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Medicinal plants Used by The Traditional Medical Practitioners of Barendra and Shamatat (Rajshahi & Khulna Division) Region in Bangladesh for treatment of Cardiovascular Disorders

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Bangladesh is a developing countries where both incidence and prevalence of Ischaemic heart disease has been increasing gradually and unless concerted efforts are made and national policy of prevention of risk factors are undertaken. The objective of this study was to conduct a survey of medicinal plants used by the traditional medical practitioners in the Barandra (Rajshahi division) and Shamatat (Khulna division) region of Bangladesh for heart diseases. The practitioners advised consumption of 28 plants to prevent or reduce the chances of occurrences of various heart disorders. Since the traditional patients appeared to be generally satisfied with the treatment offered through these plants, they do not have to visit modern medical practitioners. It is important to conduct proper scientific studies towards discovery of compounds of interest in these plants, which can be used as safe and effective medicines for cure heart diseases.

Keyword: Medicinal Plants, barendra, shamatat region, cardiovascular, heart diseases, Bangladesh.

1. Introduction

Plants have been the main source of medicines since ancient times. Practically all human societies have utilized plants not only as sources of nutrition but also as therapy against diseases and ailments. Plants contain various phytochemicals and these phytochemicals can play an important role in reducing occurrences of many diseases by boosting up various organ functions of the human body, by acting as antioxidants and by supplying necessary nutrients. Many traditional healing herbs and their parts have been shown to have medicinal value and can be used to prevent, alleviate or cure several human diseases^[1]. It is estimated that 70–

80% of people worldwide rely chiefly on traditional, largely herbal medicine to meet their primary healthcare needs^[2,3]. For cardiovascular diseases plant or herbal treatments have been used in patients with congestive heart failure, systolic hypertension, angina pectoris, atherosclerosis, cerebral insufficiency and venous insufficiency. The effectiveness of plant sterols and stanols for lowering cholesterol and as such, reducing the chances for heart disorders have been shown^[4]. A major portion of the global population in developing countries still relies on botanical drugs to meet its health needs. The attention paid by health authorities to the use of herbal medicines has increased considerably, both

because they are often the only medicine available in less developed areas and because they are becoming a popular alternative treatment in more developed areas. It has also been observed that a number modern drugs has been derived from plants used by the indigenous people [5].

In Bangladesh traditional medical practice is still ongoing. The practitioners are generally known as Kabirajes, perform a central role in providing primary health-care to the rural inhabitants of Bangladesh. There are 86,000 villages in the country and almost every village has one or two traditional Kabirajes. The practices of the Kabirajes extend throughout both urban and rural areas of the country, although rural practice is more extensive than urban practice. The advantage of the Kabirajes is that they rely chiefly on medicinal plants for treatment.

Bangladesh has over 5,000 floral species and many of them are in use by the Kabirajas in folk medicine. Medicinal plants are here found to grow naturally in the forest, bushes and marginal land along the canal and in other places. The previous ethno-medicinal studies conducted among folk and tribal medicinal practitioners of the country have noticed considerable variation between the medicinal plants selected by different Kabirajes for treatment of a given ailment [6,7,8,9,10,11]. The aim of the present study was to conduct randomized ethnomedicinal survey among the traditional medical practitioners of Barandra (Rajshahi division) and Shamatat (Khulna division) region of Bangladesh and to explore the use of those medicinal plants to treat heart disorders.

2. Materials & Methods:

2.1 Study Area

The present study was carried out in Rajshahi division & Khulna division. Rajshahi division is one of the seven administrative divisions of Bangladesh. It has an area of 18,174.4 km². This division is also known as Barendra region, is in the mid-western corner of Bangladesh. Our another study area Khulna division or Shamatat region is also one of the seven divisions of Bangladesh and is located in the south-West of

the country, it has an area of 22,285 km² and has a coastline on the Bay of Bengal to the south.

2.2 Procedure of Data collection:

Data for this study were collected randomly by the researchers themselves using questionnaires prepared earlier. The collection of data through interviews of 6 Kabirajes were conducted with the help of a semi-structured questionnaire and the guided field-walk method of Martin and Maundu^[12,13]. Plant samples shown by the Kabirajes were collected and identified at the Bangladesh National Herbarium, Mirpur, Dhaka-1216, Bangladesh. The Survey was evaluated between July to Mid-September'2012.

