

“An Ethnomedicinal Survey on the Medicinal Plants and their Unique Formulations used by the Santal Tribe in Naogaon District, Bangladesh”

Submitted By
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“An Ethnomedicinal Survey on the Medicinal Plants and their Unique Formulations used by the Santal Tribe in Naogaon District, Bangladesh”

A dissertation submitted to the Department of Pharmacy, East West University, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.

Submitted By
Tanjima Rahman

ID: 2011-1-70-004



Department of Pharmacy
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DEDICATION

This Research Paper Is Dedicated To My Mother
Latifa Ferdous

DECLARATION BY THE CANDIDATE

I, Tanjima Rahman, hereby declare that this dissertation, entitled **“An Ethnomedicinal Survey on the Medicinal Plants and their Unique Formulations used by the Santal Tribe in Naogaon District, Bangladesh”** submitted to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of Bachelor of Pharmacy (Honors) is a genuine & authentic research work carried out by me. The contents of this dissertation, in full or in parts, have not been submitted to any other institute or University for the award of any degree or Diploma of Fellowship.

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ABSTRACT

Background: The Santals form the largest tribal community in northern Bangladesh and reside primarily in the different districts of Rajshahi division. The tribe has a long history of medicinal plant use and has its own medicinal practitioners, who usually administer medicinal plant formulations for treatment of various ailments.

Objective: The objective of the present study was to conduct an ethnomedicinal survey among the Santal communities residing in Naogaon district to collect information on their use of medicinal plants.

Design: Interviews were conducted with the Santal traditional medicinal practitioners with the help of a semi-structured questionnaire and using the guided field-walk method. Plant specimens as pointed out by the practitioners were collected.

Location: The location was the Joanpur village of the Naogaon district, Bangladesh.

Subjects: Subjects of this study were the plants used to treat different ailments by the traditional medicinal practitioners of the Santals of Joanpur village.

Results: Information on 60 medicinal plants distributed into 41 families was obtained in this survey. Ailments treated by these plants included skin disorders, respiratory tract disorders, gastrointestinal disorders, impotence, diabetes, tuberculosis, rheumatism, leprosy, cardiac problems, high blood pressure, snake bite, paralysis, mental disorder asthma and many others.

Conclusions: The medicinal plants used by the Santals are worth detailed scientific studies because they are used to treat a wide range of ailments.

Keywords: Medicinal plant, Ethnomedicinal, Santal, Traditional Medicinal Practitioners and Ailments.

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1.1: General Introduction

Plants, plant extracts or plant-derived pure chemicals are being used for therapeutic benefits in disease treatment from the dawn of civilization. Today many established pharmacological classes of drugs include a natural product prototype. Aspirin, atropine, ephedrine, digoxin, morphine, quinine, reserpine and tubocurarine are a few examples of drugs, which were originally discovered through the study of traditional cures and folk knowledge of indigenous people. We are now experiencing a global revolution and revival of using herbal medicinal products. Ispaghula, garlic, ginseng, ginger, St. John's wort and aloe-vera are a few examples of botanicals which are gaining popularity amongst modern physicians and this trend is likely to continue partly due to high cost involved in the development of patentable chemical drugs. There is growing evidence to show that medicinal plants contain synergistic and/or side-effects neutralizing combinations. It has been shown in the past that Ethnopharmacology has an important role in the development of conventional medicine and is likely to play more significant role in the years to come. The ethnopharmacologists have a greater role to play in the development of medicine than we think.

Bangladesh contains a variety of ethnic groups with rich cultures of Ethnomedicine. A survey was done on the medicinal plants and their unique formulation used by the Santhal tribe in Naogaon district, Bangladesh.

1.2: Ethnomedicine

Ethnomedicine is a study or comparison of the traditional medicine practiced by various ethnic groups, and especially by indigenous peoples. The word ethnomedicine is sometimes used as a synonym for traditional medicine.

Ethnomedical research is interdisciplinary; in its study of traditional medicines, it applies the methods of ethnobotany and medical anthropology. Often, the medicinal traditions studied are preserved only orally. (Acharya and Shrivastava, 2008)

Scientific ethnomedical studies constitute either anthropological research or drug discovery research. Anthropological studies examine the cultural perception and context of a

traditional medicine. The purpose of drug discovery research is to identify and develop a marketable pharmaceutical product

1.3: Historical Background

According to the world health organization (WHO), about three-quarters of the world population relies on traditional remedies (mainly herbs) for the health care. We can say that herbal plants are the oldest friends of mankind. They not only provided food and shelter but also served the humanity to cure different ailments. The herbal medicine also sometime called as, traditional or natural medicine. Their existence is known in different civilizations, such as Egyptians, Western, Chinese, Kampo (Japan) and Greco-Arab. (Gilani et al., 1992)

Historians from all around the world have produced evidence to show that apparently all primitive peoples used herbal medicines. Quinine from Cinchona bark was used to treat the symptoms of malaria long before the disease was identified and the raw ingredients of a common or garden aspirin tablet have been a popular painkiller for far longer than we have had access to tablet-making machinery. (Gilani et al., 1992)

By the middle of the nineteenth century at least 80% of all medicines were derived from herbs. Then came the revolution of the pharmaceutical industries and synthetic drugs. Surely it was the dominating one but herbal medicine has never been out of scene. Even today if you walk into any pharmacy in the West, you will find at least 25% plant-derived drugs. Indeed today many pharmacological classes of drugs include a natural product prototype. (Gilani et al., 1992) Aspirin, atropine, artimesinin, colchicine, digoxin, ephedrine, morphine, physostigmine, pilocarpine, quinine, quinidine, reserpine, taxol, tubocurarine, vincristine, and vinblastine are a few examples of what medicinal plants have given us in the past. Most of these plant-derived drugs were originally discovered through the study of traditional cures and folk knowledge of indigenous people and some of these could not be substituted despite the enormous advancement in synthetic chemistry.

Morphine isolated from the opium poppy (*Papaver somniferum*) is one of the early molecules entered into conventional medicine and is the humanity's finest painkiller. Only the cancer patients suffering from terminal pain can appreciate the value of morphine, which remains drug of choice today despite its abuse potential. Indeed, the isolation of morphine from crude opium

by Serturner in 1806 stimulated so much wide-spread research on the vegetable drugs that Megendie was able to publish a medical formulary in 1821, which contained only pure chemical agents, hence laid the foundation for the use of pure chemicals as the alternative to the botanicals. (Gilani, 1998)

One of the important areas in which compounds from plant sources have contributed successfully is cardiovascular research (Gilani, 1998). Digitalis and the cardiac glycoside derived from the foxglove (*Digitalis purpurea*) are perhaps the classic example. They represent a widely used group of clinically effective compounds which produce positive inotropic effect on the failing heart as well as having value in the treatment of atrial fibrillation. As a group they are unrivalled to date by any synthetic or semi-synthetic substitutes even though they are among the most toxic group of clinically useful drugs and have unique mode of action with selective cardiotonic activity, without accompanying tachycardia (Rietbrock and Woodcock, 1985).

A second discovery of cardiovascular activity in natural products led to the isolation of reserpine over five decades ago. Reserpine, obtained from the roots of the Indian plant *Rauwolfia serpentina*, was brought to the attention of the modern Western world in 1949 by Vakil who described its use in hypertension; in rapid succession between 1952 and 1958, reserpine was isolated from *Rauwolfia*, its structure determined and its total synthesis achieved (Dohadwalla, 1985). The indiscriminate use of reserpine as an antihypertensive agent and tranquilizer led to reports of depression and Parkinsonism effects. These findings stimulated further investigation and evidence was found that reserpine depleted not only brain serotonin but also nor-epinephrine and dopamine (Curzon, 1990). This was a major stimulus for continued research on transmitter amine defects in depression and Parkinson's disease. This in part laid the foundation for the development of many of the modern psychoactive drugs and stimulated a significant interaction between researchers and drug industry.

As the adverse effects of reserpine continued to be revealed through clinical research, interest in the product gradually diminished, particularly when safer antihypertensive drugs were made available, though reserpine is still used in clinical medicine, particularly in low-income population. Indeed, there is a revival of interest in its use based on some recent clinical trials, which showed that lower doses of reserpine (0.05–0.1 mg) combined with low doses of thiazide diuretic and hydralazine provides highly effective blood pressure lowering regimen along with

renal protective effect; relatively free from conventional side-effects and is perhaps the most cost-effective antihypertensive treatment available today (Pavan et al., 2003; Milne and Pinkney-Atkinson, 2004).

This development of reserpine clearly illustrates the fundamental scientific principle that drugs, in addition to being therapeutic agent, become tools for further understanding of disease and hence design of new drugs. Other compounds, which are considered invaluable pharmacological “tools” for evaluating the mode of action of other drugs or investigation of basic physiological function, include muscarine and nicotine (pioneer selective agonists for muscarinic and nicotinic receptors respectively), cocaine (catecholamine uptake inhibitor) yohimbine (selective 2 blocker) and himbacine, a prototype of cardio-selective antimuscarinic agents (Gilani, 1998).

Aspirin, an acetyl salt of salicylic acid (an active principle from Willow bark) is considered one of the most effective analgesic, antipyretic and anti-inflammatory agents commonly used in modern medicine. With the passage of time multiple therapeutic uses of aspirin have been emerged, with most prevalent use as the antiplatelet/anticoagulant observed at the low dose to prevent further problems in patients who have already suffered from one heart attack (Saeed et al., 2002). The major antithrombotic drugs used today all derived from veterinary practice in Canada in the 1920s when cattle were noticed to be developing stomach haemorrhage from eating mouldy hay containing sweet clover (*Melilotus officinalis*). Freshly-cut hay contains sweet smelling coumarins, many of which act as anticoagulants. Dicoumarol was the major drug synthesized as a result of these observations. It was first marketed by Abbot and Lilly in 1942. Warfarin (from *Melilotus officinalis*) has been known to most people since the 1940s as a rat poison that acts through its anticoagulant action. The unsuccessful suicide attempt by a US Army recruit showed it to be a less toxic anticoagulant than the dicoumarol and therefore for human use (Minter, 2001). Warfarin so named from the Wisconsin Alumni Research Foundation who received the royalty from the drug sales is the world’s most successful anticoagulant drug, used in cardiology, stroke, and in general post-operative recovery when a patient is at risk of blood clotting during bed rest.

1.4: Revival of the interest in natural medicine

Despite the increasing interest of public in natural medicine, very few drugs from higher plants have attained any prominence in conventional medical practice in the last couple of decades. The most notable example is Taxol, a diterpenoid originally obtained from the bark of the Pacific yew tree (*Taxus brevifolia* Nutt.). However, even this effective anticancer agent is now produced by semi-synthesis from a precursor occurring in the needles of the common yew (*Taxus baccata* L.), a rapidly renewable source (Rao et al., 1995). Instead, major progress in the last decade has been in the field of phytomedicine, also referred to as botanicals or herbal medicine.

In Germany and many European countries, these products are classified as drugs; in USA they are sold as dietary supplements. There is a clear evidence of revival of interest in phytomedicine at a global level, the revival which has been so dramatic that sales of herbal products in the world worth staggering over 100 billion dollars a year. East is already well known for its adherence to herbal medicine and China and India are two leading countries in this regard. Even in the western world, popularity of the phytomedicine is increasing at a rapid pace. Germany is the leading country in Europe followed by France in the use of botanicals. Around 80% of German physicians prescribe herbs and St. John's Wort is a commonly prescribed in mild to moderate depression. Similarly, Ginkgo is a hot selling botanical in Europe. The cost of about 40% of the herbal remedies prescribed by German physicians is covered by the healthcare system (Harrison, 1998). In USA a large Center of Complimentary and Alternate Medicine has been established recently at the NIH, with heavy funding (Jones, 1998) and more recently, NIH has been engaged in sponsoring studies on large clinical trials on botanicals such as, St. John's Wort and Ginkgo.

The conventional medicine is now beginning to accept the use of botanicals once they are scientifically validated. Ispaghula, Garlic, Ginseng, Ginger, Ginkgo, St. John's Wort and Saw palmetto are a few examples of botanicals which are gaining popularity amongst modern physicians. Similarly, studies on medicinal plants particularly on the biological aspects and the impact factor of the journals publishing such research are growing with rapid pace. One can imagine the popularity of herbal medicine in the west from the fact that an American Journal of Chinese Medicine exists in the literature.

There is an increasing trend in the north America and Europe to incorporate the complementary and alternative medicine, particularly the herbs as an essential component in the medical curriculum (Wetzel et al., 2003). In line with the revival of interest in the old remedies, there is also greater recognition of the scholarly work of the physicians of olden days. British Pharmacology Society (BPS) recently decided to publish regularly in its Bulletin the postage stamps that portray the images of famous physicians of the past. Interestingly, the old famous stamp on herbal medicine issued by the Pakistan Post with an image of Ibn Sina (981–1037 C.E.), known as, Avicenna in the west, occupied first place in this series. Ibn Sina authored one of the most famous books, *al-Qanun fi al-Tibb*, known as “Canon” in the west, which is considered an immense encyclopedia of medicine and remained supreme for over six centuries because of its systematic approach, formal perfection and intrinsic value. He laid the foundation of the Greco-Arab system of herbal medicine (Unani Tibb), based on the philosophy of individualized treatment considering the genetic variations amongst the individuals, similar to the concept of Pharmacogenetics in conventional medicine. The concept of side-effects and the individualized treatment is perhaps more effectively elaborated in the traditional medicine (Unani Tibb), where even herbal products, like ispaghula (which is considered probably the safest by the modern physicians) is not necessarily free from side-effects, rather known to rarely cause numbness and impotence (unless combined with honey) if used regularly by the older people in the cold weather. The old concept that it is not the “safe medicine”, rather the “safe physician” or the “safe use” that matters in therapeutics, is getting strength. It should be born in mind that botanicals (mixtures of multiple chemicals) are more likely to cause individual variation in actual clinical situation than the pure compounds derived from plants. It is not surprising that the herbal remedies have been classified according to the four main temperaments (mizaj) of the individuals particularly in the Unani Tibb and such aspects may be considered when planning clinical trials on herbal products.

