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Traditional medicinal knowledge of plant species found in Maldeota Village, Dehradun, Uttarakhand (India)

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Abstract

Utilization of the natural resources especially plants in preparing the medicine or using plant parts directly had been practiced since ancient times and is prevailing in recent trends also. Current pandemic situation of COVID-19 had showed us the importance of preserving traditional medicinal knowledge, when Ayush Ministry in India advised the citizens to consume tea (decoction) of some prescribed herbal plants known as '*Kaadha*' for increasing the immunity. Present research paper is an effort to explore the traditional medicinal knowledge (TMK) of some plant species of a small village Maldeota in Dehradun district of Uttarakhand (India). On the basis of survey, 28 plant species belonging to 20 families were found which are still in use by the villagers for different ailments. These plant species are used either as a decoction or as a paste mainly for common diseases like migraine (headache), dysentery, tooth infection, cough, cold, normal fever, skin infections and menstrual disorders. On the basis of questionnaire, it was concluded that age group of people belonging to ≤45 years have strong belief on traditional medicines while the age group belonging to the age group 25-44 have faith on other forms of treatments mainly allopathy, the reason being more effective and less time consuming. The study concluded that the TMK is the heritage which has been provided by our ancestors and there is a need of preserving it.

1. Introduction

Traditional medicines derived from the plants are still in use mainly in the areas where the modern medicinal facilities are lacking. According to World Intellectual Property Organization which is an Intergovernmental Committee on Intellectual Property and Genetic Resources, 2020 in some Asian and African countries the significant number of peoples are still reliant on the traditional medicinal knowledge [1]. The word '*traditional*' means the reflection of any community's knowledge or practices. This knowledge has been created, practiced and carried out since inter-generations in the communities. The definition given by World Health Organization of traditional medicine is, "it is regarded as sum total of the skills, knowledge and the practices which are based on the experiences, beliefs and the theories which are indigenous to the different culture and sects, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness" [2]. The traditional knowledge is created, preserved and transmitted from one generation to another

Traditional knowledge is still practiced in many villages of Uttarakhand. The ethnobotanical and Ethnomedicinal description are documented in ancient *Vedas* as well as in many international scientific journals [3]. *Rig Veda, Atharvaveda* and *Charak Samhita* have documented the traditional medicinal knowledge of many species of Himalayan region [4]. Uttarakhand, belonging to the Himalayan Range is literally known as *Devbhoomi* meaning Land of Gods. Uttarakhand's forests with a rich diversity serves as a wealth for the state [5]. The state is bestowed with 1127 medicinal plant species which belong to 153 plant families [6].

Uttarakhand is a North Indian state with an area of 53,483 km^2 and consist of 86% mountainous region while 65% (34,666 km^2) of the area is under forest cover. According to Rawat and Vasistha (2011), in Uttarakhand around 18,000 plant species have been reported and out of these species approximately 1800 species have the medicinal value [7]. Uttarakhand is considered to be a bio-diverse state in reference to the wealth present in the form of medicinal plant species which may become the important alternative for the sustainability of livelihood for the people living in hilly region in near future.

1.1 *Study Area*

2 Study site is located in Dehradun, winter capital of Uttarakhand state which is surrounded by lesser Himalayas in north and Shiwaliks in the south. Rivers Ganga and Yamuna flows in the direction of east and west respectively. The longitudinal coordinates are $77^0$38' to $78^0$20' east and latitudinal coordinates are $29^0$35' and $30^0$30' north. It covers an area of approximately 2000 sq.km. Maldeota, a small village in Present study has been carried out at Dehradun district of Uttarakhand, India with an elevation ranging from 650m to about 1050m above mean sea level was selected as the study site. River Bandal which flows nearby is boon for the farmers [8].

3 Maldeota village has a treasure of medicinal wealth in the form of flora present over there. River Bandal serves as an asset for the local people and the vegetation over there. People still today are using their traditional medicinal knowledge inherited from their ancestors related with the plant species as the home remedy for some of the diseases.

