Influence of Ayurveda in traditional health practice of tribe of Shahapur and Jawhar forest area of Maharashtra

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Research

Abstract

Background: The ancient traditional system of medicine of India knows as "Ayurveda" uses natural sources as the base of medicine as per fundamental principles. The traditional folk healers also retain such knowledge gained from their ancestors of proper usage of natural resources available in their native flora, for the management of disease. Hence this study was planned to document tribal knowledge from the Jawhar and Shahapur Forest division of Maharashtra, India and verified with reported information of the Ayurveda.

Methods: Data was collected by recording detail interview of 47 respondents during Medico-ethno-botanical survey in the year 2018-19. Collected data was analyzed using quantitative tools, like Use Value (UV), Informant Consensus Factor (ICF), Family Importance Value (FIV), and Fidelity Level (FL). Collected claims were also validated from 20 books including classical textbooks of Ayurveda and ethno medicine and other search engines.

Results: Total 182 Ethno medicinal claims consisting of 10 compound formulations were reported for combating 68 different types of diseases and symptoms. Data of 99 plant species belonging to 88 genera and 48 families were recorded from 47 respondents. The highest use value (UV) 0.13 was recorded for *Holarrhena pubescens* Wall. ex G. Don and *Tinospora cordifolia* (Willd.) Miers. It was observed that 16 claims of a single drug and all compound formulations are not recorded in the classical textbooks of Ayurveda

Conclusion: Almost 95% of tribal health practice is according to the Ayurveda. However, novel folk claims could be explored for bioactive and further pharmacological activities to introduce in Ayurvedic Pharmacopoeia.

Key words: Ayurveda, Ethno medicine, Folklore claim, Validation.

Background

The human race has long relied on plants for basic necessities such as sustenance and health. Since classical times, natural resources have always been a source of medicines for India's traditional health care systems, such as Ayurveda, Unani, Siddha, Sowa Rigpa (https://main.ayush.gov.in/ayush-systems). As a result of civilization, direct reliance on natural resources has decreased. However, according to WHO, the majority of the world's population

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(80%) is contingent on natural resources to tackle a variety of diseases (Azaizeh *et al.* 2003, https://www.who.int/malaria/publications/world_mala ria_report). Ayurveda is a science having its own fundamental principles like **prakriti** (human body constitution), **panchamahabhuta** (Five basic elements- Earth, Water, Fire, Air, and Space), **tridosha** (three regulatory functional factors of the body), etc. However, a lack of exchange of information from Ayurveda to modern science around the world has resulted in the waning of this priceless traditional wisdom (Jaiswal & Williams 2017).

The traditional folk healers retain such knowledge of the proper usage of natural resources from their native flora for the management of diseases gained from their predecessor and transferred to the next generation.

The documentation of such traditional knowledge is a necessity in the field of drug research to thrive in the modern era (Chaudhary & Muchtar 2001). As evidenced by the preceding paper, indigenous plant species played vital role in various innovations (Suntar 2019). With this background, it is important to document ethnic knowledge through extensive Medico Ethno-Botanical studies to enrich the health care system. Such documentation and reporting are equally important for the conservation of native flora.

In the Charak Samhita, one of the ancient Ayurvedic classical textbooks, the importance of ethnomedicines is well recognized (Agnivesh 2007) and since then several classical textbooks, notably Nighantu (Lexicon), have been modified by incorporating knowledge shared by tribal (Pandit 2006). In the contemporary period also, substantial research is undertaken in the field of medicinal plants and ethnomedicine, even so, chemical, and pharmacological screening of just 6% of total plant species might be produced as lifesaving medications (Goswami et al. 2002). To scientifically establish a drug and enrich the science and health care system, the documentation of ethnomedicinal therapeutic use of medicinal plants needed improvisation and accuracy.

The association between the use of medicinal plants and tribal communities is always inspiring but over the period it is observed that dependency of tribal on the natural sources is slowing down due to cultural up-gradation, land degradation, deforestation, and various developmental activities. Approximately 3.5 million tribal people are estimated to have left agriculture and related activities in the last decade (Press Information Bureau. 2021. https://pib.gov.in/). Hence it is high time to codify and preserve such important tribal information by adhering to a code of ethics and conduct. (International Society of Ethnobiology Code of Ethics with 2008 additions) (https://www.ethnobiology.net/ code-of-ethics).

Further, to understand the impact of Ayurveda on tribal health practices, it is necessary to document and validate ethnomedicinal claims and medicinal plants used by tribal folk healers for their mention in the classic Ayurvedic texts. It is also necessary to validate novel claims and include the native flora used by tribal in Ayurvedic compendiums. This study will take one step closer towards merging the Ethnic and Ayurvedic knowledge recorded from the medico-ethnobotanical survey studied in Jawhar and Shahapur forest division of Than forest circle, Maharashtra, India.

The aim of the present study was documentation of the traditional knowledge from the tribal dwelling in the study area and validation of the collected data from the classical literature of Ayurveda to appraise the influence of the traditional Indian system of medicine i.e., Ayurveda on tribal health practices. The scientific presentation of data will help to understand the need for conservation of such knowledge and novel claims collected during the survey would pave the path for further scientific study.

Materials and Methods

Survey area

The medico-ethnobotanical survey was conducted in tribal pockets of Shahapur and Jawhar forest division of Thane Forest Circle of Maharashtra, India. (Fig. 1.) The selected area falls under the Northern Western Ghats region, which is, rich in biodiversity with a moist deciduous type of forest ecosystem (http://cgwb.gov.in/District_Profile/Maharashtra/Thane.pdf). Shahapur lies in the Western Ghats located at 19.45°N; 73.33°E and Jawhar lies in between 19.92°N 73.23°E (https://en.wikipedia.org). The selected area covers 40.06 % and 96.97 % of the tribal population in the Shahapur and Jawhar area respectively as per the census of 2011 (District Census Handbook Thane. 2011, census. https://censusindia.gov.in/2011,census/). Thane forest circle covers about 3463 square km. the area under the forest which is about 37.10% of the total geographical area. Out of this, 20.62% of forest area is in the Shahapur forest division and 9.99% in the Jawhar forest division (http://www.dcmsme.gov.in/). Shahapur and Jawhar forest divisions are situated merely 120-150 km from the cities

like Thane and Nashik, still the lifestyle, living standard, occupation, economic status, and culture are entirely different. Jawhar forest division falls under the newly formed Palghar district, which was carved out of Thane district on 1st August 2014, whereas Shahapur forest division comes under the Thane district of Maharashtra, India.

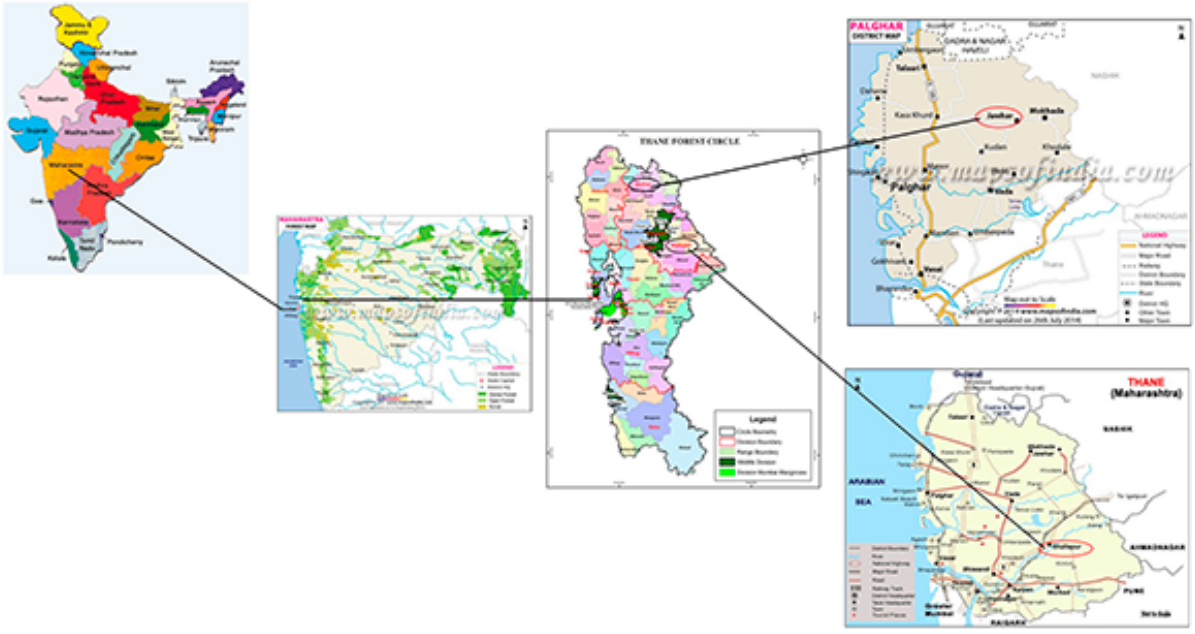

Figure 1. The location of the surveyed area

Weather

This area has high humidity nearly throughout the year, an oppressive summer season, and well distributed and heavy rainfall during the South-West monsoon season. Overall, there are four seasons summer, monsoon, post-monsoon season, and winter season.

Tribal communities in the study area

Tribal like **katkari, kolams, madiagonds, bhils, gonds, mahadevkolis, malharkolis**, and **kokans** reside in the surveyed areas among which **katkari (kathodi), madiagond**, and **kolam** are the vulnerable tribal groups (Major Caste and Tribes.https://gazetteers.maharashtra.gov.in/cultural.maharashtra.gov.in).

Data collection and identification of plant species

A systematic survey study was planned in each quarter during the year 2018-19. After obtaining permission from the government official representative of the forest department of the Thane forest circle, Maharashtra, India; a survey team consisting of Ayurvedic physicians and botanists visited villages for 10-15 days. A specially designed semi-structured questionnaire was prepared to document ethnomedicinal knowledge about the usage of natural sources for health care. Before conducting the survey, all the participants were explained the clear objective of the study in a language understood by them. Prior informed consent of the local forest department head, village heads, and tribal leaders was also taken whereas a local person of the community well versed in the local language also accompanied as a guide to assist the survey team during the interview for better understanding of local terms used by tribal communities. Interviews of the local vaidu / bhagat (Traditional doctor), folk healers, employees of forest departments like forest guards, watchmen, and elderly people having experience with the usage of medicinal plants were conducted only after obtaining prior informed consent. The information shared by the respondents was filled in the special design LHT (Local Health Tradition) proforma which served as primary data. Information regarding the local plant names, part(s) used, methods of preparation and application, dose, duration, indication, method of diagnosis, etc. along with the details of knowledge providers were recorded during the interview. Moreover, a field survey was also conducted along with the tribal for the collection of plant samples and additional information about their tradition and culture were recorded from local informers by detail formal and informal discussions.

Taxonomical identification and herbarium:
The medicinal plant species used by the local communities of the study area were collected from the study area and authenticated with the help of flora (Singh & Karthikeyan 2001), published literature (https://www.teriin.org/projects/), and the taxonomist of the Jawhar College and Botanist of the Institute. Collected Data of medicinal plants was verified for Sanskrit and local names from websites like envis FRLHT (Foundation for Revitalization of Local Health Traditions) (http://envis.frlht.org), biodiversity portal (https://indiabiodiversity.org). The Plant List (http://www.theplantlist.org) and International Plant Name Index (http://www.ipni.org), were used for the correct botanical name. The life form was categorized as herbs, shrubs, climbers, liana, and trees according to the proposed and modified system (Raunkier 1934, Brown 1977) The herbarium of rare and uncommon plant species was prepared and the field book along with voucher specimens was submitted in Herbarium of the Regional Ayurveda Research Institute, Pune, Maharashtra, India.

Data Organization
The collected ethnobotanical data were entered into Excel spreadsheet 2007 and summarized using graphical statistical methods such as percentages. The part used by the healers for the preparation of ethno medicines was grouped under 15 classes, that is, leaves, whole plant, root, fruit, bark, etc. Human ailments treated in the study area were classified as per the Ayurvedic terminology of diseases; based on the symptoms and disease narrated by respondents. Described route of administration was also categorized as per the Ayurvedic terminology of administration of medicine. The demographic data regarding informants' gender, age groups, educational status, and occupation was also carried out.

Quantitative analysis
The ethnobotanical data were analyzed using different quantitative indices including Informant Consensus Factor (ICF), Use Value (UV), and Family Importance Value (FIV) and Fidelity level (FL). Data was reported in numbers and percentages.

Informant Consensus Factor (ICF)
ICF value specifies the informant's consent on the medicinal plant utilization species and evaluates variability in the method of utilization against reported diseases. During calculating ICF values, diseases were broadly categorized into different categories. The maximum ICF value i.e. close to 1 indicates that popular species are employed by a huge number of local populations due to their authenticity regarding diseases. Nevertheless, a low ICF index close to 0 defines that the informants practice this species randomly to treat reported disease conditions. (Canales *et al.* 2005). ICF was calculated by using formula:

$$ICF = N_{ur}-N_t/ N_{ur} -1$$

Where ICF = informants consensus factor, N_{ur} = number of use citation, N_t = number of used species

Use value (UV)
Use value (UV) determines the relative importance of the uses of plant species. It is calculated using the following formula (Philips & Gentry 1993)

$$UV_i = \Sigma U_i/N$$

Where $U_i$is the number of use reports cited by an informant for a particular plant species and N is the total number of informants interviewed during the survey.