It is well known fact that the plants grown in different climatic conditions may contain different chemical composition of active principles; hence it is not surprising that the folkloric use of a plant can vary in different geographical origins. For example, *Caesalpinia bonduc* has been used in Africa as a uterine stimulant, and this effect was shown to be mediated through cholinergic effect (Datte et al., 1998), where as in south Asia this plant is used as an antispasmodic 46 A.H. Gilani, Atta-ur-Rahman / Journal of Ethnopharmacology 100 (2005) 43–49 and antidiarrhoeals,

and here it was observed that the plant contains predominantly antispasmodic constituent(s) mediated through calcium channel blockade in addition to a minor cholinergic component (Jabeen, 2001).

Thus, the ethnobotanical use of the plants in relation to their origin may be important when developing botanicals for the healthcare purpose and also warrants standardization. In addition to the exclusive use of medicinal plants in treating disease, unique herbo-mineral preparations, locally known as “Kushta(s)” have also been used in the traditional medicine system of Indo-Pak subcontinent (Unani Tibb and Ayurveda). These preparations have long been used and claimed to be the most potent and effective dosage forms. However, there are only few scientific studies carried out on these products because of several reasons mainly being the lack of communication amongst traditional healers, physicians and scientists. We have tried to fill this gap by translating the old concepts in modern understanding providing possible explanation and hypothesis (Aziz et al., 2002) and it is hoped that these important group of traditional remedies will attract further attention of the scientific community in the years to come.

1.5: Overview

The Indian sub-continent, which includes the countries of India, Pakistan and Bangladesh, has hundreds of indigenous tribal people with a long history of traditional medicine dating back thousands of years ago. The various medicinal plants used by the tribal healers form an important and integral part of providing the primary health-care needs of the tribal people. Appropriate surveys leading to proper documentation of the medicinal plants used by these tribes can play an important role in the conservation of indigenous knowledge. At the same time, this documentation can lead to further scientific studies on the plants used, which can serve as a potential source of discovery of newer and efficacious drugs. In recognition of this fact, a number of ethnobotanical studies have been carried out among different indigenous peoples of Bangladesh leading to identification of important plant species for treatment of a diverse variety of ailments.

Bangladesh has a number of tribes like the Chakmas, Santals, Oraons, Kukis, Mrus, Marmas, Rakhains, Garos and others inhabiting the northern, north-central and south-eastern districts of the country.

But very little ethnobotanical work has been done on the tribes or ethnomedicinal information collected in Bangladesh. The Santals are the largest ethnic group inhabiting the northern districts of Rajshahi division including various villages and towns within the districts of Rajshahi, Rangpur, Dinajpur, Panchagarh, and Thakurgaon. They are thought to be descendants of Austric-speaking Proto-Australoid race. The Santals do not form a very closely-linked community within the country since they inhabit dozens of villages spread out among a number of districts. As a result their customs and rituals have been influenced to varying extents by the Bengali settlers who also reside in the same district, if not the same village inhabited by the Santals. In fact, most Santals nowadays can speak fluently in both Santal as well as the Bangla language, which is spoken by 95% of the population of Bangladesh. The same applies to the traditional medicinal practices of the tribe. Although each village community or district community still have their own traditional medicinal practitioner(s), the usage of medicinal plants for treatment of ailments may differ considerably between the Santal traditional medicinal practitioners of different districts or areas. Some Ethnomedicinal surveys have previously conducted among the Santal communities living in the Rajshahi divisions (Shahidullah et al., 2009; Rahmatullah et al., 2009). The objective of the this study was to conduct an ethnomedicinal survey of the Santal community living in the village of Joanpur, Naogaon district, Bangladesh to find out more about the traditional medicinal practices of this tribe.

1.5.1: Indigenous people in Bangladesh

Bangladesh is the abode for 21 ethnic communities (Khaleque 1995).The indigenous peoples of Bangladesh refer to native ethnic minorities in southeastern, northwestern, north-central and northeastern regions of the country. These regions include the Chittagong Hill Tracts, Sylhet Division, Rajshahi Division and Mymensingh District. The total population of indigenous ethnic minorities in Bangladesh was estimated to be over 2 million in 2010. They are diverse ethnic communities including Australoid, Tibeto-Burman and Sino-Tibetan races. (Das, 2011)

The main ethnic groups are: Chakma, Khasia, Jaintia, Marma, Santal, Garo, Manipuri, Tripura and others.

1.5.2: The Santal Tribe

Our Ethnomedicinal survey was done on the Santal tribe of the village of Joanpur, Naogaon, Rajshahi, Bangladesh. (Das, 2011)

1.5.3: General introduction about the Santal Tribe

The Santals are one of the largest and oldest indigenous communities in Bangladesh. The Santal people live in Bangladesh, Nepal and in India. The Santals are known as one of the oldest and largest indigenous communities in the northwestern belt of Bangladesh. They have been living in the pristine natural surroundings of the area for thousands of years. They might be described as children of nature who are nurtured and reared by its bounty. Santals are largely seen in the northern districts of Dinajpur, Naogaon, Thakurgaon, Panchagar, etc. In Bangladesh their estimated number is about 100,000. (Das, 2011)

By nature, they are very peace loving, honest, industrious and trustworthy people. They always respect their social customs and are satisfied with what they earn and what they eat. They have profound respect for the land they live in, the soil they till and the community they live with.

The Santals mostly speak Santali, a member of the Munda language family. The Santals are of ebony colour with little growth by way of beard, are generally of stocky build and capable of undertaking hard labour. Physically the Santals are not prepossessing. The face is round and softly contoured; the cheekbones moderately prominent; eyes full and straight, nose broad and depressed, mouth large and lips full, hair straight, black and coarse. They are long-headed and of medium height.

1.5.4: Religion and spiritual believe of Santal tribe

Santal religion worships Marang buru or Bonga as supreme deity. The weight of belief, however, falls on a court of spirits (bonga), who handle different aspects of the world and who must be placated with prayers and offerings in order to ward off evil influences. These spirits operate at the village, household, ancestor, and sub-clan level, along with evil spirits that cause disease, and can inhabit village boundaries, mountains, water, tigers, and the forest. They believe in witchcraft. Their believes has a huge impact on their way of treating diseases both physiological and psychological.

1.5.5: Different Clans of Santal Tribe

Currently, the Santals are divided into eleven clans, namely Baske, Besra, Coré, Hamda, Hembrom, Kisku, Marndi, Murmu, Shona Pauria, Soren and Tudu, with a twelfth clan, namely the Bedea supposedly getting lost. Each Santal village has their own leader called the manjhi, who is supported by four assistants known as the jog manjhi, paranik, jog paranik, and godet. (Hasan et al 2012)

Since the community as a whole, and the clans in particular have widely spread in the northern districts, most Santals now reside in villages intermingled with the mainstream Bengali population and have adopted the Bengali language. However, some areas still contain pure Santal villages, often referred to in the Bengali language as Santal Para (Santal Area).

Their ways of treatment varies from tribe to tribe.

1.5.6: Food habit of the Santal people

Their main diet consist of rice, fish and vegetables, which are supplemented with mollusks, crabs, and meat of turtles, pigs, ducks, wild cats and rabbits.

1.5.7: Ethnomedicinal culture of Santal Tribe and their present condition

Though nowadays the Santali people are developing, they did not forget their traditions and culture. Many of them have converted to Islam and Christianity. But many of them are still dependent on their traditional healers mainly because of its cheaper. The traditional medicinal practitioners use age old formulations for the herbal preparation. The traditional medicinal practitioners are known locally as “Baidya”, “Kaviraj” or “Ojha. Their ethnomedicine is really rich with age old knowledge. We were really surprised to know that most of them are actually really helpful. Though some of them may contain toxic effect and awareness must be created.

At present, a large portion of them are now dependent on allopathic medicine and their ethnomedicinal culture is at the verge of extinction.

2.1: Medicinal plants used by folk medicinal healers of Sylhet Division, Bangladesh

In 2010, researcher Mohammed Rahmatullah and his co-workers did a survey on Medicinal Plants used by Folk Medicinal Healers of Sylhet Division, Bangladesh. They did a randomized ethnomedicinal survey among the folk medicinal practitioners of Komolganj in Moulvibazar district, Gulapganj of Sylhet district, and Chunarughat of Habiganj district. The survey was conducted with the help of a semi-structured questionnaire. Plant specimens were collected from the field, dried in situ and identification completed at the Bangladesh National Herbarium. Information on 107 plant species distributed into 53 families was obtained. Most plants were used to treat common ailments like gastrointestinal disorders, helminthiasis, debility, pain, skin problems, respiratory problems, fever, bleeding from cuts and wounds, urinary tract problems and sexual disorders. However, a number of plants were also used to treat more complicated ailments like cardiovascular disorders, hepatic disorders, epilepsy and cancer or tumors. (Rahmatullah et al. 2010)

2.2: Medicinal plants in two areas of Dinajpur district, Bangladesh including plants which can be used as functional foods

In 2009, researcher Mohammed Rahmatullah and his co-workers did a survey on medicinal plants in two areas of Dinajpur district, Bangladesh including plants which can be used as functional foods. The survey was done in Dinajpur is one of the northernmost districts of Bangladesh. The survey was done among the Kavirajes of Dinajpur district, Bangladesh to gather information on the medicinal plants used by the Kavirajes of this district. They found a number of plants were found that could serve this dual purpose. The plants included *Amomum subulatum*, *Bixa orellana*, *Cajanus cajan*, *Carissa carandas*, *Cinnamomum tamala*, *Cinnamomum zeylanicum*, *Coccinia grandis*, *Dillenia indica*, *Ferula asafoetida*, *Manilkara zapota*, *Mentha arvensis*, *Moringa oleifera*, *Nymphaea nouchali*, *Phyllanthus emblica*, *Spilanthes acmella*, *Syzygium aromaticum*, *Terminalia belerica*, and *Terminalia chebula*. Functional foods can be important sources of macro- and micro-nutrients and at the same time used for prevention or cure

of diseases. As such, the above plants can play important roles in the maintenance of body health, particularly of the poorer sections of the population. (Rahmatullah et al. 2009)

2.3: Treatment with aquatic plants by a Bagdi tribal healer of Rajbari District, Bangladesh

In 2014, Mohsina Mukti and Mohammed Rahmatullah did a research on Treatment with aquatic plants by a Bagdi tribal healer of Rajbari District, Bangladesh. It was a survey conducted on a Bagdi healer who used primarily aquatic plants for treatment. The survey observed the Bagdi healer to use seven different aquatic plant species coming from five plant families for treatment of ailments such as hemorrhoids, tonsillitis, heart disorders, burning sensations and pain in hands or legs, blurred vision, debility, sexual weakness in males, chronic dysentery, infertility in women, constipation, chronic leucorrhea, blackness and foul odor of menstrual blood, hair loss, graying of hair and to keep the head cool. One plant was used to treat what the healer mentioned as “evil eye”, this refers to their belief in black-magic. This is the first reported instance of a Bagdi healer who primarily uses aquatic plants for treatment. Ethnomedicinal uses of a number of the plants used by the Bagdi healer have been reported for other places in India and Pakistan. (Rahmatullah et al. 2013)

2.4: Medicinal plant usage by folk medicinal practitioners in two villages by the Rupsha River in Bagerhat district, Bangladesh

In 2010, researcher Mollik, M. A. H. and his co-workers did a survey on medicinal plant usage by folk medicinal practitioners in two villages by the Rupsha River in Bagerhat district, Bangladesh. It was conducted among the folk medicinal practitioners (Kavirajes) in two villages on the banks of the Rupsha River, namely Chanpur and Andabaaz. The survey revealed that 50 plant species and one mushroom species distributed into 32 families were used by the Kavirajes of the two villages. The Euphorbiaceae family provided 5 species, followed by the Araceae family with 4 species, and the Asteraceae, Combretaceae and Fabaceae families with 3 species, each. Even though the number of plant species used was small, a wide variety of ailments were treated by the Kavirajes. The highest number of plant species, twenty five, was used for treatment of gastrointestinal disorders. Skin disorders were treated with 22 plant species; respiratory tract disorders with 14 plant species, and sexual disorders treated with 11 plant

species. Ten plant species were used for treatment of snake bites, and six for treatment of tiger bites. Other ailments treated included heart disorders, sexually transmitted diseases, malaria, helminthiasis, rheumatoid arthritis, encysted dropsy, tuberculosis, hemorrhoids, hepatic disorders, cancer or tumor, fever, cuts and wounds, burns, epilepsy, anemia, obesity, menstrual disorders, gynecological problems, leprosy, inflammation, chicken pox, diabetes, paralysis, fistula, eye disorders, hypertension, typhoid, tooth problems, rabies, headache, and typhus. Three plants were used as astringents, four plants as tonic, one plant for treatment of vitamin C deficiency, three plants as antidote to poisoning, five plants as stimulants of the central nervous system, and one plant as an abortifacient. Two plants used to be prescribed for treatment of small pox, when the disease was still prevalent. (Mollik et al. 2010)

2.5: Medicinal plants used for treatment of diabetes by the marakh sect of the Garo tribe living in Mymensingh district, Bangladesh

In 2012, a survey was done on Medicinal plants used for treatment of diabetes by the marakh sect of the Garo tribe living in Mymensingh district, Bangladesh by Mohammad Rahmatullah and his co-workers. This survey was conducted among the Marakh sect of the Garos residing in Mymensingh district of Bangladesh to find out the medicinal plants that they use for treatment of diabetes. It was found that the tribal practitioners of the Marakh sect of the Garos use twelve medicinal plants for treatment of diabetes. These plants were *Lanea coromandelica*, *Alstonia scholaris*, *Catharanthus roseus*, *Enhydra fluctuans*, *Terminalia chebula*, *Coccinia grandis*, *Momordica charantia*, *Cuscuta reflexa*, *Phyllanthus emblica*, *Syzygium aqueum*, *Drynaria quercifolia*, and *Clerodendrum viscosum*. A review of the scientific literature demonstrated that almost all the plants used by the Garo tribal practitioners have reported antidiabetic and/or antioxidant properties and have enormous potential for possible development of new and efficacious antidiabetic drugs. (Rahmatullah et al. 2012)