Figure 1. Location of Uttarakhand in Map of India

Figure 2. Google map of study site

2. Methodology

2.1 Survey: The ethno-medicinal survey was carried out in Maldeota village and adjoining natural forest in February-March 2021. Door to door survey, group discussions on traditional medicinal practices and questionnaire were conducted [9]. The language used for the survey was Garhwali (local language) for familiarity with the people and better results of the survey (Table 1).

Table 1. Questionnaire format

Questionnaire Format	
Details of informant Name Gender Age Occupation Education	
Question1	For how long you have been using traditional medicines?
Question 2	Do you believe in traditional medicines?
Question 3	Name of the disease for which plants are used?
Question 4	What is the method of using the plant or plant part?
Question 5	Were you benefitted by the use of traditional medicine?

3. Results and Discussion

A total of 92 people of 53 families undertook the survey, 49 males and 43 females. The age of the informants ranged between 25-44 years and 45 years and above. The main occupation of the people was farming. Males and females both were engaged in farming. People belonging to the age group of 25-44 (11 males and 13 females) were mostly graduates while the people above the age of 45 and above (35 males and 33 females) have studied till intermediate and remaining 3 females were the school dropouts. The reason less population of the age group 25-44 was that the people of this age group are mostly engaged in the jobs in the nearby areas. Some people have migrated with their family in the search of better employment and lifestyle (Table 2). The literacy level of the age group of 25-44 was high in comparison to the age group of 45 years and above. The reason was the better facilities and transportation which younger generation was getting as compared to older generation due to unavailability of Degree colleges nearby during their time.

During the survey, it was found that the age group of 25-44 years was trending more towards the allopathy treatment rather than traditional medicines. They took up the traditional medicines with the allopathic treatment. On the other hand, the people of the age of 45 years and above had their faith on traditional medicines. Some of the decoctions were taken by the people of this age on daily basis. There was a gap seen in the parameter of literacy level. People belonging to the age group of 25-44 had graduated or pursued higher studies and age group of 45 years and above had completed their

intermediate while 3 females were school dropouts. As the younger generation was more exposed to the outer world and new technology hence their belief on traditional medicines made up of plant parts and decoctions was not as stronger as in the age group of 45 years and above.

Table 2. Number of males, females who took part in survey and their literacy level

Age group	Male	Females	Literacy level
25-44 years	11(24%)	13(28%)	Graduate and above
45 years and above	35 (76%)	33(72%)	Intermediate and below
Total	46	46	

People in Maldeota village have been using the traditional medicines since their birth. All the informants contacted during survey agreed that they have been using traditional medicines mainly for cough, cold, headache, dysentery, menstrual disorders and skin infections. 47 people out of 68 informants (69%) take the decoction made up of plant parts on daily basis for increasing the immunity. Mostly leaves and bark of plant parts were used either to make decoctions or freshly grind to make the paste and apply externally. Out of 92 people 68 people (74%) confirmed that they believe in traditional methods for cough, cold, headache, dysentery, menstrual disorders and skin infections while all the informants told they have been benefitted in some way or another by traditional medicines (Table 3). The use of traditional medicines in least dangerous diseases was more common in both the age groups. Some of the species found in Maldeota and nearby forest are tabulated below with their traditional use in the field of medicine.

Table 3. Plants still in use in traditional medicinal knowledge in Maldeota, Dehradun, Uttarakhand (India).

S. No.	Scientific name	Local name of the species	Family	Part used	Medicinal uses
1	*Acacia catechu*	Katha, Khair	Fabaceae	Heart wood extract, Bark extract	Heart wood extract is used in asthma, cough, bronchitis, colic, diarrhoea, dysentery, boils, skin afflictions, also used as mouth freshener, while bark paste is used to treat cuts and wounds.
2.	*Dalbergia sissoo*	Shisham	Fabaceae	Leaf extract, bark extract, woody part	Leaves used in skin ailments, leaf juice are used for eye ailments, bark paste is used in curing boils and nausea.