Family Importance Value (FIV)
Family Importance Value (FIV) gives the local importance of the families of wild species. It was calculated by calculating the percentage of informants mentioning a specific family. (Vitalini *et al.* 2013)

$$FIV=FC /N \times 100$$

Where FC is the number of informants mentioning the family and N is the total number of informants participated in the study.

Fidelity level (FL)

Fidelity level (FL) is used to calculate the relative frequency of citation (Friedman *et al.* 1986, Ouedraogo *et al.* 2019) The percentage of informants who claim to use specific plant species for specific healing processes is referred to as FL. This demonstrates people's preference for a certain plant species in a specific therapeutic therapy. The following formula was used to calculate it:

FL(%)= Np/NX100

Where Np is the number of informants who mentioned or claimed the use of plant species for a particular ailment. N is the total number of informants who cited the plant species for various kinds of medicinal treatment.

Validation of folk knowledge

After entering the data in LHT (Local Health Tradition) format, the collected folk claims were validated from the classical text of Ayurveda (Agnivesh 2007, Sushrut 2009, Vagbhat 2002), etc., Nighantus (http://niimh.nic.in/ebooks/e-Nighantu/), Glossary of Indian Medicinal Plants (Chopra 1956), Medicinal Plants used in Ayurveda, (Sharma 1998), Classical Uses of Medicinal Plants (Sharma 2004), An Appraisal of Tribal Folk Medicines (Anonymous 1999), The Ethnobotany of Eastern Ghats (Rao & Henry 1996), Medico Ethnobotany of Utter Pradesh (Uniyal & Tiwari, 1993), Medico-botanical exploration of Orissa (Hemadri et al. 1996), Ethnobotany (Trivedi 2002), Indian Materia Medica (Nadkarni 1999), Database of Medicinal Plants Vol 1-8 (Sharma et al. 2001), Ayurvedic Pharmacopeia of India (Anonymous API 1999) and Ayurvedic Formulary of India (Anonymous AFI 2000) to identify the novel folk claim or plant with a new indication or new mode of administration. Compiled folk claims were also searched on different search engines like Google Scholar, Pubmed to validate the reported claims. After analysis of the collected data from classical texts and published literature, through reference books and journals, the claims which are not reported in any literature form are considered as novel claims.

Results

Demographic Data

The present study recorded data from a total of 47 respondents. Demographic features of the informants showed that, amongst the total respondents (n=47), 93.61% were male whereas 6.38% were female. Amongst the respondent, 38.29 % were folk healers and 61.70 % were informants consisting of watchmen (19.14%), forest guard (23.40%), farmers (48.93%), laborers (12.76%). Elderly and experienced respondents were (61.70%) within the 45-70 years age category, whereas youth respondents between the 25-44 years of age group were 38.29% In terms of educational status, 66.7% of the respondents were literate having primary and secondary education; whereas (46.80%) were illiterates and spoke the local language*, i.e.* Marathi. The occupational distribution of the respondents shows that (48.93%) were farmers, while (51.06%) were belonging to the forest department working as a forest guard, watchman, and forest labor. Maximum (85.10%) respondents have learned by self-interest, whereas 14.89% of respondents, especially folk healers have learned from their gurus (teacher)/ guide/ parents. Amongst the interviewed individuals, 6.38% of folk healers had a family history of the tradition of this occupation (Table. 1.)

Table.1. Demographic information of respondents

Variables	Category	Number	Percentage
Gender			
	Male	44	93.61%
	Female	03	6.38%
Age group			
	45-70	18	61.70%
	25-44	29	38.29%
Educational status			
	Illiterate	22	46.80%
	Primary	15	31.91%
	Secondary	7	14.89%
	Graduates	3	6.38%
Major occupation			
	Farming	23	48.93%
	Forest department	24	51.06%
Area of source information			
	Self interested	40	85.10%
	From Guru	7	14.89%
	Family history	3	6.38%

Table. 2. Medico-ethnobotanical claims of single drug reported during the survey of Jawhar and Shahapur Forest division.

Botanical Name	Local name	Sanskrit name	Voucher Specimen Number	Part Used	Form of formulations	Indication	Dose	Mode of application and validation
Acacia catechu (L.F.) Willd. (Leguminosae)	**khaira**	**khadira**	1092	Heartwood	heartwood	**mukhapaka** (Stomatitis / Oral ulcers)	500 mg	Masticate the heartwood with betel leaf (*Piper betel* L.). Twice a day for 1-2 days. (Anonymous 1999)
Acacia nilotica (L.) Delile (Leguminosae)	**babhali**	**babhula**	2248	Stem Bark	**churna** (powder)	**dantashula** (Toothache)	5 gm	Take one teaspoonful of dry stem bark powder in 1 glass of water. Gargle once a day for 3 days. (Ali *et al.* 2012)
Acacia nilotica (L.) Delile (Leguminosae)	**babhali**	**babhula**	2248	Stem Bark	**gomutrakwadith a twaka** (bark boiled in cow urine)	**pad daha** (Burning sensation in sole/ Peripheral neuropathy)	As required (kept up to overnight)	Boil stem bark in cow's urine (1 lit **gomutra**) till it becomes smooth. Apply the bark on the sole, tie with the help of cloth during nighttime. Repeat it for 3 days. (Sharma 1998)
Acacia pennata (L.) Willd. (Leguminosae)	**chilar**	**vallikhadira**	470	Stem Bark	**swarasa** (juice)	**sarpadansha** (Snakebite) -for animals	1 Litre	Collect the fresh stem bark and prepare the juice by crushing and adding 1lit of water. Administer orally using a green colour bottle immediately after the snake bite. Root- (Kumar & Suryanarayana 2011)
Achyranthes aspera L. (Amaranthaceae)	**aghada**	**apamarga**	14055	Root	**kalka** (paste)	**vruschik dansha** (scorpionsting)	As required	Prepare the paste by adding sufficient amount of water. Apply fine paste locally on the affected area after the sting. (Sharma *et al.* 2001; Vaidya 1999)
Achyranthes aspera L. (Amaranthaceae)	**aghada**	**apamarga**	14055	Seed	**vati** (pills)	**shwana dansha** (dog bite)	10-12 seeds	Add a sufficient quantity of Jaggery to prepare a pill. Administer orally once. (Sharma 1998, Vaidya 1999)
Achyranthes aspera L. (Amaranthaceae)	**aghada**	**apamarga**	14055	Leaf	**vati** (pill)	**twakgata khajurkantaka shula** (**twakgat shalya vedana**) unexplored painful *Phoenix* etc. Thorns under the skin.	2-3 pills	Make pills by adding Jaggery in the paste of leaf and administer orally twice a day for one day. (Vaidya 1999)
Achyranthes aspera L. (Amaranthaceae)	**aghada**	**apamarga**	14055	Whole Plant	**kshara** (alkali)	**ashmari** (Urolithiasis)	500mg	Prepare ash (2-3 kg) of the whole part of the plant and soak it overnight, filter the

								supernatant through the cloth, allow it to settle for 24 hours, repeat the same procedure for 4-6 days. Then boil the final filtrate and evaporate the filtrate till the alkali (**kshara**) deposition occurs. Administer orally twice a day for 3 days. (Desai 2015, Bhavmishra 2006)
Haldina cordifolia (Roxb.) Ridsdale (Rubiaceae)	**haidu (bhunga powder)**	**haridru**	14176	Heart wood	**siddha taila** (medicated oil)	**dadru/ twakvikara** (ring worm infection)	As required	Boil small cut pieces of heart wood in soya bean oil till the essence of heart wood comes into the oil and the pieces become black. Filter it, keep it in airtight bottle. Apply externally whenever needed. (Natarajan *et al.* 2000, Vaidya 1999)
Aegle marmelos (L.) Corrêa (Rutaceae)	**bel**	**bilwa**	3145	Leaf	**swarasa** (juice)	**balaatisara** (diarrhoea in children), **amatisara** (diarrhoea with mucus)	1-3 leaves	Administer fresh juice orally once a day for three days on empty stomach. (Sharma *et al.* 2001)
Albizia lebbeck (L.) Benth. (Leguminosae)	**shirasa**	**shirish**	664	Stem Bark	**kwatha** (decoction)	**raktarsha** (bleeding piles)	30 ml	Add one teaspoonful powder in 60 ml of water and boil it on low flame till it becomes half quantity. Administer orally twice a day on an empty stomach for 8 days. (Vaidya 1999)
Aloe vera (L.) Burm. f. (Xanthorrhoeaceae)	**korphad**	**kumari**	2250	Leaf	leaf pulp	**visarpa** (Herpes)	As required	Apply leaf pulp locally over the affected area once in a day for 5 days. (Nadkarni 1999)
Amorphophallus paeoniifolius (Dennst.) Nicolson (Araceae)	**lotha**	**suran**	14601	Tuber	**vati** (pills)	**arsha** (Piles / Haemorrhoids)	1 -2 gm	Prepare slices of tuber and dry it. Prepare coarse powder of one slice. Coat it with 5gm jaggery administer orally on empty stomach on alternate days. Administer 5 doses. (Dey *et al.* 2016)
Anacardium occidentale L. (Anacardiaceae)	**kaju**	**kajutak**	14261	Stem Bark	**kalka** (paste)	**vrishchikdansha** (scorpion sting)	As required	Without touching peel, a piece of stem bark is to be removed with teeth, masticate and apply on the affected area immediately. (Patil 2006)
Anogeissus latifolia (Roxb. ex DC.) Wall. ex	**dhavada**	**dhav**	14175	Seed	**churna** (powder)	**atisara** (diarrhoea)	3-5 gm seed powder	Add powder in 500 ml water and administer orally, once a

Guillem. & Perr. (Combretaceae)								day for 3 days, in the morning. (Vaidya 1999)
Asparagus racemosus Willd (Asparagaceae)	**narak**	**shatavari**	2352	Root	root	**kamala** (Jaundice)	As required	Prepare 7 pearl shape beads from (1 inch/ 2-3 gm) root and make a necklace like structure. Wear this medicated necklace for 7 days.
Asparagus racemosus Willd (Asparagaceae)	**narak**	**shatavari**	2352	Root	**churna** (powder)	**Stanyakhyaya** (Hypogalactia)/ **vrikkaj vikara** (kidney diseases)	5 gm	Administer powder orally with a glass of milk, once a day at night for 4-5 days. (Sharma *et al.* 2001)
Azadirachta indica A. Juss. (Meliaceae)	**nimba**	**nimba**	4219	Leaf	leaves	**kachhu** (scabies)	As required	Take freshly collected leaves and boil it in water and use this for a bath. Once a day for 2-3 days. (Sharma 2004)
Baliospermum montanum (J.Burm.) Suresh (Euphorbiaceae)	**jivita**	**danti**	4096	Latex	latex	**netravikar** (Eye disease/ blindness)	1-2 drops	Instil 1-2 drops latex in eyes once. Note: the patient will experience blindness for 2-3 hours after which the vision will be clear. (Vaidya 1999)
Bambusa arundinacea Willd. (Poaceae)	**bambu**	**vansha**	14356	Stem bark	**vati** (pills)	**nalgutha** (Marathi) (umbilical hernia/ lateral hernia/ intestinal hernia)	500 mg-1gm	Collect fresh stem bark of bamboo and add a sufficient quantity of jaggery and make pea-sized pills. Administer orally once a day on an empty stomach for 5 days. (Lavekar *et al.*2007)
Bauhinia racemosa Lam. (Leguminosae)	**apata**	**asmantaka**	14618	Stem Bark	**kalka** (paste)	**raktapradar** (vaginal bleeding/metrorrhagia) ; **vandhyatwa** (female infertility)	5 gm in 30 ml milk	Prepare the paste of freshly collected stem bark scrubbing on the stone by adding a little amount of milk. Administer orally with milk twice a day on an empty stomach for 3 days. (Sharma 1998)
Bombax ceiba L. (Bombacaceae)	**kate savar**	**shalmali**	14054	Flower	**kalka** (paste)	**arsha** (Piles/ Haemorrhoids)	As required	Prepare the paste of fresh flowers by crushing or prepare the paste by adding water to the powder of dry flowers. Apply externally twice a day for two days on the affected part. (Desai 2015)
Butea monosperma (Lam.) Taub. (Leguminosae)	**palas**	**palash**	14187	Flower	**hima** (cold infusion)	**aniyamit artava chakra** (Irregular menstrual cycle)	100 ml	Soak 10-12 flowers in a glass of (100 ml) water for overnight and squeeze it, and filter it on the next day morning. Administer the filtrate orally

