



Medicinal Plants of Choice Practiced by Tharu Tribal Population against Fever.

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Abstract

Fever has been one of the primary health problem that seeks medical attention. Though there is a remarkable variety of modern medicines available to treat pyrexia, various indigenous communities throughout the globe still believe that medicinal plants have equal potential for reducing elevated body temperature (T). This article emphasizes the tendencies of tribal Tharu community of Nepal towards treatment of fever by ethnomedicinal approach. The interview taken from 31 local Tharu healers/vaidyas of 23 villages of Rupandehi and Nawalparasi district of Nepal revealed the use of 5 different plant species for fever namely *Guilandina bonduc* L., *Trichosanthes dioica* Roxb., *Swertia chirayita* (Roxb.ex Fleming) H. Karst., *Tinospora cordifolia* (Thumb.) Miers and *Strychnos nux-vomica* L. Out of them *Guilandina bonduc* L. was found to be used most often for treatment of fever. Moreover, *Guilandina bonduc* L. seeks conservation due to its decreased population and the ethnomedicinal knowledge of these local communities needs documentation and conservation at least for future plant based drug discoveries.

Key words: Fever, Tharu people, Ethnobotany, Medicinal plants, Nepal.

Introduction

Fever or pyrexia is an ailment where the body T is raised above the body's T set point [1] and is a process where body T rises above homeostatic condition[2]. Fever is considered to be present if rectal T is at or above 37.5-38.3 °C [3], oral T at or above 37.2 – 37.7 °C, axillary T 37.2 °C [4] and ear T 35.5-37.5 °C [5] however central T is more correct than peripheral one [6]. In general, 37 °C is taken as the normal value of human T which may fluctuate by 1 °C [7] but this threshold merely should not be characterized to define fever since it is rather a complex physiological as well as immunological response [8] and is also distinct from hyperthermia where the set-point is unchanged and is induced by specific pharmacological, environmental or endocrine stimuli [9] and remains unaffected by antipyretics since pyrogenic molecules are not involved [10].

Fever is one of the primary medical symptoms observed [11] and is a common finding of up to 75% of hospital visits [12] and intensive care admission in up to 70% of patients [13]. Infection or sepsis by virus, bacteria and other parasites as well as non-infective conditions such as cancer and drug side-effect are causes of fever [14] and the former leads to three fourth cases of total hospitalization [15] while the remaining one fourth by the later [16]. Additionally, in non-infective trigger, fever is not associated with survival benefits but is beneficial in septic conditions [17] and its response against infection is believed in evolutionary perspective as well [18]. A rapid recovery has been observed due to fever in infection and other illness in homoeothermic animals [19]. Moreover, a decreased mortality is observed due to fever in bacterial infection [20] since it contributes in host defense by hindering the pathogenic growth and elevating immunological reactions [21].

Fever is often over concerned than it actually might be [22] and it is often self-limiting hence does not always need to be treated [23]. But treating fever does not worsen the result [24]. Use of tepid water sponge or bath and fan or air condition are some traditional way to lower T in feverish children but aggressive cooling is essential in extreme hyperpyrexia [25]. Ibuprofen is superior than paracetamol [26] as well as aspirin [27] as an antipyretic and combination of both ibuprofen and paracetamol is also safe for children with fever [28]. In spite of development of a range of antipyretics, citizens of marginal civilizations are bound to be dependent upon herbal plants to cure fever due limited access of common pharmaceuticals [29]. Individual medicinal plant may be used against multiple ailments [30]. The practice of such medicinal plants by human civilization has a long history [31] and ethnomedicinal knowledge should be preserved for development of modern medicines as demonstrated by history [32].

Tharu tribe is an indigenous population distributed along southern foothills of Himalaya of Nepal and India and most of them live in Terai region [33]. 'Tharu' is an umbrella word to organize several groups of people having diversity in language, culture and tradition, costumes, customs, and social organization [34]. Traditionally, they are farmers but also practice hunting and gathering where they become directly dependent on forest for forest products including medicinal plants. They are connected to the nature both morally and spiritually while the pantheon of their deities live in the forest [35]. In local Tharu language, the medicines obtained from plants are called '*Kharbirawa Dabai*' and one generally does not reveal his/her ethnomedicinal knowledge since they believe that their secret medicinal formulae will not work anymore after doing so.

Rupandehi (27° 20'00"-27° 47'25" N, 83° 12'16" - 83° 38'16" E) is a district of Lumbini province of Nepal. The total area of the district being 1360 square kilometers and it is distributed in three geographical ranges namely Shivalik, Inner Terai and Terai[36]. The total population being 11,21,957 out of which 8.2% are Tharu people according to 2021 census [37].

