The study highlighted the importance of policy-formulation to improve both level and quality of dental utilization among children in India (Bhatt, 2021). Similarly, another study was conducted in district Hamirpur which included 32 plants belonging to 24 families with predominance of Rutaceae with 5 plant species, Juglandaceae with 3 plants species, Anacardiaceae and Fabaceae with 2 plant species each (Rawat *et al.*, 2010). So, an effort has been undertaken to investigate and record the native people's traditional uses of few plant species from the Ramshehar tehsil of district Solan in order to maintain their oral health care.

Materials and Methods

Study Area

The present study was conducted in the Ramshehar tehsil of district Solan, which is located at an altitude of 1,100 m in Himachal Pradesh. Solan district lies between latitude 31.15° North and longitude 76.87° East in the humid-sub tropical and the sub- temperate zone of the Himalayas in Himachal Pradesh. The boundary of Solan is surrounded by Haryana and Punjab. It is covered with temperate, subtropical broadleaved and pine forests along with scrubs. In the months of January and February, snow can be seen in the higher altitudes of the Solan district. It is rich in biodiversity due to variation in the climatic conditions.

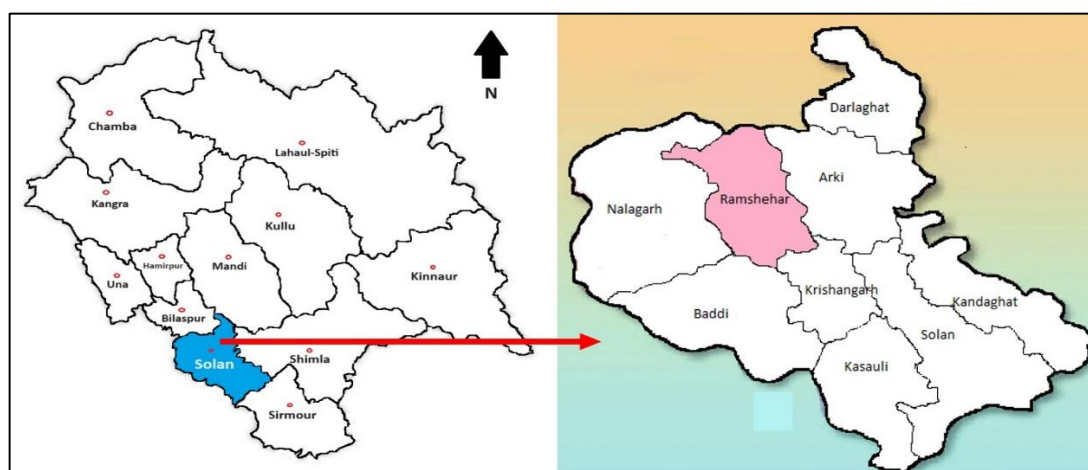


Fig.1- Map of the Study Area

Field study and data collection

Comprehensive ethnobotanical study was carried out between the periods of 2022- 2023. To speed up the identification process, voucher specimens were collected during flowering and fruiting period. The ethnobotanical data was gathered through a series of interviews and a semi-structured questionnaire from the respondents (particularly local healers) to record the traditional applications of plants. The locality and local name of each plant species were noted in the field notebook along with the information. Standard techniques

were used for the collection of plant specimens, their drying, mounting, and preparation on herbarium sheets, in accordance with Jain & Rao, 1977.

Quantitative analysis:

Relative Frequency of Citation- The relative frequency of citation (RFC) was calculated by dividing the number of informants who cited a beneficial species (FC or frequency of citation), by the total number of informants participated in the study (N). RFC value varies from 0 (when nobody mentioned a plant as a beneficial one) to 1 (when all the informants referred it as useful) (Parthiban *et al.*, 2016). RFC is calculated by the following formula:

$$RFCs = \frac{FCs}{N} = \sum_{i=1}^{iN} UR_i$$

Table 1. Demographic profile of informants

Sr. No.	Demographic Attributes	Number of informants	
1	Gender	Male	Female
		31(56.4%)	24(43.6%)
2	Age Groups	Male	Female
		2(6.5%)	1 (4.2%)
	35-44	3(9.7%)	2(8.3%)
	45-54	4(12.9%)	3(12.5%)
	55-64	5(16.1%)	4(16.7%)
	65-74	7(22.5%)	6(25.0%)
	75-84	10(32.3%)	8(33.3%)
3	Literacy among informants	Male	Female
		7(22.6%)	6(25%)
	Elementary level	6(19.4%)	2(8.3%)
	Attended school for 9-10 class	10(32.3%)	7(29.2%)
	Intermediate (12 class)	5(16.1%)	8(33.3%)
	College level	3(9.6%)	1(4.2%)

