



Review article

Herbal remedies in cure of tuberculosis prevalent among ethnic communities in Central India

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Abstract: Since ancient times, tuberculosis (TB) is an age-old contagious disease and patients are suffering from illnesses. India bears a disproportionately large burden of the world's tuberculosis rates, as it resides to be the biggest health problem in India. One third of the world's population is infected with TB. Recently, an increasing concern has been observed because the causing organism of this disease has become multi-drug resistant. The present study was carried out among Gond, Korku and Bhatra tribe in Central India. Out of 700 respondents surveyed 443 respondents (63.2%) of them were found to be suffering from disease. Gond tribes preferred leaf or root powder of Muskdana (*Abelmoschus esculentus*); Korku tribes preferred leaf or root powder of Aduša (*Adhatoda vasica*) and Bhatra tribes favoured whole plant of Van Tulsi (*Ocimum basilium*). Out of diseased 443, 307 (69.3%) were found to be cured by herbal medicines in their region for a period of five months. The paper concludes that WHO has thus, recognized these herbal remedies and found, it will not be feasible to replace and probably not desirable to replace these herbal home remedies with modern medicines.

Keywords: Tribals - Herbal - Traditional healers - Formulations.

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INTRODUCTION

Tuberculosis (TB), an infectious deadly disease of worldwide occurrence is caused by various species of Mycobacterium, especially Mycobacterium tuberculosis and its treatment is one of the most severe challenges at the global level (Grange & Zunla 2002). Globally, about 2 million people die with this disease and 9 million become infected each year (WHO 2006). In different regions comprising of 141 countries of globe as African, American, East Mediterranean, European, South East Asian and Western Pacific area new cases of tuberculosis (TB) were estimated as 7.96 (6.3–11.1) million in year of 1997, (Dye *et al.* 1999). An estimated 1.87 million people died of TB and the global case fatality rate was 23% but exceeded 50% in some African countries (Dye *et al.* 1999). Global prevalence of MTB infection was 32% (1.86 billion). Eighty percent of all incident TB cases were found in 22 countries, with more than half the cases occurring in 5 Southeast Asian countries. The global burden of tuberculosis remains enormous, mainly because of poor control in Southeast Asia, sub-Saharan Africa, and Eastern Europe, and because of high rates of M tuberculosis and HIV co infection in some African countries (Dye *et al.* 1999).

Tuberculosis, exhibiting specific symptoms was published in consumption of lungs in terms of diagnosis, symptoms, signs of accuracy as per studies observed by Richard Morton in Latin Language for the first time in year 1689 in book Phthisilogia (Richard 1694, Keers 1982). In 1700, John Jacob Manget further described in year 1700 form of disseminated tuberculosis as miliary (TB) which were linked with tiny tubercles as evident by gross pathological examination to had innumerable millet seed in size and appearance, which he coined the term miliary (TB) had been fatal form of dissemination from Mycobacterium tuberculosis (Manget 1700, Sakula 1982). Mycobacterium tuberculosis (TB) is a potential lethal disease if not diagnosed and treated early. It is this form of tuberculosis which pose patients suffering from human immune deficiency syndrome (HIV/AIDS) significant problem in treatment of infection. Mortality of this form has remained high, despite effective therapy

being available. The infection is considered to be a childhood disease (Udwadia *et al.* 2012). In 1720, Benjamin Marten after invention of narrowly viewed microscope conjectured that certain species of animalcula on lungs, particularly being contagious cause infection TB. He also developed a new theory of consumption (Doetsch 1978). At the beginning of the 19th century in 1865, Jean Antoine Villemin through further advanced demonstration of the transmissibility of *Mycobacterium tuberculosis* infection and the identification of the tubercle bacillus as the etiologic agent presented his results suggesting that TB was a contagious disease (Mohan & Sharma 2009, Rubin 1995). However, it was Robert Koch who announced the discovery of the tubercle bacillus during the monthly evening meeting of the Berlin Physiological Society on 24th March 1882 (WHO 1994). On this day, after thousands of years, *Mycobacterium tuberculosis*, the organism causing TB finally revealed itself to humans. Commemorating the centenary of this event, since 1982, 24th March is being celebrated as “World TB Day” world over. Wilhelm Conrad Roentgen’s discovery of X-rays, facilitated radiographic visualization of changes caused by TB in a living person. Thus, it was in the early years of 20th century that basic concepts related to etiologic agent of TB, consequent pathological changes in humans and detection of the organism became established. In Belfast it was found tuberculosis infection was caused due to failure of pasteurization of milk (John & Debra 2011). It was further reported that antibiotic streptomycin was too toxic for human beings. In 1942 Streptomycin antibiotic was isolated and developed from actinomycin C and D, which developed an era of antibiotics and their role in the conquest of tuberculosis infection (Waksman 1964).

India has a large burden, of the world’s tuberculosis patients as this developing country can ill afford, with an estimated economic loss of US\$ 43 billion and 100 US \$ annually lost directly due to disease (Udwadia *et al.* 2012, WHO 2013). Tuberculosis infection is in rise in India, hence its important to prevent spreading rapidly by help of reputed physician than to follow complications (Udwadia *et al.* 2012, Sharma *et al.* 2012). It has claimed its victim throughout the history. It reached epidemic portion in Europe and North America (Anon 1893, Daniel 2006). India is a high TB burden country contributing to 26 per cent of global TB burden (WHO 2006). In 2008, nearly 2 million cases were reported in India and 2.76 lacs of deaths are reported every year of this disease (WHO 2009). The WHO reports in 2012 states that, there were almost 9 million new cases in 2011 and 1.4 million TB deaths (WHO 2013). Tuberculosis disproportionately affects the poor as things like crowded living, poor ventilation, malnutrition all makes individuals more susceptible. This is despite the availability of treatment that will cure most cases of TB. WHO reports of 2012 states that, 9 million people worldwide became sick with TB disease, most of whom (80%) live in one of the 22 high burden countries for TB (WHO 2009, WHO 2012, WHO 2013).