Nawalparasi(27° 19' 12" N, 83° 24' 0" E) is also a district of Lumbini province sharing its boundary with Rupandehi district in west. The total area of this district is 747.5 square kilometers [38]. Total population of this district is 3,86,868 out of which 17.6% are of Tharu ethnicity according to 2021 census [37]

Materials and method

This study was conducted in different villages of Rupandehi and Nawalparasi district of Western Terai of Nepal. Different villages predominantly inhabited by Tharu people were visited and the major local healers were identified and interviewed. The local Tharu people who had been treating diseases by using medicinal plants were interviewed and the name of plant along with identification, method of use against fever and precaution was also asked. Moreover, the photograph of each plants was taken and stored.

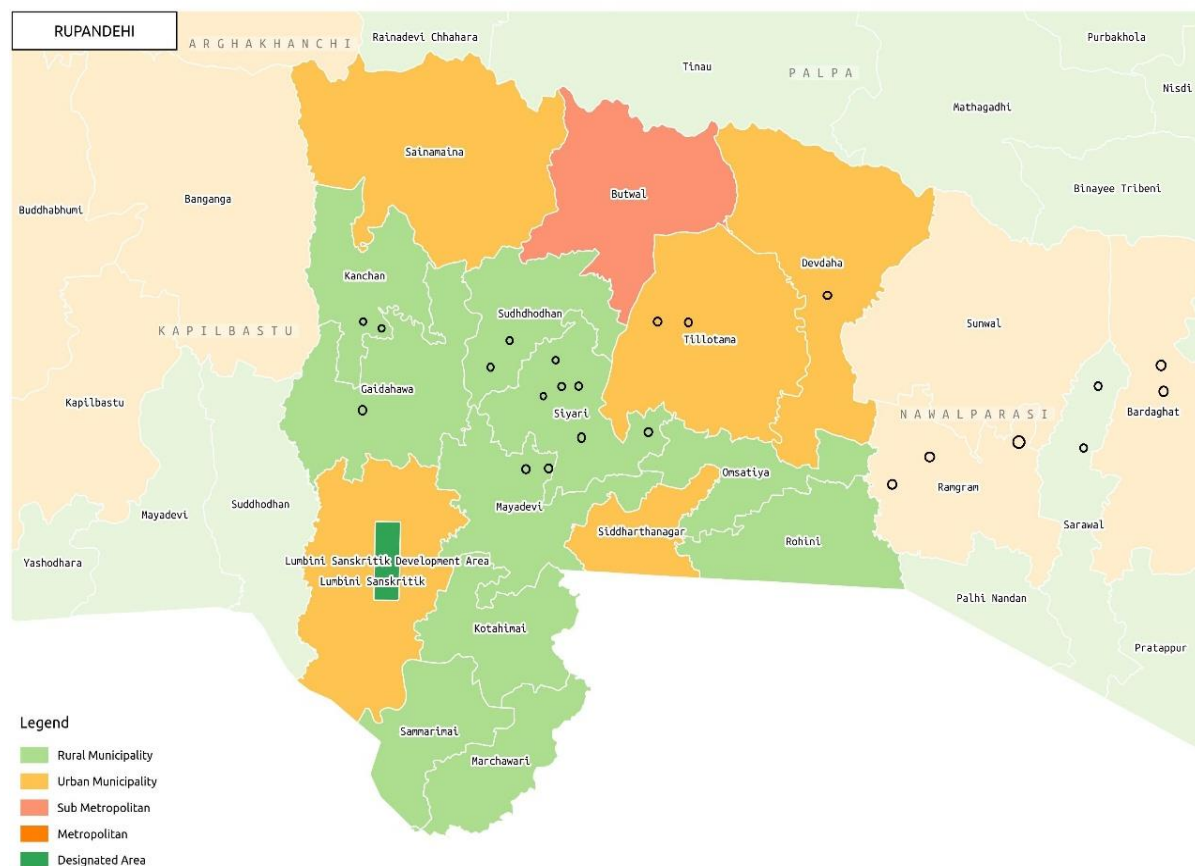


Figure:1 A political map of Rupandehi and a part of Nawalparasi district showing study area . circles denote the Tharu villages where interview was taken.(source: EHRP Nepal <https://ehrpinspection.nra.gov.np/maps?district=49>)

Result

Total 23 Tharu villages of two districts namely Rupandehi and Nawalparasi were visited . Each villages had at least 1 expert in handling diseases by means of traditional herbal knowledge and up to 5 healers were also found in a village. Total 5 different plant species ,which have been used against fever, were reported by total 31 local healers and out of them, Kadja was accepted by every person interviewed so far. Chiraita was second widely used herb accepted by 22 person while Kuchilha was used by only 2 person. Both Parwar and Bawar were used by 8 person each.

