Exploration of Traditional Medicinal Plants Used by the Mishing Community of Sonitpur, Assam for the management of Dysmenorrhea

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ABSTRACT

A vast majority of the developing world still depends on traditional medicines for the treatment of the common ailments. Open discussions about the reproductive disorders are generally considered taboo in most of the traditional homes even today. Therefore, these disorders are the common ones to be treated by traditional means. Assam, being the abode of many tribes acts as a hub for such remedies from ancient times. Lots of herbal medicines are used here for curing many diseases, including the reproductive ones. Therefore, the present study was designed to document the medicinal plants used by the Mishing community of Sonitpur district. Pieces of information were collected from the traditional healers with the help of interviews. A total of 46 medicinal plants were reported which belong to 19 families. The plant with high use value was *Acacia fernesiana*, followed by *Bambusa bambos*. The highly reported family was Malvaceae. A thorough study of the phytochemicals present in the reported plants and the validation of the mentioned ethnobotanical use are necessary. Identification and isolation of the compounds with pain healing properties, *in silico* interaction of the compounds with target proteins and clinical trials are recommended for drug development from the reported plants.

Keywords: Dysmenorrhea, Reproductive disorder, Traditional Medicine, *Acacia fernesiana*, *Bambusa bambos*

INTRODUCTION

Reproductive health of each human being is a matter of great concern. The importance of it is recognized globally in the name of reproductive rights. Reproductive health especially that of woman, is directly related with the long- term development of any country (Khaleghinezhad *et al.,* 2018). Menstrual cycle serves as the best indicator of reproductive health for every normal woman. The onset of menstruation indicates the beginning of puberty and generally occurs between the age of 10- 16 in every female, with a high range of variations (Omidvar *et al.,* 2018).

Menstruation in women of reproductive age is one of the most natural phenomena, characterized by blood discharge from uterus through the vaginal route, occurring at an interval of approximately one month (Rafique *et al.,* 2018). Though some women are blessed with comparatively painless menstrual cycle, 70% experience abnormalities related with menstruation (Khaleghinezhad *et al.,* 2018). There are a wide range of disorders associated with the menstrual cycle such as dysmenorrhea, premenstrual symptoms, menorrhagia, polymenorrhea, abnormal vaginal bleeding, amenorrhea, oligomenorrhea, and irregular menstruation. Menstrual problems are also associated with eco-

nomic burden and work efficiency of women during those days (Rafique *et al.,* 2018).

Among all the menstrual abnormalities, dysmenorrhea is considered as an unsolved problem in medical science. 80% women in the world suffer from dysmenorrhea in the reproductive years (Pu *et al.,* 2015). This condition is characterized by acute pelvic pain during the periods, without any visible pelvic lesions. But it also shows symptoms of lower backache, nausea, vomiting, etc. (Omidvar *et al.,* 2018). This condition is categorized into two categories- primary and secondary dysmenorrhea. The primary type is very common while the secondary one is dependent on some other pelvic disorders. The pelvic pain is severe in 15% cases globally (Jesíno *et al.,* 2018).

Though the problem is quite unsolved, modern science uses some ovarian steroids for treatment of dysmenorrhea (Baruah *et al.,* 2019). In cases with moderate symptoms, nonsteroidal anti- inflammatory drugs are mostly used, but they come with some severe side effects after discontinuation of medication (Pu *et al.,* 2015). Due to this, use of some drugs with lesser side effects is recommended for use. In some traditional societies, some herbal medicines are used to fulfill this purpose. But survey and documentation of such traditional medicines are not sufficient till date. Therefore, the present study aims at the study and documentation of medicinal plants used for dysmenorrhea.

MATERIALS AND METHODS

Study and Documentation of Medicinal Plants:
Study Area:

The study area consisted of the Mishing tribe inhabited villages of Sonitpur district (26.6739ºN, 92.8577ºE). The villages selected for the study were- Bokagaon miri, Baligaon, Koloi, Kekakuli, Dalikati, Bamonipam, Towbhanga and Bor Dikhorai. The study was conducted from November 2020 to May 2021.