Globally, tuberculosis (TB) still remains a major public health problem. Which is wide spread in Africa region (Ethopia, Gambia, Congo, Liberia, Mali, Malwi, Nigeria, Keyna, Uganda, Republic of Tanzania, Zimbabwe), American region (Brazil, Argentina, Colombia, Eucador, Jamica, Mexico, Parague, Bolvia) , Eastern Mediterranean (Afghanistan, Sonali, Iran, Jordan), European region (Spain, Portugal, Check Republic Bulgaria, Romania Norway ,Switzerland), South East Asian region (India, Indonesia, Pakistan, Sri Lanka, Nepal, Myanmar, Thailand, Maldives), Western pacific region (China, Malaysia, PapauNew Guinea, Vietnam, Cambodia, Korea) (Dye *et al.* 1999).

Tuberculosis is a leading killer of people living with HIV (PLHIV). Tuberculosis is a respiratory disorder which is passed to other people through coughing and sneezing over a period of time under unsanitary conditions. The disease is caused by bacterium *Mycobacterium tuberculosis*. This bacterium is passed through fine spray of water vapors expelled when a person coughs or sneezes, if proper ventilation not exists in the system. Since ancient times, there have been references to TB or illnesses resembling TB from several parts of the world from many civilizations. The earliest references to TB can be found in the language *Sanskritam* (Sanskrit). In the ancient Indian scriptures, *The Vedas*, TB was referred to as *Yakshma* (meaning wasting disease). Description of a TB-like disease has been documented in ancient Chinese and Arabic literature. In English literature, the word “consumption” (derived from the Latin word *consumer*) has also been used to describe TB. The word “tuberculosis” appears to have been derived from the Latin word *tubercula* (meaning “a small lump”) (Dubos & Dubos 1952), Waksman (1964). Many studies conducted had reported that Fracastorius (1443–1553) believed that TB was contagious, whereas Thomas Willis (1621–1675) had documented in clinical presentation of consumption in detail in his treatise *Pthiologica* (Rubin 1995, Keers 1978, Sakula 1982).

Richard Morton (1637–1698) has also described several pathological appearances of TB (Anand & McKay 2012, WHO 2006).

Tuberculosis is an age-old contagious disease in Bangladesh, which often leads to fatality if not treated properly. Recently, there has been increasing concerns because the organism causing this disease has become multi-drug resistant. Since this disease is prevalent in Bangladesh and is often treated with herbal medicines by the traditional medicinal practitioners (Kavirajes), we undertook an ethnomedicinal survey of Kavirajes in Bogra district, Bangladesh to gather information on medicinal plants used to treat this disease. Plants were collected from the Kavirajes and identified at the Bangladesh National Herbarium. The collected information indicates that the following plants (with family name in parenthesis) are used to treat tuberculosis: *Adhatoda vasica* (Acanthaceae), *Andrographis paniculata* (Acanthaceae), *Centella asiatica* (Apiaceae), *Catharanthus roseus* (Apocynaceae), *Holarrhena antidysenterica* (Apocynaceae), *Colocasia esculenta* (Araceae), *Pistiastratiotes* (Araceae), *Aloe vera* (Asphodelaceae), *Calendula officinalis* (Asteraceae), *Shorea robusta* (Dipterocarpaceae), *Ricinus communis* (Euphorbiaceae), *Swertia chirata* (Gentianaceae), *Ocimum sanctum* (Lamiaceae), *Allium sativum* (Liliaceae), *Hibiscus rosa-sinensis* (Malvaceae), *Swietenia mahagoni* (Meliaceae), *Tinospora cordifolia* (Menispermaceae), *Eucalyptus globules* (Myrtaceae), *Piper longum* (Piperaceae), *Cymbopo gonicitratus* (Poaceae), *Zizyphus mauritiana* (Rhamnaceae), *Morinda citrifolia* (Rubiaceae) and *Vitis vinifera* (Vitaceae) (Rahman *et al.* 2009).

TB in the United States reflects the global reality. TB is one of the most common infectious diseases worldwide (WHO 2013). While significant progress has been made toward the elimination of TB in the United States, this disease remains an urgent public health problem in many other parts of the world. Tuberculosis was first isolated in 1882 by German Physician named Robert Koch (1843–1910). Tuberculosis (TB) most commonly affects lungs but can also affect any part of the body. A person can be infected by tuberculosis bacillus, which proved to be ineffective as a cure but became important diagnostic tool for tuberculosis; if a healthy person inhales minute particles of infected sputum from the air. Bacteria get into air when a person who has lungs infection coughs, sneezes, shouts or spits. People in the vicinity of infected air if breathe such air the bacteria is inhaled and healthy one is infected with tuberculosis. This bacterium after being perceived in lungs of healthy person can remain inactive (dormant) state for several years, without causing symptoms or spreading infection. As and when the immune system of the infected person with dormant Tuberculosis bacteria is weakened, the person exhibits the symptoms of infection (Sakula 1982).

