



DIVERSITY AND USES OF MEDICINAL PLANTS AMONG THE PEOPLE LIVING AROUND SAL FOREST OF DINAJPUR

M.S. Parvin, I.J. Sarmin, M.A. Mannan, M.S. Bari and M.S. Rahman*

Department of Agroforestry and Environment, Hajee Mohammad Danesh Science and Technology University, Dinajpur 5200, Bangladesh

ABSTRACT

A field survey was conducted among the people living around Sal forests of Dinajpur, Bangladesh to identify the diversity and uses of medicinal plants and to realize the local dependency and healthcare pattern through the medicinal plants. The field survey was done from October 2018 to March 2019. The current investigation identified a total of 30 medicinal plant species used for different ailments. Among them Tulsi, Basok, Gada flower, Coconut, Tetul, Ada, Neem, Durba grass, Thankuni, Anaros etc were popular and the people living around sal forests highly used these medicinal plants. Moreover, the respondents also grew necessary medicinal plants in their house like Tulsi, Gada flower, *Piper*, Basok, etc. The survey results also showed that there was extinction of some medicinal plants, among them Ulotkombol was highest (66%) in percentage for extinction. The research revealed that 61% respondents sought Kaviraj for their treatment. The survey also showed that most of the people (46%) choose medicinal plants for their primary health care, 29% emphasized medicinal plants availability, 16% on low price and 9% of people's reasons for traditional uses. In case of knowledge on medicinal plants, 32% had knowledge from inheritably, 32% had gathered knowledge from others, 22% sought Kaviraj and 10% solve their problem by self-medication. The study also revealed the most important thing that the majority of the people living around Sal forest of Dinajpur were highly dependent (60%) on medicinal plants for their healthcare and 40% people dependent on general medicine. Therefore, threatened medicinal species should be conserved properly to restore the forest in its original state.

Key words: Medicinal plant, diversity, sal forest, healthcare

INTRODUCTION

A medicinal plant is a plant that is used with the intention of maintaining health, to be administered for a specific condition, or both, whether in modern medicine or in traditional medicine (Wikipedia 2019). Millions of people throughout the world traditionally use medicinal plants for their primary health care since time immemorial (Mukul *et al.* 2007). These plants are easily and quickly available. The global demand for natural medicine is now growing day by day. The sal forests of Bangladesh belong to the category of tropical moist or

*Corresponding author: Email: shoibur@hstu.ac.bd, Cell phone: 8801777448929

dry deciduous forest, which covers about 32% of the forested land. Sal (*Shorea robusta*) is the dominant species of these forests. In the northern region of Bangladesh, Sal forests are the only remaining natural forest which is seen in Birganj, Nawabganj, Biral, Birampur upazilas of Dinajpur district and some parts of Thakurgaon and Panchagarh Districts. Many people live in and around the Sal forest area including ethnic groups like Santal. They use medicinal plants from the forest for their urgent ailments. According to the World Health Organization (WHO), medicinal plants form the basis of traditional and indigenous health systems used by the majority of the population of most developing countries. In Bangladesh, the importance of medicinal plants needs no mention. Bangladesh being a country of this Indian sub-continent also possesses a great diversity in plants. The linkage between biodiversity and human health is now well established (Bodeker 2005). Our study is aimed to assess the diversity and use of medicinal plants among the people living around Sal Forest, Dinajpur. Many research works about medicinal plants have been cited in literature (Thapa-Magar and Shrestha 2015). But few researches have been done in the Sal forest of northern region of Bangladesh specially in Singra Sal forest. Therefore, the present work was an attempt to identify the diversity of medicinal plants available in the Sal Forest area of Dinajpur, the uses of medicinal plants among the people living around the Sal Forest against several diseases and to realize the local dependency and health care pattern through the medicinal plants which are available in Sal forest area.

MATERIALS AND METHODS

The experiment was conducted in and around the people living near Singra (Birganj), Nawabganj and Biral Sal forest of Dinajpur, Bangladesh. The total area of Singra Sal forest is 355 ha and almost whole area was declared as National Park (305.69 ha) in 2010. Many people live in and around the forest area including ethnic groups like Santal. Nawabganj is located at 25.4167°N 89.0833°E. It has 34999 households and total area 314.68 km². Dighipara, a village of Nawabganj Upazila. It was declared as National forest under the name "Nawabganj National Forest" at 24/10/2010 by the People's Republic of Bangladesh. Biral Sal forest in Dinajpur which lies in the north-western part of Bangladesh (88° 42'-89° E, 25° 18'N-25° 29'N). The forest covers 1104.5 ha.

