TANG HUMANITAS MEDICINE

Original Article

Natural products traditionally used by the tribal people of the Purulia district, West Bengal, India for the abortifacient purpose

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ABSTRACT

The paper provides a brief account of 11 plant species used by the tribal people of the district Purulia, West Bengal, India. Most of the plant species are common in this district and some have not been reported earlier for abortive purposes, pharmacology for preparation of medicines for antifertility. All these data were obtained from the tribal medicine men (ojha). At least 10 interview reports of various tribal medicine men were recorded. Parts of various medicinal plants were observed personally, collected and preserved as herbarium specimens for proper identification. The reports of various indigenous methods may help to give some clue in searching the potent contraceptives.

Keywords abortifacient, contraception, antifertility, ethnomedicine, tribal people

INTRODUCTION

Nearly 80% of the world populations rely on traditional medicines for primary health care, most of which involve the use of plant extracts (Sandhya et al., 2006). The tribal communities of the district Purulia, W.B., India have a rich herbal heritage and very closely linked to the ecosystem they live in. Ojha (medicine men) from tribal communities of this district have possessed empirical knowledge about the plant wealth of their surroundings. During this technologically advanced day, the tribal people of the Purulia District still use plant, plant products and other parts for the curing of various ailments and for the control of fertility in men and women and for the abortifacient purposes in pregnant women also. The use of some abortifacient plants used by the tribal people of West Bengal is very common practice among different tribal communities like Santal, Munda, Oraon, Lepcha, Polia, Lodha, Birhore, Sabar, Rabha, Bhumji, Sherpa and Bhutia of the State West Bengal and in accordance with the situation and the necessity (Mitra and Mukherjee, 2009). 36 medicinal plants are used to induce abortion, to stop conception and to make the man sterile in Pakisthan (Shah et al., 2009).

It was found that the present information has not so far been available in literature regarding fertility control in the Purulia District, West Bengal. The experimental approaches of some medicinal plants of Purulia District have been reported on male contraceptives (Maiti and Manna 2000, 2001; Maiti et al. 2010; Prusti and Satapathy, 2002). The present study deals with the study of the medicinal plants and various products used by the tribal people of Purulia District in the form of prescriptions for the abortifacient purposes.

MATERIALS AND METHODS

Study site

Purulia is the westernmost district of the state of West Bengal, India. It has some peculiarity in comparison to all other districts of the State regarding its location, origin, population, topography, river system and water resources, languages, life and culture of the tribal peoples which are occupied about 19.22% of the total population of this district etc. Its latitude extends from 22°42′35″ N to 23°42′0″ N and its longitude extends from 85°49′25″ E to 86°54′37″ E. The Tropic of Cancer passes over the district. As a result, the heat of this district is too much. It is well known as a drought prone district and falls within the semi-arid region of the state of West Bengal and is characterized by high evaporation and low precipitation. The district has a sub-tropical climate. The climate of this district is characterized by a hot summer and well distributed seasonal rainfall. In cold season, due to the influence of Northern wind, cold becomes too much. The temperature varies over a wide range from 7°C in winter to 46.8°C in the summer. Real area of forest is 50% of the total area marked in the papers of the Government.

Methodology

Field studies were conducted to collect periodically information using ethnobotanical methods among the tribal communities during the period May, 1998 to January, 2001 covering various remote village areas around Ajodhya hills, Baghmundi, Matha, Panchakot hills, Joychandi hills, Kalma, Belamu hills, Kortsila, Barabazar, Puncha, Kashipur. These areas were visited with the aid of field assistants and facilitators who served as interpreters for the major (Santal, Munda and Bhumij) and minor (Birhors and Oraons) ethnic group. These tribal villages were surveyed through periodical tours, collection and field observation. Medicine men of these area demanded about 5000 tribal women used these ethnic plants to induce abortion successfully. Special attention was given to record those plants and plant materials, which are used by the tribal for various purposes of antifertility and abortifacient herbal medicine. Cross-examination was done to verify the use of particular species mostly by interrogating another 'ojha' of the same community. The collected specimens were processed according to the usual procedure for herbarium preparation. Species used