As soon as the immune system gets weakened symptoms of horrible cough extending for a period of more than 3–4 weeks followed with chest pain, blood or sputum when coughing are observed. In acute and sub-acute cases patient gets fatigue, reduced weight, loss of appetite, high fever, chills and night sweatness is observed. The diagnosis is further confirmed leading to skin test, chest X-rays, sputum analysis and PCR tests. To detect genetic material of causing bacteria are performed to confirm laboratory analysis of diseases. According to an estimate of WHO about 8–9 million people are infested throughout the globe and about three million people are killed every year (WHO 2013).

The present study focuses on use of home an herbal remedies in use of plants and their parts as prevalent in Central India in pockets of Gond, Korku and Bhatra tribes in states of Madhya Pradesh and Chhattisgarh.

MATERIALS AND METHODS

The study has been carried out in states of Madhya Pradesh and Chhattisgarh, states in India during the period 2004–2006. The study was carried out among Gond tribes in Madhya Pradesh (*viz.* Banjari, Lakhnadon, Dhuma, Bitarwada), Korku Tribe in Madhya Pradesh: (Kesla, Tawa Nagar, Sohagpur, Bankhedi) and Bhatra tribe in Chhattisgarh: (Kondagaon, Kolebeda, Makdi & Keshkal) to study health status pertaining to Tuberculosis. The Survey conducted with examination of 700 persons, who were tested for Tuberculosis infestation, comprising of Gond, Korku and Bhatra tribes in districts covered Seoni, Hoshangabad and Bastar in tribal localities has been listed in table 1. During the visits a rapport was made with a number of elderly people of tribal communities and traditional herbal healers who were contacted to collect the information and interviewed. The discussion revealed local name of species, plant part used, formulation and dosages of herbal drug used by traditional healers and tribal communities. The specimens were collected, processed and identified with help of flora. During the visits in tribal pockets tribal communities, traditional healers, of different age group were selected for recording the information. The people were randomly selected with help of traditional healers and tribal communities who were suffering from tuberculosis to avoid any biasness for selection. The

information was recorded from 443 patients with open structured schedule and discussions were held with patients to confirm and record symptoms occurred due to infestation of tuberculosis. The herbal therapy was recorded as prevalent among 307 patients who informed they were benefitted on account of continuous medication in last five months, along with information on plant part used and formulations. The pathological tests of patients and reports were conducted with assistance of Regional Medical Research Centre who carries health examinations for Tribes. The discussion revealed local name of species, plant part used, formulation and dosages of herbal drug used by traditional healers and tribal communities. The specimens were collected, processed and identified with help of flora.

Table 1. Distribution of patients suffering from Tuberculosis in tribal pockets of MP & CG.

State	A) District B) Tribe	Localities (Cluster of villages)	No. of persons surveyed in Population (N)	No. of persons infected with Tuberculosis (n 1)	No. of persons cured (n 2)	% of infected persons	% of cured persons
Madhya Pradesh MP		1. Banjari - Ramchor, Nagan Deori, Mohagaon	50	42	35	21.0	
	A) Seoni	2. Lakhnadon - Kunda, Dungar gaon, Dhansor	50	39	31	19.5	
	B) Gond tribe	3. Dhuma	50	27	19	13.5	
		4. Bitarwada - Kohma, Dangani, Ari	50	25	20	12.5	
	Sub-total 1			200	133	105	66.5
Madhya Pradesh MP		1. Kesla - Semli-khurd, Borkheda, Kuorda	75	69	38	27.6	
	A) Hoshanagbad	2. Tawa Nagar - Gomtipara, Morpani	75	40	23	16.0	
	B) Korku tribe	3. Sohagpur - Samanapur, Rainabani	50	22	13	8.0	
		4. Bankhedi - Mandakheda, Fatehpur, Goghari	50	27	19	18.8	
	Sub-total 2			250	158	91	63.2
Chhattisgarh CG		1. Kondagaon - Kalipara, Matipara, Sugampara	75	66	47	26.4	
	A) Bastar	2. Kolebeda - Khapdri, Kormel, Paroda	50	22	13	8.0	
	B) Bhatra tribe	3. Makdi - Pathari, Mohali	75	61	42	24.4	
		4. Keshkal	50	13	07	5.2	
	Sub-total 3			250	162	109	64.8
Cumulative status of patients			700	443	307	63.2	69.3

The discussion revealed local name of species, plant part used, formulation and dosages of herbal drug used by traditional healers and tribal communities (Fig. 1). The specimens were collected, processed and identified with help of flora. The information recorded in field were further screened in laboratory as per work pertaining to Indian ethno-botany and plants recorded (Chopra *et al.* 1965, Chopra *et al.* 1982, Nadkarni 1982, Kapur 1990, Jain 1981, 1991& 1996). The information as genus of plant species, local name, family, plant part used of plant species, formulation in cure of ailments prevalent among tribal community have been tabulated in the present investigation.

RESULTS

Out of 700 persons, tested and examined for infestation due to tuberculosis in tribal pockets of Central India. The study revealed that 443 tribal person were infested with tuberculosis in 2 districts of Madhya Pradesh (Seoni and Hoshanagbad district inhabited with Gond and Korku tribes respectively) and 1 district in Chhattisgarh state. (Bastar district inhabited with Bhatra tribes). The status of health of tribals in relation to Tuberculosis is shown in figure 2.