2.6: A survey and scientific evaluation of medicinal plants used by the Pahan and Teli tribal communities of Natore district, Bangladesh

A survey and scientific evaluation of medicinal plants used by the Pahan and Teli tribal communities of Natore district, Bangladesh was done by N. Azam and his co-researchers in 2012. The Pahans, numbering about 14,000 people are widely scattered in several northern districts of the country. Both of the tribes are on the verge of disappearance. One each of the

Pahan and the Teli community was located after much search in two adjoining villages of Natore district. The survey documented their traditional usage of medicinal plants and to evaluate such plants against modern research-based pharmacological activity studies on these plants. Interviews were conducted of the practitioners of the Pahan and Teli community of Natore district with the help of a semi-structured questionnaire and using the guided field-walk method. Plant specimens as pointed out by the practitioners were collected and pressed on the field and identification completed at the Bangladesh National Herbarium. The Pahan tribal practitioners used 13 plants distributed into 9 families for treatment of 14 different ailments. The Teli tribal practitioner used 15 plants divided into 14 families for treatment of 17 different ailments. Eight out of the thirteen plants used by the Pahan tribal practitioner (61.5%) had reported relevant pharmacological activities in the scientific literature, while six out of the fifteen plants used by the Teli tribal practitioners (40%) had such relevant pharmacological activities in accordance with their usage. The medicinal plants used by the Pahans and Telis warrant further scientific studies toward discovery of lead compounds and efficacious drugs and the documentation and protection of the traditional medical knowledge held by these tribes. (Azam et al. 2012)

2.7: A Survey on Medicinal Plants Used by Folk Medicinal Practitioners of Paschim Shawra and Palordi Villages of Gaurnadi Upazila in Barisal District, Bangladesh

A Survey on Medicinal Plants Used by Folk Medicinal Practitioners of Paschim Shawra and Palordi Villages of Gaurnadi Upazila in Barisal District, Bangladesh was done by researcher Anup Biswas and his co-workers in 2011. The ethnomedicinal survey was done among the Kavirajes of Paschim Shawra and Palordi villages, Gaurnadi Upazila, Barisal district. Informed consent was obtained of the Kavirajes and interviews conducted with the help of a semi-structured questionnaire and the guided field-walk method. All plant specimens as pointed out by the Kavirajes were collected and brought back for identification at the Bangladesh National Herbarium. It was observed that the Kavirajes of Paschim Shawra and Palordi villages used 51 plants distributed into 33 families for treatment of various ailments. The Fabaceae family contributed the highest number of species followed by the Lamiaceae, Lythraceae and Zingiberaceae families. The largest number of remedies was used to treat

gastrointestinal disorders. Respiratory tract disorder like coughs, chest pain, bronchitis, asthma and whooping cough and sexual disorders including leucorrhoea, sexual weakness, menstrual problem, gonorrhoea and loss of libido formed the second most common disorders treated by the Kavirajes. 10 plants were used for the treatment of skin diseases like tinea infection, scabies, and eczema. The Kavirajes also used medicinal plants for treatment of ailments including diabetes, urogenital disorder, hepatic disorder, neurological disorder, pain and inflammation, fever, weakness, infectious, cancer, blood purifier, blood clotting agent, anemia, snake bite, insect bite, aging, appetizer, blood pressure, malaria, heart disease and others. A number of scientific literatures showed that uses of several plants by the Kavirajes are validated by scientific studies on the pharmacological activities of the relevant plant species. (Biswas et al., 2011)

2.8: Ethnomedicinal Practices among a Minority Group of Christians Residing in Mirzapur Village of Dinajpur District, Bangladesh

In 2010, Mohammed Rahmatullah and his co researchers did a survey on Ethnomedicinal Practices among a Minority Group of Christians Residing in Mirzapur Village of Dinajpur District, Bangladesh. The survey was conducted in a Christian majority Mirzapur village of Dinajpur district of Bangladesh. It was observed that the group depends on their own folk medicinal healers or Kavirajes for their primary health-care needs. It was observed that 41 medicinal plant species distributed into 28 families were used by the Christian Kavirajes for treatment of various ailments. The ailments treated included pain, gastrointestinal disorders, urinary tract infections, hepatic problems, cuts and wounds, sexual disorders, kidney and gall bladder stones, diabetes, heart disorders, tumor, elephantiasis, rheumatism, edema, epilepsy, nerve weakness, respiratory tract disorders, paralysis, fever, helminthiasis, and debility. It was observed that the medicinal plants used by the Kavirajes can be of excellent potential for further scientific studies and discovery of newer and effective drugs. (Rahmatullah et. Al 2010)

2.9: Medicinal plants in Phulbari Upazila of Dinajpur District, Bangladesh

An Ethnobotanical survey was done on medicinal plants in Phulbari Upazila of Dinajpur District, Bangladesh by Mohammad Zashim Uddin, Md Abul Hassan, Mahmuda Sultanain 2006. The study has revealed a total of 86 species used as medicinal plants by the Santal community. Santal

names, part/s used as medicine and diseases to be treated with each plant have been presented. A number of threats to medicinal plants and their habitats have been identified and some measures have also been recommended for the conservation of medicinal plants and their habitats in the area. (Uddin et al. 2006)

2.10: Medicinal plants and formulations used by the Soren clan Of Santal tribe in Rajshahi District, Bangladesh for of various ailments

In 2012, Mohammed Rahmatullah, A. Hasan and their co-researchers did a survey on “Medicinal plants and formulations used by the Soren clan Of Santal tribe in Rajshahi District, Bangladesh for of various ailments.” This survey was conducted among the Soren clan of the Santal community residing in two villages of Tanor Santal Para in Rajshahi district. Plant specimens as pointed out by the practitioners were collected and pressed on the field and identification completed at the Bangladesh National Herbarium. Information on 53 medicinal plants distributed into 32 families was obtained in this survey. Ailments treated by these plants included skin disorders, respiratory tract disorders, gastro-intestinal disorders, sexual dysfunctions, sexually transmitted diseases, diabetes, helminthiasis, pain, urinary problems, filariasis, leprosy, tuberculosis, epilepsy, snake bite, enlarged heart, and paralysis. (Hasan et al 2012)

2.11: Ethnomedicinal knowledge among the Tonchongya tribal community of Roangchaari Upazila of Bandarban district, Bangladesh

In 2012, a survey was conducted by Md. Shahadat Hossan and his co-researchers on Ethnomedicinal knowledge among the Tonchongya tribal community of Roangchaari Upazila of Bandarban district, Bangladesh. The ethno medicinal survey was conducted among the tribal healers of this community to get a more complete coverage of the medicinal practices of this tribe and comparison between the medicinal practices of the two communities of the same tribe was done. The eight tribal medicinal practitioners (TMPs) of the surveyed community used a total of 54 medicinal plants for treatment of a diverse variety of ailments. Ailments treated included common ailments or symptoms like coughs, cold, fever, urinary tract infections, gastrointestinal disorders like diarrhea or dysentery, pain, abscess, and skin diseases. But some of the ailments treated were more complicated like malaria, rheumatism, elephantitis, epilepsy,

otitis, otalgia, hepatic disorders, gall bladder stones, and kidney diseases. Some plants were used as aphrodisiacs while other plants were used for treatment of esoteric disorders like mental sickness due to 'possession by ghosts or evil spirits'. (Hossan et al. 2012)

2.12: Ethnomedicinal survey among the folk medicinal practitioners of three villages in Kurigram district, Bangladesh

In 2012, Protiva Rani Das and her co-researchers did an ethnomedicinal survey among the folk medicinal practitioners of three villages in Kurigram district, Bangladesh. Interviews were conducted of the Kavirajes with the help of a semi-structured questionnaire and the guided field-walk method. A total of 64 plants distributed into 46 families were found to be used by the four Kavirajes. For the treatment of respiratory disorders, sexual problems, skin diseases, tuberculosis, urinary tract disorders, tooth or gum disease, anemia, gastrointestinal disorders, bone fracture, eye diseases, pain, fever, paralysis, rheumatism and rheumatic pain, snake bite, helminthiasis, heart disorders, poisoning, chicken pox, kidney or stomach stones, diabetes, ear disorders, hypertension, puerperal fever, edema, jaundice, dog bite, and elephantiasis. The Kavirajes also treated two ailments, which they called meho and promeho. Meho appeared to be urinary problems arising from endocrinological disorders like diabetes, while promeho meant urinary disorders arising from sexually transmitted diseases like gonorrhoea. Among the various families of plants used for treatment, the Amaranthaceae and the Euphorbiaceae family contributed 4 plants each, followed by the Combretaceae, Lamiaceae and the Rutaceae family with three plants per family. Ayurvedic influences were observed in the use of several plants in the Kavirajes' formulations. (Das et al., 2012)

2.13: Traditional medicinal plants used for the treatment of diabetes in rural and urban areas of Dhaka, Bangladesh

In 2013, Soeren Ocvirk and his co-researchers did a survey on Traditional medicinal plants used for the treatment of diabetes in rural and urban areas of Dhaka, Bangladesh. They conducted an ethnobotanical survey to identify the traditional medicinal plants being used to treat diabetes in Bangladesh and to critically assess their anti-diabetic potentials with focus on evidence-based criteria. An ethnobotanical survey was done both in rural and urban areas 63 randomly chosen individuals (health professionals, diabetic patients), identified to use traditional medicinal plants

to treat diabetes, were interviewed in a structured manner about their administration or use of plants for treating diabetes. In total 37 medicinal plants belonging to 25 families were reported as being used for the treatment of diabetes in Bangladesh. The most frequently mentioned plants were *Coccinia indica*, *Azadirachta indica*, *Trigonella foenum-graecum*, *Syzygium cumini*, *Terminalia chebula*, *Ficus racemosa*, *Momordica charantia*, *Swietenia mahagoni*. The study showed that traditional medicinal plants are commonly used in Bangladesh to treat diabetes. (Ocvirk et al., 2013)

2.14: Medicinal formulations of a Kanda tribal healer – a tribe on the verge of disappearance in Bangladesh

In 2013, Mohammad Rahmatullah and his co-researchers did a survey on Medicinal formulations of a Kanda tribal healer – a tribe on the verge of disappearance in Bangladesh. An ethnomedicinal survey was done among the traditional healers of the Kanda tribe. Information was collected from the healer with the help of a semi-structured questionnaire and the guided field-walk method. A total of 24 formulations were obtained from the healer containing 34 . Besides medicinal plants, the Kanda healer also used the body hairs of the Asiatic black bear (*Ursus thibetanus*) and bats (*Pteropus giganteus giganteus*) in one of his formulation for treatment of fever with shivering. The ailments treated by the Kanda healer were fairly common ailments like cuts and wounds, skin diseases, helminthiasis, fever, respiratory problems (coughs, asthma), gastrointestinal disorders (stomach pain, constipation, diarrhea), burning sensations during urination, various types of pain (headache, body ache, toothache, ear ache), conjunctivitis, poisonous snake, insect or reptile bites, jaundice, and bone fractures. A number of important drugs in allopathic medicine like quinine, artemisinin, morphine and many others have been discovered from observing indigenous medicinal practices. (Rahmatullah et al. 2013)

2.15: Folk Medicinal Uses of Verbenaceae Family Plants in Bangladesh

In 2011, Mohammad Rahmatullah and his co-researchers did a survey on Folk Medicinal Uses of Verbenaceae Family Plants in Bangladesh. An ethnomedicinal survey was done among the Kavirajes and tribal practitioners to determine which species of plants belonging to the Verbenaceae family are used by the practitioners. The Verbenaceae family plants are well known for constituents having important bio-active properties. The result of this survey

indicated that 13 species belonging to 8 genera are used by the folk and tribal medicinal practitioners of Bangladesh. A comparison with his survey and published reports in the scientific literature suggests that the Verbenaceae family plants used in Bangladesh can potentially be important sources of lead compounds or novel drugs for treatment of diseases like malaria and rheumatoid arthritis. (Rahmatullah et al. 2011)

3. Significance of the Study

The Santal Tribe being the oldest ethnic group, their ethnomedicinal culture is also the oldest in Bangladesh. The knowledge of the Santal traditional healers is hidden from the modern world. Nowadays some of them are also trying to increase their knowledge by educating themselves. And as their culture is getting extinct, we should do something to preserve it and encourage them. If we fail to do so, we will soon lose a great potential for the development of medicine. The Santals, particularly their traditional healers are well known for their knowledge of medicinal plants, which they use to treat ailments. In fact, settlers residing in the region but belonging outside the Santal tribe seek out Santal traditional healers to treat various ailments.

One of the major reasons for choosing Santal tribe was that they can speak in Bengali fluently. So, it is easier to communicate with them and understand their medicinal practices.

Given the number of diseases treated and the uniqueness of a number of the plant species used for treatment, it was really needed to conduct an Ethnomedicinal survey with these plants. Such studies have enormous potential towards discovery of novel drugs for treatment of a number of ailments, which cannot be treated with current medicines.

4. Aims and Objective of the Study:

The objective of the present study was to conduct an ethnomedicinal survey among the Santal communities residing in Naogaon district to collect information on their use of medicinal plants.

5.1: Type of Study

The study was an ethnomedicinal survey based study.

5.2: Study area

The survey was done in the village of Jaonpur, Naogaon.

Naogaon is a district situated in the north-western part of Bangladesh in the Rajshahi Division.



Figure 0: Map Of the study area

5.3: Study Population

This Ethnomedicinal survey was done on the plants used by the four traditional medicinal practitioners of the Santal tribe of Joanpur village. All of the traditional healers were male with an age range of 40-70 years. After exclusion total 60 medicinal plants under 41 families were obtained.

5.4: Study Period

This Ethnomedicinal survey was done from July 2014-April 2015.

5.5: Inclusion Criteria

In this Ethnomedicinal survey the plants with great therapeutic potential were chosen. Also we took those plants that the traditional medicinal practitioners provided us.