Results & Discussion

Demography of informants

The ethnomedicinal data from the area was collected through open discussions and direct interviews with the informants. The informants were divided into 6 groups on the basis of their age. Majority of informants were less than 85 years old. In order to compile traditional knowledge on ethnomedicinal plants, 55 informants in all were chosen (Table1).

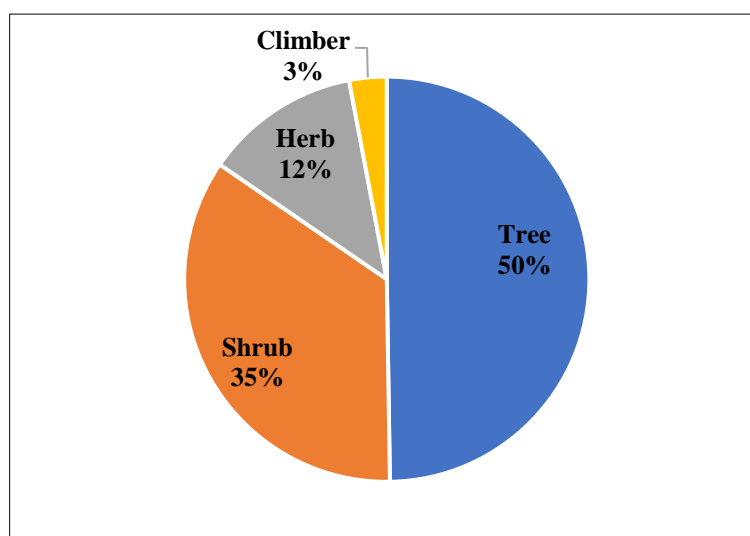


Fig. 2- Percentage of life forms documented in the study area

Plant Attributes

The present study revealed that the people of Ramshehar region have a very rich traditional knowledge related to ethnomedicinal plants. A total of 40 ethnomedicinal plant species from 25 different families were reported in Ramshehar region of district Solan. Most of the plant species collected from the study area were trees (50%), followed by shrubs (35%), herbs (12%) and climbers (3%) (Fig.2). Fabaceae and Moraceae (4 species each) were reported with highest number of plants from the study area followed by Euphorbiaceae, Lamiaceae and Rutaceae family (3 species each) (Fig. 3). The predominant plant parts used for oral hygiene were twigs (34%), followed by leaves (18%), latex (14%), bark (7%), fruits (7%), stem (7%), terminal buds (7%), roots (4%) and seeds (2%). The data on ethnomedicinal plants from study area was systematically organized in tabulated form which includes the botanical name, vernacular name, family, habit, part/s used and ethnomedicinal uses as shown in Table 2.