The study shows that in state of Madhya Pradesh Gond tribals were surveyed (n=200) to know the health status in relation to tuberculosis. The survey revealed that 66.5% of tribals (n=133), were found to be infested with tuberculosis in Seoni district in localities in clusters of villages at Banjari, Lakhnadon, Dhuma and

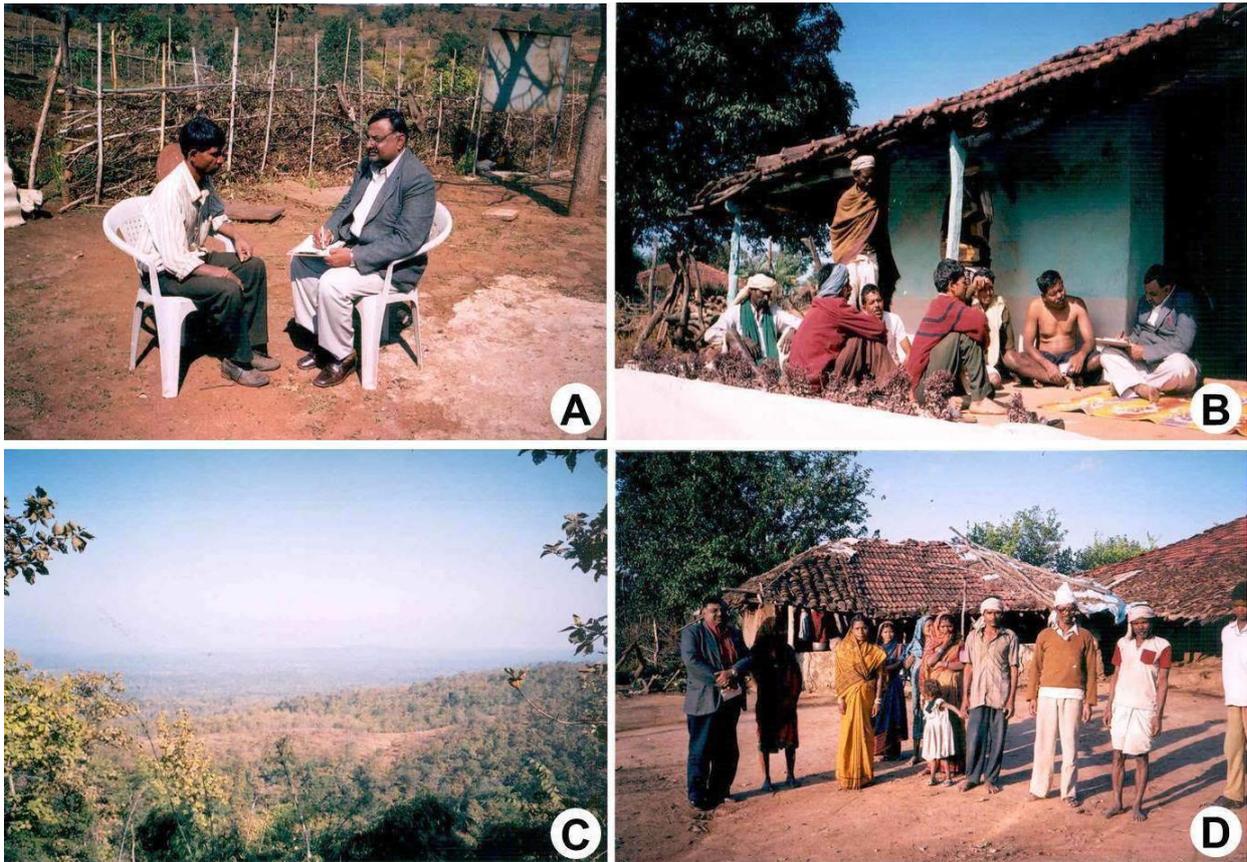


Figure 1. A, Interviewing a traditional healer; B, Interviewing Korku Tribal community; C, A view of forest; D, A family of Bhatra tribe in Chhattisgarh.