5.6: Exclusion Criteria

In this Ethnomedicinal survey the plants which the practitioners could not provide us but described orally, were not included.

5.7: Study tool

Medicinal plants, questionnaire and identification tag.

5.8: Questionnaire Development

A simple questionnaire was developed based on some basic knowledge of the traditional medicinal practitioner. His learning source, social status, success rate, diseases they cure etc.

5.9: Collection, Identification and Distribution pattern of the plants

As the study period was during the winter, many of the plants were not available that time. We brought the plants which were available from the healer. One of the traditional healers send other plants with identification tag but he did not tell us the source. The information about the plants was cross-checked among the traditional healers.

We identified the scientific name and family of the plants from the local Bengali name and by matching their photographs from many published papers and internet.

All the chosen plants were distributed into a table (Table-1) according to their local name in Bengali. The table contains their scientific name, family, used plant parts, use and unique formulation. But some of the plant's scientific name and family name were unidentified.

6.1: Plants and their distribution into families

In this Ethnomedicinal survey after exclusion total 60 plants were chosen finally. These plants were distributed into total 41 families. The results are shown in Table-1. The various families included the Acanthaceae, Amaranthaceae, Apiaceae, Apocynaceae, Asclepiadaceae, Asparagaceae, Boraginaceae, Caesalpiniaceae, Caryophyllaceae, Cannabaceae, Combretaceae, Convolvulaceae, Crassulaceae, Cucurbitaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Lamiaceae, Liliaceae, Loranthaceae, Lythraceae, Mackinlayaceae, Magnoliaceae, Malvaceae, Meliaceae, Monaceae, Nyctaginaceae, Oleaceae, Onagraceae, Phyllanthaceae, Piperaceae, Poaceae, Polygonaceae, Ranunculaceae, Rubiaceae, Salicaceae, Santalaceae, Solanaceae, Verbenaceae, Vitaceae, Zingiberaceae.

Among these various families Fabaceae has the highest number of plants which is four. Combretaceae, and Acanthaceae have three plants each. Amaranthaceae, Convolvulaceae, Apocynaceae, Zingiberaceae and Lamiaceae have two plants each. Other families have one plant each under them.

Not all plants were collected from the wild. *Zingiber officinale* and *Curcuma longa* are widely used in Bangladesh cuisine as spices and so were available in village markets. Some of the plants were unidentified but we included those as the traditional healers provided them in hand.

6.2: Disease Identification Process of the Traditional Healers

The Traditional healers of the Santal tribe of Joanpur village are locally known as “Baidya”, “Kaviraj” or “Ojha”.

They identify the disease by symptoms. There is no diagnostic process of the disease.

6.3: Plant parts used

The various plant parts used in the formulations included whole plants, leaves, roots, stems, barks, young branches, flowers, fruits, seeds and rhizomes. The most used plant part is leaves. The most used plant part is leaves. In this Ethnomedicinal survey 50% of the used plant parts are leaves. 16.67% roots, 11.67% flowers, 8.33% branches, 8.33% seeds, and 8.33% whole plants, 8.33% fruits, 5% rhizomes. Latex, gels inside the leaves and young branches are also used in minute percentages.

6.4: Mode of Preparation

The various formulations included maceration (to obtain juice), direct application or partaking of plant part, pills prepared from macerated and dried plant part, smoking of plant part, partaking of boiled or fried plant part(s), soaking of plant part in water followed by partaking of the water, and decoctions. Decoctions were usually made by boiling the plant part in water till the volume was reduced by half, followed by straining the water through a piece of thin cloth. The water was then further used. Frying of any plant part, if necessary, was done in ghee (clarified butter).

6.5: Table 1: Medicinal plants and their formulations used for treatment of various ailments by the mixed clans of Santals of Joanpur Village, Naogaon District, Bangladesh

No	Local Bangla Name	Scientific Name	Family	Used Plant Part (s)	Tribal Formulation	Used in/ Used as
1	অর্জুন	<i>Terminalia arJunea</i>	Combretaceae	Bark	<p>1. For Palpitation, chest pain, lack of libido and diarrhea, bark is powdered and mixed with water or milk and honey. It is then taken orally twice daily.</p> <p>2. For common cold the powdered bark is mixed with the maceration of the leaves of <i>Justicia adhatoda</i> and taken orally daily twice.</p> <p>3. 4-5 gram of the bark of <i>Terminalia arJunea</i> is boiled in 1 glass of water .It is them filtered. The filtered water is mixed with 1 teaspoon of the paste of <i>Santalum album</i> wood paste. It is taken orally, daily one.</p>	Palpitation, Chest pain or Heart Disease, Lack of Libido, Spermatorrhoea, Common Cold and Diarrhea
2	অশ্বগন্ধা	<i>Withania somnifera</i>	Solanaceae	Root and Leaves	<p>1. The decoction of the root is taken with milk orally and used as stimulant.</p> <p>2. The root is crushed and applied topically on tumors or swelling and carbuncles.</p> <p>3. The maceration of the leaves is used in fever with milk, daily once.</p>	Stimulant, Tumors, Carbuncles and Fever
3	আকন্দ	<i>Calotropis procera</i>	Asclepiadaceae	Root, Leaves, Bark and Flower	The maceration of the root, leaves, bark and flowers is taken orally for 7 days.	Ulcer, Tooth pain, Chronic dysentery, Cold, and Asthma
4	আদা	<i>Zinziber officinale</i>	Zingiberaceae	Rhizome	The maceration of the rhizome is taken orally with honey.	Indigestion and Flatulence
5	আপাং	<i>Achyranthes paniculata</i>	Amaranthaceae	Whole plant	1. The paste of the whole plant is made separately. The paste is then warmed and mixed with paste of <i>Cuscuta reflexa</i> (স্বর্ণলতা) and applied to vaginal area before sleeping for 7	Constipation, Piles, Leucorrhoea, Abortion, Excessive Menstruation Bleeding or Bleeding after Miscarriage or Child Delivery.

					<p>days, for leucorrhea, excessive menstruation bleeding or bleeding after miscarriage or child delivery.</p> <p>2. The paste of the leaves is taken orally for abortion.</p> <p>3. Paste is made and then applied to anus for piles and constipation for 7 days.</p>	
6	আলকুশি	<i>Mucuna pruriens</i>	Fabaceae	Seed	The seed is boiled in milk. It is then made into paste and then fried into ghee (clarified butter) and taken orally with honey or sugar. But one cup of warm milk must be consumed immediately after taking the medicine. It gives the best results if consumed at twilight.	Reduced Libido and Sperm Production
7	কদম	<i>Neolamarckia cadamba</i>	Rubiaceae	Leaves	Young leaves are crushed with garlic cloves and topically applied for 7 days.	Swelling (due to injury) or Tumor.
8	কনকসুধা	<i>Caesalpinia emneaphylla</i>	Fabaceae	Leaves and root.	The decoction of leaf and root is taken orally regularly.	Convulsions and Leprosy.
9	কঙ্কাসুন্দা	<i>Cassia occidentalis</i>	Fabaceae	Leaves and Seed	<p>1) The maceration of the leaves is taken orally for inducing fertility in men, jaundice and typhoid daily once.</p> <p>2) Seed is crushed and taken with honey for diabetes and heart disease, taken orally, daily once.</p>	To Induce Fertility, Diabetes, Jaundice, , Heart Disease and Typhoid.
10	কালজিরা	<i>Nigella sativa</i>	Ranunculaceae	Seed	Seeds are crushed and taken once daily with honey or fresh ghee	Diabetes, High Blood Pressure, Increased Lactation, Tooth Tche and Sexual Stimulant for Men.
11	কলমি	<i>Ipomoea aquatica</i>	Convolvulaceae	Leaves	<p>1. For inflammation, irritation and pus in gonorrhoea 4-5 teaspoon of leaf juice is mixed with hot ghee (clarified butter) and taken orally. It is taken twice a day for 7 days.</p> <p>2. To increase lactation in mothers 3-4 teaspoons of leaf juice is taken orally with ghee. It is taken twice daily.</p> <p>3. For laxative effect in babies 20-25 drops of the leaf juice is mixed with luke warm milk and given orally.</p> <p>4. To keep chicken pox away the leaf juice is taken orally with milk daily in</p>	Gonorrhoea, to Increase Lactation, Insect Bite, Laxative for Babies and to Prevent Chicken Pox.

					the morning. 5. For relief in insect bite the liquid after tearing a leaf is rubbed on the affected area.	
12	কালমেঘ	<i>Andrographis paniculata</i>	Acanthaceae	leaves	Leaves are dried and powdered. The powder is then boiled with water and the extract is taken in the morning before breakfast.	Fever, Dysentery and Worm.
13	গন্ধতুল	<i>Cymbopogon citratus</i>	Poaceae	Leaves	The leaves are boiled in well water. A decoction is obtained and taken orally daily.	Stimulant and Expectorant
14	গোল্লিকা	<i>Silene gallica</i>	Caryophyllaceae	Leaves	The cooled decoction of the leaves is used in the eyes. One or two drops daily, twice.	Ophthalmitis
15	হৃতকুমারি	<i>Aloe barbadensis</i>	Liliaceae	Gel inside the leaf	1. For diabetes and to increase immunity juice of the aloe vera gel is made with water and taken orally. Daily once. 2. For skin irritation and inflammation the gel is used topically. 3. For premature ejaculation juice of aloe vera gel is taken orally with mishri (crystalline sugar) daily after dinner, for 15 days. 4. For irregular period the aloe vera gel is made into paste and dried in the sun in a big plate. After drying another layer is added over it. 4-5 layers are added in the same process. After the whole thing is dried, it is cut into pieces of 1-2 inch. These pieces are wetted into water in the night and taken orally in the morning before breakfast.	Diabetes, Premature Ejaculation, Irregular period, to Increase Immunity, Skin Irritation and Inflammation
16	চটচটিয়া (Chotchotia)			Whole plant	The whole plant is made into paste and taken orally with honey.	Leucorrhoea
17	জহরিচাঁপা	<i>Magnolia pumila</i>	Magnoliaceae	Bark and Flower Buds	1. For Indigestion, constipation, inflammation, asthma the decoction of barkis taken orally, once daily. 2. Flower bud is applied directly to the gums for toothaches	Indigestion, Constipation, Inflammation, Asthma and Toothache.

18	জোয়ানবীর (Joanbeer)			Leaves and Branches.	The young leaves and branches are made into paste and taken orally with lukewarm milk.	Tonic
19	ডুমুর	<i>Ficus hispida</i>	Moraceae	Fruit and Young Leaf	1) After fever the cooked fruit works as a tonic. 2) For dysentery the young leaves should be chewed with raw rice. 3)The fruit juice is taken orally with milk and honey for vertigo and dysmenorrheal syndrome	Dysentery, Vertigo, Dysmenorrheal Syndrome and Tonic
20	তেলকুচা	<i>Coccinia grandis</i>	Cucurbitaceae	Leaves	1. 2-3 teaspoonful of the maceration of the crushed leaves and roots are taken orally for diabetes. 2. For lack of appetite, cold, fever and mucus. Leaves are boiled and then fried in ghee (clarified butter) and eaten. 3. 5-6 tablespoonful the maceration of the leaves is given to patients of Poisoning. 4. Crushed leaves are applied as to abscesses and pimple.	Diabetes, Abscesses, Pimple Lack of Appetite and Anti-dote.
21	তুলসি	<i>Ocimum tenuiflorum</i>	Lamiaceae	Leaves	Decoction of the leaves are taken orally daily with honey.	Coughs, Mucus, and cold.
22	খানকুলি	<i>Centella asiatica</i>	Mackinlayaceae	Leaves	1) Leaves are taken and made into paste and taken orally daily twice. 2) The paste of the leaves can also be added with chilies, mustard oil, salt and Nigella sativa seeds. It is eaten with rice daily twice.	Diabetes, Ulcer, Headache, Pain killer, Dysentery and Cough
23	ধইরা	<i>Dendrophthoe falcata</i>	Loranthaceae	Small branches with leaves.	Crushed plant part is mixed with fat of Darash snake (<i>Xenochropis piscator</i>) and applied to affected areas twice daily for 10 days.	Rheumatism
24	নিম	<i>Azadirachta indica</i>	Meliaceae	Leaves and branches	Leave juice extract are used topically and the branches are made into tooth cleansing stick	Skin Diseases, Tooth-brush, and chicken pox
25	নাগলিঙ্গম	<i>Couroupita guianensis</i>	Lecythidaceae	Flower bud	The decoction of the flower bud is taken orally during child birth.	Ease in child delivery
26	নিশিন্দা	<i>Vitex negundo</i>	Verbenaceae	Leaves	Leaves are crushed, mixed with water and put within the nostril	Headache

27	নয়নতারা	<i>Catharanthus roseus</i>	Apocynaceae	Leaves, Flowers and Branches	1. For diabetes, worm and hypertension branch, flower and leaf is taken and made into paste. This paste is taken orally with honey daily once 1 tea-spoon. 2. For sedative effect 3-4 flower paste is taken with a glass of warm milk.	Diabetes, Insect Bite, Worm, Hypertension and Insomnia.
28	পূর্ণর্বা	<i>Boerhavia erecta</i>	Nyctaginac	Root and Leaves	1. The roots are rubbed in eyes for cataract, chronic conJunectivitis. 2. Leaf's paste is used for local application in the form of poultice in edema. It is useful in reducing swelling and foul smelling in skin disorders 3. The decoction of leaves is used in kidney problem. It is taken orally, daily twice.	Eye disease, Skin Disease and Kidney Related Problems.
29	পাথরকুচি	<i>Kalanchoe pinnata</i>	Crassulaceae	Leaves	1. For kidney stone and stomach ache 1cup of decoction of the leaves is mixed with half cup of decoction of the roots of Rauvolfia serpentine (সর্পগন্ধা) and taken orally, daily once. 2. For insect bite and general wound The leaves are made into paste and applied topically.	Kidney Stone, Stomach Ache, Insect Bite and General Wound
30	পিসুল	<i>Piper longum</i>	Piperaceae	Fruit	2 parts of date molasses are mixed with 1 part of the powdered fruit. It is then boiled is water. This water is taken twice a day orally, for influenza and asthma.	Influenza and Asthma
31	ফণিমনসা	<i>Euphorbia Trigona</i>	Euphorbiaceae	Latex	The latex of the plant is taken orally with water once a day.	Urinary Tract Infection (UTI)
32	বৈঁচি	<i>Slacourtia indica</i>	Salicaceae	Fruit	3-4 fruits are eaten raw for gum inflammation.	Gum Inflammation
33	বনধনিয়া	<i>Eryngium foetidum</i>	Apiaceae	Leaves and root	Decoction of the roots and leaves are mixed with honey or sugar and taken orally.	Analgesic and Anti-inflammatory
34	বনমরিচ	<i>Ammannia baccifera</i>	Lythraceae	Whole plant	1. For skin diseases the whole plant is burned in fire. The ash is then mixed with mustard oil and applied topically.	Skin Disease, Blood Related Diseases, Rheumatic Pain, Fever and Indigestion