								on empty stomach for 2-3 days before the menstrual cycle. (Nadkarni 1999, Vaidya 1999)
Butea monosperma (Lam.) Taub. (Leguminosae)	**palas**	**palash**	14187	Flower	**churna** (powder)	**adhmana** (bloating with distension), **raktapradar** (Metrorrhagia)	10 gm	Administered orally with water. (Nadkarni 1999)
Butea monosperma (Lam.) Taub. (Leguminosae)	**palas**	**palash**	14187	Root	**kalka** (paste)	**vruschik dansha** (scorpion sting)	As required	Apply the paste, locally on the affected area (Vaidya 1999)
Calotropis procera (Aiton) Dryand. (Apocynaceae)	**rui**	**arka**	14105	Stem	dried stem	**ardhavabhedaka** (Migraine)	As required	Make a cigar of dried stem pieces, light it on one end and inhale the smoke through nostrils for 2-3 days. (Sree *et al.* 2011)
Calotropis procera (Aiton) Dryand. (Apocynaceae)	**rui**	**arka**	14105	Leaf	leaf coated by oil	**sandhivata** (Osteo arthritis)	As required	Apply mustard oil/edible oil over the leaves and heat it slightly, keep it on the affected area and tie with a cloth. Repeat the same twice a day for 30 days. (Vaidya 1999, Anonymous 1999)
Calotropis procera (Aiton) Dryand. (Apocynaceae)	**rui**	**arka**	14105	Latex	**vati** (pills)	**tamak shwas** (Bronchial asthma)	500mg	Collect the latex before sunrise and add a sufficient amount of **besan** (Chickpea flour) and make small pills (Chickpea size). Administer internally with water twice a day for 3 days. . (Vaidya 1999)
Calycopteris floribunda (Roxb.) Lam. ex Poir. (Combretaceae)	**ukasa**	**pullani**	14330	Tender Leaf	tender leaf	**udarshula** (abdominal colic)	2-3 tender leaves	Masticate 2-3 tender leaves whenever required. (Nadkarni 1999, Desai 2015, Anonymous 1999)
Calycopteris floribunda (Roxb.) Lam. ex Poir. (Combretaceae)	**ukasa**	**pullani**	14330	Tender Leaf	**swarasa** (juice)	**shwandansha** (dog bite)	30ml	Administer juice orally once a day (Upadhye *et al.* 1986)
Capparis spinosa L. (Capparaceae)	**waghoti**	**himsra**	14245	Root	**kalka** (paste)	**arsha** (piles/haemorrhoids)	As required	Apply paste locally on the affected area at bedtime and keep overnight for 7 days. (Anonymous 1999)
Careya arborea Roxb. (Lecythidaceae)	**kumbhi**	**kumbhi**	14337	Stem Bark	**kalka** (paste)	**sandhivata** (osteo arthritis)	As required	Apply paste locally over the affected area twice a day for two days. (Vaidya 1999)
Careya arborea Roxb. (Lecythidaceae)	**kumbhi**	**kumbhi**	14337	Stem Bark	**swarasa** (juice)	**udarshula** (abdominal colic	50 m	Soak 2-3 inch piece in half glass (50 ml) water and filter it

								and drink twice a day, on empty stomach in the morning (Nadkarni 1999)
Carissa carandas L. (Apocynaceae)	**karvanda**	**karamarda**	14117	Root	root	**dantashula** (dental carries)	1-2 inch	Masticate and hold 1-2 inch piece of the root between aching tooth for 10 minutes, once a day for 2-3 days. (Kaunda *et al.* 2017)
Casearia graveolens Dalzell (Salicaceae)	**kirmir**	**chilhaka**	14312	Twig	twig	**sarpadansha** (snake bite)	As required	Hold a 2-3 inch piece of a tender twig in hand immediately after the snake bite for 2-3 hours to control **vishavega** (spreading of poison) till further proper medical treatment is initiated. (Lele *et al.* 2017)
Cassia fistula L. (Leguminosae)	**bahava**	**aragvadha**	14154	Stem Bark	**kalka** (paste) and **kwatha** (decoction)	**visarpa** (herpes)	1-2 inch piece and 30 ml **kwatha**	Rub stem bark over a stone and apply the paste over the affected area; prepare a decoction by boiling the root in 60 ml water and reduce it to half quantity. Administered orally on stomach for 5 days (Nadkarni 1999)
Cassia fistula L. (Leguminosae)	**bahava**	**aragvadha**	14154	Leaf	**kalka** (paste)	**dadru** (ringworm infection)	3-4 fresh tender leaves	Prepare a paste by crushing 3-4 fresh tender leaves and rub over the affected area once a day, for 2-3 days. (Vaidya 1999; Agnivesh 2007)
Cassia fistula L. (Leguminosae)	**bahava**	**aragvadha**	14154	Pod	**swarasa** (juice)	**mutravikar – mutrakrucchra** (Painful micturation)	5ml	Administer orally once a day for three days on an empty stomach. (Deshpande 2018)
Catunaregam spinosa (Thunb.) Tirveng. (Rubiaceae)	**galphal**	**madanphal**	4289	Seed	**kalka** (paste)	**pashanagardhabha** (Mumps)	As required	Prepare the paste by rubbing ripe fruit and apply locally, keep overnight, once in a day, for 3 days. (Anonymous 1999, Vaidya 1999)
Celosia argentea L. (Amaranthaceae)	**kurdu**	**mayurshikha**	14622	Root and Seed	**churna** (powder)	**mutrashmari** (urolithiasis)	5 g/5ml	Administer 5 gm powder orally twice a day with water for three days on empty stomach. (Desai 2015)
Cissampelos pareira L. (Menispermaceae)	**tanvel**	**patha**	14016	Leaf	**swarasa** (juice)	**atisara** (diarrhea)	5-10 ml	Administer orally once in a day. (Bhavmishra 2006)
Cissampelos pareira L. (Menispermaceae)	**tanvel**	**patha**	14016	Whole plant	aerial part	**amatisara** (stools with mucus)	As require	Tie stem and aerial part over the wrist of both hands as

								bracelets for 2-3 days. (Bhavmishra 2006)
Clerodendrum serratum (L.) Moon (Lamiaceae)	**bharangi**	**bharangi**	14108	Leaf	leaf	**galashotha** (Throat Infection)	4-5	Consume freshly collected tender leaves 3-4 times a day for 2-3 days. (Sharma 2013)
Coriandrum sativum L. (Apiaceae)	**dhane**	**dhanyak**	1121	Seed	**hima** (cold decoction)	**mutrashmari** (urolithiasis/ renal calculi)	200ml	Crush approx 30gm of seeds and soak in. 200ml of water overnight filter and administered internally the next morning on empty stomach. Repeat the same for 7-8 days. (Sharma *et al.*2001, Bhavmishra 2006)
Costus speciosus (J. Koenig) Sm. (Costaceae)	**peva**	**kebuka**	14035	Rhizome	**swarasa** (juice)	**arsha** (piles/ haemorhiods)	1-2 inch piece	Administer internally with Jaggery once a day, on empty stomach, for 5 days. (Anonymous 1999)
Crotalaria juncea L. (Leguminosae).	**zunzuni**	**shanapushpi**	14248	Exocarp of Fruit	**churna** (powder)	**kasa** (Cough)	5 gm	Prepare fine powder of 5-6 exocarps of fruits of *Crotolaria* and fill it in the dried leaf of **ashmantak** to prepare a cigar. Light it on one side and inhale the smoke as and when required. (Agnivesh 2007)
Curculigo orchioides Gaertn. (Hypoxidaceae)	**kali musali /dhasada**	**mushali**	14616	Root	root	**shukrakshyaya** (oligospermia)	1-inch piece	Roast 1 inch long piece of fresh/dried root. Administer orally as required. (Vaidya 1999; Sharma 2004)
Curculigo orchioides Gaertn. (Hypoxidaceae)	**kali musali /dhasada**	**mushali**	14616	Root	root	**ashmari** (urolithiasis/ urinary calculi)	2-3 piece	Take ½ inch root (3-4 Nos.) and masticate and swallow on empty stomach and drink 1 glass of water for 2 days. Note: if it is difficult to swallow the roots, few **chanas** (chickpea) can be consumed along with it. (Bhavmishra 2006)
Curcuma amada Roxb. (Zingiberaceae)	**ambehalad**	**aamragandhi haridra**	14608	Rhizome	**kalka** (paste)	**aghataj shotha, abhighataj shotha** (traumatic swelling)	3 gm –Oral, Local	Apply the fine paste on the affected area once a day for 3 days and administer orally 3 gm powder (Nadkarni 1999, Vaidya 1999)
Curcuma caesia Roxb. (Zingiberaceae)	**kali halad**	**-**	14876	Rhizome	rhizome	**granthi** (cyst)	1 inch	Masticate once in a day for 8 days. (Vaidya 1999, Nadkarni 1999)

Curcuma longa L. (Zingiberaceae)	**halad**	**haridra**	2816	Rhizome	**vati** (pills)	**pandu** (anaemia)	1 pill (2 gm of turmeric powder)	Prepare the pills by mixing turmeric powder and Jaggery in equal quantity. Administer orally once in a day on empty stomach for 2-3 days. (Nadkarni 1999)
Cyclea peltata (Lam.) Hook.f. & Thomson (Menispermaceae)	**tanvel**	**rajpatha**	14630	Root and Leaf	**swarasa** (juice)	**bala atisara** (Diarrhoea in children)	3-5 ml	Administer orally once a day for 3-4days. Also, tie fresh root around both wrists as a bangle. (Sharma 1998, Bhavmishra 2006)
Cyclea peltata (Lam.) Hook.f. & Thomson (Menispermaceae)	**tanvel**	**rajpatha**	14630	Stem	stem	**atisara** (Diarrhoea)	As required	Tie stems around the wrists of both hands as a bracelet for 1-2 days. (Bhavmishra 2006, Sharma 1998)
Cynodon dactylon (L.) Pers. (Poaceae)	**harali**	**durva**	2301	Whole Plant	whole part	**kamala** (Jaundice)	As required	Keep Brass plate (**kansya**/ **pital** plate) on the head of the patient and pour water in it, later add mustard oil in lt. Then take a bunch of **durva** and mix mustard oil and water by stirring until it becomes yellow. Repeat the procedure for 2-3 days. (Billore *et al.* 2004)
Cyperus rotundus L. (Cyperaceae)	**lavhal**	**musta**	4314	Tuber	tuberous roots.	**amlapitta** (Hyper acidity)	3gm	Masticate 2-3 gm once a day. (Nadkarni 1999)
Cyperus scariosus R.Br. (Cyperaceae)	**nagarmotha**	**chakranksha**	14877	Tuber	**tailam** (oil)	**khalitya** (loss of hair)	As required	In 250 gm coconut or sesame oil adds 50 gm powder and apply locally on the scalp. Once a day at night, for 6-10 months. (Anonymous. 1999)
Dalbergia sissoo DC. (Leguminosae)	**shisam**	**sinsapa**	4221	Leaf	**swarasa** (juice)	**mutrashmari** (urolithiasis/ renal calculi)	2-3 fresh leaves	Eat 2-3 fresh leaves twice or thrice a day for 15 days. (Sharma *et al.* 2001, Bhavmishra 2006)
Dalbergia volubilis Roxb. (Leguminosae)	**yelvas**	**sirisika**	14332	Stem Bark	fresh stem	**mukhapaka** (mouth ulcer)	5ml	Masticate fresh stem bark once a day, before the meal. (Sharma 2004)
Derris scandens (Roxb.) Benth. (Leguminosae)	**karanjvela /velikaranja/ velyakaranj**	**-**	14640	Root	**dravana** (solution)	**stanyakshyaya** (Hypogalactia)	30 ml	Add 3-5 gm powder in 500 ml water, leave it for some time and filter. Administer the filtrate orally twice a day for 3 days. (Natarajan *et al.*2000)

Dregea volubilis (L.f.) Benth. ex Hook.f. (Apocynaceae)	**ekot/ harandodi**	**brhatpurva**	763	StemBark	**swarasa** (juice)	**sarpadansha** (Snake bite)	30-50ml	Administer orally immediately after the snake bite. (Nadkarni 1999)
Embelia tsjeriam-cottam (Roem. & Schult.) A. DC. (Primulaceae)	**phatangali/a mbattingali**	**vidang bhed**	14600	Root	*swarasa* (juice)	**sarpadansha** (Snake bite)	2-3 ml	Instill 2 drops in the nostrils twice a day and also apply juice locally over the forehead. (Vaidya 1999)
Embelia tsjeriam-cottam (Roem. & Schult.) A. DC. (Primulaceae)	**phatangali/a mbattingali**	**vidang bhed**	14600	Stem Bark	**swarasa** (juice)	**sarpadansha** (Snake bite) , **shirashula** (head ache)	1-2 drop	Instill juice in the nostrils immediately after the snake bite or for headache. Precaution: do not use more than two drops as it causes nasal bleeding. (Vaidya 1999)
Ensete superbum (Roxb.) Cheesman (Musaceae)	**rankeli/ kavadar**	**van kadali/ bahubija**	155	Root	**swarasa** (juice)	**mutrashmari** (urolithiasis/ renal calculi)	30-50ml	Administer internally twice a day for 8 days. (Sharma *et al.* 2002)
Ensete superbum (Roxb.) Cheesman (Musaceae)	**rankeli/ kavadar**	**van kadali/ bahubija**	155	Root	**churna** (powder)	**shwan dansha** (dog bite)	3-5 gm	Administer powder with water for 3-6 days. (Sethiya *et al.*2019)
Euphorbia neriifolia L. (Euphorbiaceae)	**sabar**	**snuhi**	14032	Aerial part	**swarasa** (juice)	**karnashula** (ear ache), **kasa** (Cough), **tamak shwasa** (Bronchial asthma)	5-10 ml	Collect fresh stem and roast on burning coal until it becomes soft, remove its spine, and extract juice by squeezing it. Administered orally in **tamak shwas** and **kasa** and instill 1-2 drops in the ear in case of **karnashula**- earache twice a day for 4-5 days. (Sharma 2013, Nadkarni 1999, Desai 2015)
Ficus racemosa L. (Moraceae)	**umbar**	**udumbar**	14135	Root	**swarasa** (juice)	**anartava/aartav** (Amenorrhea)	30- 50ml	Administer internally twice a day for 2 days before the expected date of menses on empty stomach. (Anonymous. 1999)
Ficus religiosa L. (Moraceae)	**pimpal**	**ashwattha**	2518	Stem Bark	**swarasa** (juice)	**raktamutrata** (haematuria)	30- 50ml	Administer orally twice a day for 3 days. (Vaidya 1999)
Gardenia turgida Roxb. (Rubiaceae)	**pendharun**	**bharangi, mahapindi**	14391	Seed	**dravana** (solution)	**balatisara** (Diarrhoea in children)	30ml	Mix a cup of water in the seed powder and filter it after 5 min. Administer orally twice a day for 3 days. (Uniyal and Tiwari, 1993)
Garuga pinnata Roxb. (Burseraceae)	**kakad**	**golika**	14402	Stem bark	**kalka** (paste)	**shotha** (Localised Oedema) **sandhishula** (joint	As required	Apply the warm paste over the affected area; once in a day for 2-3 days (Suneetha *et al.* 2011)