3 Results

Information on total 28 plant species was obtained. The collected information indicates that the following (Table 1) plants are used by the kabirajes against heart disorders. The Meliaceae family contributed the highest number of plant species (3), followed by Combretaceae, Lamiaceae, Liliaceae and Meliaceae (2) of each family. Amongst 28 plant species Kabirajes were used mostly *Asparagus racemosus* Willd., *Camellia sinensis* (L.) O. Kuntze, *Ipomoea mauritiana* Jacq., *Plectranthus barbatus* Andrews and, *Terminalia chebula* Retz., and *Terminalia arjuna* (Roxb. ex DC.).

3.1 Plant parts used & preparation method

The various plant parts were used included whole plants, leaves, roots, barks, stems, flower, seeds, fruits, and rhizomes. In the present survey total 41 uses of whole plants or plant parts were reported for the 28 plant species. (Table 2) displays the results on medicinal plant parts used to treat heart diseases. The Kabirajes used several different mode of preparation for a particular plant or plant parts (leaf, stem, and root). Kabirajes was squeezed the whole plant or plant part to extract juice, after straining through a piece of cloth the juice administered orally. Other preparation method was typically involved boiling of the plant or plant part (rhizome, leaf, bark). The boiling was then strained through a

piece of cloth & administered orally. Seeds were usually extracted to make oil & that oil used for topical applications. It was also noted that a plant or plant part may be administered in combination

with other substances. For example Juice squeezed from the leaves/bark of *Terminalia arjuna* (Roxb. ex DC.) was taken with sugar.

Table 1: Uses of medicinal plants for cardiovascular disorders advised by the Traditional Medical Practitioners of Rajshahi & Khulna division.

Serial Number	Botanical name	Family name	Local Name	Parts used
1	<i>Agaricus albolutescens</i> Zeller	Agaricaceae	Bang chata	Whole plant
2	<i>Areca catechu</i> L.	Arecaceae	Supari	Fruits
3	<i>Oroxylum indicum</i> (L.) Vent	Bignoniaceae	Shona sal	Bark
4	<i>Bombax ceiba</i> L.	Bombacaceae	Shimul	Leaf, root
5	<i>Terminalia arjuna</i> (Roxb. Ex DC)	Combretaceae	Arjun	Bark
6	<i>Terminalia chebula</i> Retz.	Combretaceae	Horitoki	Fruits, leaf, bark
7	<i>Ipomoea mauritiana</i> Jacq.	Convolvulaceae	Bui kumra	Rhizome
8	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Shorno lota	stem
9	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Dud kura	Whole plant
10	<i>Cassia occidentalis</i> L.	Fabaceae	Kulka-shundi	Leaf, seed
11	<i>Plectranthus barbatus</i> Andrews	Lamiaceae	Pathor-hara	Whole plant
12	<i>Ocimum gratissimum</i> L.	Lamiaceae	Seth-tulshi	Whole plant
13	<i>Dehaasia kurzii</i> King ex Hook.f.	Lauraceae	Modonmosh	leaf
14	<i>Allium sativum</i> L.	Liliaceae	Roshun	fruit
15	<i>Asparagus racemosus</i> Willd.	Liliaceae	Shotomul	Root, leaf
16	<i>Lawsonia inermis</i> L.	Lythraceae	Mehedi	Leaf, stem, root
17.	<i>Punica granatum</i> L.	Lythraceae	Dalim	Leaf, fruit, seed
18.	<i>Swietenia mahagoni</i> (L.) Jacq.	Meliaceae	Mahogoni	seed
19.	<i>Cereus grandiflorus</i>	Meliaceae	Kut raz	Whole plant
20.	<i>Aphanamixis polystachya</i>	Meliaceae	Pitraj	Bark
21.	<i>Tinospora cordifolia</i>	Menispermaceae	Guloncho lota	Whole Plant
22.	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	kathal	Leaf, fruit
23.	<i>Psidium guajava</i> L.	Myrtaceae	Peyara	Leaf, fruit
24.	<i>Olea europaea</i> L.	Oleaceae	Jolpaye	Fruit, seed
25.	<i>Zea mays</i> L.	Poaceae	Botha	Leaf, fruit
26.	<i>Ziziphus jujuba</i> Mill	Rhamnaceae	kool	Leaf, fruit
27.	<i>Rosa damascena</i> Mill.	Rosaceae	Golap	Leaf, fruit
28.	<i>Camellia sinensis</i> (L.) O. Kuntze	Theaceae	Cha	Leaf

Table 2: Parts of medicinal plants used by the traditional medical practitioners to treat heart disorders.

