Anti-malarial plants used by traditional healers in Mayurbhanj district, Orissa

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ABSTRACT
An ethno medicinal study was carried out on the tribals of eight villages of Mayurbhanj district, Orissa. The information was gathered from Kondha, Kolha, Santal, Bhumij, Bathudi tribes using an integrated approach of botanical collections, group discussion and interviews with traditional healers during year 2007 – 2008. A total of 15 no. of medicinal plants distributed among 11 families were documented. In most of the cases aerial plant parts were used for the preparation of medicine for treatment of malaria. The tribal people exclusively depend on these medicinal plants for the cure and prevention of malaria as a part of their traditional practice. There is an urgent need to evaluate the pharmaceutical activities of these medicinal plants for the treatment and prevention of malaria in India.

INTRODUCTION
Malaria is the oldest recorded disease in the world¹. It has been estimated that 58% of the malarial death occur in poor population³ killing 1 - 3 million people in a year. The aim of this study was to collate information from an indigenous group of people living in the selected 8 villages of Mayurbhanj district about their current traditional uses of plants for the treatment and preventive practices for malaria.

SUBJECTS AND METHODS
About 40% of the population in the world is at a risk of malaria and this risk is more in tropical & sub tropical countries¹¹. About 60 to 65 % of the infections are due to P. vivax and 35- 40% are due to P. falciparum⁷. The magnitude of problem of Malaria in Orissa is very acute and encountered in almost all parts of the Orissa. In 2002 the planning commission⁷ estimated that 23% of the populations in Orissa are malaria prone. However the disease is more prevalent in the tribal districts of state. Forest, plains, hilly and coastal areas with numerous streams, rivers, mines, ethnic diversity and various socioeconomic conditions pretends a dreadful challenge to malaria control operation in the state.

Malaria is caused by single celled protozoan parasites called Plasmodium and transmitted to man through female Anopheles mosquito. It is one of the major fatal diseases in the world, especially in the tropics and is endemic in some 102 countries with more
than half of the world population at risk\cite{11}, 60 to 65\% of the infections are due to \textit{P. vivax} and 35- 40\% are due to \textit{P. falciparum}. In spite of control programmes in many countries there has been very little improvement in control of malaria and infections can reduce the effectiveness of labour and can lead to both economic and human loses. Control of malaria is complex because of the appearance of drugs resistant strains of \textit{Plasmodium} and with the discovery that man may become infested with species of Simian (monkey) malaria\cite{11}. At the same time the \textit{Anopheles} mosquito have developed resistance to many insecticides\cite{9}. Thus it is important to search for new anti-malarial compounds, either synthetic or natural compounds that kill either the vector or parasite. The use of plant derived drugs for the treatment of malaria has a long and successful tradition. For example, quinine isolated from \textit{Chincona} and quinghausu from \textit{Artimisia annua} Linn. Illustrate the potential value of investigating plants for anti malarial compounds\cite{9}.

**OBJECTIVE OF THE STUDY**

The aim of this study was to collate information from an indigenous group of people living in the selected 8 villages of Mayurbhanj district about their current traditional uses of plants for the treatment and preventive practices for malaria.

**MATERIALS AND METHOD STUDY AREA**

Mayurbhanj is one of the largest district in the state of Orissa and is situated towards the North-eastern region of the state. The district covers a geographical area of about 10418 square kilometers and lies between 85° 40’ to 87° 11’ East Longitude and latitude 21° 16’ to 22° 34’ North. The district is bordered by Jharkhand on the North western, by West Bengal Northeastern side, Keonjhar Southeastern side and it is enclosed by Baleshwar district. The district headquarters is at Baripada, situated at a distance of 270 kilometers from the State Capital, Bhubaneswar. As regard the distribution of land area of Orissa State, Mayurbhanj district occupies the highest i.e. 6.69 \% of land area among all the districts. In the district the tribals occupy a big portion of the population constituting 52\% with 53 tribal communities both aboriginals and migrated tribes are found in the district glorifying the rich heritage of tribal culture\cite{5}. The major tribes of the district area Kondha, Kolha, Santal, Bhumij, Bathudi, Lodha, Gond, Sauntu etc. along with some of the primitive tribes like Khadia and Mankedia.

The study conducted in the villages namely Thakurmunda, Dhatikidiha, Dubapala, Chichirpali, Satkosia, Ektali, Dhalabani and Gudugudia. The location of these villages has been demarcated in figure 1.

**LOCAL TRADITIONAL HEALERS**

Local traditional healers having practical knowledge in the use of medicinal plants for treatment and prevention of malaria were interviewed in 8 villages of Mayurbhanj district. During the course of study during the period of 2007 – 2008 several trips have been made to the study areas. Method of selecting the informants depends upon the distribution of local people having folk knowledge. The informants were requested to collect the specimen of the plants they know to be used for malaria. The wealth of the medicinal plant knowledge among the people of the district is based on hundreds of years of belief and observations. The knowledge has been transmitted orally from generation to generation, however it seems that it is vanishing from modern society since younger people are no more interested in this tradition.