						pain) ; **sandhishotha** (swelling in the joints)		
Gloriosa superba L. (Colchicaceae)	**kalalavi**	**langali**	14087	Rhizome	**kalka** (paste)	**dushtvrana** *of animal* (Chronic ulcer of animal)	1 inch piece of rhizome	Mix1 inch piece of rhizome in the fodder of animals once a day. (Sharma *et al.* 2001, Nadkarni 1999)
Gmelina arborea L. (Lamiaceae)	**shiwan**	**gambhari**	14204	Twig	twig	**bhram** (giddiness)	As required	A necklace is prepared from 1inch pieces of tender twigs and kept in the patient's neck to prevent giddiness as and when required (Sharma 2013)
Gymnema sylvestre (Retz.) R.Br. ex Sm. (Apocynaceae)	**bedaki**	**meshasringi**	2521	Leaf	**churna** (powder)	**madhumeha** (diabetes)	2 gm	Administer orally once in a day, empty stomach, for 10 days. (Nadkarni 1999, Anonymous 1999)
Helicteres isora L. (Sterculiaceae)	**murud sheng**	**avartani**	14281	Pod	**churna** (powder)	**udarshula** (abdominal colic)	3-5 gm	Administer fine powder of dried pods orally with water twice a day for 2-3 day, once on empty stomach (Sharma 2013)
Hemidesmus indicus (L.) R. Br. ex Schult. (Apocynaceae)	**sariva**	**sariva**	14346	Root	root	**udarshula** (abdominal colic)	2-3 inch piece of root	Masticate 2-3 inch piece of root, immediately after abdominal pain. (Desai 2015)
Heterophragma quadriloculare (Roxb.) K.S chum. (Bignoniaceae)	**varas/ varasa**	**varas**	14380	Leaf	**swarasa** (juice)	**alaji** (Tinea pedia)	As required	Apply the juice on sore foot once in a day. (Sharma 1998, Surana *et al.* 2016)
Heterophragma quadriloculare (Roxb.) K.Schum. (Bignoniaceae)	**varas/ varasa**	**varas**	14380	Leaf	**kalka** (paste)	**alaji** (Tinea pedia)	As required	Apply the paste locally on the affected area twice a day for 2-3 days. (Sharma 1998)
Holarrhena pubescens Wall. ex G. Don (Apocynaceae)	**kuda**	**kutaj**	14084	Sten Bark	**swarasa** (juice)	**atisara** (Diarrhoea) **sarpadansha** (Snake bite)	30-50ml.	Administer orally twice a day for 2-3 days; immediately after the snake bite. (Desai 2015, Dey & De 2012)
Holarrhena pubescens Wall. ex G.Don (Apocynaceae)	**kuda**	**kutaj**	14084	Sten Bark	**churna** (powder)	**mutrashmari** (urolithiasis/ urinary calculi), **kamala** (Jaundice), **madhumeha** (Diabetes)		Administer powder internally with water, twice a day for 3 days on an empty stomach. (Vaidya 1999)
Holarrhena pubescens Wall. ex G.Don (Apocynaceae)	**kuda**	**kutaj**	14084	Root	**swarasa** (juice)	**udarshula** (abdominal colic) **mutrashmari** (Renal Calculi)	5 ml 30 ml	Administer orally when requires on empty stomach early in the morning for 4-5 days. (Vaidya 1999)
Holostemma ada-kodien Schult.	**shiricha vel**	**arkapushpi**	14636	Fruit	**mashi** (ash)	**kasa** (cough)	500 mg	Collect the fruit and break it to get the fibre cotton and burn it

(Apocynaceae)								to get ash. In 500 mg Ash, add 5 ml of honey. Administer orally by licking twice a day for 3-4 days. (Vaidya 1999)
Jatropha curcas L. (Euphorbiaceae)	**chadarjyot**	**dravanti**	14072	Latex	latex	**vrana** (Wound)	5-10 ml	Collect the latex from the aerial part and apply over wounds for 2-3 days for cleansing. (Nadkarni 1999)
Jatropha curcas L. (Euphorbiaceae)	**chadarjyot**	**dravanti**	14072	Tender Root / Stem Bark	**swarasa** (juice)	**sarpadansha** (Snake bite)	100 ml	Administer orally immediately after a snake bite (Sekhar *et al.* 2014)
Jatropha curcas L. (Euphorbiaceae)	**chadarjyot**	**dravanti**	14072	Stem	**dantashula** (tooth ache)	As required		Warm the stem on fire and peel the skin off. Use a toothbrush once a day. (Anonymous 1999)
Lawsonia inermis L. (Lythraceae)	**mehandi**	**madayntika**	14360	Leaf	**swarasa** (juice)	**kamala** (Jaundice)	30 ml	Add a glass of cow's milk in the juice and administer internally twice a day for two days. (Sharma *et al.* 2001, Vaidya 1999)
Leea macrophylla Roxb. ex Hornem. (Vitaceae)	**dinda**	**hastikarna**	14614	Tuber	**kalka** (paste)	**gatha/ granthi** (Tumor) **pidika** (boils/ Furuncles)	As required	Apply locally on the affected area, once a day for 8 days. (Desai 2015, Nadkarni 1999)
Madhuca indica J.F.Gmel. (Sapotaceae)	**moha**	**madhuka**	14126	Seed	**churna** (powder)	**shirashula** (headache)	As required	Inhale powder through nostrils once a day. (Sharma 2013)
Mangifera indica L. (Anacardiaceae)	**amba**	**amra**	2653	Stem Bark	**swarasa** (juice)	**arsha** (Piles/ haemorrhoids)	30 ml	Administer orally once in a day on empty stomach for 2 days. (Desai 2015)
Momordica dioica Roxb. ex Willd. (Cucurbitaceae)	**kartuli**	**karkotaki**	14012	Root	**kalka** (paste)	**madhumehavrana** (Diabeties wound)	1-2 inch piece	Apply on the affected area once a day, for 15 days. (Vaidya 1999)
Moringa oleifera Lam. (Moringaceae)	**shevaga**	**shigru**	2019	Stem Bark	stem bark	**udarshula** (Abdominal colic)	As required	Keep fresh stem bark on the stomach while lying down or tie with a cloth while moving or working for 30 min. (Nadkarni 1999)
Moringa oleifera Lam. (Moringaceae)	**shevaga**	**shigru**	2019	Leaf	**swarasa** (juice)	**abhishyanda** (Conjunctivitis)	2 drops	Instil juice in infected eyes twice a day for two days. (Vaidya 1999, Nadkarni 1999)
Myristica fragrans Houtt. (Myristicaceae)	**jayphal**	**jatiphal**	3783	Fruit, Flower	**churna** (powder)	**vandyatva** (female Infertility)	5gm	Administer orally on empty stomach for 5 days. (Nadkarni 1999)
Ocimum tenuiflorum L. (Lamiaceae)	**tulashi**	**krishnatulasi**	2680	Leaf	leaves	**vruschik dansha** (scorpion sting)	5-6 leaves	Take a handful of **tulasi** leaves and rub them on hands and chant the **mantra**. Tell the

								patient to look at the leaves. (Belief) (Vedavathy *et al.*1997)
Operculina turpethum (L.) Silva Manso (Convolvulaceae)	**tinshira**	**trivrit**	4223	Stem	tender fresh stem	**kasa** (Cough)/ **yakshma** (tuberculosis/ Consumption)	3-4 inch	Masticate thrice a day for 2-3 days. (Vaidya 1999)
Oxide of Iron (Fe_2O_3).	**geru**	**gairik**	MS-457	Mineral	**kalka** (paste)	**visarpa** (herpes zoster)	As required	Prepare a paste by mixing curd (¼ kg) add 3 teaspoons of **geru**. Apply the paste on the affected area. (by chanting the mantra). (Bhavmishra 2006)
Peucedanum grande C.B.Clarke (Apiaceae)	**baphali**	**baspika**	14220	Seed	**churna** (powder)	**adhmana** (flatulence)	2-3 gm	Administer orally, once a day for 3 days, on empty stomach in the morning. (Vaidya 1999)
Phoenix sylvestris (L.) Roxb. (Arecaceae)	**shindoli**	**khajur bheda**	859	Resin	**vati** (pills)	**mutrashmari** (Urolithiasis)	5 tab / 500 mg	Administer internally early in the morning on empty stomach for 5 days. (Nadkarni 1999)
Plumbago zeylanica L. (Plumbaginaceae).	**chitrak**	**chitrak**	14275	Root	**churna** (powder)	**vaivarnya** (Discoloration of skin)- **twakvikar** (Skin disease)	As required	Apply externally on the affected area for 10 minutes, once in a day, repeat if required. (Nadkarni 1999, Anonymous 1999)
Plumeria obtusa L. (Apocynaceae)	**chapha**	**champaka bhed**	3958	Pod	**kalka** (paste)	**sarpadansha** (snake bite)	One teaspoon (Stat)	Mix one teaspoonful of honey in the paste and administer it orally to the patient once a day. (Nadkarni 1999)
Pogostemon benghalensis (Burm.f.) Kuntze (Lamiaceae)	**fangali**	**-**	14258	Leaf	**swarasa** (juice)	**udarshula** (abdominal colic)	5 ml	Administer orally twice a day on empty stomach. (Sharma 1998)
Pogostemon benghalensis (Burm.f.) Kuntze (Lamiaceae)	**fangali**	**-**	14258	Root /Leaf	**kalka** (paste)	**vrushchik dansha** (Scorpion sting)	As required	Apply locally on the affected area once in a day. (Nadkarni 1999, Desai 2015, Annonymous CSIR 1986)
Polyalthia longifolia (Sonn.) Thwaites (Annonaceae)	**mumbai ashok**	**kasthadaru**	1803	Stem Bark	**swarasa** (juice)	**sweta pradar** (leucorrhoea)	30 ml	Administer orally once in a day, for 2 days. (Vaidya 1999; Desai 2015)
Pongamia pinnata (L.) Pierre. (Leguminosae)	**karanja**	**karanja**	14174	Stem bark	**kwatha** (decoction)	**kamala** (Jaundice)	50 -60 ml	Administer orally twice a day on empty stomach for 5-6 days. (Vaidya 1999)
Pterocarpus marsupium Roxb. (Leguminosae)	**bivala**	**vijaysara**	14292	Stem Bark	**phant** (hot infusion)	**raktatisara** (Bleeding diarrhoea)	30 ml	Boil stem bark in water, filter and administer orally once a day. (Desai 2015)
Pterocarpus marsupium Roxb. (Leguminosae)	**bivala**	**vijaysara**	14292	Stem Bark	**churna** (powder)	**haridrameha/ pitamutrata raktamutrata /**	5gm	Prepare fine powder of dried stem bark by pounding. Administer fine powder with