3.	*Albizia lebbeck*	Shirish, Siris	Leguminosae	Bark extract	Neutralize toxins in the body. Used in curing bronchial asthma. Bark decoction is used as herbal tea for asthma.
4.	*Toona ciliata*	Tun	Meliaceae	Leaf powder, bark powder, bark paste, gum and flowers.	Useful in chronic dysentery, leprosy, cures fever, headache, blood complaints, ulcer, traditionally used in menstrual disorders.
5.	*Populus ciliata*	Ban peepal	Salicaceae	Bark paste	A bark paste mixed with cow dung ash is used to cure muscular swellings
6.	*Jatropha curcas*	Jungli arandi	Euphorbiaceae	Leaves powder and paste	antimicrobial, anti-cancer, treats influenza virus infections
7.	*Grewia optiva*	Bhimal	Malvaceae	Bark	Anti- bacterial and Anti-malarial, cough, dysentery, diarrhoea, small pox, malaria, typhoid
8.	*Bauhinia variegata*	Kachnar	Fabaceae	Bark	Bark is used for curing of skin diseases and ulcers. In diarrhoea bark decoction is used. The root serves as antidote to snake poison. The dried buds are used for curing various diseases like the piles, dysentery, diarrhoea and worms.
9.	*Bombax ceiba*	Semal	Malvaceae	Bark decoction, paste	Useful in diarrhoea, piles, urinary disorder, constipation, heals wounds.
10.	*Cassia fistula*	Amaltas	Fabaceae	Leaves, buds, fruit	The tree leaves are used for treatment of malarial fever and skin diseases while buds are used for curing constipation and ulcers, and skin disease and the fruit for abdominal pain, fever, heart disease, leprosy.

11.	*Moringa oleifera*	Sahajan	Moringaceae	Pods, roots, flowers, fruits, bark, leaves, seed	Various parts used as cardio-vascular problems, seeds are used to treat ulcers, use of flowers in food increases the immunity, while bark decoction lowers the cholesterol levels leaf paste is used to heal wounds and cuts
12.	*Nyctanthes arbortristis*	Harsingar, Parijat	Nyctanthaceae	Leaves, flowers	Antibacterial, anti – malarial, immunity booster. Used in treatment of sciatica, arthritis, cough, fever, intestinal worms
13.	*Murraya koenigii*	Kari patta	Rutaceae	Leaves	Raw leaves are eaten for treatment of diarrhoea and dysentery and fever. A leaf infusion stops vomiting.
14.	*Woodfordia fruiticosa*	Dhaaya / Dhaay ke Phool	Lythraceae	Leaves and flowers	Flowers are used as astringent, leaves and flowers are used in treatment of dysentery
15.	*Mallotus philippensis*	Kamaala/Kumkum/Sindur/Rohini	Euphorbiaceae	Seeds and bark	Antibacterial, antifungal, Anti-inflammatory
16.	*Achyranthes aspera*	Latjira	Amaranthaceae	Whole plant	Used in indigestion, cough, asthma, anaemia, jaundice and snake bite.
17.	*Ageratum conyzoids*	Gandela	Asteraceae	Flowers	Used to treat fever, headache, Antiseptic
18.	*Carrisa opaca*	Karaunda	Apocynaceae	seed	Used in treatment of jaundice, hepatitis, asthma, fruit used in diabetes
19.	*Leuceana leucocephala*	Safed Babool	Fabaceae	Seed extract	Used in stomach diseases, facilitation of abortion, contraception and the treatment of diabetes.
20.	*Urtica dioica*	Kandali	Urticaceae	Leaves	Treats joints pain, anti-inflammatory in nature, useful in urinary diseases.

21.	*Aerva scandens*	Safed Phool	Amaranthaceae	Branches decoction, roots, leaves paste	Used in irregular and painful menstruation, the roots paste is applied externally for treating headache, paste of fresh leaves is applied on cuts and wounds
22.	*Acorus calamus*	Bach	Araceae	Roots decoction	Used in speaking problems
23.	*Adina cordifolia*	Haldu	Rubiaceae	Leaves, stem, bark, latex	Paste of leaves is applied over the swollen portion of the body for relief, Bark paste is used for skin allergy problems and in bacterial infections, paste of stem, leaves and bark is used for deep wounds, jaundice and stomach ache, latex of the tree is used for toothache
24.	*Pogostemone benghalensis*	Masa pindi	Lamiaceae	Leaf paste	Used in healing deep wounds
25.	*Artemesia vulgaris*	Douna	Asteraceae	Whole plant	Plant dried and powdered is used against fever and malaria
26.	*Emblica officinalis*	Amla	Euphorbiaceae	Fruit, root, leaves	Fruit used for Obesity, better eyesight, memory enhancement
27.	*Ficus religiosa*,	Pipal	Moraceae	Root, bark, leaf, fruit	Diabetes, migraine, chickenpox,
28.	*Ricinus communis*	Arandi	Euphorbiaceae	Leaf	Pain and swelling ,arthritis, constipation