**INTERVIEW WITH THE TRADITIONAL HEALERS**

The data on the traditional practices for treatment and prevention of malaria has been collected through general conversation with the informants. Questionnaires were used to obtain information on medicinal plants with their local names, parts used, mode of administration, contraindications etc.

**PRESERVATION OF PLANT SPECIMENS**

Standard method was followed with regard to collect the plant materials, drying, mounting, preparation and preservation of the plant specimen. Voucher specimens of medicinal plants were collected in trip-
Figure 1: Location of study villages in Mayurbhang district, Orissa, India
licates, prepared and identified. The identification and nomenclature of the listed plants were based on the Flora of Orissa[7].

RESULTS

Ethno-medicinal study on malaria from Mayurbhanj district reveals use of 15 medicinal plant species distributed across 11 families used for treatment and prevention of malaria. Among these plants 7 are herbs, 2 are trees, 4 are shrub and other 2 are climbers. The uses of above ground parts were found to be higher (62.5%) than the underground parts (37.5%). Leaves was the most widely used plant part accounting for 7 reported plant species followed by roots (6 sps.) and bark (2 sps.). The whole plants of *Andrographis paniculata* and *Desmodium gangeticum* used for the treatment of malaria. The most widely used form of medicine is decoction (7 formulations) followed by paste (3 formulations) and juice (2 formulations). The other formulation used are tablet and powder. It is also observed that formulations with several plant parts in combination are used for the prevention of malaria. The data on medicinal plants used for the curative and preventive measures of malaria was collected from the knowledgeable person of the Mayurbhanj district and analyzed. The detail enumeration and utilization of these plants are described in the TABLE 1.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of the Plant</th>
<th>Local Name</th>
<th>Family</th>
<th>Habit</th>
<th>Parts used</th>
<th>Mode of Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Nyctanthes arbor-tristris</em> L.</td>
<td>Gangasiuli, Gotikharika</td>
<td>Oleaceae</td>
<td>Large Shrb</td>
<td>Leaves</td>
<td>A handful leaf juice of <em>Nyctanthes arbor-tristris</em> (Gangaseiuli) with honey thrice daily for 5 days</td>
</tr>
<tr>
<td>2.</td>
<td><em>Andrographis paniculata</em> (Burm. F.) Wall. ex. Nees</td>
<td>Bhuin Nimba, Kalmegh</td>
<td>Acanthaceae</td>
<td>Herb</td>
<td>Whole plant</td>
<td>The whole plant extract of <em>Andrographis paniculata</em> along with leaf juice of <em>Nyctanthes arbor-tristris</em> and stem decoction* of <em>Tinospora cordifolia</em> taken together to make the pill (5 gm of each ingredient). These pills taken thrice daily for 3 to 7 days</td>
</tr>
<tr>
<td>3.</td>
<td><em>Tinospora cordifolia</em> (Willd.) Hook. F. &amp; Thoms</td>
<td>Guluchi</td>
<td>Menispermaceae</td>
<td>Climber</td>
<td>Stem</td>
<td>The decoction* of stem of <em>Tinospora cordifolia</em> (15gm) with whole plant of <em>Andrographis paniculata</em> (15gm) along with black pepper twice daily for 5 days.</td>
</tr>
<tr>
<td>4.</td>
<td><em>Azadirachta indica</em> A. Juss.,</td>
<td>Nimba</td>
<td>Meliaceae</td>
<td>Tree</td>
<td>Stem bark and Leaves</td>
<td>The bark and leaf decoction* (15gm) taken with honey thrice daily found to be effective for the treatment of malaria.</td>
</tr>
<tr>
<td>5.</td>
<td><em>Ocimum sanctum</em> L.</td>
<td>Tulasi</td>
<td>Lamiaceae</td>
<td>Herb</td>
<td>Leaves</td>
<td>A paste is prepared with a hand full leaves of <em>Ocimum sanctum</em> along with 5 to 7 leaves of <em>Nyctanthes arbor–tristris</em> . This paste taken twice daily for 5 to 7 days with honey</td>
</tr>
<tr>
<td>6.</td>
<td><em>Alstonia scholaris</em> (L.) R.Br</td>
<td>Chatiana</td>
<td>Apocyanaceae</td>
<td>Tree</td>
<td>Stem bark</td>
<td>The stem bark decoction* (30gms) taken twice daily for 3 to 5 days</td>
</tr>
<tr>
<td>7.</td>
<td><em>Clerodendrum serratum</em> (L.) Moon.</td>
<td>Samarkana</td>
<td>Verbenaceae</td>
<td>Shrub</td>
<td>Root</td>
<td>The juice of 5gm root along with 5 gm neem leaf, 5 gm Gangasiuli leaf and Bhuin neem leaf taken twice daily for 5 days</td>
</tr>
</tbody>
</table>
Sl. No | Name of the Plant | Local Name | Family | Habit | Parts used | Mode of Administration
---|---|---|---|---|---|---
8. | *Mimosa pudica* L. | Lajkuli | Mimosaceae | Herb | Root | Equal quantity of leaf of *Andrographis paniculata*, leaf of *Azadirachta indica*, leaf of *Nyctanthes arbor–tristis*, Bark of *Oroxylum indicum* and root of *Mimosa pudica* made to decoction* and taken twice daily for 3 days