						raktajmeha (yellowish urination/ Haematuria)		water, twice a day on an empty stomach for 1 day. (Sharma 2013)
Radermachera xylocarpa (Roxb.) Roxb. ex K. Schum. (Bignoniaceae)	**khara shinga**	**shwetapatala**	14228	Stem Bark	**churna** (powder)	**dadru** (Ringworm infection)-**tvakvikar** (Skin disease)	As require	Prepare the powder of dried (150-200g) stem bark and boil it in 1-2 lit water, add this in warm water and take bath for 2-3 days. (Desai 2015)
Ricinus communis L. (Euphorbiaceae)	**lal eranda**	**rakta eranada**	2672	Leaf	**swarasa** (juice)	***ashmari*** (urolithiasis/urinary calculi)	150 ml.	Extract the juice by crushing 8-10 fresh leaves and add approximately 1 lit water. Administer orally thrice a day for 7-8 days. (Anonymous. 1999)
Ricinus communis L. (Euphorbiaceae)	**lal eranda**	**rakta eranada**	2672	Root	**swarasa** (juice)	**mutrakrucchra** (Painful micturation/ dysuria)/ **raktamutrata** (Haematouria)	30 ml	Administer orally once a day on an empty stomach for 3 days. (Sharma 2013)
Sapindus emarginatus Vahl (Sapindaceae)	**ritha**	**arishtaka**	14252	Root	**dravana** (solution)	**udarshula** (Abdominal colic)	10-20 ml	Add 2-3 spoonful of water in the powder and administer it internally for 2-3 days. (Nadkarni 1999)
Sapindus emarginatus Vahl (Sapindaceae)	**ritha**	**arishtaka**	14252	Fruit	**dravana** (solution)	**malavibandha** (Constipation)	10-15 ml (paediatric)/ 30 ml (Adult)	Prepare the solution by crushing the rind of single fruit in approx. 100ml (1 glass) water and filter. Administer the squeezed filtrate orally at bedtime. (Nadkarni 1999)
Sesbania sesban (L.) Merr. (Leguminosae)	**dedhara**	**itakata**	3748	Latex	latex	**kumbhika/anjananamika** (stye)	As required	Collect the yellowish watery latex obtained from the base of the leaf and apply locally on the style. Once a day for 2-3 days. (Anonymous. 1999)
Sida rhombifolia L. Malvaceae	**chikana**	**bala bhed**	780	Leaf	**swarasa** (juice)	**pitika** (pimples) / **shotha** swelling	As required	Apply on face, once a day for 5-7 days. (Dwivedi 2008, Sharma 2013)
Solanum virginianum L. (Solanaceae)	**ringani**	**kantakari**	2371	Riped Fruit	**yavkut** (coarse podwer)	**dantakrumi** (Dental caries)	As required	Crush the dried ripe fruit and heat it over the iron pan and inhale the fumes through the mouth to expose dental caries. Once a day for 3-5 days (Sharma *et al.* 2002, Nadkarni 1999, Anonymous 1999)
Solanum virginianum L. (Solanaceae)	**ringani**	**kantakari**	2371	Fruit	**mashi** (ash)	**arsha** (Piles/ haemorrihoids)	As required	Prepare ash of dried fruits by burning and add a sufficient quantity of coconut oil to get

								the paste, apply locally on the affected area once a day for 8-10 days. (Sharma *et al.*2002, Nadkarni 1999;)
Solena amplexicaulis (Lam.) Gandhi. (Cucurbitaceae)	**gometi**	**sukakandah**	14022	Root	root	**kshudhakshyaya** (loss of appetite) **agnimandhya** (loss of appetite)	1-2 inch piece	Roast the root on burning coals and consume for a day. (Natarajan & Paulsen 2000)
Solena amplexicaulis (Lam.) Gandhi. (Cucurbitaceae)	**gometi**	**sukakandah**	14022	Fruit	**swarasa** (juice)/ **dravana** (solution)	**karnashula** (ear ache/Otalgia)	2 drops in a ear	Juice extracted from the fresh fruit or soak dried fruit powder in water and that solution is to be instilled in the ear as and when required. (Patil 2006)
Sphaeranthus indicus L. (Compositae)	**mundi**	**mundi**	14363	Flower	**hima** (cold infusion)/ fresh flower	**sthoulya** (obesity)	150ml	Soak 7-8 dried flowers in water overnight and crush on the next morning; filter it and administered the filtrate orally/ consume 7-8 fresh flowers once a day for 30 days on empty stomach. (Bhavmishra 2006)
Syzygium cumini (L.) Skeels. (Myrtaceae)	**jambhul**	**jambu**	669	Seed	**churna** (powder)	**madhumeha** (Diabetes) *Antraopucchashotha* (Appendicitis)	5gm	Administer internally with water twice a day for 7 days. (Desai 2015, Anonymous. 1999, Vaidya 1999)
Tectona grandis L.f. (Lamiaceae)	**sag**	**shaka**	14048	Stem Bark	**swarasa** (juice)	**udarshula** (abdominal colic)	3-4 gm	Extract the juice of stem bark by crushing and adding a sufficient quantity of water. Administer orally once a day as and when required. (Nadkarni 1999, Desai 2015)
Tectona grandis L.f. (Lamiaceae)	**saga**	**shaka**	14048	Seed	**churna** (powder)	**ashmari** (Urolithiasis/ urinary calculi)	3 gm	Administer orally with lukewarm water, twice a day for 2-3 days on empty stomach. (Vaidya 1999)
Tectona grandis L.f. (Lamiaceae)	**saga**	**shaka**	14048	Seed	**dravana** (solution)	**mutrashmari** (urolithiasis/ renal calculi)	50 ml	Crush 4-5 seeds and soak in 50 ml water and filter it. Administer internally thrice a day before food for 3-4 days. (Vaidya 1999)
Terminalia bellirica (Gaertn.) Roxb. (Combretaceae)	**behada**	**bibhitaki**	4144	Fruit	fruit	**udarshula** (abdominal colic)	1 fruit	Remove the rind of the fruit and consume once a day for 2-3 days. (Sharma *et al.* 2001)
Terminalia bellirica (Gaertn.) Roxb. (Combretaceae)	**behada**	**bibhitaki**	4144	Fruit	fruit pericarp	**anidra** (Insomnia)	3-5 gm	Collect and masticate the pericarp of matured fruit

								administer orally once a day, at bedtime. (Sharma 2013)
Terminalia chebula Retz. (Combretaceae)	**hirada**	**haritaki**	2356	Stem Bark	**churna** (powder)	**kasa** (Cough)	3 gm	Prepare the fine powder by pounding dried stem bark. Administer orally with water, twice a day for 3- 4 days. (Bhavmishra 2006)
Terminalia tomentosa Wight & Arn. (Combretaceae)	**yen/ ain arjun sadada**	**arjuna bheda**	3957	Stem Bark	stem bark	**vrana** (Wound/ulcer)	As require	Keep a piece of fresh stem bark over the wound for 3-4 days by bandaging it with a cloth. (Sharma 2013)
Terminalia tomentosa Wight & Arn. (Combretaceae)	**arjun sadada**	**arjun**	4071	Stem Bark	**swarasa** (juice)	**panduroga** (Anemia), **anartava** (Amenorrhoea), **rajodosha** (Menstrual disorders)	5gm	Extract the juice of fresh stem bark. Administer orally on empty stomach for 20-30 days. (Sharma 2013)
Terminalia tomentosa Wight & Arn. (Combretaceae)	**yen/ ain arjun sadada**	**arjuna bheda**	3957	Stem Bark	**kalka** (paste)	**vrana** (wound/ulcer), **dushtavrana** (chronic ulcer)	As required	Prepare the paste of freshly collected stem bark. Apply locally (paste or fine powder) over the wound. Once in a day, for 7-8 days or as required. (Sharma 2013)
Thespesia lampas (Cav.) Dalzell (Malvaceae)	**ranbhendi**	**vanakarpasah**	14099	Root	**swarasa** (juice)	**udarshula** (Abdominal colic)	5 ml	Administer the filtrate orally as required. (Pawar & Patil 2008)
Tinospora cordifolia (Willd.) Miers (Menispermiaceae)	**gulvel**	**guduchi**	14209	Stem	**swarasa** (juice)	**jwara** (fever), **kamala** (Jaundice)	10 ml	Administer orally twice a day for 2-3 days. (Vaidya 1999, Anonymous 1999 , Sharma *et al.* 2001)
Tinospora cordifolia (Willd.) Miers (Menispermiaceae)	**gulvel**	**guduchi**	14209	Stem	**dravana** (solution)	**raktasrsha** (bleeding piles)	30 ml	Soak 1 tablespoonful powder (5gm) in a cup of water and keep for 10-15 min. Filter and administer the filtrate on empty stomach for 2-3 days. (Anonymous. 1999)
Tinospora cordifolia (Willd.) Miers (Menispermiaceae)	**gulvel**	**guduchi**	14209	Stem	**kalka** (paste)	**sandhigatvata** (Osteo-arthritis)	As required	Make a fine paste of fresh stem using the required quantity of water and apply externally on affected part once in a day (Agnivesh 2007)
Tridax procumbens (L.) L. (Compositae)	**burada /jakhamjodi**	**jayantiveda**	3943	Leaf	**swarasa** (juice)	**dantshula** (Toothache) **vrana** (Wound/ulcer)	2 drops	Extract the juice of fresh leaves by crushing. Instil 2 drops in the ear of the affected teeth side. Apply locally over the wound once in a day for 2-3 days. (Rao & Henry 1996)

Vitex negundo L. (Lamiaceae)	**nirgundi**	**nirgundi**	14045	Leaf	**kalka** (paste)	**vruschik dansha** (Scorpion sting) **shirashula** (Headache) *Dantashula* (Toothache)	As required	Prepare the paste of freshly collected leaf by crushing on hands and apply immediately to the affected area. (Desai 2015, Sharma *et al.* 2001, Anonymous1999, Vaidya 1999) Instil 1-2 drops in the nose as errhine (Nasya)
Vitex negundo L. (Lamiaceae)	**nirgundi**	**nirgundi**	14045	Root	**kwatha** (decoction)	**Sandhivat** (Osteoarthritis)	30 ml	Administer orally once a day on empty stomach. (Sharma 2004, Sharma *et al.* 2001)
Dregea volubilis (L.f.) Benth. ex Hook.f. (Apocynaceae)	**karodi**	**swarna jivanti**	763	Leaf	**kalka** (paste)	**sarpadansha shotha** (Swelling due to snake bite)	As required	Prepare the paste of freshly collected leaves by crushing and rubbing it on hands. Apply externally on the swelling developed due to snake bite, once a day. (Nadakarni 1999)
Woodfordia fruticosa (L.) Kurz. (Lytheraceae)	**dhayti**	**dhataki**	14389	Leaf	leave	**jwara** (Fever)	50-100 gm	Take leaves and boiled in water and use to take a bath. (Sharma 2013)
Ziziphus xylopyrus (Retz.) Willd. (Rhamnaceae)	**bora**	**badar**	14222	Leaf	**kalka** (paste)	**vruschik dansha** (Scorpion sting)		Crush the fresh leaf, and apply over the affected area by chanting the **mantra**. (Belief) (Nadkarni 1999)

Table. 3. Medico-ethnobotanical claims of compound formulation reported during the survey of Jawhar and Shahapur Forest division

local name	Sanskrit name	Botanical Name	Voucher specimen number	Part Used	Form of formulation	Indication	Dose	Mode of application and validation
sabar	**snuhi**	*Euphorbia neriifolia* L (Euphorbiaceae)	14032	Aerial Part	**kalka** (Paste)	**shotha** (Swelling)	As required	Take fresh stem of **sabar**, remove the thorns, cut vertically into 2 parts. Apply turmeric powder on to it and worm. Tie on swelling and keep it overnight. (Sharma 2013)
halad	**haridra**	*Curcuma longa* L. (Zingiberaceae)	2816	Rhizome				
gulvela	**guduchi**	*Tinospora cordifolia* (Willd.) Miers (Menispermiaceae)	14207	Stem	**kwatha** (Decoction	**rajyakshma** (Tuberculosis/ consumption	1 gm Kutaj powder, goat urine 10-20 ml and 30 ml Decoction of Guduchi stem	Prepare the powder of dry stem bark of **kutaja**; Add 10-20 ml of goat urine in 1 gm **kutaj** powder mix this solution in 30 ml decoction of **guduchi** (prepared by boiling 3-5 gm of powder in approx. 100 ml water and reduce it to the half quantity). Administer the mixture once a day for 15 days, on empty stomach (Agnivesh 2007)
safed kuda	**kutaj**	*Holarrhena pubescens* Wall. ex G. Don (Apocynaceae)	14082	Stem Bark	**churna** (Powder) +Gomutra			
khair	**khadir**	*Acacia catechu* (L. f.) Willd. (Leguminosae)	14109	Stem Bark	**kalka** (Paste)	**varnavikara / krushnata** (Dark complexion / tanning)	As required	Take one tea spoonful (3gm) powder of stem bark of **khadir**. Add 125 mg powder of turmeric, and sufficient quantity of water to make paste. Apply on face and keep for 2hr and wash. Continue the same for a week. (Agnivesh 2007)
halad	**haridra**	*Curcuma longa* L. (Zingiberaceae)	2816	Rhizome				
khadir	**khadir**	*Acacia catechu* (L.f.) Willd. (Leguminosae)	14109	Stem Bark	**kalka** (Paste)	**yuvavanpitika** (pimples)	As required	Take one tea spoonful (3gm) powder of stem bark of **khadir**, add 125mg powder of turmeric and (half teaspoonful) powder of thorns of **shalmali**. Add sufficient quantity of water to make paste. Apply on face and keep for 2hr and wash. Continue the same for a week. (Sharma 2013)
halad	**haridra**	*Curcuma longa* L. (Zingiberaceae)	2816	Rhizome				