Collection of Data:

The traditional practitioners were selected based on their knowledge of medicinal plants in the study area. In the first visit, the purpose and nature of the project were explained to each practitioner to get prior informant consent. Then formal interviews were conducted in the local language 'Mishing' and the documentation of data of the data in the field was completed. The informants were asked to describe the medicines with their mode of usage. The details regarding the parts used, mode of preparing medicine and solvent used for administration were noted down.

Calculation of Use Value:

According to Phillips *et al.*. (1994), the UV was calculated using the following formula:

$$UV = U/N$$

Where, "U" refers to the number of uses mentioned by the informants for a given species and "N" refers to the total number of informants interviewed. If a plant secures a high UV score that indicates there are many use reports for that plant, while a low score indicates fewer use reports cited by the informants.

RESULTS

A total of 46 plants used for the treatment of dysmenorrhea were documented in the survey (Table 1 to Table 6; Figure 1). The plants belong to a total of 19 families, the highest being of the family Malvaceae (12.24%). The use of leaves, roots, bark, flower, seeds, rhizome and pulp of the plants was reported for the treatment of menstrual pain. There was report of the highest use of the leaves followed by that of the roots.

Calculation of Use Value:

Use Value of *Acacia farnesiana,* UV = 3/49
$$= 0.0612$$
Use Value of *Bambusa bambos*, UV = 2/49
$$= 0.0408$$
Use Value of Other Documented Species,
$$UV = 1/49$$
$$= 0.0204$$

Table 1. Information collected from traditional healer-1

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Abroma augusta*	Kopashi ame	Malvaceae	Profusely branched roots and leaves are used for treatment
2	*Curcuma caesia*	Yakkan haldi	Zingiberaceae	Rhizome is consumed
3	*Eclipta prostrata*	Marsang	Asteraceae	Leaves are boiled in water and consumed as medicine
4	*Hydrocotyle sibthorpioides*	Manimuni	Araliaceae	Leaf juice is used for period cramps
5	*Leucas aspera*	Dhoron bon	Lamiaceae	Leaves are boiled in water and consumed as medicine

Table 2. Information collected from traditional healer-2

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Acacia farnesiana*	Torua kadam	Fabaceae	Bark juice is consumed
2	*Paederia foetida*	Lapuk	Rubiaceae	Leaves and roots are squashed, mixed with water and drunk
3	*Sida acuta*	Varbei	Malvaceae	Leaves are crushed to produce juice and consumed
4	*Terminalia arjuna*	Aurjun aame	Combretaceae	Viscous juice of the bark is consumed

Table 3. Information collected from Traditional healer-3

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Acacia farnesiana*	Torua kadam	Fabaceae	Bark juice is consumed
2	*Hibiscus rosa sinensis*	Jova ame	Malvaceae	Flower petals are taken with jaggery.
3	*Mikania micrantha*	Injo lota	Asteraceae	Leaves are crushed and mixed with water and drunk during periods
4	*Tinospora cordifolia*	Meshor	Menispermaceae	Leaf juice is taken
5	*Urena lobata*	Rinjin	Malvaceae	Juice of both root and leaf are consumed

Table 4. Information collected from traditional healer-4

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Abelmoschus moschatus*	Koroi ame	Malvaceae	Ground seeds are mixed with lukewarm water and consumed
2	*Bambusa bambos*	Divang	Poaceae	Decoction of leaves are taken
3	*Hibiscus mutabilis*	Podma ame	Malvaceae	Root extract is consumed
4	*Mimosa pudica*	Miktab ame	Fabaceae	Root juice is consumed during periods

Table 5. information collected from traditional healer-5

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Albizia lebbeck*	Saw ame	Fabaceae	Bark and roots are pounded to make juice and taken
2	*Bambusa bambos*	Divang	Poaceae	Decoction of leaves are taken
3	*Drimia indica*	Yumya talap	Asparagaceae	Tunicate bulb-like portion is used to prepare juice and taken
4	*Targetes erecta*	Maloti appun	Asteraceae	Leaves are boiled in water and taken
5	*Vitex negundo*	Posotia appun	Lamiaceae	Fruit is consumed