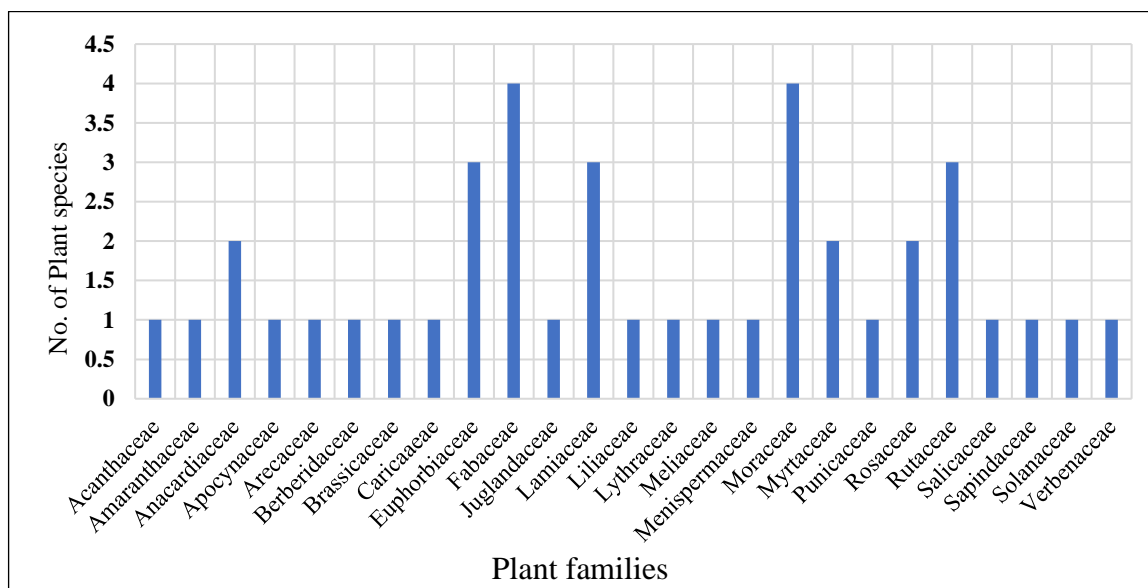


Fig. 3- Representation of Plant Families Used in Oral Health Care

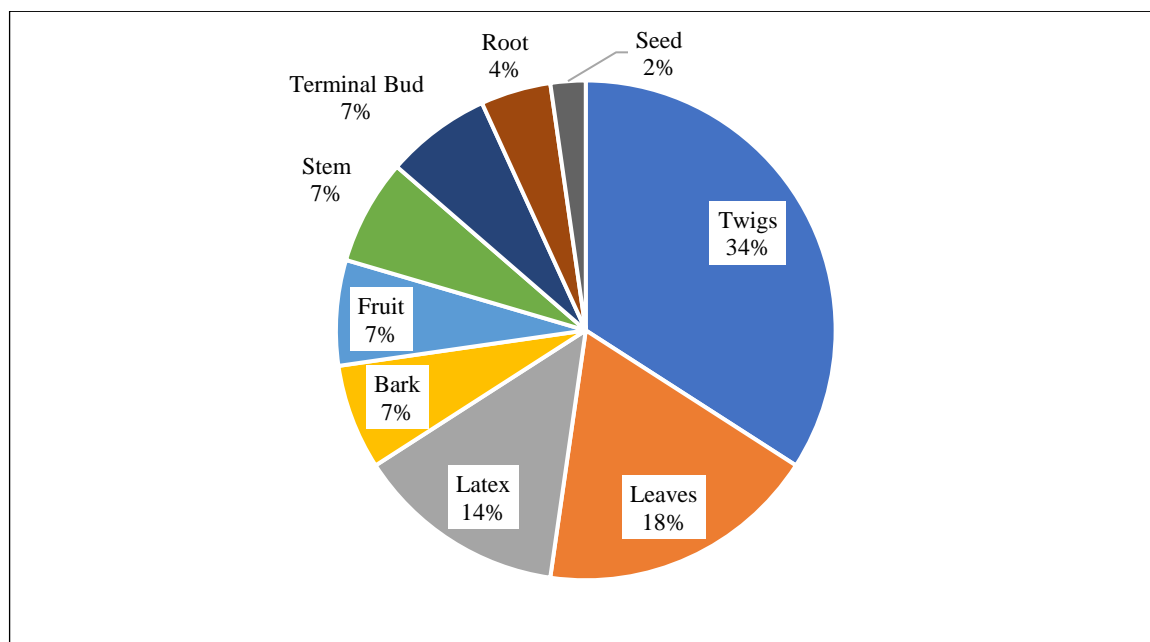


Fig. 4-Percentage of Documented Plant Species Used in Oral Health Care

Quantitative analysis

Relative Frequency of Citation

The relative frequency of citation was used to assess the significance of ethnomedicinal plants to cure oral problems. The highest RFC was calculated for *Vitex negundo* L. (1.0) and *Juglans regia* L. (0.909). This

means that these species had been referred by all or most of the respondents and were the most recognized plant species in the study area. The lowest value of RFC was calculated for *Acacia nilotica* L. and *Carica papaya* L. (0.09). This indicates that these species had been mentioned by a smaller number of respondents.