The extensive survey was conducted during the period of October 2018 to March 2019. Data has been collected from the respondents through a personal interview by using a questionnaire. The qualitative data were converted into quantitative by means of suitable scoring techniques. Random sampling has been applied to select the sampling size. A sample of 100 people was selected, twenty two (22) from Birganj (Singra Sal forest), twenty eight (28) from Nawabganj and fifty (50) from Biral Sal Forest. The collected data were coded, tabulated and analyzed according to the objectives of the study. Local units of measurement were converted into standard units. The data were entered into the computer by using the SPSS package program.

RESULTS AND DISCUSSION

Knowledge about medicinal plant

Patterns of medicinal plant use by local peoples are considered to vary as a function of plant

habitat collection, cultural changes and ecological and biochemical aspects (Stepp and Moerman 2001). Various species of medicinal plants have been observed in Dinajpur Sal Forest. There have been recorded about 30 medicinal plant species on the basis of the opinion of the respondents. The respondents have knowledge about these 30 medicinal plant species and their uses for the treatment of diseases. The results were shown that about 85% (highest) respondent have knowledge about Tulsi (*Ocimum tenuiflorum*) which mean and standards deviation were 0.85 and 0.359 respectively, while 3% (lowest) have knowledge about Harjora (*Cissus quadrangularis*) which mean and standard deviation were 0.03 and 0.171, respectively (Table 1).

Table 1. Distribution of respondents according to their knowledge about medicinal plants

Medicinal Plant Species	Knowledge of the respondents (%)	Mean	Standard Deviation
Basok (<i>Justicia adhatoda</i>)	80.0	0.80	0.402
Thankuni (<i>Centella asiatica</i>)	61.0	0.61	0.490
Anaros (<i>Ananas sativus</i>)	60.0	0.60	0.492
Arjun (<i>Terminalia arjuna</i>)	53.0	0.53	0.501
Shorno lota (<i>Cuscuta reflexa</i>)	19.0	0.19	0.394
Khoyer (<i>Acacia catechu</i>)	16.0	0.16	0.368
Tetul (<i>Tamarindus indica</i>)	69.0	0.69	0.464
Tokma (<i>Hyptis suaveolens</i>)	5.0	0.05	0.219
Tulsi (<i>Ocimum tenuiflorum</i>)	85.0	0.85	0.359
Daruchini (<i>Cinnamomu mverum</i>)	4.0	0.04	0.197
Ulot kombol (<i>Abroma augusta</i>)	9.0	0.09	0.287
Neem (<i>Azadirachta indica</i>)	66.0	0.66	0.476
Bel (<i>Aegle marmelos</i>)	11.0	0.11	0.314
Harjora (<i>Cissus quadrangularil</i>)	3.0	0.03	0.171
Durba ghas (<i>Cynodon dactylon</i>)	63.0	0.63	0.485
Ada (<i>Zingiber officinale</i>)	67.0	0.67	0.472
Ghritokumari (<i>Aloe barbadensis</i>)	5.0	0.05	0.219
Kalomegh (<i>Andrograph paniculata</i>)	47.0	0.47	0.502
Gada ful (<i>Calendula officinalis</i>)	71.0	0.71	0.456
Narikel (<i>Cocos nucifera</i>)	70.0	0.70	0.461
Dhutura (<i>Datura metel</i>)	11.0	0.11	0.314
Chalta (<i>Dillenia indica</i>)	12.0	0.12	0.327
Gab (<i>Diospyros peregrina</i>)	9.0	0.09	0.288
Jaba (<i>Hibiscus rosasinensis</i>)	23.0	0.23	0.423
Paan (<i>Piper betel</i>)	63.0	0.72	0.965

Amloki (<i>Phyllanthus emblica</i>)	23.0	0.23	0.423
Horitoki (<i>Terminalia chebula</i>)	32.0	0.32	0.469
Bohera (<i>Terminalia belerica</i>)	37.0	0.37	0.485
Shatamull (<i>Asparagus racemosus</i>)	29.0	0.29	0.456
Akanda (<i>Calotropis gigantean</i>)	21.0	0.21	0.40

Medicinal plants present in respondents house

Mukul *et al.* (2007) reported that the area is very rich in medicinal plants and people living in and proximity of the reserved area relies traditionally on these plants for their primary health care purpose. Most of the people grow medicinal plants such as Tulsi (*Ocimum tenuiflorum*), Thankuni (*Centella asiatica*), Basok (*Justicia adhatoda* L), Neem (*Azadirachta indica*), Gada ful (*Calendula officinalis*), Ada (*Zingiber officinale*), Amloki (*Phyllanthus emblica*) etc. in their homestead to cure several common ailments. Among these medicinal plants Tulsi (*Ocimum tenuiflorum* 56%) was present most of the respondents house which mean and standard deviation were 0.56 and 0.499 (Table 2).