The above mentioned species have been documented by other researchers also. Kumar et al. while studying in different climatic regions of Garhwal Himalayas found that people are still using the traditional medicinal knowledge for diarrhoea, common cold, dysentery, bronchitis, menstrual disorders, tooth infections, migraines and leprosy [10].

Wanjohi et al., (2020) studied the traditional knowledge and use of medicinal plants in Marakwet community, Kenya and found that traditional medicinal knowledge was mainly used to treat the common diseases like stomach ache, diarrhoea, chest problems, and typhoid [11].

A study was carried out in Jakholi block in Rudraprayag District, Uttarakhand and found that 46 plant families are able to heal 14 different diseases, most dominant family being Asteraceae. Traditional medicinal knowledge was being used in treating skin infections followed by Gastro-intestinal disorders and then for hair ailments. In treatment mainly herbs were used while roots were the most used plant part which was used in the form of paste [12].

The location of the community, availability of the infrastructure, distance from the urban area, transport system, healthcare facilities is the important factor on which the loss of traditional medicinal knowledge depends [13-16]. Another explored the scientific evidences of the traditional medicinal knowledge of Chhattisgarh state in India used in healthcare system of humans. The study documented 81 different practices which belong to 42 different plant families. 51% of the practices which were carried out by tribals have evidences in scientific literature while 20% of the total practices were evaluated clinically in human subjects. The study explored many practices which had no documentation [17]. Molina et al., (2015) concluded that the some people of Ilocos, Sur, Philippines are dependent on the medicinal plants and the knowledge related to it for cure of some common diseases like headache, skin diseases, menstrual disorders, cough, cold, fever, snake bites, and tooth infections [18].

Roy et al., (2022) focused their study on the species diversity and population of ethnomedicinal plants in home gardens and their traditional therapeutic use. Leaves of 22 ethnomedicinal plant species were used in 39 diseases including cancer. The study documented that ethnomedicinal knowledge serves as the primary health care system for the people of the Terai region in the Jalpaiguri district of West Bengal [19].

Pradhan et al.,(2021) concluded in their study that local people of the Fringe village of Kitam Bird Sanctuary, South Sikkim, India had an excellent knowledge of medicinal plants and are dependent on their ethnobotanical knowledge for treating several diseases. The study suggested that some species *Calamus erectus, Laportea bulbifera, Pteris biaurita* and *Solanum viarum* have a high potential and scope for pharmacological studies in the future [20].

Adebayo et al., (2021) documented the indigenous knowledge of African ginger (*Siphonochilus aethiopicus*) which is commonly used by the sub-Saharan African people to treat cold, cough, inflammation and related symptoms [21].

Conclusion

The traditional knowledge of medicines related to plants has its own importance and it has sustained itself for centuries, but modern development and anthropogenic disturbances are posing threat to this invaluable ancient knowledge [22, 23, 24]. In the current study, the complete interest shift of the young generation from the traditional way of healing to the modern way of treatment. Increased use of allopathic medicines has been seen because of its wide availability and no labour is to be done for taking the medicines but in the traditional way of healing the diseases through plant decoctions or paste requires time and labor. Ecological issues like the decline in biodiversity, soil erosion, deforestation, flourishing real estate are some of the reasons for the younger generation to lose interest in time taking traditional medicinal treatments. The validation of this traditional knowledge, scientifically by isolation, purification or preparing decoctions of the constituents of the plants is necessary for use on a large scale in today's context.

Today the medicinal plants which were once growing naturally in Uttarakhand (India) are depleting at a rapid rate, the reason being the overexploitation of natural resources and migration of people from the hills which has left the field in degraded conditions [25]. There is an urgent need to work further in this area, preparing of database district-wise so that this invaluable information does not vanish away.

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