Conclusion

The study of ethnomedicinal plants for oral health care unveils a wealth of possibilities for both traditional and modern medicine. Ethnomedicinal plants not only provide alternative and complementary approaches to oral health care but also serve as reservoirs of bioactive compounds with therapeutic potential. The utilization of these plants in oral health practices highlights the need for a holistic understanding of healthcare that integrates traditional wisdom with modern science.

Moreover, the findings emphasize the necessity of conservation efforts to protect these ethnomedicinal plants and their habitats. As we continue to explore the potential of these natural resources, it is crucial to strike a balance between traditional knowledge and contemporary scientific research. Collaborative efforts involving local communities, scientists, and healthcare professionals can facilitate the sustainable utilization of ethnomedicinal plants, ensuring their preservation for future generations.

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Table 2. Plant Species Documented for Oral Health Care from the Study Area.

Sr. No.	Botanical Name	Vernacular Name	Family	Habit	Part/s Used	Folk Uses	Relative Frequency Citation	
							FC	RFC
1.	<i>Acacia catechu</i> (L.f.) Willd	Khair	Fabaceae	Tree	Bark	Powder of bark (2gm) is applied on bleeding gums.	15	0.272
2.	<i>Acacia nilotica</i> L.	Kikar	Fabaceae	Tree	Bark	Powder of bark (2gm) is kept in the mouth for an hour to get relief from toothache.	5	0.090
3.	<i>Achyranthes aspera</i> L.	Puthakanda	Amaranthaceae	Herb	Root	Small branches are used as tooth brush. The dried root powder is used as tooth paste and it is used to cure gum disorders.	12	0.218
4.	<i>Adhatoda vasica</i> Nees	Basuti	Acanthaceae	Shrub	Twigs	Stem is used as tooth stick to clean the teeth.	13	0.236
5.	<i>Asparagus adscendens</i> Roxb.	Sansmullu	Liliaceae	Shrub	Root	Root powder is used to cure swelling in mouth.	16	0.290
6.	<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Tree	Stem and Leaves	Small branches are used as tooth brush. Leaves are chewed to treat toothache.	42	0.763
7.	<i>Berberis aristata</i> DC.	Kashmal	Berberidaceae	Shrub	Terminal Bud	Terminal buds are chewed to cure mouth ulcer and tongue inflammation.	9	0.163
8.	<i>Brassica campestris</i> L.	Sarson	Brassicaceae	Herb	Seed	Seed Oil (Mustard oil) is gargled for 10 minutes once a week to check all oral problems.	17	0.309
9.	<i>Butea monosperma</i> (L.) Taub.	Palas	Fabaceae	Tree	Bark	Bark Powder is used as tooth paste to cure pyorrhoea and gum disease.	21	0.381
10.	<i>Calotropis procera</i> (Ait.) R. Br.	Aak	Fabaceae	Herb	Latex	Latex is filled in the hollow cavities to get relief from the toothache.	31	0.563
11.	<i>Capsicum annum</i> L.	Mirch	Solanaceae	Shrub	Ripe fruit	Powder of dried chillies is recommended for toothache.	15	0.272
12.	<i>Carica papaya</i> L.	Papita	Caricaceae	Tree	Latex	Latex is applied twice a day to stop bleeding in gums.	5	0.090
13.	<i>Colebrookea oppositifolia</i> Smith	Magabasuti	Lamiaceae	Shrub	Twigs	Twigs are used as toothbrush to cure bleeding gums.	8	0.145
14.	<i>Citrus limon</i> L.	Neembu	Rutaceae	Shrub	Leaves	Leaves are used for cleaning teeth in the morning.	13	0.236
15.	<i>Citrus aurantifolia</i> (Christm) Swingle	Galgal	Rutaceae	Tree	Leaves	Leaves are used for cleaning teeth and are good as a mouth freshener.	9	0.163
16.	<i>Dodonaea viscosa</i> (L.) jacq.	Mendu	Sapindaceae	Shrub	Twigs	Twigs are used as toothbrush for cleaning teeth.	19	0.345
17.	<i>Eucalyptus citriodora</i> Hook.	Safeda	Myrtaceae	Tree	Twigs and Leaves	Twigs are used as toothbrush for cleaning teeth. Leaves are chewed to cure toothache.	36	0.654
18.	<i>Euphorbia thymifolia</i> L.	Choti doodali	Euphorbiaceae	Herb	Whole plant	Herb is chewed to cure tongue inflammation.	21	0.381
19.	<i>Euphorbia royleana</i> Boiss	Chhuro	Euphorbiaceae	Shrub	Latex	Latex is filled in the hollow cavities to get relief from the decayed teeth.	17	0.309
20.	<i>Ficus benghalensis</i> L.	Barota	Moraceae	Tree	Latex	Latex is filled in the hollow cavities to get relief from the decayed teeth.	6	0.109
21.	<i>Ficus carica</i> L.	Kainwari	Moraceae	Tree	Latex	Latex is mixed with black salt (2g) and the rind powder of <i>Punica granatum</i> (Anar) (4g). A pinch of this mixture is applied to the oral sore to cure it.	25	0.454
22.	<i>Ficus glomerata</i> Roxb.	Gular	Moraceae	Tree	Latex	Latex is applied against gum swellings.	14	0.254
23.	<i>Juglans regia</i> L.	Khod	Juglandaceae	Tree	Bark and leaves	Bark and leaves are rubbed on the teeth to clean them.	50	0.909
24.	<i>Lantana camara</i> L.	Fool-lakdi	Verbenaceae	Shrub	Twigs	Twigs are used as toothbrush for cleaning teeth.	13	0.236
25.	<i>Mangifera indica</i> L.	Aamb	Anacardiaceae	Tree	Twigs	Tooth brush of small stem is used to cure toothache.	10	0.181
26.	<i>Mentha viridis</i> L.	Pudina	Lamiaceae	Herb	Leaves	Leaves are chewed as mouth fresheners for avoid bad smell.	26	0.472
27.	<i>Morus alba</i> L.	Keemu and	Moraceae	Tree	Twigs	Twigs are used as tooth brush to	18	0.327