Parts Used	Number of Species	Percentage
Whole plant	6	14.63
Leaf	13	31.71
Root	2	4.88
Bark	4	9.76
Stem	2	4.88
Flower	1	2.44
Seed	3	7.32
Fruit	9	21.95
Rhizome	1	2.44

4. Discussions

Leaves and roots generally form the most frequently used plant parts in traditional medicine^[14,15]. Our survey results showed a different profile of plant parts used in Khulna & Rajshahi division. Leaves were used the most, followed by fruits whole plants respectively. The flower & rhizome of only one plant species each was used.

The cardioprotective effects, particularly of bark of *Terminalia arjuna* (used by the Kabirajes for treatment of heart disorders) are well known. Such effects include reported protective effects of plant bark against doxorubicin induced cardiotoxicity^[16] reported significant inotropic and hypotensive effect of bark, also increased coronary artery flow and protection of myocardium against ischemic damage, reviewed by Dwivedi^[17] reported protection of rabbit heart by bark against ischemic-reperfusion injury^[18], reported cardioprotective effect of alcoholic extract of bark in an *in vivo* model of myocardial ischemic-reperfusion injury^[19] reported efficacy of the plant in chronic stable angina^[20,21] reported beneficial effects of bark of the plant in isolated ischemic-reperfused rat heart^[22] and reported beneficial effects in coronary artery disease (significant reductions in anginal frequency)^[23].

Another study revealed that administration of *Ipomoea mauritiana* Jacq tuber root powder to rats demonstrated a number of positive effects, which can prove beneficial to patients with coronary problems^[24].

Terminalia chebula pericap has also been reported to have cardioprotective activity in isolated frog heart model^[25]. Its extract was found to ameliorate the effect of isoproterenol on lipid peroxide formation and retained the activities of the diagnostic marker enzymes in isoproterenol induced myocardial damage in rats^[26]. Pretreatment with *Terminalia chebula* Retz. extract stabilizes the lysosomal membrane and, thus preventing myocardial damage^[27].

Aqueous extract of *Ocimum gratissimum* L. indicate that might be beneficial in protecting cardiomyocytes from oxidative stress^[28]. The study scientifically proved the folklore use of

Oroxylum indicum (Bignoniaceae) in cardiovascular disorders and as ingredient in various Ayurvedic formulations used in cardiovascular diseases^[29]. *Euphorbia hirta* L. extract possessed compounds with potent ACE (angiotensin converting enzyme) inhibitory activities which are important agents for treating hypertension & congestive heart failure^[30]. A dose of 500 mg crude extract expressed about 90% inhibition of the enzyme action. The study also revealed that the most active ACE inhibitory compounds were present in the medium polar (chloroform extract) and very polar (methanol and water) fractions^[31].

Another study^[32] showed that intragastric administration at dosages 0.2 and 1.0 g/kg.d of green tea significantly decreased blood pressure and plasma angiotensin II level and Administration of tea to high carbohydrate diet-fed rats prevented and reversed glucose intolerance and the increased systolic blood pressure, left ventricular wet weight, interstitial collagen and passive diastolic stiffness^[33].

5. Conclusion

It can be concluded that the traditional practitioner had a good sound of knowledge on the medicinal properties of various plants to use for both preventive and therapeutic purposes. In modern days, our present generation are losing their previous glorious heritage of plant use knowledge because of urbanization, lack of practicing and degradation of forests. The establishment of modern health care centers in the villages of every divisions also gradually change the existing pattern of indigenous knowledge system of healthcare. It is necessary to conserve the threatened medicinal plants from extinction and to document the plant's information before disappearing. From a brief survey of the literature it appears that the plants used by the traditional medical practitioner in Rajshahi and Khulna division of Bangladesh present considerable potential in the treatment of cardiovascular disorders. Since the practitioners have treated patients from ancient times with the claim of success, further scientific research need

to be evaluated on these plants towards discovery of new drugs for treatment of cardiovascular disorders with giving no side effects or less.

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