kate savar	**shalmali**	*Bombax ceiba* L. (Bombacaceae)	14052	Thorns				
ambehalad	**aamragandhi haridra**	*Curcuma amada* Roxb. (Zingiberaceae)	14607	Rhizome	**swarasa** (Juice)	**shotha** (Swelling)	30ml	Prepare the powder of **ambehalad** and stem bark of **bivala**. Mix one table spoonful of both **ambehalad** and **bivala** in the bulk of 2 eggs. Administer the mixture orally, once a day in early morning on empty stomach for 4 days. (Vaidya 1999, Nadkarni 1999)
bivala	**asana**	*Pterocarpus marsupium* Roxb. (Leguminosae)	14288	Stem bark				
mehandi	**madayntika**	*Lawsonia inermis* L. (Lythraceae)	14357	Leaf	**swarasa** (Juice)	**kamala** (Jaundice)	30 ml	Extract the juice of 7-8 fresh leaves and add the powder of 1 betel nut in the juice and mix it in 500 ml cow's milk. Administer orally twice a day on empty stomach for 2-3 days. (Vaidya 1999, Sharma 2001)
supari	**puga**	*Areca catechu* L. (Arecaceae)	8850	Fruit				
tanvel	**rajapatha**	*Cyclea peltata* (Lam.) Hook.f. & Thomson (Menispermiaceae)	14629	Root	**hima** (cold infusion)	**atisara** (Diarrhoea)	30 ml	Prepare the fine powder of both ingredients in equal quantity. Soak 3gm powder in 30ml water overnight. Filter and administer the cold infusion once a day for 2 days (Bhavmishra 2006, Sharma 1998)
saga	**shaka**	*Tectona grandis* L.f. (Lamiaceae)	14046	Stem Bark				
adulsa	**vasa**	*Justicia adhatoda* L. (Acanthaceae)	3869	Leaf	**kwatha** (Decoction)	**kasa** (Cough)	30 ml	Take 4-5 leaves of **adulsa** and add 4-5 dried fruits of **miri** and add in 250 ml of water, boil on low flame and reduce it to half the quantity. Filter and administer 30 ml decoction twice a day for 2 days. (Sharma 2013)
miri	**maricha - 10gm**	*Piper nigrum* L. (Pipercaeae)	672	Fruit				
dhane	**dhnayak**	*Coriandrum sativum* L. (Apiaceae)	1121	Seed	**hima** (cold infusion)	**mutrashmari** (Urolithiasis)	200 ml	Soak approx. 50gm seeds of coriander and 10-12 dried flowers of **palash** in 200ml water, keep for overnight. Filter it in the next morning. Administer filtrate orally once in day for 10 days on empty stomach. (Bhavmishra 2006)

palas	**palash**	*Butea monosperma* (Lam.) Taub. (Leguminosae)	14185	Flower				
gulvela	**guduchi**	*Tinospora cordifolia* (Willd.) Miers (Menispermaceae)	14207	Stem	**dravan** (solution)	**madhumeha** (Diabetes)	50 ml	Dissolve 1gm resin of **asana** in approx 50 ml water, till the water becomes reddish, later mix approx. 3 gm powder of dried **guduchi** stem. Administer orally twice a day for 8 days. (Sharma 2013)
bivala	**vijayasar**	*Pterocarpus marsupium* Roxb. (Leguminosae)	14288	Resin				

Ethnomedicinal claims

During the survey 182 folk claims were collected, amongst them, 172 were of single drug claim reported from 99 plant species and 10 numbers were of compound formulations of 16 plant species. This indicates the precise knowledge about the usage of particular medicinal plants in particular disease (Table. 2.& 3.)

Taxonomic Variation

Data analysis showed that information on 100 drugs consisting of 99 plant species and 01 mineral drug were reported during the survey. Total 88 genera and 48 families are being used by the tribes for managing various ailments. The plant family with the highest number of plants cited were Leguminosae (29.17%) followed by Apocynaceae (16.67%) and Combretaceae (12.50%) and Lamiaceae (10.42%). (Fig. 2.)

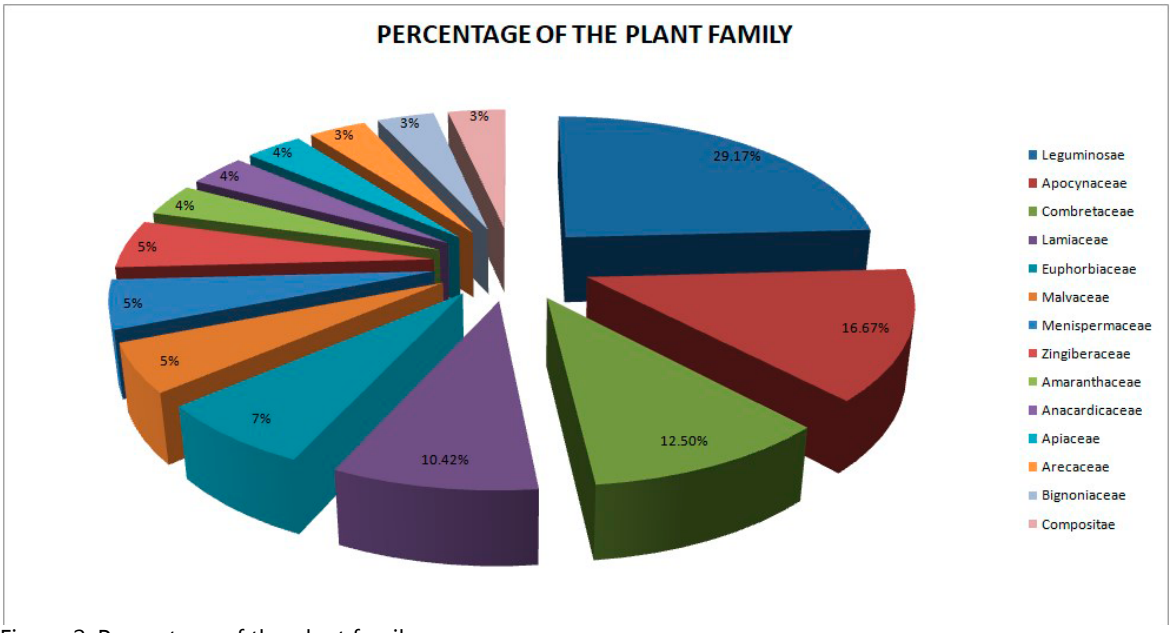

Figure 2. Percentage of the plant family

The life form

The data of the survey study revealed that amongst the different life form pattern, tress were used maximum 54% for therapeutic purpose followed by herb and climber, as shown in Fig. 3. Similar result was obtained in previous study (Roy & Janbandhu 2020).

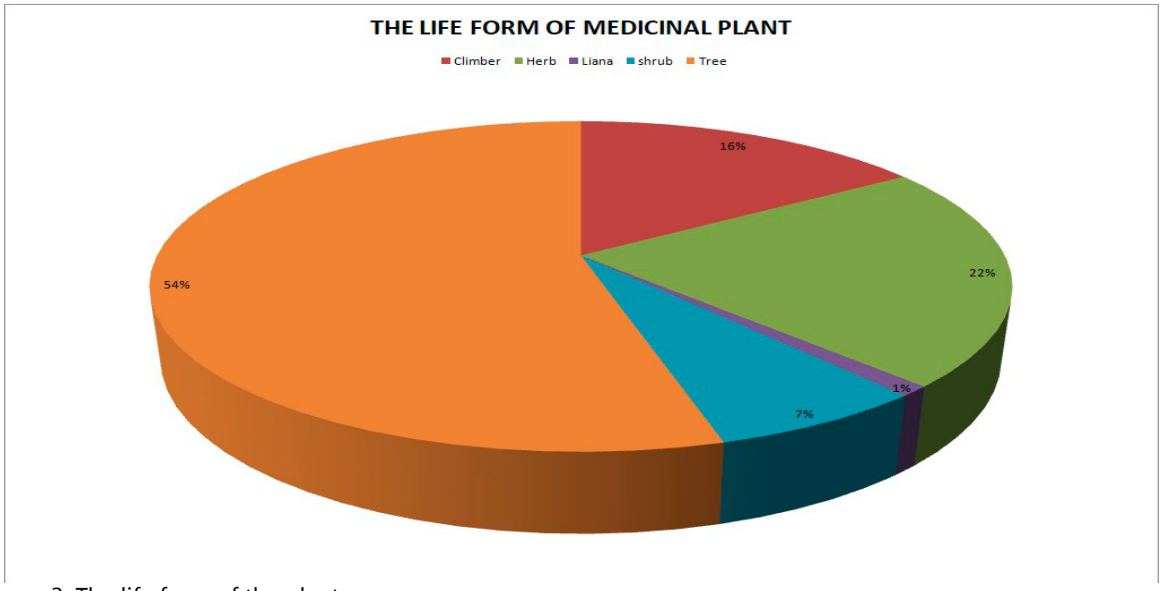

Figure 3. The life form of the plants

Plant part(s) used

Amongst the 15 classes of the different useful parts of the plants, the stem bark was utilized the most (22%) among the 99 plant species, followed by root (18%) and leaf (18%). Details are shown in Fig. 4.

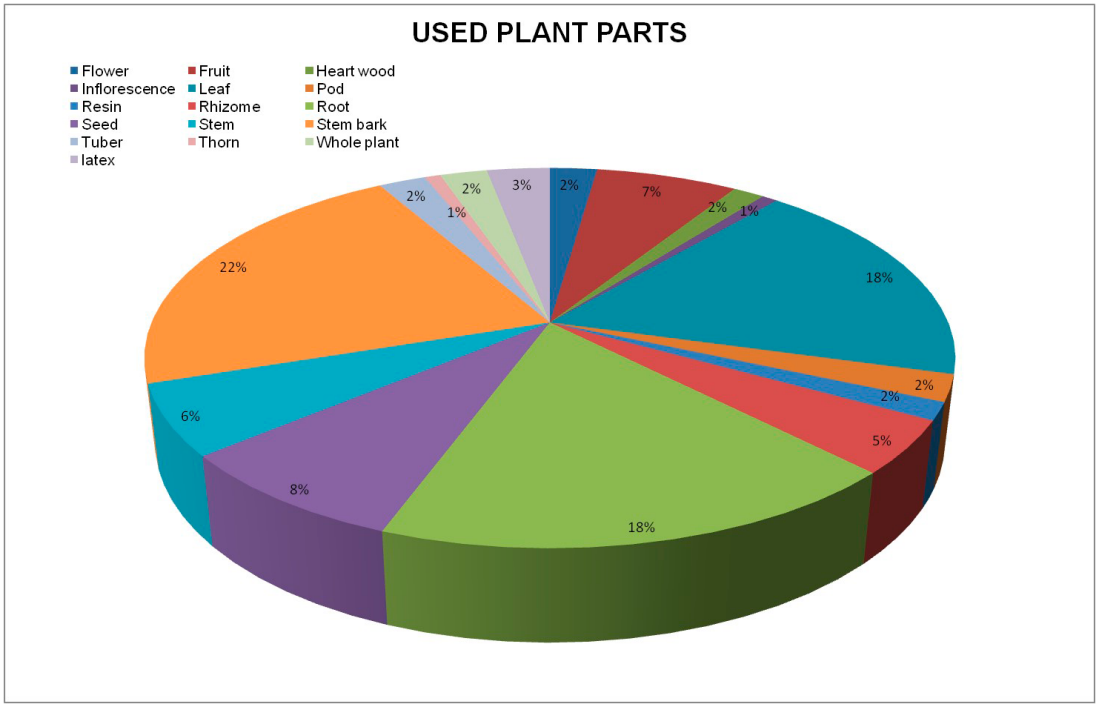

Figure 4. Used plant parts

Form of formulations

For the treatment of various ailments, respondents in the study region use various means for administering medicine, such as juice, decoction, paste, powder, medicated oil, paste, infusion, and ash. In studied area juice (**swarasa**) is used frequently (26.81%), followed by paste (**kalka**) (19.55%), and powder (**churna**) (13.40%). Solution (**dravana**) is also used frequently (5.02%) which is prepared by soaking powder in the water for 5-20 minutes. Other than this, pills (**vati**), hot infusion (**phant**), cold infusion (**hima**), decoction (**kwatha**), ash (**mashi**), alkali (**kshara**), etc. forms of administration are used by the tribal. (Fig.5). In many folk claims, useful plant parts like root, stem, bark, leaf, fruit, the rhizome were advised to masticate in the fresh form, and aerial part, the latex of certain medicinal plants were used in the form of local application (21.22%).