					2. For blood diseases, fever, rheumatic pain or indigestion the leaves are boiled in water with Zinziber officinale. The liquid is then taken orally, daily twice.	
35	বসন্তবিদায়	<i>Clarkia unguiculata</i>	Onagraceae	seed	The dried seeds are chewed to reduce any pain.	Pain
36	বাসক	<i>Justicia adhatoda</i>	Acanthaceae	Leaves	<p>1. For breast abscess, 4-5 leaves of Datura metel (ধুতুরা) are crushed with 7 slices of Zingiber officinale (আদা) and applied to topically to the affected area.</p> <p>2. For any type of pain. Warm leaves with old ghee (clarified butter) are applied to painful areas to obtain instant relief.</p> <p>3. For asthma or common cold, dried and powdered leaves of Datura metal (ধুতুরা) are wrapped in a leaf of Justicia adhatoda and smoked like a cigarette.</p> <p>4. For common cold the powdered bark of <i>Terminalia arjuna</i> is mixed with the maceration of the leaves of Justicia <i>adhatoda</i> and taken orally daily twice.</p>	Abscess on Breast with Pain and Pus, Rheumatic Pain, Joint Pain ,General Pain, Common Cold and Asthma
37	বিষকাটালী	<i>Polygonum orientale</i>	Polygonaceae	Leaves	The leaves are crushed with 5-6 black peppers put in a pot with hot water and the steam is taken.	Headache and Back-pain.
38	বিষজারণ-কালো (Bishjaron-black)			Leaves	<p>Without talking to anybody the patient himself has to collect the plant. Then the leaves are made into paste with the leaves of হাড়বসাক.</p> <p>The paste is then warmed and applied to fractures in the form of a poultice.</p>	Bone Fracture
39	বিষজারণ-সাদা (Bishjaron-white)			Leaves	<p>Without talking to anybody the patient himself has to collect the plant. Then the leaves are made into paste with the leaves of হাড়বসাক.</p> <p>The paste is then warmed and applied to fractures in the form of a poultice.</p>	Bone Fracture
40	বহেড়া	<i>Terminalia bellirica</i>	Combretaceae	Fruit, Seed and Shell of the Fruit	1. For indigestion and diarrhea the shell of the fruit is dried and made into powder. It is then taken with water daily twice.	Indigestion, Expectorant , Diarrhea and Asthma

					<p>2. As an expectorant .the fruit is crushed and fried in ghee (clarified butter). It is then taken orally with honey, twice daily.</p> <p>3. For asthma extract of the seed is chewed, every two hours.</p>	
41	ভাং	<i>Cannabis sativa</i>	Cannabaceae	Leaves and Top of Plant	Paste is made and mixed with milk taken orally.	Fever, Loss of Appetite, Depression and Indigestion
42	মনিরাজ	<i>Cycas revoluta</i>	Cycadaceae	Flower	The decoction of the flower is taken orally for instant relief.	Stomach Ache
43	মোরগেরফুল	<i>Celosia argentea</i>	Amaranthaceae	Whole plant	<p>1. Stems and leaves are crushed and applied as poultice, is used for treating of infected sores, wounds and skin eruptions.</p> <p>Poultice of leaves, smeared with honey, used for soothing effects to inflamed areas and abscesses.</p> <p>2. Seeds when in decoction or finely powdered, are considered anti diarrheal.</p> <p>3. Seeds are crushed and taken orally with water for diabetes, gonorrhoea, jaundice and fever.</p> <p>4. Decoction of the whole plant used as antidote for snake-poison</p>	Infected Sores, Wounds , Skin Eruptions, Diabetes, Gonorrhoea, Jaundice Fever, Snake bite and Diarrhea
44	রক্তকুঁচ	<i>Abrus precatorius</i>	Fabaceae	Leaves and seed	<p>1. The decoction of leaves cure common cold and cough. It is taken orally daily once.</p> <p>2. The seeds of <i>Abrus precatorius</i> are crushed and taken orally with warm milk and same amount of crushed roots of <i>Asparagus racemosus</i> to cure weakness.</p>	Common Cold, Cough and weakness.
45	রক্তকাঞ্চন	<i>Bauhinia tomentosa</i>	Caesalpiniaceae	Root	Root is boiled with water and the whole thing is blended together. It is taken orally daily twice.	Dysentery
46	রক্তজবা	<i>Hibiscus rosasinensis</i>	Malvaceae	Flower	<p>1. For UTI and diarrhea 6-8 flowers are soaked in 1 liter water overnight. This water is taken orally for 3 days daily 3 times (2 tea-spoon per dose)</p> <p>2. For Contraceptive the flower is crushed and made into paste with henna (<i>Lawsonia inermis</i>) leaves and</p>	Urinary Tract Infection, Anti-diarrhea and contraceptive.

					water. The paste is made into pills and taken orally.	
47	শিকোরি	<i>Fluegge virosa</i>	Phyllanthaceae	Root, Bark and Leaves	Decoction of root, bark and leaf are taken orally daily twice.	Gonorrhoea, Skin Disease and Worm
48	শোনা (Shona)			Bark and Branches with leaves	<p>1. For arthritis 100 gm bark is boiled in water for half an hour. This water is used to bath after sunset.</p> <p>2. For swelling with pain bark paste is made and applied topically on the affected area.</p> <p>3. Small branches with leaves and set on fire. The smoke of this fire is used as home sanitizer.</p>	Arthritis, Swelling with Pain and Sanitizer.
49	শতমূলী	<i>Asparagus racemosus</i>	Asparagaceae	Root	<p>1. The roots are mixed with roots of <i>Asparagus racemosus</i> (Anantamul), cinnamon, cardamom, root of nutmeg, clove, saffron, black cumin mixed, gojruti (unidentified) the root is crushed and made into pills. The pills are taken with chuani (rice fermented alcoholic beverage) thrice daily for seven days.</p> <p>2. The seeds of <i>Abrus precatorious</i> are crushed and taken orally with warm milk and same amount of crushed roots of <i>Asparagus racemosus</i> to cure weakness.</p>	Tuberculosis and Weakness
50	শ্বেতদ্রোণ	<i>Leucas indica</i>	Lamiaceae	Leaves	<p>1. For Common cold, cough, worm and rheumatism the leaves are fried in mustard oil and eaten orally with rice.</p> <p>2. The warm leaf extract can also be rubbed on the chest for the remedy of cold and cough.</p>	Common Cold, Cough, Worm and Rheumatism
51	শ্বেতচন্দন	<i>Santalum album</i>	Santalaceae	wood	<p>1. 4-5 gram of the bark of <i>Terminalia arJunea</i> is boiled in 1 glass of water .It is then filtered. The filtered water is mixed with 1 teaspoon of the paste of <i>Santalum album</i> wood paste. It is taken orally, daily one.</p> <p>2. For high blood pressure the wood paste is taken orally with half cup of goat milk.</p>	Spermatorrhoea and High Blood Pressure

52	সর্পগন্ধা	<i>Rauwolfia serpentine</i>	Apocynaceae	Root	<p>1. The root is boiled in 1 liter water and reduced to half liter. It is then filtered and taken orally twice daily 2 spoons.</p> <p>2. For snake bite the decoction of root one glass is taken orally.</p>	Liver Disease, Mental Illness, Snake bite and High Blood Pressure.
53	স্বর্ণচামেলী	<i>Jasminum humile</i>	Oleaceae	Flower and Root	<p>1. For astringent effect the flower is made into paste and applied topically.</p> <p>2. For heart trouble, chest pain and ring worm the juice of root is taken orally once a day.</p>	Bleeding due to cuts, Heart Trouble, Chest Pain and Ring worm
54	স্বর্ণলতা	<i>Cuscuta reflexa</i>	Convolvulaceae	Whole plant	<p>1. For excessive bleeding during menstruation, after miscarriage or child delivery; <i>Achyranthera aspera</i> (apang) paste is made separately. The paste is then warmed and mixed with paste of <i>Cuscuta reflexa</i> and applied to vaginal area before sleeping for 7 days.</p> <p>2. To use as contraceptive the whole plant is made into paste and flour is added to form pills. One pill is taken orally after intercourse.</p> <p>3. To induce abortion 2 plants are made into paste and taken orally in empty stomach.</p>	Excessive Bleeding During Menstruation, after Miscarriage or Child Delivery, Contraceptive and Abortion Inducer.
55	হাতিরশুঁড়	<i>Heliotropium indicum</i>	Boraginaceae	Leaves	One drop of leaf juice is applied to eyes for 5 days.	Cataract and Eye Disease
56	হরিতকী	<i>Terminalia chebula</i>	Combretaceae	Fruit	<p>1. The fruit is soaked into water overnight with the fruits of <i>Terminalia bellerica</i> (বহেড়া) and <i>Phyllanthus emblica</i> (আমলকী). The water is then taken orally in the morning for overall immunity for digestive system and benefit.</p> <p>2. The dried fruit is crushed and taken orally with fresh ghee (clarified butter) for Constipation, worm, indigestion, stomach ache, piles and ulcer</p>	Constipation, Worm, Indigestion, Stomach Ache, Piles, Ulcer, Overall Immunity of Digestive system.
57	হারকুঁচকাটা	<i>Acanthus ilicifolius</i>	Acanthaceae	Root and Leaves	<p>1. For asthma and cough the juice of root is taken orally with honey.</p> <p>2. The decoction of leaves is taken orally for rheumatism and paralysis.</p> <p>3. For snake bite chewing of the</p>	Asthma, Cough, Rheumatism, Paralysis, Snake Bite and Dyspepsia

					leaves are suggested and you have lie down on the ground while chewing. 4. Leaves are boiled in water and mishri (crystalline sugar) and cumin seeds for curing dyspepsia. It is taken orally.	
58	হলুদ	<i>Curcuma longa</i>	Zingiberaceae	Rhizome	1) The paste of rhizome is applied to wounded area as an anti-septic. 2) Paste of rhizome is taken orally with milk for healing any wound quickly.	Anti-septic and Wound Healer.
59	হাড়জোড়া	<i>Cissus quadrangularis</i>	Vitaceae	Whole plant	Whole plant is crushed separately. Then the whole plant of <i>Evolvulus nummularius</i> (ভুঁইআঁকড়া), whole plant of <i>Cyperus rotundus</i> (মুঠা), and 7 slices of ginger are crushed and made into a paste. The paste is warmed and applied to fractures in the form of a poultice.	Bone fracture
60	হাড়বসাক (Harboshak)			Leaves	Without talking to anybody the patient himself has to collect the plant. Then the leaves are made into paste with the leaves of বিষজারণ. The paste is then warmed and applied to fractures in the form of a poultice.	Bone fracture

7: Discussion

1. অর্জুন (*Terminalia arJunea*):



Figure 1: অর্জুন (*Terminalia arJunea*)

Terminalia arJunea is familiar name in Bangladesh. In Santal tribe it is believed that if you have tree of *Terminalia arJunea* in your house, you would not need a doctor. Use of this tree was quiet common in old days. The arJunea is about 20–25 metres tall; usually has a buttressed trunk, and forms a wide canopy at the crown, from which branches drop downwards. It has oblong, conical leaves which are green on the top and brown below; smooth, grey bark; it has pale yellow flowers which appear between March and June; its glabrous, 2.5 to 5 cm fibrous woody fruit, divided into five wings, appears between September and November. It is a reliable source for heart diseases in traditional medicines. (Bhattacharya et al., 2011)

2. অশ্বগন্ধা (*Withania somnifera*)



Figure 2: অশ্বগন্ধা (*Withania somnifera*)

This species is a short, tender perennial shrub growing 35–75 cm (14–30 in) tall. Tomentose branches extend radially from a central stem. The flowers are small and green. The ripe fruit is orange-red. The main chemical constituents are alkaloids and steroidal lactones. These include tropine and cuscohygrine. The leaves contain the steroidal lactones, withanolides, notably withaferin A, which was the first to be isolated from the plant. (Pati et al., 2008)

3. আকন্দ (*Calotropis procera*) :

Calotropis procera is another plant which is very commonly used in mainstream Bengali “kobiraj” and ayurvedic practitioners also. Santals use this plant for many purposes. But



Figure 3: আকন্দ (*Calotropis procera*)

The milky sap contains a complex mix of chemicals, some of which are steroidal heart poisons known as "cardiac aglycones".

4. আদা (*Zinziber officinale*) :



Figure 4: আদা (*Zinziber officinale*)

Zinziber officinale or ginger produces a hot, fragrant kitchen spice. Young ginger rhizomes are juicy and fleshy with a very mild taste. It is widely available in the village market. According to the American Cancer Society, ginger has been promoted as a cancer treatment "to keep tumors from developing," but "available scientific evidence does not support this." They add: "Recent preliminary results in animals show some effect in slowing or preventing tumor growth. While

these results are not well understood, they deserve further study. Still, it is too early in the research process to say whether ginger will have the same effect in humans."(Unitproj.library.ucla.edu, 2015)

5. আপাং (*Achyranthes paniculata*) :



Figure 5: আপাং (*Achyranthes paniculata*)

In recent studies the plant shows significant abortifacient activity in mice and rabbits. An n-butanol extract has been found to possess contraceptive efficiency in rats which might be assigned to its potent estrogenicity. It is widely used in Santal tribe of Joanpur village.