Toont						clean the teeth.		
28.	<i>Murraya koenigii</i> (L.) Spreng.	Gandilla	Rutaceae	Shrub	Twigs	Twigs are used as tooth brush.	49	0.890
29.	<i>Nerium indicum</i> Mill.	Kaneera	Apocynaceae	Shrub	Twigs	Twigs are used as tooth brush.	38	0.690
30.	<i>Phoenix sylvestris</i> Roxb.	Khazoor	Areaceae	Tree	Twigs	Twigs are used as tooth brush.	12	0.218
31.	<i>Phyllanthus emblica</i> L.	Amla	Euphorbiaceae	Tree	Fruits	Fruit are consumed for bleeding gums.	24	0.436
32.	<i>Pistacia integerrima</i> Stew.	Kakarsinghi	Anacardiaceae	Tree	Leaves	Leaves are chewed to check toothache.	8	0.145
33.	<i>Prunus persica</i> (L.) Batsch.	Aaru	Rosaceae	Tree	Twigs	Twigs are used as toothbrush	29	0.527
34.	<i>Psidium guajava</i> L.	Amrood	Myrtaceae	Tree	Leaves, Twigs and Terminal Bud	Leaves and twigs are used for scouring teeth. The terminal buds are chewed to cure oral inflammation.	43	0.781
35.	<i>Punica granatum</i> L.	Anar and Daru	Punicaceae	Tree	Fruits	Powdered rind of fruit (2-3g) is applied to inflamed parts of the oral cavity to cure oral inflammation.	40	0.727
36.	<i>Rubus ellipticus</i> Sm.	Heer	Rosaceae	Shrub	Terminal Bud	The terminal bud is chewed to cure tongue inflammation.	28	0.509
37.	<i>Salix tetrasperma</i> Roxb.	Biyunsh	Salicaceae	Tree	Twigs	Twigs are used as toothbrush to clean the teeth.	30	0.545
38.	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f.& Thomson	Giloy	Menispermaceae	Climbing Shrub	Stem	Small pieces of stem are used as toothbrush to clean the teeth.	13	0.236
39.	<i>Vitex negundo</i> L.	Banna and Samalu	Lamiaceae	Shrub	Twigs	Twigs are used to clean teeth and are recommended to heal pyorrhoea, gum inflammation and other dental problems.	55	1
40.	<i>Woodfordia fruticosa</i> Kurz	Danvi	Lythraceae	Shrub	Twigs	Twigs are used as toothbrush	23	0.418