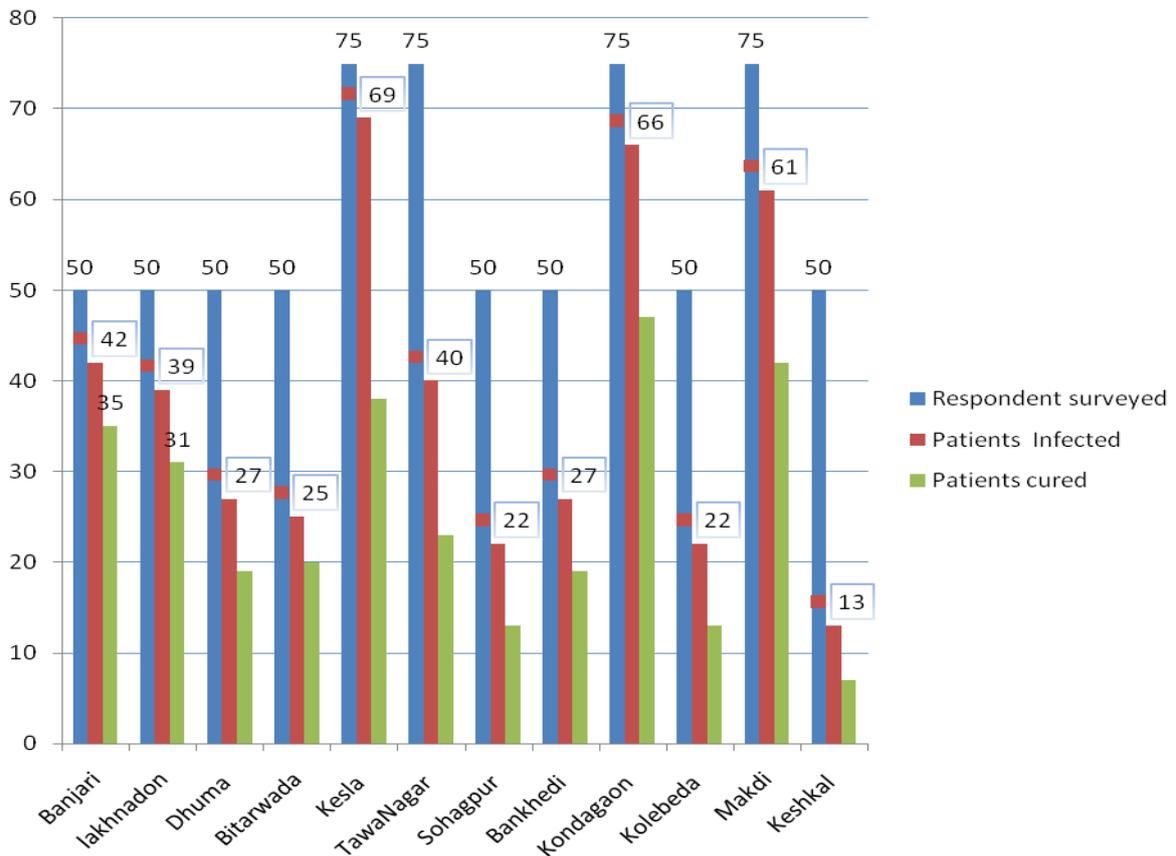


Figure 2. Status of tuberculosis in tribal pockets respondent surveyed, patients affected and patients cured.

Biterwada the infestation was found to be varying from 12.5–21 %. Patients were found to be infested with disease since last 1–2 years. These patients were supplemented with Leaf or Root Powder of Muskdana, *Abelmoschus esculentus* (Linn.) Moech. The herb was collected during rainy season from forest, washed and dried, powdered and stored in cool place. About 3–5 gms of powdered leaf / root depending upon its availability was orally administered empty stomach 5–6 times a day, for a period of 5–6 months. The dose is even recommended for a period of 2–3 months, even after cure of illness as bacteria may be in a dormant state (Table 2). The traditional healers during the investigation accompanied to home of some of the patients to record information and their experience about the cure. It was observed during the visit at patients home they have planted Muskdana, *Abelmoschus esculentus* in their home. The patients collect fresh leaves from species and powder is used for cure of illness. The patients were monitored for health status by examination of Chest X-ray and sputum test and record is maintained. After a period of five months of continuous medication about 78.94% (n=105) of infected persons were found to be cured.

Table 2. Herbal medicine prevalent with plant parts, formulation and dose in cure of Tuberculosis in tribal pockets of Madhya Pradesh and Chhattisgarh state.

Plant Species (Local Name)	Family	Tribe	District (State)	Plant part used	Formulation	Dosages
<i>Abelmoschus esculentus</i> (Linn.) Moech. (Muskdana)	Malvaceae	Gond	Seoni (Madhya Pradesh)	Leaf or Root	Powder	3–5 gms of leaf or root powder is orally administered with warm water empty stomach 5–6 times a day, for a period of 5–6 months. The dose is even recommended for 2–3 months after cure as bacteria may be in dormant state
<i>Adhatoda vasica</i> Nees (Adusa)	Acanthaceae	Korku	Hoshangabad (Madhya Pradesh)	Leaf or Fruit	Powder	4–5 gms of leaf or fruit powder is orally administered twice a day first empty stomach before lunch with warm water and 5 hours after meals and before dinner for a period of 5–6 months
<i>Ocimum basilium</i> Linn. (Van Tulsi)	Lamiaceae	Bhatra	Bastar (Chhattisgarh)	Whole Plant	Decoction	1–2 gms of leaves, twigs, flowers, fruits (whole plant) is collected and boiled with 200 ml of water for 15–20 minutes. The plant is mashed and juice is extracted filtered and stored in cool place. This decoction is orally administered 5–6 times a day for period of 5–6 months

When we talk about the health status of Korku tribes who were screened for Tuberculosis (n=250) in Hoshangabad district in localities in clusters of villages at Kesla, Tawa Nagar, Sohagpur and Bankhedhi, the infestation was found that 63.2 % of respondents (N=158) infested with tuberculosis to be varying from 8–27.6 %. These patients were supplemented with Leaf or Fruits of Adusa, *Adhatoda vasica* Nees. About 4–5 gms of leaf or fruit powder was orally administered twice a day first empty stomach before lunch with warm water and 5 hours after meals and before dinner for a period of 5–6 months (n=91). After a period of five months of continuous medication 56.1 % of respondent (n=91) were found to be cured with the supplement of herbal medicine. The patients were monitored for health status by examination of Chest X-ray and sputum test and record is maintained.

On the other hand the status of health of Bhatra tribes in Chhattisgarh state who were screened for Tuberculosis (n=250) in Bastar district in localities of in clusters of villages in Kondagaon, Kolebeda, Makdi and Keshkal, the infestation was found varying from 5.2–26.4 % (n=162). These patients were supplemented

with whole plant of Van Tulsi, *Ocimum basilium* Linn. 1–2 gms of leaves, twigs, flowers, fruits (whole plant) is collected and boiled with 200 ml. of water for 15–20 minutes. The plant is then mashed and juice is extracted, filtered and stored in cool place. This decoction is orally administered 5–6 times a day to patients for period of 5–6 months. The traditional healers during the investigation accompanied by researcher to home of some of the patients to record information and their experience about the cure. It was observed during the visit at patients home they have planted Van Tulsi in their home and extract fresh leaves, twigs etc for preparation of decoction. The patients were monitored for health status by examination of Chest X-ray and sputum test and record is maintained. After a period of five months of continuous medication about 67.2% (n =109) of the infected persons were found to be cured. The tribals cured with use of herbal drug have been shown in figure 3.