6. আলকুশি (*Mucuna pruriens*) :

The seeds of *Mucuna pruriens* have been used for treating many dysfunctions in Tibb-e-Unani (Unani Medicine), the traditional system of medicine of Indo-Pakistan Subcontinent.



Figure 6: আলকুশি (*Mucuna pruriens*)

7. কদম (*Neolamarckia cadamba*):

A fully mature *Neolamarckia cadamba* tree can reach up to 45 m (148 ft) in height. It is a large tree with a broad crown and straight cylindrical bole. The fresh leaves are fed to cattle. The flower is used for decoration purpose.



Figure 7.1: কদম (*Neolamarckia cadamba*)



Figure 7.2: কদম (*Neolamarckia cadamba*)

8. कनकसूधा (*Caesalpinia enneaphylla*):

A special criterion for taking this medication is that the patient has to consume this while facing north. Scientifically it has no significance. But it is their belief that if you take it while facing north, it will be more effective.



Figure 8: कनकसूधा (*Caesalpinia enneaphylla*)

9. कङ्कासून्दा (*Cassia occidentalis*) :

It is traditionally used mainly for increasing fertility in men. But there are plenty other disease in which it is used like diabetes, Jaundice and heart disease.



Figure 9: ককাসুন্দা (*Cassia occidentalis*)

Recent studies have showed that it has antibacterial, antifungal, antidiabetic, anti-inflammatory, anticancerous, antimutagenic and hepatoprotective activity. (Yadav et al., 2010)

10. কালজিরা (*Nigella sativa*) :

The seeds of *Nigella sativa* are used as a spice in Indian and Middle Eastern cuisines. The black seeds taste like a combination of onions, black pepper and oregano. They have a pungent bitter taste and smell. They are commonly used as “panchforon” in Bengali cuisine. The Santals use them in as spice and also as medicine.



Figure 10: কালজিরা (*Nigella sativa*)

11. কলমি (*Ipomoea aquatica*):

It is a very common plant in Bangladesh. It is widely found in the village ponds or by the side of ponds. It is a very popular vegetable. Santals have it as vegetable and also as medicine. They collect it from the wild.



Figure 11: কলমি (*Ipomoea aquatica*)

This plant is known in English as water spinach, river spinach and water morning glory.

12. কালমেঘ (*Andrographis paniculata*):



Figure 12: কালমেঘ (*Andrographis paniculata*)

Andrographis paniculata is an annual herbaceous plant in the family Acanthaceae. It is another common plant used by the tribal traditional practitioners. The herb has a number of purported medicinal uses, although research has found evidence of its effectiveness is limited to treatment of upper respiratory infection, ulcerative colitis and rheumatic symptoms.

According to the Mayo Clinic Book of Alternative Medicine, "A specific product (andrographis combined with *Eleutherococcus senticosus*) may shorten the duration and lessen the symptoms of common cold. It also says, "Pregnant women shouldn't use andrographis because it could terminate pregnancy. Awareness must be spread about it as it is a very commonly using plant. (Mayo Clinic Book of Alternative Medicine, 2010)

13. গন্ধতুল (*Cymbopogon citratus*):



Figure 13: গন্ধতুল (*Cymbopogon citratus*)

The use of this plant in Santal tribe is not so common. But they use it for expectorant and stimulant. Laboratory studies have shown cytoprotective, antioxidant, and anti-inflammatory properties in vitro, as well as antifungal properties. (Figueirinha et al., 2010).

14. গোল্লিকা (*Silene gallica*):

Silene gallica is one of the few plants which are used by the Santals for eye diseases. It is very easy to find it and can be found by the road sides.



Figure 14: গোল্লিকা (*Silene gallica*)

15. ঘৃতকুমারি (*Aloe barbadensis*) :



Figure 15: ঘৃতকুমারি (*Aloe barbadensis*)

Aloe barbadensis or Aloe-vera is a widely used plant all over the world since the beginning of the first century AD. . The gel inside its leaves has several uses. Santals use it their unique formulation. There is, however, little scientific evidence of the effectiveness or safety of *Aloe vera* extracts for either cosmetic or medicinal purposes, and what positive evidence is available is frequently contradicted by other studies. (Boudreau and Beland, 2006)

16. চটচটিয়া (Chotchotia):

This plant was identified. It is used widely among the Santals for leucorrhoea. This plant should be studied.



Figure 16: চটচটিয়া (Chotchotia)

17. জহরিচাঁপা (*Magnolia pumila*):

This Plant is used mainly for the problems to gastro intestinal tracts by the Santals. Some other uses are also observed.



Figure 17: জহরিচাঁপা (*Magnolia pumila*)

18. জোমানবীর (Joanbeer):

This plant was unidentified. Santal people use it as tonic. Its effect is similar to its name জোমানবীর which means young-brave. Studies should be contacted for identification and analysis of it. It is taken orally with milk.



Figure 18: জোয়ানবীর (Joanbeer)

19. ডুমুর (*Ficus hispida*):

Ficus hispida is a very commonly found tree all over Bangladesh. Its fruit is used in traditional medicines. Santals also use it for various purposes. Santals call it “kakdumur”. This fruit is eaten by them as snack. The traditional medicinal practitioners use its fruit and leaf for dysentery, vertigo, dysmenorrheal syndrome and tonic.



Figure 19.1: ডুমুর (*Ficus hispida*)



Figure 19.2: ডুমুর (*Ficus hispida*)

20. তেলকুচা (*Coccinia grandis*):

Coccinia grandis is in Santals for diabetes, abscesses, pimple, to increase appetite and anti-dote. Leaves of this plant are used in formulation.



Figure 20: তেলকুচা (*Coccinia grandis*)

These products are claimed to help regulate blood sugar levels.

21. তুলসি (*Ocimum tenuiflorum*):

Ocimum tenuiflorum, also known as *Ocimum sanctum*, holy basil, or tulasi (other spelling thulasi), is an aromatic plant in the family Lamiaceae which is native to the Indian subcontinent.

Ocimum tenuiflorum is the plant which has been used for centuries in this sub-continent. Santals are not exceptions. The use of this plant is very common among them. It also has religious values to them. It is generally used in common cold, to relief mucus and cough.

Tulasi (Sanskrit:-Surasa) has been used for thousands of years in Ayurveda for its diverse healing properties. It is mentioned in the Charaka Samhita, an ancient Ayurvedic text. Tulsi is considered to be an adaptogen, balancing different processes in the body, and helpful for adapting to stress. Marked by its strong aroma and astringent taste, it is regarded in Ayurveda as a kind of "elixir of life" and believed to promote longevity. (Singh, 2002)



Figure 21: তুলসি (*Ocimum tenuiflorum*)

22. থানকুনি (*Centella asiatica*):

Centella asiatica is another very common plant of Bangladesh. Santals eat it as vegetable as well as medicine. The stems are slender, creeping stolons, green to reddish-green in color, connecting plants to each other. The Santals use it for diabetes, ulcer, headache, pain killer, dysentery and cough.



Figure 22: থানকুনি (*Centella asiatica*)

23. ধইরা (*Dendrophthoe falcate*):

Dendrophthoe falcate is traditionally used in Santals for rheumatism. Its formulation by the traditional healers is very interesting as they use the fat of Darash snake (*Xenochropis piscator*). One of the healers told us that one a days it is not easy to find snakes easily. So, they do not use it very often.



Figure 23: ধইরা (*Dendrophthoe falcate*)

24. নিম (*Azadirachta indica*):



Figure 24: নিম (*Azadirachta indica*)

Azadirachta indica which is commonly known as Neem , has been used as traditional medicines since the ancient times in this sub-continent. Traditional Santal healers also use it very often. They use it in Skin Diseases and chicken pox. They take bath with Neem leave's decoction in chicken pox and skin diseases. They also use its young branch as tooth-brush. Researches and

studies have showed that it has anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative activities. (Rahman and Jairajpuri., 1993)

25. নাগলিঙ্গম (*Couroupita guianensis*):

It is traditionally used by the “dhais” or mid-wives. They use the flower bud decoction for reducing the labor pain and to ease child delivery. Its fruit is feed to their domestic animals such as pigs.



Figure 25: নাগলিঙ্গম (*Couroupita guianensis*)

26. নিশিন্দা (*Vitex negundo*):



Figure 26: নিশিন্দা (*Vitex negundo*)

Vitex negundo is used by the traditional healers of the Santals for headache. In vitro and animal studies have also shown that chemicals isolated from the plant have potential anti-inflammatory and analgesic activities. (Dharmasiri et al., 2003)

27. নয়নতারা (*Catharanthus roseus*):

Though this plant is widely used as ornamental plant all over Bangladesh, the Santal healers cultivate it especially for medicinal uses. They use it in diabetes, insect Bite, worm, hypertension and insomnia.

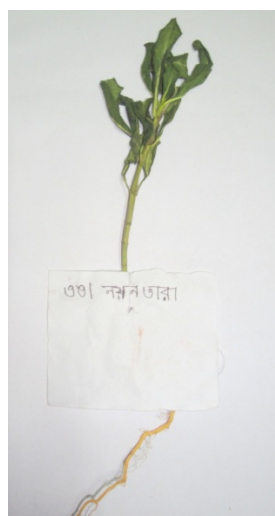


Figure 27: নয়নতারা (*Catharanthus roseus*)

The extracts of its roots and shoots, though poisonous, is used against several diseases. All over the world extracts from it have been used against numerous diseases, including diabetes and malaria. Many of the vinca alkaloids were first isolated from *Catharanthus roseus*. The substances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia. (Toki et al., 2008)

28. পূর্ণবা(*Boerhavia erecta*):



Figure 28: পূর্ণবা (*Boerhavia erecta*)

This plant is traditionally used by the Santals for eye disease, skin disease and kidney related problems. *Boerhavia erecta* is used in production of medicine as well as food. *Boerhavia erecta* is found in many vegetables such as legumes and cotton. It is also found in sugar canes. In West and East Africa, the leaves are eaten as a vegetable and used in the preparation of sauces.

29. পাথরকুচি (*Kalanchoe pinnata*):

It is a very common plant in Bangladesh and found almost everywhere. The Santals use its leaves for kidney stone, stomach ache, insect bite and general wound. The mainstream Bengali traditional practitioners also use it.



Figure 29: পাথরকুচি (*Kalanchoe pinnata*)

30. পিপুল(*Piper longum*):

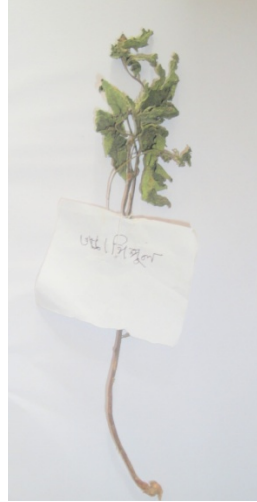


Figure 30: পিপুল (*Piper longum*)

Santals use the fruit of *Piper longum* traditionally for influenza and asthma. They take this with date molasses. It is also known as long pepper.

Long pepper's first reference comes from ancient Indian textbooks of Ayurveda, where its medicinal and dietary uses are described in detail. It reached Greece in the sixth or fifth century BCE, though Hippocrates discussed it as a medicament rather than a spice. (Dalby, 2002)

31. ফণিমনসা (*Euphorbia Trigona*):



Figure 31: ফণিমনসা (*Euphorbia Trigona*)

Its latex is widely used in Santals to cure urinary tract infection. It must be consumed in empty stomach.

32. বৈঁচি (*Slacourtia indica*) :

The reference of বৈঁচি (*Slacourtia indica*) can be seen in many Bengali literatures works. It is also consumed in gum inflammation. But this plant is becoming extinct and very hard to find nowadays.



Figure 32: বৈঁচি (*Slacourtia indica*)

33. বনধনিয়া (*Eryngium foetidum*):



Figure 33: বনধনিয়া (*Eryngium foetidum*)

This plant is often used by the traditional healers of the Santals as analgesic and anti-inflammatory medicine. They also use it in their food for flavor.

34. বনমরিচ (*Ammannia baccifera*):



Figure 34: বনমরিচ (*Ammannia baccifera*)

বনমরিচ (*Ammannia baccifera*) is found in the wild. The Santals use it for skin Disease, blood related diseases, rheumatic pain, fever and indigestion. They use the whole young and small plant.

35. বসন্তবিদায় (*Clarkia unguiculata*):



Figure 35: বসন্তবিদায় (*Clarkia unguiculata*)

It is a wild flowering tree. It is used by the Santal traditional medicinal practitioners for its therapeutic activities. They use its seed for general pain.

36. বাসক(*Justicia adhatoda*):

This plant is one of the most used plants by the traditional healers of the Santal tribe of Joanpur village. Many people have this in their houses for home remedy of common cold. But the traditional healers use it also for abscess on breast with pain and pus, rheumatic pain, joint pain, general pain, common cold and asthma. They often use other plants in its formulation.



Figure 36.1: বাসক (*Justicia adhatoda*) Figure 36.2: বাসক (*Justicia adhatoda*)

37) বিষকাটালী (*Polygonum orientale*):

This is most popular analgesic used by the traditional healers of Santals. It is generally used for headache and back pain.



Figure 37: বিষকাটালী (*Polygonum orientale*)

38) বিষজারণ – কালো (Bishjaron-black):



Figure 38: বিষজারণ – কালো (Bishjaron-black)

This plant was unidentified. It is widely used in bone fracture. There are two types of bishjaron plant available but the black one is considered more effective. The procedure is very unusual and interesting. The patient himself has to brought the plant to the healer and can not talk to anyone during this procedure. If he is unable to walk one of his family member can do this. The healer use the leaves of হাড়বসাক (Harboshak) with it.

39) বিষজারণ –সাদা(Bishjaron-white) :

This plant was unidentified. It is widely used in bone fracture. There are two types of bishjaron plant available but the black one is considered more effective. If the black one is not available then বিষজারণ –সাদা(Bishjaron-white) is used. The procedure is very unusual and interesting. The patient himself has to brought the plant to the healer and can not talk to anyone during this procedure. If he is unable to walk one of his family member can do this. The healer use the leaves of হাড়বসাক (Harboshak) with it.