Table 2. Distribution of respondents on the basis of the medicinal plants present in their house

Medicinal Plants	Respondents (%)	Mean	Standard Deviation
Basok (<i>Justicia adhatoda</i>)	16.0	0.1600	0.368
Thankuni (<i>Centella asiatica</i>)	11.0	0.1100	0.314
Arjun (<i>Terminalia arjuna</i>)	10.0	0.1000	0.301
Tulsi (<i>Ocimum tenuiflorum</i>)	56.0	0.5600	0.499
Neem (<i>Azadirachta indica</i>)	12.0	0.1200	0.327
Ada (<i>Zingiber officinale</i>)	12.0	0.1200	0.327
Gada ful (<i>Calendula officinalis</i>)	18.0	0.1800	0.386
Narikel (<i>Cocos nucifera</i>)	15.0	0.1500	0.359
Chalta (<i>Dillenia indica</i>)	3.0	0.0300	0.171
Jaba (<i>Hibiscus rosasinensis</i>)	16.0	0.1600	0.368
Paan (<i>Piper betel</i>)	17.0	0.1700	0.378
Amloki (<i>Phyllanthus emblica</i>)	6.0	0.0600	0.239

Extinct medicinal plants from the sal forest

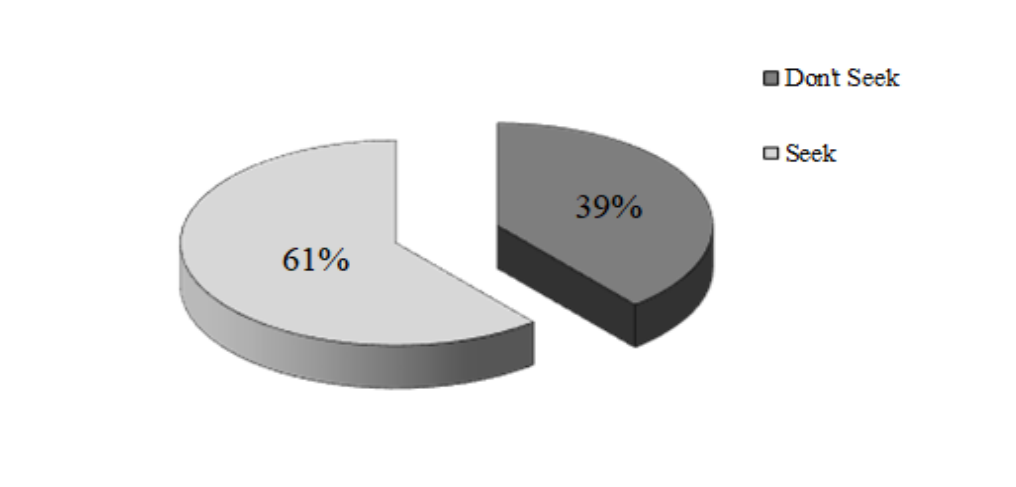
Medicinal plants face both general threats, such as climate change and habitat destruction, and the specific threat of over-collection to meet market demand (Ahn 2017). The opinion of the people living around Sal forest was many medicinal plants from the forest were extinct for the lack of proper conservation policy and scientific used. Among these medicinal plants, extinction of *Abroma augusta* (66%) is high which mean and standard deviation were 0.66 and 0.476 while *Acacia catechu* (40%), *Terminalia arjuna* (43%), *Hyptis suaveolens* (63%), *Cissus quadrangularis* (61%), *Asparagus racemosus* (65%), *Calotropis gigantean* (35%) are also going to extinct (Table 3).

Table 3. Distribution of respondents according to the extinct medicinal plants from the sal forest

Extinct medicinal plants	Respondents (%)	Mean	Standard Deviation
Ulot kombol (<i>Abroma augusta</i>)	66	0.660	0.476
Khoyer (<i>Acacia catechu</i>)	40	0.400	0.492
Arjun (<i>Terminalia arjuna</i>)	43	0.430	0.497
Tokma (<i>Hyptis suaveolens</i>)	63	0.630	0.485
Harjora (<i>Cissus quadrangularis</i>)	61	0.610	0.490
Shatamull (<i>Asparagus racemosus</i>)	65	0.650	0.476
Akanda (<i>Calotropis gigantea</i>)	35	0.350	0.479

Treatment from kaviraj

Kavirajes or traditional medicinal practitioners form the primary healthcare providers of the predominantly rural population of Bangladesh. Kavirajes use a variety of medicinal plants for treatment of different ailments. Haque *et al.* (2014) reported that the Kavirajes of the 11 villages surveyed used a total of 55 plants distributed into 35 families in their formulations. In the study area it was found that about 60% people sought kaviraj for the treatment of diseases and the rest didn't have faith on kaviraj treatment (Figure 1).