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Table 1. The list of plants used by the medicine men of the Purulia District, W.B. for the preparation of medicines for the abortifacient purposes

Sl. No	Scientific name	Family	Tribal name	Other name	Parts used	Active principle
1	*Abutilon indicum* (L.) Sweet.	Malvaceae	Mirubaha	Beng.- Potari Hindi- Kanghi	Root	Linoleic, oleic, plamitic and stearicacid; Raffinose and astringent substances.
2	*Achyranthes aspera* L.	Amaranthaceae	Chirchit	Beng.- Apang Hindi- Latjira	Root	β-sitosterol, γ-sitosterol, ecdysterone, hentriacontane, saponin, oleanolic acid.
3	*Calotropis gigantea* (L.) R.Br.	Asclepiadaceae	Akana	Beng.- Akanda Hindi- Ak	Latex	Akundrin, calotropin, uscharon, calotoxin, calactin, gigantin, giganteol, β-amyrin, β-calotropeol etc.
4	*Centratherum anthelminticum* (L.) O.Kuntze.	Asteraceae	Saoraj	Beng. -Somraj Hindi -Somraj	Seed	Brassicasterol, Stigmasterol, bitter resin acid, oxygenated acid.
5	*Crotalaria prostrata* Rott.ex Willd	Fabaceae	Chotojhunjuni	Beng. -Junkha Hindi -Junkha	Root	*****Chemical constituent is not commonly available.
6	*Desmodium gangeticum* (L.) DC.	Fabaceae	Titakhari	Beng.- Salpani Hindi- Sarivan	Root	Isoflavonoid phyloalexin-desmocarpin, genistein, 2'-hydroxygenistein, dalbergioiden, diphysolone and kievitone.
7	*Desmodium triflorum* (L.) DC.	Fabaceae	Chatpati/ charchini	Beng. - Kudaliya Hindi - Kudaliya	Root	2"-O-Glucosylvitexin, (+)pinitol, apigenin, vitexin and isovitexin.
8	*Madhuca indica* J.F.Gmel.	Sapotaceae	Mahua	Beng.- Mahwa Hindi- Mahua	Flower	β-sitosterol, quercetin, dihydroquercetin, caoutchouc, tannin etc.
9	*Mucuna pruriens* (L.) DC.	Fabaceae	Alkushi	Beng.- Alkusi Hindi- Kiwach	Root	Mucunine, mucunadine, prurienine, indole-3-alkylamines, choline.
10	*Plumbago zeylanica* L.	Plumbaginaceae	Chitaway	Beng.- Chitraka Hindi- Chita	Root	Plumbazin, 3-chloroplumbagine, 3,3-biplumbagin, binapthoquinone, zeylinone, elliptinone, droserone.
11	*Sida rhombifolia* L.	Malvaceae	Bagjati	Beng.- Lalberela Hindi- Sahadevi	Root	Ephedrine, lignin, quinqzolines, β-phenethylamines, steroid, phytosterol, resin etc.

along with some rituals and magico-religious practices were deliberately omitted.

RESULTS

Report of medicine men for abortifacient purpose

The results of various observations that were collected from the different medicine men of Purulia District are enumerated here (Table 1). The enumeration includes correct botanical name, followed by family name (in Parenthesis), local name within inverted commas and voucher specimen number are noted also. All voucher specimens cited are deposited in the Department of Zoology, University of Kalyani under the author's number. During Ethno-botanical survey of Purulia District, it was found that wild medicinal plants were used by the tribal people as antifertility elements. Also some have used portion of other plants (e.g. parts of stem, resins, leaves, flowers, seeds etc.) or with other ingredients to make pill for some definite periods (Table 2).

DISCUSSION

Several studies have indicated that induced abortion might reduce the birth rate even among the tribes. The induced abortion was mostly arisen by middle-aged women, particularly the wife of the tribal medicine man. She alone knew the use of indigenous medicines for induced abortion. Several herbs were mentioned in different literature, which, have abortifacient effect (Chatterjee, 1996; Jain, 1991; Saxena and Brahman, 1994; Shrestha et al., 2010; Yakubu and Bukoye, 2009). The mechanism of action appeared to be similar to the actions of oxytocics and ergot alkaloids. However, hormonal influence may be implicated (Aguwa and Mittal, 1983).