Binomial name	Local name	Family	No. of reports
<i>Guilandina bonduc</i> L.	Kadja	Fabaceae	31
<i>Swertia chirayita</i> (Roxb.ex Fleming) H. Karst.	Chiraita	Gentianaceae	22
<i>Trichosanthes dioica</i> Roxb.	Parwar	Cucurbitaceae	8
<i>Tinospora cordifolia</i> (Thumb.) Miers	Bawar	Menispermaceae	8
<i>Strychnos nux-vomica</i> L.	Kuchilha	Loganiaceae	2

Table:1 Medicinal plants used by Tharu people of Nepal for the treatment of fever.

1. Kadja (*Guilandina bonduc* L.)

The seeds are removed carefully from thorny fruits and then roasted in hot ash. The hard seed coat of seeds is removed and remaining part which is cotyledon, is crushed and dissolved in about 20 ml of water. This solution is taken by the feverish person. One seed is required per dosage and total dosage is determined as required.

2. Chiraita (*Swertia chirayita* (Roxb.ex Fleming) H. Karst.)

A decoction is prepared by boiling about 5-10 gram of dried stem in about 40 ml of water and drying up half amount of water. The remaining mixture is cooled, filtered and provided to the patient. This is specially prescribed in typhoid.

3. Parwar (*Trichosanthes dioica* Roxb.)

0.5 inch of a mature fresh root is crushed into paste and dissolved into half glass of water which is then taken by the patient. The dosage is decided very carefully since overdose may cause a tremendous fall in T.

4. Bawar (*Tinospora cordifolia* (Thumb.) Miers)

About one foot of an average thick stem is taken and the outermost peel is removed. Then it is washed and boiled in a glass of water. When half of water is left after evaporation, it is cooled, filtered and then consumed by the patient. This is again repeated after 12 hours.

5. Kuchilha (*Strychnos nux-vomica* L.)

The decoction prepared from leaves or bark is used against the fever. For that, five leaves or about 10 gram of bark is boiled in a glass of water until half of the water is evaporated and the remaining decoction is filtered and offered to the patient. But the use of seeds or fruits is very carefully monitored since their poisonous effect.

Discussion

More than 1200 plant species are being used traditionally for treatment of malaria and fever[39]. Phumthum and Sadgrove found that *Mimosa pudica*, *Acorus calamus*, *Elephantopus scaber*, *Melicope glomerata*, *Phyllanthus amarus* and *Scoparia dulcis* were used by Karen hill tribe people against fever in Thailand [29]. According to a review article by Hadian et.al., 2019, *Althaea officinalis*, *Beta vulgaris*, *Cichorium intybus*, *Citrullus lanatus*, *Coriandrum sativum*, *Fumaria officinalis*, *Glycyrrhiza glabra*, *Lawsonia inermis*, *Matricaria chamomilla*, *Mentha piperita*, *Nymphaea alba*, *Plantago major*, *Portulaca oleracea*, *Punica granatum*, *Salix species*, *Viola odorata* and *Ziziphus jujube* have been used against pediatric fever in Persian medicinal system [40]. The herbal medicines are used as primary medicine or supplementary to modern allopathic drugs. Various plants or their extracts are used to cure fever such as *Ocimum sanctum*, *Azadirachta indica*, *Asparagus adscendens*, *Terminalia belerica*, *Terminalia chebula*, *Emblica officinalis* etc and out of them many plants are used as a single herb extract or used in combination with other antipyretic herbal plant as a polyherbal formulation [41]. According to a clinical trial conducted in 2011, it was found that the combined therapy of medicinal herb extract with modern allopathic drugs shows superiority in reducing fever rather than using them separately [42].

Abbreviations

T - temperature

Declarations

I. Ethics approval and consent to participate

Informed consent from all the participants was taken before the interview in written form in their understandable language.

II. Consent for publication

Consent for publication of data, image, video and any other personal information of participants and their attributes regarding this research was taken in written form in their understandable language.

III. Availability of data and materials

- <https://dccrupandehi.gov.np/ne-brief-introduction/> :Geography of research area/ Rupandehi.
- <https://daonawalparasiwest.moha.gov.np/en/page/para-caya> :Geography of research area/Nawalparasi.
- <https://censusnepal.cbs.gov.np/results> : population detail of Target community in Nepal.

IV. Competing interests

Authors declare no any financial and non-financial competing interests.

V. Funding

Not any.

VI. Authors' contributions

All authors have equal contribution in this research.

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