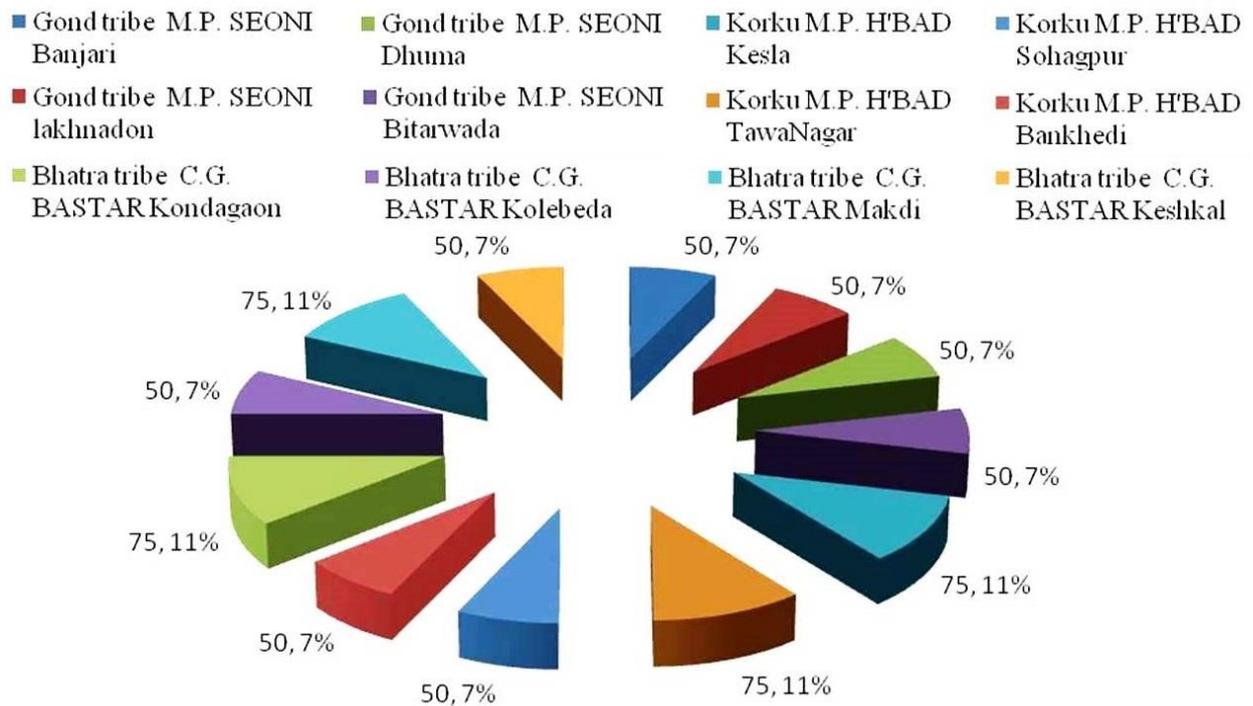


Figure 3. Patients cured in tribal pockets by use of herbal formulations.

DISCUSSION

Tuberculosis (TB) is a disease that has affected mankind from very ancient times. Anti-TB allopathic medications have been prescribed to control symptoms of this disease but results into side effects like hepatitis, hypersensitivity reactions, nausea, vomiting etc. The use of herbal medicine becoming popular due to toxicity and side effects of allopathic medicines. Medicinal plants from Ayurveda (Indian traditional medicine system) and from foreign origin have been successfully employed to treat tuberculosis (TB) (Sharma 1998). Globally, tuberculosis (TB) still remains a major public health problem. In India there is a high incidence of tuberculosis (TB) in country, contributing to 26 per cent of global TB burden (WHO 2006). Tuberculosis (TB) is the most common cause of death due to a single infectious agent worldwide in adults. The World Health Organization (WHO) in year 1993, took an unprecedented step and declared TB to be a global emergence (Sharma & Mohan 2004). Tuberculosis is a highly infectious disease with about one third of the world's population including 40 per cent from India estimated to be infected it (Agarwal 2004). Tuberculosis (TB) is a bacterial infection caused mainly by *Mycobacterium tuberculosis* (MTB). The development of paleopathology and paleo-epidemiology in infectious diseases has proven the very ancient origin of this disease (Godreui *et al.* 2007). Tuberculosis (TB) is principally a disease of poverty, with 95 per cent of cases 98 per cent of deaths occurring in developing countries (Sharma & Mohan 2004). Each year an estimated eight million new cases and two million deaths occur due to TB worldwide (Kishore *et al.* 2007).

Tuberculosis, still remains one of the largest on India's health and wellness scale. India as and when compared with global scenario remains at the highest tuberculosis (TB) burden country in the world (WHO 2012). According estimates of World Health Organization incidence of TB in India is 2.2 million cases rising to 2.6 million cases out of a global incidence of estimates as 8.7 million cases (WHO 2012). Where as in Canada,

the reports are for about 1,600 new cases of TB every year (WHO 2013, Anand & McKay 2012), which does not largely sum up, even closely, to the amount India suffers in India. Tuberculosis (TB) is principally a disease of poverty, with 95 per cent of cases and 98 per cent of deaths occurring in developing countries (Sharma & Mohan 2004, Godreuil *et al.* 2007). Each year an estimated eight million new cases and two million deaths occur due to TB worldwide (Kishore *et al.* 2007).