Among 10 herbal recipes, several plants have already been tested for their antifertility efficacy. Chemical constituents of these plants are linked with the antifertility effect. As for example, *Plumbago zeylanica* L. is used for both female contraceptive and abortifacient purposes by the medicine men. Plumbazin is the main constituent of this plant. This plant has significant anti-implantation and abortifacient activity (Premakumari et al., 1977) and has significant antispermatogenic activity (Bhargava, 1984). Seeds of this plant contain saponin based on echinocystic acid and barks contain friedelin and γ-sitosterol. Active principle of the seed of *C. Juncea* is an alkaloid (Carchorin). Seeds of *C. juncea* have an anti androgenic property (Vijaykumar et al., 2004). Between Talan (*Kabiraji ingredient*) and Goalmarich (*Piper nigrum* L.) seeds have post-coital antifertility activity (Chandhoke et al., 1978).

Tribal medicine men also used *Achyranthes aspera* L. on many occasions as the male or female contraceptive purposes and also as the abortifacient. Betaine, achyranthine, saponin A and B, ecdysterone, oleanolicacid have been isolated from this plant. The stem bark of this plant has abortifacient property (Pakrashi and Bhattacharya, 1977), roots have contraceptive property (Wadhwa et al., 1986) and also produced reproductive toxicity in male rats (Sandhyakumary et al., 2002). The oral administration of the crude 50% methanolic extract of *A. aspera* root (1 g/kg/b.w./day) induced reversible infertility in male albino mice due to interference in the testicular androgen levels altering the process of spermatogenesis without inducing any side effects (Maiti et al., 2010).

These findings lend support the traditional claims of antifertility activity of some of the herbs, which are used

Table 2. Various preparation of the medicine men of the Purulia District, W. B., for the abortifacient purposes