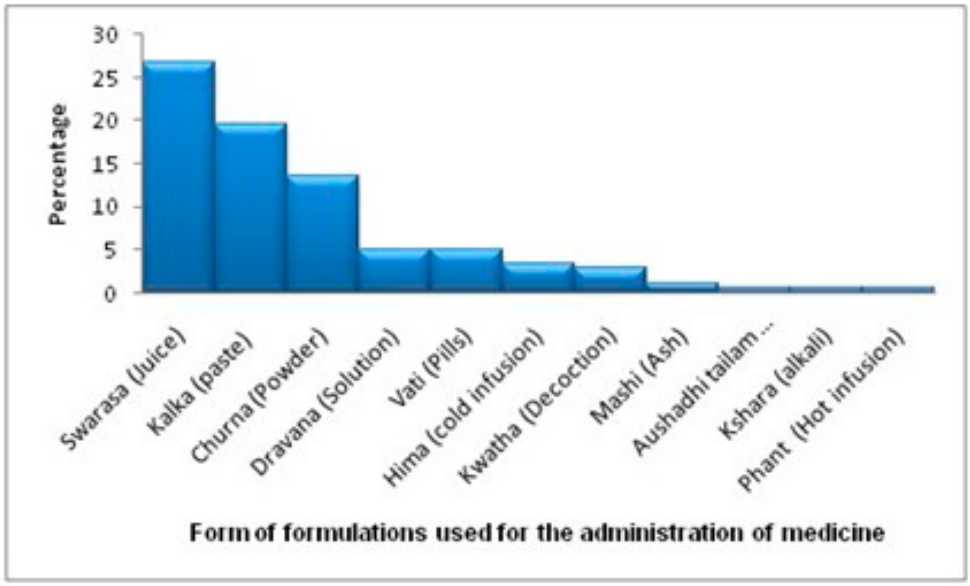

Figure 5. The form of formulations used for the administration of medicines

Mode of administration

Amongst the collected claims, 73.23% of remedies were administered orally whereas 26.77% were applied topically on the affected area supporting the previous studies (Roy & Janbandhu 2020). Tribal also administers medicines in the form of dhumapana- (Medicated smoking) which was recorded 05 times, nasya- (Medication through nasal route) noted 03 times, karnapurana- (filling of the ear with medicated liquid) recorded once. For certain disease conditions like fever and jaundice, a bath of medicated water was also recommended 03 times. dhupana- (Fumigation) and aschotana- (eye drops) is recorded twice and pradhamannasya- insufflations of medicated powder in the nose is recorded once. Moreover, the root of shatavari (Asparagus racemosus Willd), the twig of gambhari (Gmelina arborea L.) are also used as a necklace, and the whole plant of Cyclea peltata (Lam) Hook and Cissampelos pareira L. are used as a bracelet to treat the disease.

Qualitative analysis

Informant Consensus Factor ICF

To calculate ICF, the reported ailments were first classified into 06 different disease categories and Migraine was taken as a symptom. Among these, the highest ICF value of hypogalactia (0.67), followed by ICF of poisonous bite (0.36) were recorded as significant. Details of the calculated ICF values are exhibited in Fig. 6 and Table.4.

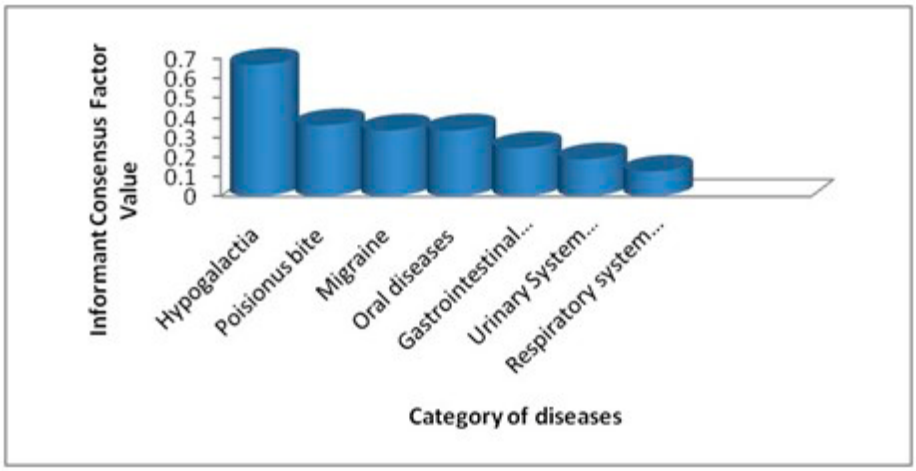

Table 4. Informant Consensus Factor of documented disease category during the survey

Category of diseases	N_{ur}- (Number of use citation)	N_t (Number of used species)	N_{ur}-N_t	N_{ur}-1	ICF
Gastrointestinal disease	42	32	10	41	0.24
Oral disease	4	3	1	3	0.33
Respiratory	9	8	1	8	0.12
Poisonous bite	26	17	9	25	**0.36**
Urinary	17	14	3	16	0.19
Hypogalactia	4	2	2	3	**0.67**
Migraine	4	3	1	3	0.33

Data indicated the significance of Informant consensus factor value on some categories of diseases gathered during the survey, whereas infectious disease, dental problem, gynecological disorders, skin diseases, metabolic disorders, musculoskeletal disorders, infertility, and symptoms like fever and wound showed 0 ICF value.

Use Value Index

Data analysis of plant species used or narrated by the respondents is expressed as Use Value (UV). The highest use value (UV) 0.13 was recorded for *Holarrhena pubescens* Wall. ex G. Don and *Tinospora cordifolia* (Willd.) Miers Details of the Use Value Index are shown in Fig. 7.

Family Importance Value

During the survey from Shahapur and Jawhar forest area, information on plant drugs of a total of 23 families was obtained from informers and folk healers. Among this maximum of 37.78 % of utilization of plant, drugs were recorded of Leguminosae family, utilized by total 17 informants. Apocynaceae was recorded showing 28.89%

importance value followed by Lamiaceae with 26.67% FIV. The family importance value of Euphorbiaceae and Menispermiaceae was recorded at 20% each. The details of the result of the FIV value is shown graphically (Fig. 8.)

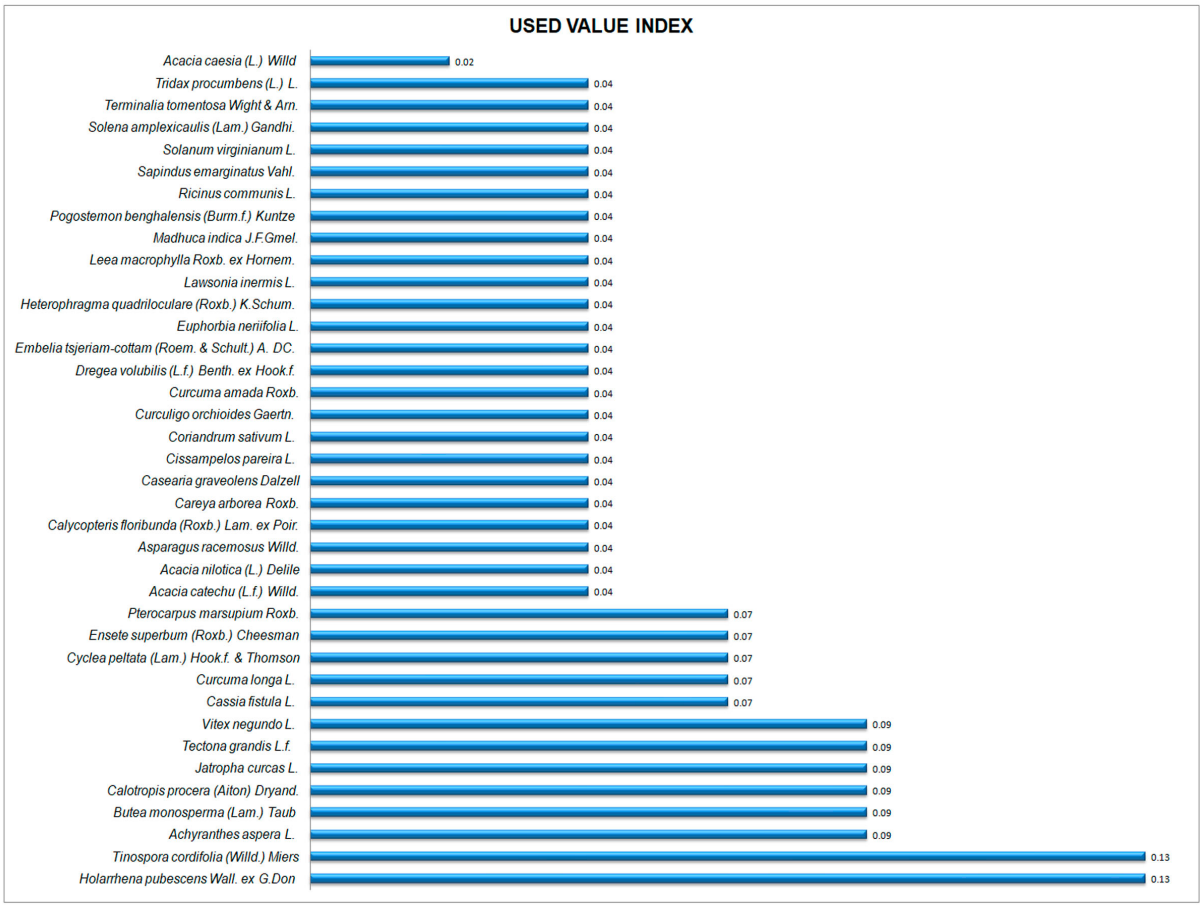

Figure 7. Use Value Index of plants

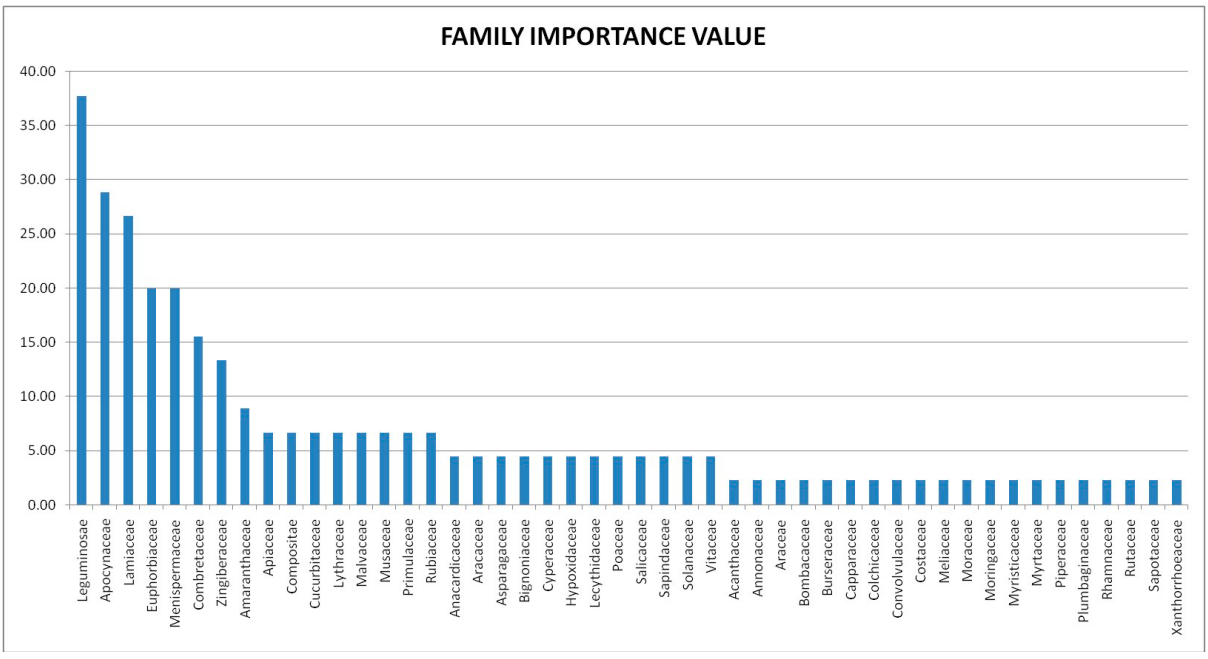

Figure 8. Family Importance Value

Fidelity level is useful for determining which species are favoured by key informants for treating specific diseases. The FL values of frequently used medicinal plants that are by the locals are higher than those that are less widely used. The percentage of informants that claim to utilise a specific plant species for the same principal purpose is referred to as the fidelity level. The low value of FL indicates that plant species are used for several medicinal purposes and confirms that they are used infrequently against a specific ailment by the informants in the study area.

The medicinal plants that are widely used by the local people have higher FL values than those that are less popular. The present study revealed that 12 plant species are commonly used having more than 50% FL for the most prevalent 10 diseases reported in the survey area. *Cissampelos pareira* L., *Curcuma amada* Roxb., *Lawsonia inermis* L. *Casearia graveolens* Dalzell, *Dregea volubilis* (L.f.) Benth. ex Hook. f., *Heterophragma quadriloculare* (Roxb.) K. Schum. *Coriandrum sativum* L. and *Terminalia tomentosa* Wight & Arn. showed 100 %. Thus, native plants having medicinal values are used to combat diseases. Fidelity level (FL) in the study area showed its acceptance as a medicinal herb for a particular ailment category. Details of the result are showed in Table.5. and Fig. 9.