Tuberculosis is the biggest health issue around India, but what makes it worse is the newly and recently discovered global phenomenon of drugs available, known as Totally Drug-Resistant Tuberculosis (TDR-TB drug-resistant). The multi-drug resistant (MDR-TB - drug-resistant) drugs had been recommended, and gradually in the market Extensive drug resistant of tuberculosis (XDR-TB) are available, but are very costly to economically poor families. Gradually, the lowest but most dangerous and strongest of them all has situated itself in India as TDR-TB. Emergence of multi-drug resistant (MDR) and extensively-drug resistant (XDR) strains of *Mycobacterium tuberculosis* has further complicated the problem of tuberculosis (TB) control. Medicinal plants offer a hope for developing alternate medicines for the treatment of TB. The studies on herbal plants were done to evaluate in vitro anti-tubercular activity of five medicinal plants *viz.*, *Acalypha indica*, *Adhatoda vasica*, *Allium cepa*, *Allium sativum* and *Aloe vera* (Gupta *et al.* 2010). The ethnic communities in Central India are living in most hostile conditions at hill tops, down hills, where there are no approach roads, community hospitals, compelled to live in lonely places and are not so financially viable, so as to purchase costly drugs in remedial measures for tuberculosis and are only dependent on native flora for their health care. Many of these have good knowledge on flora, their distribution pattern, part and formulation and they pass such valuable herbal remedies from one generation to another through oral communication. Such remedies are quite effective and cheap in comparison to drugs marketed in township. Tuberculosis (TB) is a disease that has affected mankind from very ancient times. Anti-TB allopathic medications have been prescribed to control symptoms of this disease but results into side effects like hepatitis, hypersensitivity reactions, nausea, vomiting etc. The use of herbal medicine becoming popular due to toxicity and side effects of allopathic medicines. About 48 Medicinal plants from Ayurveda (Indian traditional medicine system) and from foreign origin have been explained which have the potential of anti-tubercular activity from various sources in the literature and successfully employed to treat tuberculosis (TB) (Arya 2011).

Medicinal plants based traditional systems of medicines are playing important role in providing health care to large section of population, especially in developing countries. Interest in them and utilization of herbal products produced based on them is increasing in developed countries also. It is a well-known fact that Traditional Systems of medicines always played important role in meeting the global health care needs. They are continuing to do so at present and shall play major role in future also. The system of medicines which are considered to be Indian in origin or the systems of medicine, which have come to India from outside and got assimilated in to Indian culture are known as Indian Systems of Medicine (Prasad 2002). India is one of the few countries in the world which has unique wealth of medicinal plants and vast traditional knowledge of use of herbal medicine for cure of various diseases (Gupta & Tandon 2004, Sharma 1998).

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India is one of the few countries in the world which has unique wealth of medicinal plants and vast traditional knowledge of use of herbal medicine for cure of various diseases (Gupta & Tandon 2004, Sharma 1998). India has a large burden of the world's tuberculosis (TB), one that this developing country can ill afford, with an estimated economic loss of US \$43 billion and 100 million lost annually directly due to this disease (Udwadia *et al.* 2011). Treatment in India is on the rise just as the disease itself is on the rise. To prevent spreading TB, it's important to get treatment quickly and to follow it through to completion by your doctor. This can stop transmission of the bacteria and the appearance of antibiotic-resistant strains. It is a knowingly fact that bacterial infections require antibiotics for treatment and prevention, thus, commonly you will see that patients diagnosed with tuberculosis have certain pills and antibiotics carried around with them.

In all the three tribal pockets a large number of traditional healers have pre-dominance in tribal pockets in the states of Madhya Pradesh and Chhattisgarh. These traditional healers collect medicinal plants and their parts, prepare formulations and supplement to their patients in health care of ailment. This indigenous information is passed from one generation to another and is in practice since last several hundreds of centuries.

CONCLUSION

Globally, tuberculosis (TB) still remains a major public health problem. India is a high TB burden country contributing to 26 per cent of global TB burden. However, herbal home Remedies have been found to be very effective in health care of tuberculosis a respiratory disorder which had spread throughout the globe and kills a large number of patients in acute and sub-acute cases every year. Hence WHO has also now recently recognized herbal medicines feasible to replace and probably desirable to replace herbal home remedies with modern medicines where so ever applicable.