Case Study No.	Plant combination	Application	Result
A1	*Madhuca indica* J.F. Gmel. (Sapotaceae) 'Mahua', 45*.	A gram size Hing (*Ferula assafoetida* L.) is thoroughly mixed with approximately 250 ml of 'Mahua' liquor (Phulimod) and is taken orally by the pregnant women in empty stomach for 7 consecutive days at morning.	This plant combination leads to abortion of 2 - 3 months of fetus.
A2	*Plumbago zeylanica* L. (Plumbaginaceae) 'Chitway', 57.	Fresh root tip (9 - 10 cm) of 'Chitaway' is smashed and coated with Hing (*Ferula assafoetida* L.) dust (10 - 20 gm) and applied within the entire length of vagina for 7 - 8 hours upto 10 consecutive days at night.	It induces abortion of 2 - 3 months of pregnancy.
A3	*Sida rhombifolia* L. (Malvaceae) 'Bagjati', 65.	Smashed tip portion of the root with the powder (10 - 20 gm) of 'Golmarich' (*Piper nigrum* L.) is usually placed along the entire length of vagina for some hours up to 14 consecutive days at night.	It leads to abortion upto 2 - 3 months of pregnancy
A4	*Abutilon indicum* (L.) Sweet. (Malvaceae) 'Mirubaha', 2. *Mucuna pruriens* (L.) DC. (Fabaceae) 'Alkushi', 48. Talan (Kabiraji ingredient) Elachi (*Elettaria cardamomum* Maton.), Jaephol (*Myristica fragrans* Houtt), Rasasindur (a short of factitious ingredient), Makardwhaj (a short of factitious ingredient).	These entire roots (9 - 15 cm) are taken in proportional amount, mixed with talan and smashed with small amount of water to make pills of pea size. One pill (5 - 8gm) is orally administered in empty stomach for two times a day for 5 consecutive days at morning.	It causes abortion of 3 - 4 months of pregnancy.
A5	*Desmodium triflorum* (L.) DC. (Fabaceae) 'Chatpati', 34.	The root of 'Chatpati' approximately 10 - 15cm long is generally placed inside the vagina for 5 - 6 h for 10 consecutive days at night.	It causes abortion of 2 - 3 months old fetus.
A6	*Crotalaria prostrata* Rott.ex Willd. (Fabaceae) 'Chotojhunjhuni', 28.	Fresh root tip (10 - 12cm) is smashed and applied within the entire length of vagina with the dust of Kankrasingi (*Pistacia integerrima* Stewart ex Brandis) for 6 - 7 h for 14 consecutive days at night.	It causes abortion of 1 - 1.5 months old fetus.
A7	*Desmodium gangeticum* (L.) DC. (Fabaceae) 'Titakhari', 33.	Root tip (8 - 12cm) is smashed and properly placed along the entire length of the vagina for few hours for 20 consecutive days at night.	a) It leads to the expulsion of fetus of 2 - 3 months of pregnant woman. b) It is also useful for the expulsion of the dead fetus.
A8	*Achyranthes aspera* L. (Amarantheceae) 'Chir-Chiti', 3. *Calotropis gigantea* (L.) R.Br. (Asclepiadaceae) 'Akona', 18.	Fresh root of 'Chir-Chiti' about 10cm long (according to the length of the vagina) is coated with thin layer of 'Akona' latex, Kathila gum (*Sterculia urens* Roxb.) and mustered oil and properly placed in the vagina of the pregnant tribal women for 7 - 8 h for 14 consecutive days at night.	This medicinal stick causes abortion upto 3 - 4 months of pregnancy.
A9	*Achyranthes aspera* L. (Amaranthaceae) 'Chir-chiti', 3.	The fresh root (approx.10cm in long) of 'Chir-chiti' plant along with Hing (*Ferula assafoetida* L.) dust is properly placed along the entire length of the vagina for 8 - 10 h for 14 consecutive days at night.	It causes abortion up to 2 - 3 months of pregnancy.
A10	*Centratherum anthelminticum* (L.) O.Kuntze. (Asteraceae) 'Saoraj', 20.	The seeds of 'Saoraj' and Hing (*Ferula assafoetida* L.) (10-15gm) are taken in proportional amount and smashed to prepare pills of pea size. One pill (7 - 10gm) is administered orally with lukewarm water in empty stomach for 7 consecutive days.	Abortion occurs up to 3 months of pregnancy.

* Voucher specimen number.

among 10 tribal recipes by the medicine men of the Purulia District. The active ingredients of *Centratherum anthelminticum* (L.) O. Kuntze. (seeds), *Desmodium gangeticum* (L.) DC. (root), *Madhuca indica* J. F.Gmel. (flower), *Mucuna pruriens* (L.) DC. (root), *Sida rhombifolia* L. (root), may have antifertility property as medicine men stressed upon these plants during the time of field investigation. Probably these plants are not pharmacologically screened for antifertility purposes. Thus, a proper practical investigation is required to asses the claims of the medicine men of the Purulia District regarding these medicinal herbs associated with antifertility purposes.

Abortifacients act to expel an implanted embryo from the uterus. Fertility-affecting plants may affect ovulation or conception through hormonal activity. Insufficient progesterone secretion by the corpus luteum or placenta also termed a luteal phase defect has been suggested to cause abortion (Schorge et al., 2008). They may affect the physiology and biochemistry of

the lining of the uterus to prevent implantation. They may cause contractions of the uterus to expel an embryo, or they may have a toxic effect on the embryo, causing it to perish and be flushed away with the menstrual cycle.

From the 10 tribal prescriptions it is clearly revealed that the tribal people of Purulia District use roots, portion of some plants and other ingredients for the abortifacient purposes. Some variations have been noticed about the plants and method of application of the medicines. The medicines that have been reported so far are mainly the roots. No clear correlation can be made with other medicines used by other communities of the district. Whether the action of these products is from the pituitary level or alteration of some hormones in the blood is not yet known. This research aimed at promoting the conservation of medicinal plants as well as traditional abortifacient purpose associated with them for cheap alternative health care resource. Thus, the plants have to be screened for their active principles and tested in the laboratory and then maximum benefit can be derived from them in the future.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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