**Figure 1.** Percentage of respondents who took treatments from Kaviraj.

Reason for choosing medicinal plants

The use of medicinal plants for treating diseases is as old as the human species. The *reasons* for this are because of their higher effectiveness, easy availability comparatively low price and traditional uses which are adaptable with the human body and pose lesser side effects. The results are shown that 46% of respondents choose medicinal plants for their effectiveness, 29% choose for their availability, 16% for a low price and 9% for the reason of tradition (Figure 2).

Source of knowledge of medicinal plants

The research also showed that 32% people have knowledge about medicinal plants and treatment of diseases using these medicinal plants inheritably, 32% have gathered knowledge from others, 22% seek to kaviraj and 10% solve their problem by self-medication depends on many factors

namely, individual responsibility for one’s health, knowledge of health problems (influence of the mass media, medical literature for non-specialists) (Figure 3).

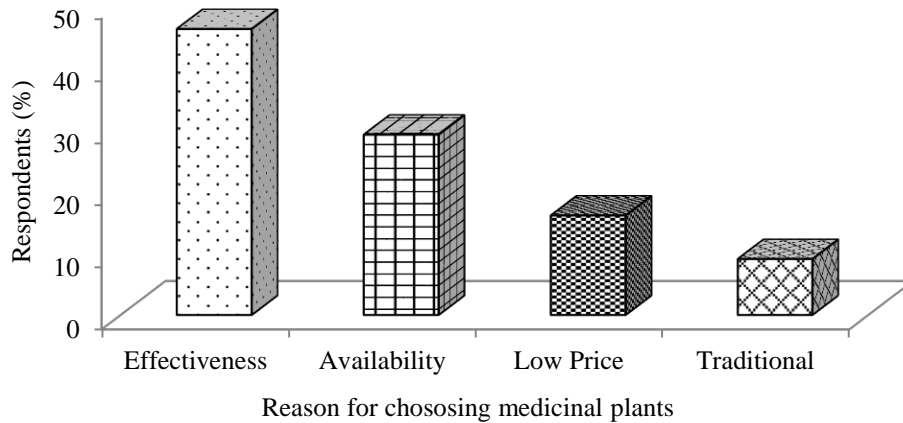


Figure 2. Reason for choosing medicinal plants.

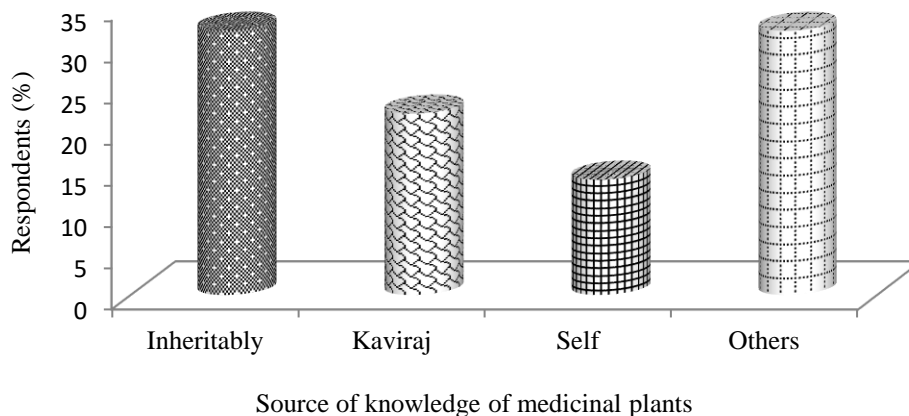


Figure 3. Source of knowledge of medicinal plants.

Dependency on medicinal plants

The plant is an important source of medicine and plays a key role in world health (Sandberg and Corrigan 2001) medicinal herbs or plants have been known to be an important potential source of therapeutics or curative aids. The use of medicinal plants has attained a commanding role in health systems all over the world. This involves the use of medicinal plant not only for the treatment of diseases but also as potential material for maintaining good health and conditions. Many countries in the world, that is, two-thirds of the world’s population depend on herbal medicine for primary health care. The research result was revealed that about 60% of people depend on medicinal plants for remedies of ailments while 40% depends on general medicine and doctors for the treatment of their diseases (Figure 4).