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REFERENCES

- Agarwal SP (2004) Inter-sectoral cooperation for success of the RNTCP. *Indian Journal of Tuberculosis* 51: 59–62.
- Anand G & McKay B (2012) Awakening to Crisis, India Plans New Push Against TB. *The Wall Street Journal*. Available from: http://online.wsj.com/article/SB10001424127887324_461604578193611711666432.html (accessed: 03 Apr. 2013).
- Anon (1893) Jean–Antoine Villemin ‘Posthumous Honour to Villemin’. *Medical Record* 43(5): 149.
- Arya V (2011) A Review on Anti-Tubercular Plants. *International Journal of PharmTech Research* 3(2): 872–880.
- Chopra RN, Chopra SL & Chopra IC (1965) *Glossary of Indian Medicinal Plants*. CSIR, New Delhi.
- Chopra RN, Chopra SL, Handa KL & Kapur LD (1982) *Indigenous Drugs of India*. Second edition (Reprinted) Academic Publishers, New Delhi.
- Daniel T M (2006) The history of tuberculosis. *Respiratory Medicines* 100(11): 1862–1870.
- Doetsch RN (1978) *Benjamin Marten and His New Theory of Consumption: Microbiological Review*. American Society for Microbiology. USA, pp. 521–528.
- Dubos RA & Dubos J (1952) *The white plague: tuberculosis, man and society*. Little, Brown and Company, Boston.
- Dye C, Scheele S, Dolin P, Pathania V & Raviglione MC (1999) Consensus statement. Global burden of tuberculosis: estimated incidence, prevalence, and mortality by country. WHO Global Surveillance and Monitoring Project. *Journal of the American Medical Association* 282(7): 677–686.
- Godreuil S, Tazi L & Banuls AL (2007) Pulmonary Tuberculosis and Mycobacterium Tuberculosis: Modern Molecular Epidemiology and Perspectives. *Encyclopedia of Infectious Diseases: Modern Methodologies* 1(3): 1–29.
- Grange JM & Zumla (2002) The global emergency of Tuberculosis. *Journal of Royal Society for the Promotion of Health* 122: 78–81.
- Gupta AK & Tandon N (2004) *Reviews of Indian medicinal plants*. New Delhi, India: Indian Council of Medical Research.
- Gupta R, Thakur B, Singh P, Singh HB, Sharma VD, Katoch VM & Chauhan SV (2010) Anti-tuberculosis activity of selected medicinal plants against multi-drug resistant Mycobacterium tuberculosis isolates. *The Indian Journal of Medical Research* 131: 809–813.
- Jain SK (1981) *Glimpse of Indian Ethnobotany*, Oxford and I.B.H Pub, New Delhi.
- Jain SK (1991) *Dictionary of Indian Folk Medicines and Ethnobotany*. Deep Publications, New Delhi.

- Jain SP (1996) Ethno-Medico-Botanical survey of Chaibasa Singbhum district, Bihar. *Journal of Economic & Taxonomic Botany* 12(Additional Series): 403–407.
- John HW & Debra RM (2011) Tuberculosis Scrofula; Belfast Experience. *Ulster Medical Journal* 80 (2): 97–103.
- Kapur SK (1990) Review on Ethno-medico plants for skin affilications. *Indian Drugs* 28 (5): 210–223.
- Keers RY (1978) Pulmonary tuberculosis - A journey down the centuries. London: Bailliere, Tindall.
- Keers RY (1982) Richard Mortan (1637–98) and his Phthisilogias. *Thorax* 37(1): 26–31.
- Kishore PV, Palaian S, Paudel R, Mishra P, Prabhu M & Shankar PR (2007) Drug induced hepatitis with anti-tubercular chemotherapy: Challenges and difficulties in treatment. *Kathmandu University Medical Journal* 5(2): 256–260.
- Manget JJ (1700) Sepulcretum sive anatomica practica. *Observations* Gramer and Perachon, London Vol 1(XLVIII)
- Mohan A & Sharma SK (2009) History. In: Sharma SK & Mohan A (eds) Tuberculosis. 2nd ed. Jaypee Brothers Medical Publishers New Delhi. pp. 7–15.
- Nadkarni AK (1982) *Indian Materia Medica*. Popular Prakashan, Bombay Vol I & II (reprinted).
- Prasad LV (2002) In: Chaudhury RR & Rafei UM (eds) *Indian System of Medicine and Homoeopathy Traditional Medicine in Asia*. New Delhi: WHO-Regional Office for South East Asia, pp 283–328.
- Rahman F, Hossan S, Mollik AH, Islam T, Jahan R, Taufiq-Ur-Rahman M & Rahmatullah M (2009) Medicinal plants used against tuberculosis by traditional medicinal practitioners of Bogra district, Bangladesh. *Planta Medica* 75: PD64 [DOI: 10.1055/s-0029-1234543]
- Richard M (1694) Phthisiologia, Or, A treatise of consumptions. London. Sam Smith and Benj.
- Rubin SA (1995) Tuberculosis. Captain of all these men of death. *Radiologic Clinics of North America* 33: 619–39.
- Sakula A (1982) Robert Koch: Centenary of the Discovery of the Tubercle bacillus. *Thorax* 37: 246–251.
- Sharma SK & Mohan A (2004) Multidrug-resistant tuberculosis. *Indian Journal of Medicinal Research* 120: 354–376.
- Sharma SK (1998) *Medicinal plants used in Ayurveda*. New Delhi, India: National Academy of Ayurveda, Ministry of Health and Family Welfare, Government of India.
- Sharma SK, Mohan A & Sharma A (2012) Challenges in the diagnosis & treatments of military tuberculosis. *Indian Journal of Medicinal Research* 135(5): 703–730.
- Udwadia Z, Amale R, Ajbani K & Rodrigues C (2011) Totally Drug-Resistant Tuberculosis in India. *Oxford Journals* 201(1): 11–16.
- Udwadia Z, Amale R, Ajbani K & Rodrigues C (2012) Total drug-resistant tuberculosis in India. *Clinical Infectious disease* 54 (4): 579–581.
- Waksman SA (1964) *The Conquest of Tuberculosis*. University of California Press, California, 104 p.
- WHO (1994) World Health Organization: Report on the TB epidemic. WHO/TB/94.177.
- WHO (2006) World Health Organization: Global tuberculosis control report. WHO/HTM/TB/2006.362.
- WHO (2009) World Health Organization: The Stop TB Strategy, case reports, treatment outcomes and estimates of TB burden. *Global tuberculosis control: epidemiology, strategy, financing*. pp. 187–300.
- WHO (2012) World Health Organization: TB Statistics for India. TB Facts.
- WHO (2013) World Health Organization: Tuberculosis - Causes, Symptoms, Treatment, Diagnosis.