Figure 39: বিষজারণ –সাদা (Bishjaron-white)

40) বহেড়া (*Terminalia bellirica*):

বহেড়া (*Terminalia bellirica*) is a very common name in Ayurveda and Herbal medicines. The traditional healers of Santals also use it for indigestion, as expectorant, diarrhea and asthma. It has been used for many years as herbal medicine. It is also believed by the Santals that it extends your life period if you eat it daily.



Figure 40: বহেড়া (*Terminalia bellirica*)

41) ভাঁ (Cannabis sativa):

ভাঁ (*Cannabis sativa*) is used to make alcoholic beverage in Santal tribe. They drink this beverage in every social occasion. But the traditional Santal healers use this plant for medicinal use. They claim that is very useful in fever, loss of appetite, depression and indigestion.



Figure 41: ভাঁ (*Cannabis sativa*)

42) মনিরাজ (*Cycas revoluta*):

The flower of this plant is used for instant relief in stomach ache. But it is very rare plant. One of the traditional healers said that he had used it. Each tree can bring only one flower.



Figure 42: মনিরাজ (*Cycas revoluta*)

43) মোরগেরফুল (*Celosia argentea*) :



Figure 43: মোরগেরফুল (*Celosia argentea*)

It is a very widely used plant by the traditional medicinal practitioners of the Santals. They use it for infected sores, wounds, skin eruptions, diabetes, gonorrhoea, jaundice fever, snake bite and diarrhoea. They use young and small plants for snake bites.

44) ରଞ୍ଜକୁଞ୍ଚ (*Abrus precatorius*):

Its fruit is known for unique beauty. The Santal women often make necklace with its fruit. But the traditional medicinal practitioners use its young leaves and seeds to cure common cold, cough and weakness. They also believe that wearing bracelet and necklace with its fruit keeps evil spirit away. But the healers suggested that large dose may cause headache and dizziness. The fruit however is poisonous and the healers know it. Recent studies also have found that *Abrus precatorius* fruit contains abrin and may cause toxicity. (Arora et al., 2011)



Figure 43: ରଞ୍ଜକୁଞ୍ଚ (*Abrus precatorius*)

45) ରଞ୍ଜକାଞ୍ଚନ (*Bauhinia tomentosa*):

This plant's root is used by the healers to cure dysentery.



Figure 45: ରଞ୍ଜକାଞ୍ଚନ (*Bauhinia tomentosa*)

46) রক্তজবা (*Hibiscus rosasinensis*):



Figure 46: রক্তজবা (*Hibiscus rosasinensis*)

Hibiscus rosasinensis is a very common flowering plant in Bangladesh and can be found almost anywhere. The flower has special religious value to the Santal people. But the traditional healers use its flower in urinary tract infection, diarrhea and as contraceptive. It is also used in Ayurvedic and Unani system.

47) শিকোরি (*Flueggea virosa*):



Figure 47: শিকোরি (*Flueggea virosa*)

This plant is often used by the traditional medicinal practitioners of the Santals for curing gonorrhoea, skin disease and worm.

48) শোনা (Shona):

This plant was unidentified. The traditional healers of Santals used it for arthritis, swelling with pain and home sanitizer. The interesting thing is that they prescribe to take bath with the water which was previously boiled with শোনা (Shona), after sunset to cure arthritis. They use small young plant's smoke to sanitize home.



Figure 48: শোনা (Shona)

49) শতমূলী (*Asparagus racemosus*):

It is very popular among the traditional medicinal practitioners of Santals for treating tuberculosis but they also use it as a tonic in weakness. It has an adventitious root system with tuberous roots that measure about one meter in length, tapering at both ends, with roughly a hundred on each plant. Its medicinal usage has been reported in the Indian and British Pharmacopoeias and in traditional systems of medicine such as Ayurveda, Unani and Siddha.



Figure 49.1: শতমূলী (*Asparagus racemosus*)

Figure 49.2: শতমূলী (*Asparagus racemosus*)

50) শ্বেতদ্রোণ (*Leucas indica*):

This plant is used to cure common cold, cough, worm and rheumatism.



Figure 50: শ্বেতদ্রোণ (*Leucas indica*)

51) শ্বেতচন্দন (*Santalum album*):

This plant is very rare. One of the traditional medicinal practitioners surveyed has one plant in his garden. It is used to treat spermatorrhoea and high blood pressure.



Figure 51: শ্বেতচন্দন (*Santalum album*)

52) সর্পগন্ধা (*Rauvolfia serpentina*):

This plant is very common all over Bangladesh. The traditional healers of Santals use it for liver disease, mental illness, snake bite and high blood pressure.



Figure 52: সর্পগন্ধা (*Rauvolfia serpentina*)

It has been used for millennia to treat insect stings and the bites of venomous reptiles. A compound which it contains called reserpine, was used in an attempt to treat high blood pressure and mental disorders including schizophrenia, and had a brief period of popularity for that purpose in the West from 1954 to 1957.

According to the American Cancer Society: "Available scientific evidence does not support claims that Indian snakeroot is effective in treating cancer, liver disease, or mental illness. It also has many dangerous side effects and is likely to increase the risk of cancer." (Indian Snakeroot, 2008)

53) স্বর্ণচামেলী (*Jasminum humile*):



Figure 53: স্বর্ণচামেলী (*Jasminum humile*)

This plant is used for bleeding due to cuts, heart trouble, chest pain and ring worm. The traditional healers collect it from the wild.

54) স্বর্ণলতা (*Cuscuta reflexa*):

স্বর্ণলতা (*Cuscuta reflexa*) is another very popular plant used by the Santals for many diseases. It is used to treat excessive bleeding during menstruation, after miscarriage or child delivery, as contraceptive and as abortion inducer.



Figure 54: স্বর্ণলতা (*Cuscuta reflexa*)

55) হাতিরশুঁড় (*Heliotropium indicum*):

This is one of the very few plants which are used to treat eye diseases. The traditional Santal traditional healers collect it from the wild. But recent studies have showed that *Heliotropium indicum* contains tumorigenic pyrrolizidine alkaloids which can be toxic. (Fu et al., 2002)



Figure 55: হাতিরশুঁড় (*Heliotropium indicum*)

56) হরিতকী (*Terminalia chebula*):



Figure 56: হরিতকী (*Terminalia chebula*)

This particular fruit has been in use for thousands of years in this sub-continent. The Santals also use it for constipation, worm, indigestion, stomach ache, piles, ulcer and overall immunity of digestive system.

57) হারকুঁচকাঁটা (*Acanthus ilicifolius*) :

This plant is used by the traditional medicinal practitioners of the Santals for curing asthma, cough, rheumatism, paralysis, snake bite and dyspepsia.



Figure 57: হারকুঁচকাঁটা (*Acanthus ilicifolius*)

58) হলুদ (*Curcuma longa*):



Figure 58: হলুদ (*Curcuma longa*)

হলুদ (*Curcuma longa*) is a very common in Bangladesh. The Santals also use it almost every cuisines. The women in Santal tribes also use it as a cosmetic to brighten skin tone.

The traditional healers of Santals use it as anti-septic and wound healer. They get it from the village market.

59) হাড়জোড়া (*Cissus quadrangularis*):



Figure 59: হাড়জোড়া (*Cissus quadrangularis*)

It is another very popular plant to treat fractured bones. Very little is known about this plant.

60) হাড়বসাক (Harboshak):



Figure 60: হাড়বসাক (Harboshak)

This plant was unidentified. It is used with বিষজারণ (Bishjaron) to treat bone fracture.

Overall, all the surveyed traditional medicinal practitioners identify the disease only by symptoms .Some of the plants were un-identified which must be studied. They are also unaware of the fact that some of these plants may cause toxicity and can be poisonous. However they have been treating the people of their tribe successfully for ages. The traditional healers of the Santals and their patients firmly believe that, the patients have to take the medicine with pure belief. They think otherwise it will not work on them. They also believe that the fees the patient gives to the healer must be given with pure heart otherwise the medicine will not work. They think that, if the medicine shows any adverse effect its God's punishment to the patient for his wrong doings.

8. Conclusion:

The studies to preserve the great knowledge of medicinal plants and their formulations used by the tribal people are of great importance. Some of this knowledge has been accumulated in this paper. Further phytochemical and pharmacological studies of less studied and un-identified plants must be given priority. This will help us to exploit the underlying mechanism of traditional treatment system which can bring a new era of medicine. Another thing that should be studied is the adverse effects and toxicities of the plants used by the tribal people. There are numerous tribes living in Bangladesh all of their Ethnomedicinal practices must be studied. These medicinal plants hold tremendous potential for pharmaceutical products of commercial values.

9. References

Acharya, D. and Shrivastava, A. (2008). Indigenous Herbal Medicines: Tribal Formulations and Traditional Herbal Practices. Aavishkar Publishers Distributor, [Online], p.440. Available at: <http://www.positivehealth.com/review/indigenous-herbal-medicines-tribal-formulations-and-traditional-herbal-practices> [Accessed 25 June, 2015]

Arora, R., Gill, N., Kaur, S and Jain, A. (2011). Phytopharmacological Evaluation of Ethanolic Extract of the Seeds of *Abrus precatorius* Linn. Journal of Pharmacology and Toxicology, [Online], 6(6), pp.580-588. Available at: <http://www.scialert.net/abstract/?doi=jpt.2011.580.588> [Accessed 25 June, 2015]

Aziz, N., Gilani, A.H., Rindh, M.A. (2002). Kushta(s): unique herbomineral preparations used in South Asian traditional medicine. Medical Hypotheses, [Online], 59, pp. 468–472. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/> [Accessed 25 June, 2015]

Biswas, A., Haq,W., Akbar, M., Ferdousi, D., Seraj, S., Israt Jahan, F., Chowdhury, A. and Rahmatullah, M. (2011). A survey of medicinal plants used by folk medicinal practitioners of Paschim Shawra and Palordi villages of Gaurnadi Upazila in Barisal district, Bangladesh. American-Eurasian Journal of Sustainable Agriculture, [Online],5,pp.15-22. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/> [Accessed 25 June, 2015]

Bhattacharya, K., Biswas, M., Biswas, S. and Haldar, P. (2011). Evaluation of analgesic and anti-inflammatory activities of *Terminalia arjuna* leaf. Journal of Phytology, [Online], 3(1), pp.33-38. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/12208190> [Accessed 25 June, 2015]

Boudreau, M. and Beland, F. (2006). An Evaluation of the Biological and Toxicological Properties of *Aloe Barbadensis* (Miller), *Aloe Vera*. Journal of Environmental Science and Health, Part C, [Online], 24(1), pp.103-154. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/16690538> [Accessed 25 June, 2015]

Curzon, G. (1990). How reserpine and chlorpromazine act: the impact of key discoveries on the history of psychopharmacology. Trends in Pharmacological Sciences, [Online], 11, pp.61–63. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/2180160> [Accessed 25 June, 2015]

- Dalby, A. (2002). *Dangerous Tastes: The Story of Spices*. University of California Press, p.89.
- Dharmasiri, M., Jayakody, J., Galhena, G., Liyanage, S. and Ratnasooriya, W. (2003). Anti-inflammatory and analgesic activities of mature fresh leaves of *Vitex negundo*. *Journal of Ethnopharmacology*, [Online], 87(2-3), pp.199-206. Available at: <http://www.ucpress.edu/book.php?isbn=9780520236745> [Accessed 25 June, 2015]
- Das, P., Islam, M., Mahmud, A., Kabir, M., Hasan, M., Khatun, Z. and Rahman, M. (2012). An ethnomedicinal survey conducted among the folk medicinal practitioners of three villages in Kurigram district, Bangladesh. *American-Eurasian Journal of Sustainable Agriculture*, [Online], 6, pp.85-96. Available at: http://www.researchgate.net/publication/230602046_An_ethnomedicinal_survey_conducted_among_the_folk_medicinal_practitioners_of_three_villages_in_Kurigram_district_Bangladesh_1 [Accessed 25 June, 2015]
- Das, S. (2011). Indigenous people's access to land in northern-belt of Bangladesh: a study of the Santal community. *Universitetet i Tromsø*. [Online] Available at: <http://hdl.handle.net/10037/3471> [Accessed 25 June, 2015].
- Datte, J.Y., Traore, A., Offoumou, A.M., Ziegler, A. (1998). Effect of leave extract of *Caesalpinia bonduc* (Caesalpiniaceae) on the contractile activity of uterine smooth muscle of pregnant rats. *Journal of Ethnopharmacology*, [Online], 60, pp. 149–155. Available at: http://database.prota.org/PROTAhtml/Caesalpinia%20bonduc_En.htm [Accessed 25 June, 2015]
- Dohadwalla, A.N. (1985). Natural product pharmacology: strategies in search of leads for new drug designs. *Trends in Pharmacological Sciences*, 6, pp.49–53. Available at: <http://www.cell.com/trends/pharmacological-sciences/abstract/0165-6147> (85)90020-3 [Accessed 25 June, 2015]
- Figueirinha, A., Cruz, M., Francisco, V., Lopes, M. and Batista, M. (2010). Anti-inflammatory activity of *Cymbopogon citratus* leaf infusion in lipopolysaccharide-stimulated dendritic cells: contribution of the polyphenols. *Journal of Medicinal Food*, [Online], 13(3), pp.681-690. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20438326> [Accessed 25 June, 2015]

Fu, P.P., Yang, Y.C., Xia, Q., Chou, M.C., Cui, Y.Y., Lin G. (2002). Pyrrolizidine alkaloids-tumorigenic components in Chinese herbal medicines and dietary supplements. *Journal of Food and Drug Analysis*, [Online], 10(4), pp. 198-211. Available at: [http://www.researchgate.net/profile/Ya_Chen_Yang/publication/265873732_Pyrrolizidine_Alkaloids_-](http://www.researchgate.net/profile/Ya_Chen_Yang/publication/265873732_Pyrrolizidine_Alkaloids_-Tumorigenic_Components_in_Chinese_Herbal_Medicines_and_Dietary_Supplements/links/54f6859f0cf2ca5efefe5d1f.pdf)