Table 6. Information taken from traditional healer-6

Sl. No.	Scientific Name	Mising Name	Family	Use
1	*Aloe barbadensis*	Aloe vera	Asphodelaceae	Freshly prepared pulp juice is taken
2	*Amaranthus spinosus*	Gnyage	Amaranthaceae	Root juice is taken
3	*Cinnamomum verum*	Dal cheni	Lauraceae	Dried bark is boiled in water and consumed
4	*Curcuma amada*	Adi take	Zingiberaceae	A quarter inch long root is taken with lukewarm water
5	*Foeniculum vulgare*	Sofo ame	Apiaceae	Decoction of seed is taken
6	*Houttuynia cordata*	Yumya pan	Saururaceae	Juice of freshly collected leaves are consumed during periods
7	*Melia azedarach*	Chemene ame	Meliaceae	Bark juice is taken
8	*Neolamarckia cadamba*	Kodom ame	Rubiaceae	Leaf and bark juice is taken during periods
9	*Nerium indicum*	Korobi appun	Apocynaceae	Root or root bark juice is consumed

| 10 | *Petroselium crispum* | Yumpa oli | Apiaceae | Freshly collected leaves are boiled in hot water and drunk |
11	*Solanum nigrum*	Yakkan okkan	Solanaceae	Decoction leaves and berries are taken
12	*Trachyspermum ammi*	Jain aaye	Apiaceae	Seeds are boiled in water and taken with added honey
13	*Trigonella foenum-graecum*	Methi aye	Fabaceae	Seeds are soaked overnight and taken
14	*Zingiber officinale*	Take	Zingiberaceae	Rhizome is grated and taken with water
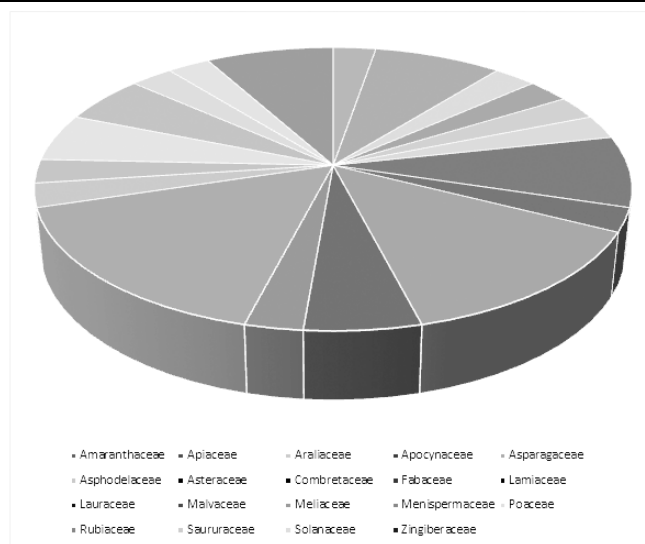
Figure 1. Comparative presentation of plant families used for dysmenorrhaea treatment by the Mishing tribe of Sonitpur district, Assam

DISCUSSION

The traditional healthcare system has direct effect on the health of local people and most of the modern drugs have been tried and tested in their crude from, which is directly based on the traditional knowledge (Sasil-Lagoudakis *et al..*, 2012; Fabricant and Farnsworth, 2001). Information about the use of a particular plant in treatment of a specific disease reduces the cost of unnecessary trials (Panda *et al..,* 2018). In Assam, which is the home of various tribes, people use lots of herbal medicines for treatment of common diseases; proper knowledge of these traditionally used medicine may lead to development of new drugs (Kalita and Kalita, 2014).

Dysmenorrhaea is one of the most prevalent problems of reproductive system that may leave a woman bed-ridden for those days (Rafique and Sheikh, 2018). The root cause of the problem is improper proliferation and detachment of the uterine endometrial cells (Baruah *et*

al.., 2019). There are some reports of use of traditional medicines for the treatment of this problem and their trials on the laboratory animal models. However, the number of studies is very low.