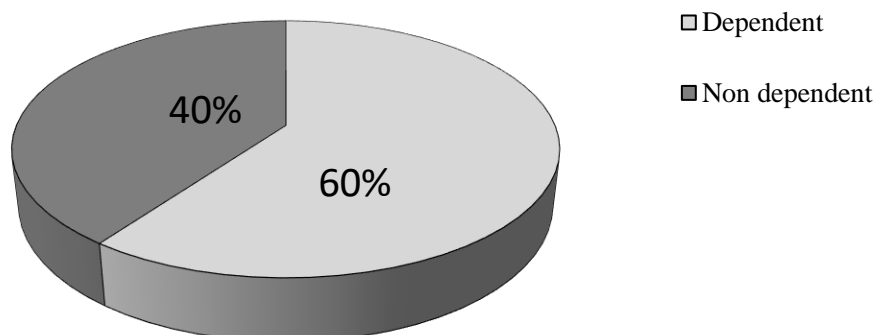


Figure 4. Dependency of the respondents on the medicinal plants.

The present study provides an overview of the medicinal plants used in Dinajpur District. The current investigation identified a total of 30 plants species used for different ailments. About 60% local people depend on medicinal plants for their treatment. Our present investigation created positive impact especially on the local people who expressed their interest after learning the fact that there is sufficient scientific basis of the healing power of the plants. This will help in developing people awareness towards the conservation of the traditional knowledge as well as to preserve the plant diversity for the future generation. This is a necessity because a number of uses of plant species for medicinal purposes are unique to this study and may contribute to further research and development of novel drugs.

The diversity and use of medicinal plants was recognized in the study area for healing of human and veterinary diseases. The data accessible in this paper form a basis for further medicinal research in the district especially in studies dealing with effectiveness, amount, superiority and toxicology. In preparation of profit-making indigenous-based pharmaceuticals, those plants found empirically to be mainly efficient and can be used. Therefore, a thorough certification of medicinal plant uses that are obtainable in Bangladesh is important. The findings of the present survey propose that the medicinal plants that have been reported to be used for different types of diseases may be scientifically studied for discovering relevant pharmacological effects in order to manufacture successful drugs designed with fewer side effects.

CONCLUSION

The people living around the Sal Forests (Singra, Nawabganj and Biral Sal forest) of Dinajpur, Bangladesh heavily depend on the medicinal plants for their primary health care, especially fever, cough, cold, headache, body pain, diarrhea, dysentery, constipation, indigestion, skin diseases and urinary troubles. From the overall findings of the present study it might be concluded that due to high dependency of local people to the sal forests proper protection conservation of the existing medicinal plants is an immense need. Besides this plantation program of extinct species may be a good opinion to restore the forest in its original state.

ACKNOWLEDGEMENTS

This study was supported by National Science and Technology Scholarship, Ministry of Science and Technology, Bangladesh in 2018. The research team are grateful to Ministry of Science and Technology, Bangladesh for providing financial support to conduct the research successfully.

REFERENCES

- Ahn K. 2017. The worldwide trend of using botanical drugs and strategies for developing global drugs. *BMB Reports*. 50(3): 111-116.
- Bodeker G. 2005. Medicinal Plant Biodiversity and Local Healthcare: Sustainable Use and Livelihood Development. In: Proceedings of the 17th Commonwealth Forestry Conference held at Colombo, Sri Lanka. pp. 14.
- Haque MA, Bari, Hasan MM, Sultana MM and Reza SA. 2014. A Survey on Medicinal Plants used by the Folk Medicinal Practitioners in Tangail Sadar Upazilla, Tangail, Bangladesh. *Journal of Environmental Science and Natural Resources*. 7(1): 35-39.
- Mukul SA, Uddin MB and Tito MR. 2007. Medicinal plant diversity and local healthcare among the people living in and around a conservation area of Northern Bangladesh. *International Journal of Forest Usufructs Management*. 8(2): 50-63.
- Sandberg F and Corrigan D. 2001. *Natural Remedies: their Origins and Uses*. CRC Press, pp 156
- Stapp JR and Moerman DE. 2001. The importance of weeds in ethnopharmacology. *Journal of Ethnopharmacology*. 75(1): 19-23.
- Thapa-Magar KB and Shrestha BB. 2015. Carbon stock in community managed hill Sal (*Shorea robusta*) forests of central Nepal. *Journal of Sustainable Forestry*. 34(5): 483-501.
- Wikipedia contributors. 2019. Medicinal plants. In Wikipedia, The Free Encyclopedia. Retrieved 08:57, September 11, 2019.