[Tumorigenic_Components_in_Chinese_Herbal_Medicines_and_Dietary_Supplements/links/54f6859f0cf2ca5efefe5d1f.pdf](http://www.researchgate.net/profile/Ya_Chen_Yang/publication/265873732_Pyrrolizidine_Alkaloids_-Tumorigenic_Components_in_Chinese_Herbal_Medicines_and_Dietary_Supplements/links/54f6859f0cf2ca5efefe5d1f.pdf) [Accessed 25 June, 2015]

Gilani, A.H., (1998). Novel developments from natural products in cardiovascular research. *Phytotherapy Research*, [Online], 12(1), pp.66-69. Available at: [http://onlinelibrary.wiley.com/doi/10.1002/\(SICI\)1099-1573\(1998\)12:1%2B%3CS66::AID-PTR253%3E3.0.CO;2-W/abstract](http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1099-1573(1998)12:1%2B%3CS66::AID-PTR253%3E3.0.CO;2-W/abstract) [Accessed 25 June, 2015]

Gilani, A.H., Molla, N., Atta-ur-Rahman, Shah, B.H. (1992). Role of natural products in modern medicine. *Journal of Pharmaceutical Medicine*, [Online], 2, pp. 111–118. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3061248/> [Accessed 25 June, 2015]

Harrison, P. (1998). Herbal Medicine takes roots in Germany. *Canadian Medical Association Journal*, [Online], 10, pp. 637–639. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1229014/> [Accessed 25 June, 2015]

Hossan, M., Roy, P., Seraj, S., Mou, S., Monalisa, M., Jahan, S., Khan, T., Swarna, A., Jahan, R. and Rahmatullah, M. (2012). Ethnomedicinal knowledge among the Tonchongya tribal community of Roangchaari Upazila of Bandarban district, Bangladesh. *American-Eurasian Journal of Sustainable Agriculture*, [Online], 6(4), pp.349-359. Available at: http://www.academia.edu/10110531/Ethnomedicinal_knowledge_among_the_Tonchongya_tribal_community_of_Roangchaari_Upazila_of_Bandarban_district_Bangladesh [Accessed 25 June, 2015]

Indian Snakeroot. (2008). American cancer Society, [Online], Available at: <http://www.cancer.org/treatment/treatmentsandsideeffects/complementaryandalternativemedicine/complementaryandalternativemethodsandcancer/index> [Accessed 25 June, 2015]

Jabeen, Q., (2001). Studies on the calcium channel blocking activities of indigenous medicinal plants. M.Phil Thesis, University of Karachi, Karachi, [Online], pp. 35–64. Available at: http://www.jpma.org.pk/full_article_text.php?article_id=4740 [Accessed 25 June, 2015]

Jones, W.B. (1998). Alternative Medicine-Learning from the past, examining the present, advancing to the future (editorial). *Journal American Medical Association Alternative Medicine-Learning from the past, examining the present, advancing to the future (editorial)*. *Journal American Medical Association*, [Online], pp. 1616–1618. Available at: http://www.chiro.org/alt_med_abstracts/FULL/Alternative_Medicine_Learning_From.shtml [Accessed 25 June, 2015]

Khaleque, K. (1995). Ethnic communities of Bangladesh. In: Gain, P. (ed.) *Bangladesh, Land, Forest and Forest People*, [Online], pp. 1-25. Available at: http://www.wildmukul.com/uploads/1/1/6/6/11664733/uddin_n_mukul_2012_ind._j_of_trop._bi_odiv_proof.pdf [Accessed 25 June, 2015]

Kumar, B. and Ragunath, G. (2014). Effect of *Mucuna Pruriens* Seeds on Testes of Young Albino Rats. *Indian Journal of Public Health Research & Development*, [Online] 5(4), p.14. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:ijphrd&volume=5&issue=4&article=003> [Accessed 25 June, 2015]

Mayo Clinic Book of Alternative Medicine. (2010). [Online], p.47. Available at: <http://store.mayoclinic.com/BMC/pdf/books/291500/premium/291500.pdf> [Accessed 25 June, 2015]

Milne, F.J., Pinkney-Atkinson, V.J. (2004). Hypertension guideline 2003 update. *South African Medical Journal*, [Online], 94, pp. 209–216. Available at: <http://www.samj.org.za/index.php/samj/article/view/2535/1794> [Accessed 25 June, 2015]

Minter, S., (2001). Chemical creativity. *Biochemist*, (23), pp. 14–17.

Mollik, M., Hassan, A., Paul, T., Sintaha, M., Khaleque, H., Noor, F., Nahar, A., Seraj, S., Jahan, R., Chowdhury, M. and Rahmatullah, M. (2010). A survey of medicinal plant usage by folk medicinal practitioners in two villages by the Rupsha River in Bagerhat district, Bangladesh.

American-Eurasian Journal of Sustainable Agriculture, [Online], 4(3), pp.349-356. Available at: http://www.researchgate.net/publication/261912733_A_Survey_of_Medicinal_Plants_Used_by_Folk_Medicinal_Practitioners_of_Paschim_Shawra_and_Palordi_Villages_of_Gaurnadi_Upazila_in_Barisal_District_Bangladesh [Accessed 25 June, 2015]

Ocvirk, S., Kistler, M., Khan, S., Talukder, S. and Hauner, H. (2013). Traditional medicinal plants used for the treatment of diabetes in rural and urban areas of Dhaka, Bangladesh – an ethnobotanical survey. *J Ethnobiology Ethnomedicine*, [Online],9(1), p.43. Available at: <http://www.ethnobiomed.com/content/9/1/43> [Accessed 25 June, 2015]

Pati, P., Sharma, M., Salar, R., Sharma, A., Gupta, A. and Singh, B. (2008). Studies on leaf spot disease of *Withania somnifera* and its impact on secondary metabolites. *Indian J Microbiol*, [Online], 48(4), pp.432-437. Available at: <http://link.springer.com/article/10.1007%2Fs12088-008-0053-y> [Accessed 7 June, 2015]

Pavan, M.V., Ghini, B., Castro, M., Lopes-De-Faria, J.B. (2003). Prevention of hypertension attenuates albuminuria and renal expression of fibronectin in diabetic spontaneously hypertensive rats. *American Journal of Nephrology*, [Online], 23, pp. 422–428. Available at: http://www.researchgate.net/publication/9042250_Prevention_of_hypertension_attenuates_albuminuria_and_renal_expression_of_fibronectin_in_diabetic_spontaneously_hypertensive_rats [Accessed 7 June, 2015]

Rahman, S. and Jairajpuri., M. (1993). *Neem in Unani Medicine*. Neem Research and Development Society of Pesticide Science, pp.208-219.

Rahmatullah, M. and Mukti, M. (2013). Treatment with aquatic plants by a Bagdi tribal healer of Rajbari District, Bangladesh. *Ancient Science of Life*, [Online], 33(1), p.22. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4140017/> [Accessed 7 June, 2015]

Rahmatullah, M., Ayman, U., Akter, F., Sarker, M., Sifa, R., Sarker, B., Chyiti, H., Jahan, F., Chowdhury, M. and Chowdhury, S. (2013). Medicinal formulations of a Kanda tribal healer – a tribe on the verge of disappearance in Bangladesh. *African Journal of Traditional, Complementary and Alternative Medicines*, [Online], 10(2). Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3746568/> [Accessed 7 June, 2015]

Rahmatullah, M., Azam, N., Khatun, Z., Seraj, S., Islam, F., Rahman, A., Jahan, S. and Aziz, S. (2012). Medicinal plants used for treatment of diabetes by the marakh sect of the Garo tribe living in Mymensingh district, Bangladesh. *African Journal of Traditional, Complementary and Alternative Medicines*, [Online], 9(3). Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3746667/> [Accessed 7 June, 2015]

Rahmatullah, M., Hasan, A., Parvin, W., Moniruzzaman, M., Khatun, A., Khatun, Z., Jahan, F. and Jahan, R. (2012). Medicinal plants and formulations used by the Soren clan of the Santal Tribe in Rajshahi district, Bangladesh for treatment of various ailments. *African Journal of Traditional, Complementary and Alternative Medicines*, [online] 9(3), pp.350-359. Available at: <http://www.ajol.info/index.php/ajtcam/article/view/81427/71602> [Accessed 7 June, 2015].

Rahmatullah, M., Jahan, R., Safiul Azam, F., Hossan, S., Mollik, M. and Rahman, T. (2011). Folk Medicinal Uses of Verbenaceae Family Plants in Bangladesh. *African Journal of Traditional, Complementary and Alternative Medicines*, [Online], 8(5). Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3252728/> [Accessed 7 June, 2015].

Rahmatullah, M., Khatun, Z., Hasan, A., Parvin, W., Moniruzzaman, M., Khatun, A., Mahal, M., Bhuiyan, S., Mou, S. and Jahan, R. (2012). Survey and scientific evaluation of medicinal plants used by the Pahan and Teli tribal communities of Natore district, Bangladesh. *African Journal of Traditional, Complementary and Alternative Medicines*, [Online] 9(3). Available at: <http://www.bioline.org.br/abstract?id=tc12050> [Accessed 7 June, 2015].

Rahmatullah, M., Khatun, A., Morshed, N., Neogi, P., Khan, S., Hossan, M., Mahal, M. and Jahan, R. (2010). A Randomized Survey of Medicinal Plants used by Folk Medicinal Healers of Sylhet Division, Bangladesh. *American-Eurasian Journal of Sustainable Agriculture*, [Online], 4(1), pp.52-62. Available at: <http://connection.ebscohost.com/c/articles/51701750/randomized-survey-medicinal-plants-used-by-folk-medicinal-healers-sylhet-division-bangladesh> [Accessed 7 June, 2015].

Rahmatullah, M., Noman, A., Hossan, M., Harun-Or-Rashid, M., Rahman, T., Chowdhury, M. and Jahan, R. (2009). A survey of medicinal plants in two areas of Dinajpur district, Bangladesh including plants which can be used as functional foods. *American-Eurasian Journal of Sustainable Agriculture*, [Online], 3(4), pp.862-876. Available at:

http://www.researchgate.net/publication/234806913_A_Survey_of_Medicinal_Plants_in_Two_Areas_of_Dinajpur_District_Bangladesh_Including_Plants_which_can_be_Used_as_Functional_Foods [Accessed 7 June, 2015].

Rahmatullah, M., Kabir, A. A. B. T., Rahman, M. M., Hossan, M. S., Khatun, Z., Khatun, M. A., & Jahan, R. (2010). Ethnomedicinal practices among a minority group of Christians residing in Mirzapur village of Dinajpur District. Bangladesh. *Adv Nat Appl Sci*, [Online] 4(1), 45-51. Available at: http://www.researchgate.net/publication/228805176_Ethnomedicinal_Practices_among_a_Minority_Group_of_Christians_Residing_in_Mirzapur_Village_of_Dinajpur_District_Bangladesh [Accessed 25 June, 2015].

Rao, K.V., Hanuman, J.B., Alvarez, C., Stoy, M., Juchum, J., Davies, R.M., Baxley, R. (1995). A new large-scale process for taxol and related taxanes from *Taxus brevifolia*. *Pharmacological Research*, [Online], 12, pp.1003–1010. Available at: <http://link.springer.com/article/10.1023%2FA%3A1016206314225#page-1> [Accessed 25 June, 2015].

Rietbrock, N., Woodcock, B.G. (1985). Two hundred years of foxglove therapy: *Digitalis purpurea*. *Trends in Pharmacological Sciences*, [Online], 6, pp .267–269. Available at: <http://www.cell.com/trends/pharmacological-sciences/abstract/0165-6147> (85)90123-3 [Accessed 25 June, 2015].

Saeed, S.A., Atiq, M., Verani, S., Gilani, A.H. (2002). New vistas in the therapeutic uses of aspirin. *Research Communications in Pharmacology and Toxicology*, [Online], 6, pp.277–285. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/3126155> [Accessed 25 June, 2015].

Singh, H. (2002). *Rasayana: Ayurvedic Herbs for Longevity and Rejuvenation*. CRC Press, [Online], pp.272–280. Available at: <http://online.liebertpub.com/doi/abs/10.1089/10755530360623446?journalCode=acm> [Accessed 25 June, 2015].

Toki, K., Saito, N., Irie, Y., Tatsuzawa, F., Shigihara, A., Honda, T. (2008). 7-O-Methylated anthocyanidin glycosides from *Catharanthus roseus*. *Phytochemistry*, [Online], 69 (5), pp 1215–

1219. Available at: <http://www.sciencedirect.com/science/article/pii/S0031942207006747>
[Accessed 25 June, 2015]

Uddin, M., Hassan, M. and Sultana, M. (2006). Ethnobotanical survey of medicinal plants in Phulbari Upazila of Dinajpur District, Bangladesh. *Bangladesh Journal of Plant Taxonomy*, [Online], 13(1). Available at: <http://www.banglajol.info/index.php/BJPT/article/view/596>
[Accessed 25 June, 2015]

Unitproj.library.ucla.edu, (2015). Medicinal Spices Exhibit - UCLA Biomedical Library: History & Special Collections. [Online] Available at: <http://unitproj.library.ucla.edu/biomed/spice/index.cfm?displayID=15> [Accessed 25 June, 2015].

Wetzel, M.S., Kaptchuk, T.J., Haramati, A., Einsenberg, D.M. (2003). Complementary and alternative medical therapies: implications for medical education. *Annals of Internal Medicine*, [Online], 138, pp. 191–196 Available at: http://www.chiro.org/alt_med_abstracts/FULL/Ethical_Considerations_of_Complementary_Alternative.html [Accessed 25 June, 2015]

Yadav, J., Arya, V., Yadav, S., Panghal, M., Kumar, S. and Dhankhar, S. (2010). *Cassia occidentalis* L.: A review on its ethnobotany, phytochemical and pharmacological profile. *Fitoterapia*, [Online], 81(4), pp.223-230. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/19796670> [Accessed 25 June, 2015]