In the present investigation, a total of 46 species were reported to be used by the Mishing tribe of Sonitpur district, Assam for treatment of dysmenorrhaea. All of the documented species were found to be locally available in the study area. Among them, the species *Acacia farnesiana* was having the highest use value. Other plants documented so far were *Abroma augusta, Leucas aspera, Paederia foetida, Terminalia arjuna, Hibiscus rosa sinensis, Mimosa pudica, Aloe barbadensis, Amaranthus spinosus, Houttuynia cordata, Zingiber officinale,* etc. Plants like *Hibiscus rosa sinensis, Paederia foetida, Aloe barbadensis, Zingiber officinale, etc.* were also reported by other authors for the treatment of dysmenorrhea in Barpeta district of Assam (Singh and Bhagawati, 2020).

Acacia farnesiana is known to possess lots of ethnopharmacological properties (Ramli *et al..,* 2011). It has been reported to have significant anti-inflammatory activity in acute and chronic inflammation models (Hukkeri *et al..,* 2002). The glycosydal fraction of the plant extract showed branchiodilator and anti-inflammatory effect (Ramli *et al..,* 2011). The proteins isolated from the *A. farnesiana* seeds have anti-inflammatory and analgesic activities (Leal *et al..,* 2016).

During the menstrual cycle, Dysmenorrhea patients induce visceral pain sensitization during the menstrual cycle that starts the viscerosomatic pain reflex and referred pain that results in chronic somatic pain as well as nociceptor hypersensitivity to inflammation (Jarrell and Arendt-Nielsen, 2016). A clear idea about whether the enhancement of such sensitivity to painful stimuli is the cause or the effect of recurrent menstrual pain is still lacking. This pain in long run can predispose to other chronic pain conditions (Iacovides *et al..,* 2015). The primary dysmenorrheal pain is a result of abnormal activity of the uterus, characterized by the release of chemical mediators like prostaglandin, which is comparable to uterine contractility during labor or abortion (Chen *et al..,* 2013; Dawood, 2006). Dysmenorrhea is attributed to the high serum levels of prostaglandin E2 (PGE2), PGF2α and leukotrienes, leading to not only severe myometrial contraction but also to vasoconstriction and consequently the release of cytokines (Chen *et al..,* 2014; Deligeoroglou *et al..,* 2006). *Acacia fernesiana* root and stem extracts showed anti-inflammatory activity by reducing interleukin-6 (IL-6) and tumour necrosis factor -α (TNF-α) in a previous study (Mueller *et al..,* 2015). 8, diosmetin (13), and 3',4',5-trihydroxy-7-methoxyflavone (15) isolated from *A. fernesiana* also showed anti-inflammatory activity by secretion of elastase from human neutrophils (Lin *et al..,* 2009). Bioactive compounds like gallic acid, catechin and epicatechin were found in different extracts of *A. fernesiana* and they are also known to show anti-inflammatory activity (Claudia *et al..,* 2018). The methanolic bark extract is believed to possibly possess these compounds or some phytochemicals like them that help the patients relieve dysmenorrheal pain.

CONCLUSION

Tribal and rural communities in the developing world still depend on various traditional modes of treatment to get rid of minor and in some cases major ailments. Dysmenorrhea, being one of the common gynecological problems and a so-called topic of taboo is usually healed at home using some traditional methods. In the present survey, the traditional healers of the Mishing community of Sonitpur, Assam have informed about 46 medicinal plants for treating dysmenorrhea and the highly used one was reported to be *A. fernesiana*. This plant has exhibited multiple pharmacological properties in a few previous studies. However, there are few systematic studies on the phytochemicals and their interactions of the plant with the target proteins while treating a particular disease. Similar cases are seen with the other reported plants. Therefore, proper validation of the

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plants on the animal model for the mentioned ethnobotanical use is necessary. All the molecular and toxicological aspects and *in silico* studies should be taken into consideration for fruitful drug discovery strategies from the mentioned plants.

DECLARATION OF COMPETING INTEREST

The authors declare no conflict of interest.

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