Table. 5. Fidelity level of medicinal plant in Thane forest circle, Maharashtra, India

Botanical Name	**Sanskrit Name**	**Disease categories**	**Specified Disease name**	**Fidelity level (%)**
Cissampelos pareira L.	**patha**	GastroIntestinal Tract Diseases	**amatisara**	100.00
Cyclea peltata (Lam.) Hook. f. & Thomson	**rajpatha**		**atisara** (Diarrhoea in children)	66.67
Holarrhena pubescens Wall. ex G. Don	**kutaja**		Udarshula	28.57
Curcuma amada Roxb.	**aamragandhi haridra**	Inflammatory conditions	**aghataj shotha**, (traumatic swelling)	100.00
Lawsonia inermis L.	**madayntika**	Liver disorder	**kamala** (Jaundice)	100.00
Calotropis procera (Aiton) Dryand.	**arka**	Neurological disease	**ardhavabhedak** (Migraine)	50.00
Achyranthes aspera L.	**apamarga**	Poisonous bite	**vruschik dansha** (scorpion sting)	50.00
Casearia graveolens Dalzell	**-**		**Sarpadansha** (Snake bite)	100.00
Dregea volubilis (L. f.) Benth. ex Hook. f.	**brhatpurva**		**sarpadansha** (Snake bite)	100.00
Embelia tsjeriam-cottam (Roem. & Schult.) A. DC.	**vidang bhed**		**sarpadansha** (Snake bite)	66.67
Ensete superbum (Roxb.) Cheesman	**vanyakadali**		**shwan dansha** (Dog bite)	66.67
Jatropha curcas L.	**dravanti**		**sarpadansha** (snake bite)	50.00
Pogostemon benghalensis (Burm. f.) Kuntze	**-**		**vrushchikdansha** (Scorpion sting)	100.00
Butea monosperma (Lam.) Taub.	**palash**	Reproductive diseases	**aniyamit artava** chakra (Irregular menstrual cycle)	50.00
Heterophragma quadriloculare (Roxb.) K. Schum.	**waras**	Dermatological diseases	**chikhalya** (M) **alaji** (Tinea pedia)	100.00
Coriandrum sativum L.	**dhanyak**	Urinary Tract Diseases	**mutrashmari** (urolithiasis/ renal calculi)	100.00
Tectona grandis L. f.	**shaka**		**ashmari**	50.00
Terminalia tomentosa Wight & Arn.	**arjuna bheda**	Wound	**vrana**	100.00
Vitex negundo L.	**nirgudi**	Migraine	**shirashula** (Head ache)	50.00

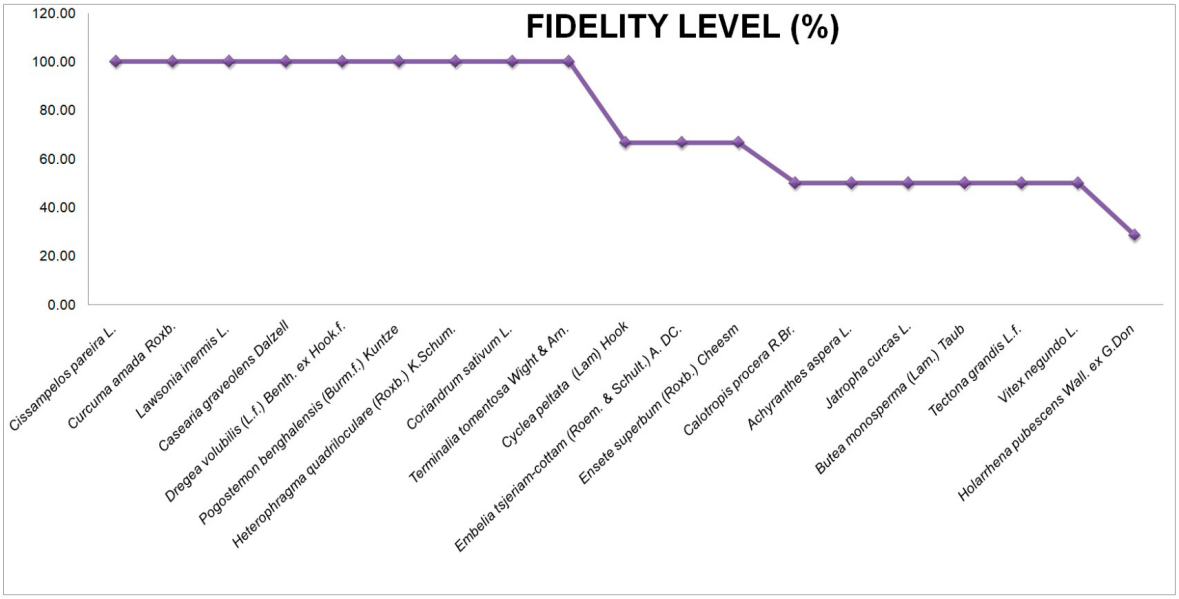

Figure 9. Fidelity level (%)

Discussion

In the survey zone, the project team interacted with many local individuals who had basic information regarding traditional medicine but to get authentic and reliable information the data was collected only from the traditional folk healers known as **vaidu / bhagat** in local language and the respondents who were well versed and had complete information of the claims. It was observed that maximum information was shared by illiterate and elder informants on the traditional use of medicinal plant species as compared to educated informers. More dependency on allopathic doctors their availability in nearby areas and mode of transportation, less belief in folk healers, etc. are some of the reasons to decline interest of the young generation towards traditional health practice. Similar observations are also reported in other countries also (Farooq *et al.* 2019, Mafuva & Marima-Matarira 2014) It was also noticed in previous ethnomedicinal studies that, native people who are illiterate are more habituated to using ethnomedicinal herbs than those who are literate in the same area and other parts of the world (Roy & Janbandhu 2020, Tugume et al. 2016,). Tribal folk healers are mostly dependent on the traditional method of diagnosis which is well explored as the asthvidhapariksa (eight-fold examination) in the Ayurveda. Nadipariksha (Pulse examination) is the prime method of examination done by maximum folk healers (Panda & Mishra 2010). It is used for assessing tridoshas and various physiological and psychological states of the patient in Ayurveda. (Kumar *et al.* 2019) udar pariksha (Abdominal examination) is done by touching and palpating the abdomen, (Fig. 10.), whereas the sclera of eyes, palm, and tongue are also checked for the diagnosis of anemia, jaundice, etc. Thus, the method of examination of has Ayurvedic foundations, but many of them have indigenous roots based on personal experience and oral tradition (Deshmukh & Pardeshi 2014) Along with this, they also considered the diagnosis done by the Modern physician eg. Urinary stone, fracture.

Western ghat located in Thane forest circle is dominant in Leguminosae, Euphorbiaceae, family as plants of these family is reported maximum in the survey area. (Rao R. http://wgbis.ces.iisc.ernet.in/biodiversity/sahyadri)

Amongst the useful plants, the maximum used plants were of the tree followed by herb and climber found similar observation as per the previous study (Roy & Janbhandu 2020). Stem bark was reported as maximum, followed by leaves as used part of medicinal plants, whereas in many of the previous study leaves are reported maximum as useful plant part (Roy & Janbandhu 2020, Jeyaprakash *et al.* 2011). Many of the essential phytoconstituents are extracted from the bark. quinine is extracted from Cinchona bark (Pasztory *et al.* 2016).

In the survey study, folk claims for gastrointestinal disease are reported by maximum respondents (42), indicating the prevalence of disease in the study area. Lack of adequate sewage management and sanitation systems, defecation in open fields, drinking contaminated water, food, poor hygiene, etc may be the reason for more prevalence of Gastrointestinal related diseases. (Tripurari *et al.* https://www.cdc.gov) Therefore most of the healers were well versed in its treatment. Similar results were reported in other survey studies. (Khan 2016), likewise Cases of the poisonous bite were also very common in tribal areas which is also supported by the previous report. As,

farmers, plantation workers, herdsmen, hunters, or field workers are mostly affected by snakebite and scorpion sting, particularly in rainy and summer seasons (Warrell 1999). Many respondents also reported folk claims for urinary problems. As selected area faced drouth in the summer season, and risk of urolithiasis in people working outdoors or exposed to high temperatures, such as workers, farmers, laborers are twice (Chadrajith *et al.* 2006, Ganesamoni & Singh 2012) as compared to persons working in the room temperature also support the findings. Local health practitioners use native plant resources to cure 50 ailments ranging from fever to diabetes. Jaundice, abdominal pain, urinary stones, piles, diabetes, joint pain, and poisonous bites are the most prevalent disorders in the surveyed area. Natural plants are being used by the tribal to treat them. It demonstrates that the indigenous people of this area have a thorough understanding of ailments, remedies, and the identification of plants.

Figure.10. Folk healer doing the abdominal examination for the diagnosis of the disease

ICF value showed that limited plants species with unanimous opinion was recommended amongst different respondents. Early age pregnancy and malnourishment are the major problems faced by the tribal woman lead to hypogalactia (Ghosh & Varerkar 2019).

After the diagnosis of disease, folk healers recommend the medicines best of their knowledge either in fresh form or prepare the combination of raw drugs and administer in required form like decoction, paste, etc. it was observed that tribal use all the major and subtype of form of administration depicted in the Ayurveda. Panchvidhakashayakalpana (Five basic preparations of medicines) includes Juice, paste, decoction, Hot and cold infusion. (Sharnagdhara 2008) are the major form of medicines used for the administration of medicines. The observations of this study are contrary to the previous study where Powder (churna) form is reported maximum in the Palghar area (Roy & Janbandhu 2020). In the present study, Juice was reported maximum and is considered as the most potent form in the Ayurveda also. (Sharnagdhara 2008) Since the area of Shahapur and Jawhar receiving

high rainfall as it is situated in the Western Ghats, bestowed with rich floristic flora, therefore, the availability, accessibility, and knowledge of indigenous plants make their choice to use fresh juice of useful plant part.

It was interesting to know that tribal is well versed about the different routes of administration of medicine other than oral and topical like Nasal application of medicine (nasya), smoking (dhumpana), etc. even proves the impact of Ayurveda. But other routes of administration like through vagina, rectal, intra-urethral were not reported in the studied area, unlike the description in Ayurveda (Pardeshi *et al.* 2016). Moreover, the use of well-practiced plants of Ayurveda as bracelets and necklaces showed the novelty of the studied area.

It is revealed that the use of *Holarrhena pubescence* (Buch.-Ham.) Wall ex DC. In diarrhea and dysentery was recorded with maximum UV, proves the immediate measure taken by the tribal by the easily available native plant. Kutaj (*H. pubescence*) is also considered the best drug for the treatment of diarrhea in Ayurveda. (Agnivesh 2007). The stem of *Tinospora cordifolia* (Willd.) Hook.F. &Thoms., is preferably used for the treatment of diabetes, piles, fever as reported in the Ayurveda. (Agnivesh 2007). Thus, native plants are observed with maximum UV. The use of plants by the tribal are reported for similar therapeutic use mentioned in the traditional medicinal system like Ayurveda, Unani reported in other studies also. (Uniyal *et al.* 2006)

FIV value showed that Leguminosae, Apocynaceae, Lamiaceae are the most recorded family in the study area. Leguminosae is also the dominant family in India (Jain 1983) and the largest family of ethnopharmacological importance (Macido *et al*. 2018). In Bangladesh also plants belonging to the Leguminosae family are reported with maximum medicinal uses (Rehman & Parvin 2014)

Plants that reported higher FL values are frequently used in the study region, showed the specific importance for a specific purpose. In the study are FL ranged from 28.57 to 100%. Amongst the medicinal plants reported with 100 %. FL viz., *Cissampelos pareira* L., *Curcuma amada* Roxb., *Lawsonia inermis* L. and *Coriandrum sativum* L. are also well-established plants in Ayurveda for similar therapeutic purposes as mentioned by tribal. Even the plants with low fidelity levels may be due to differences in the learning experience, tradition, and availability.

Limitation

The ethnomedicinal study is intended to record the traditional health practice adopted by the tribal, leaving in the remote area, close to nature. Their primary source of management of any ailment is a natural source available in their native area, but they didn't keep a record of such ancestral knowledge however share such wisdom by oral communication only. During this survey study, there were few well-known folk healers who refused to share any information due to linguistic obstacles and apprehension. Respondents other than folk healers were aware of such information but had incomplete information or not well versed for identification of authentic plants and disease condition.

Novelty and future impact

After the validation of reported claims, it was observed that 16 claims of single drug and all compound formulations are not recorded in the classical textbooks of Ayurveda. Ayurveda is a treasure house of vast knowledge recorded in numbers of classical literature and to validate each claim from all literature is quite difficult. Hence for present study important classical textbooks and authorized textbooks having compilation of references were referred. Amongst the 16 single drug claims, 14 plants are mentioned in the Ayurveda whereas **fangali**- *Pogostemon benghalensis* (Burm.f.) Kuntze. and **kalihalad**- *Curcuma caesia* Roxb. these two plant species are novel and could be explored further to screen bioactive compounds and their pharmacological activities to introduce in Ayurvedic Pharmacopoeia. Plants mentioned in the compound formulations are reported in Ayurveda, but the combination of plants and its indications reported in survey area are novel. The present study is unique in terms of documentation of details about the medicinal plants; its method of preparation, mode of application, and indication reported by the survey team consisting of Ayurveda Physician and Botanist. It helps to minimize the ambiguity regarding symptoms, method of diagnosis, an indication as well as botanical identification.

Conclusion

After the validation of reported claims, it was observed that 16 claims of a single drug and all compound formulations are not recorded in the classical textbooks of Ayurveda. Ayurveda is a treasure house of vast knowledge recorded in numbers of classical literature and to validate each claim from all literature is quite difficult. Hence for the present study important classical textbooks and authorized textbooks having a compilation of references were referred. Amongst the 16 single drug claims, 14 plants are mentioned in the Ayurveda whereas

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Declarations

List of abbreviation: UV: Use Value; ICF: Informant Consensus Factor; FIV: Family Importance value (FIV); FL: Fidelity level; LHT: Local Health Tradition; FRLHT: Foundation for Revitalisation of Local Health Traditions

Ethics approval and consent to participate: All the participants provided prior informed consent before the interviews.

Availability of data and materials: Data are available from the first author and corresponding Author.

Competing interests: The authors declare that they have no competing interests.

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Author contributions: RK, AG and GP carried out the field study and wrote the manuscript. AG, CR and AM contributed in specimen identification. NS thoroughly revised the manuscript. All authors read and approved the manuscript.

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