9. | *Cissampelos pareira* L. var. *hirsuta* (DC.) Forman | Akanabindhi | Menispermaceae | Climber | Root | Root (8g) of *Cissampelos pareira* made to powder and mixed with the powder of 10-12 black pepper. It is given thrice a day as full dose for 5 days to

10. | *Grewia hirsuta* Vahl. | Farshakoli | Tiliaceae | Shrub | Root | Roots (100g) of *Grewia hirsuta* made to paste along with 10-12 black pepper. From this decoction* is prepared and given as full dose 3 times a day for a week. Treatment is repeated twice at an interval of one week

11. | *Cryptolepis buchananii* Roem. & Schult. | Gopakanhu | Asclepiadaceae | Climber | Root | Roots (50g) of *Cryptolepis buchananii* made to paste along with 10 – 15 no. of black pepper. It is given thrice daily for 7 days

12. | *Hemidesmus indicus* (L.) R.Br. | Anantamool / Sugandhi | Asclepiadaceae | Climber | Root | Dry roots (50g) of *Hemidesmus indicus* powdered along with 10-12 black pepper. This powder given thrice daily for 5 days

13. | *Desmodium gangeticum* (L.) DC. | Salaparni | Fabaceae | Herb | Whole Plant | Whole plant of *Desmodium gangeticum* is ground and decoction is prepared in water. It is given in the dose of 5ml three times a day for 5 days

### Preventive Practice

14. | *Nyctanthes arbor–tristis* + *Andrographis paniculata* + *Tinospora cordifolia* | Gangaseuli + Bhuin nimba + Guluchi | Oleaceae + Acanthaceae + Menispermaceae | Shrub + Herb + Climber | Leaf + Whole Plant Stem | 15 gm of all three along with 3 – 5 black pepper taken at a time to make a decoction*. This decoction taken once in a week prevents malaria.

15. | *Andrographis paniculata* | Bhuin nimba | Acanthaceae | Herb | Leaves | Leaf paste of a handful of taken every day in empty stomach.

16. | *Azadirachta indica* + *Vitex nigundo* + *Ocimum sanctum* + *Ocimum bacilicum* | Nimba + Nirgundi + Tulasi + Durlava | Meliaceae + Verbenaceae + Lamiaceae + Lamiaceae | Tree + Shrub + Herb + Herb | Leaves | The extract applied all over the body has found to be the mosquito larvicidal effect and these plants are effective against mosquito bite.

* Decoction: 1 part raw drugs + 4 part water boiled till it becomes 1/4th of the total volume.

**DISCUSSION**

There are several malaria eradication programmes going on in the country with the substantial investment by the govt. of India. Still malaria remains as the most endemic health problem in the tropical part of the country. The traditional system of medicine can be act as an
alternative towards providing eco system specific curative and preventive practice for malaria as this practice is easily accessible and available to the community. In Ayurveda several plants have been mentioned for the treatment of Vishamajwara (Interpreted to be malaria). The decoction of leaves and roots of Adhatoda zeylanica taken orally for curing malaria\cite{2}, Clerodendrum phlomidis L.f. is one of the components of Ayurvedic preparations Amritarista and Agasta Haritaki rasayan (The Ayurvedic formulary of India, 2003), Dried fruit of Embelia ribes Burm.f. are used for fever\cite{5}, Erythrina indica Lam. is used as febrifuge\cite{5}. Decoction of Tinospera cordifolia is used for malarial fever\cite{8}. The plants like Andrographis paniculata, Ocimum sanctum, Nyctanthes arbor – tristis, Tinospora cordifolia etc. has been reported to be used in traditional phytotherapy in the treatment of malaria by rural people of Bhopal in Madhyapradesh\cite{4}. Some of the newly reported anti-malarials in the present study are Clerodendrum serratum, Mimosa pudica, Cissampelos pareira, Grewia hirsute, Cryptolepis buchananii etc. There is an urgent need for the more research on the pharmacological validation and clinical study on traditional anti malarial practice to provide easy accessible, cost effective and culturally compatible treatment against malaria.

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REFERENCES