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Plants used for bone fracture treatment in Natore, Bangladesh

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ABSTRACT

The present study was to explore the traditional knowledge about medicinal plants used in bone fracture treatment in Natore district of Bangladesh. Barleria prionitis, Cissus quadrangularis, Dendrocnide sinuata, Justicia gendarussa and Zingiber officinale have been documented to be used in bone fracture and bone injuries treatment. Leaf and stem of these plants used only externally. Information was obtained through open informal interviews from 15 herbal practitioners. The informants were residents, belonging to families living in the study area since generations. It is the first report about the use of Dendrocnide sinuata leaves in the treatment of fractured bone.

INTRODUCTION

The reference to the curative or healing properties of certain herbs in Rigveda seems to be the earliest record of the use of plants in medicine. Plants associated with the healing of bones from ancient times are also found in many literatures. In clinical practice, there are many methods and techniques described for the treatment of fracture that would enable it to heal within a reasonable amount of time. The mechanical

fixation is only a means of immobilization for healing but it has now been seen that the bone tissue is one of the very active tissues of the body (Singh 2017). The treatment is needed just to assist the natural healing process. Fractures are accompanied by severe pain, swelling, and at times injuries also. In nature, there are wonderful plants and traditional medical practices in vogue from time immemorial for healing the fractures quite effectively (Babu et al.

2018). In Folk medicine, hairline fractures, incomplete fractures, simple fractures can be healed safely and easily, whereas for treating multiple fractures, or compound fractures, it requires proper attention, care, diagnosis through X Rays and expertise. Because of its medical importance, the present study was focused to know the traditional medicinal plants' wealth that is being used by the local people of the study area for joining the fractured bones effectively (Oryan et al. 2015).

MATERIALS AND METHODS

Field surveys were made from January-2020 to June-2020. Data were collected from 15 informants aged between 47-65 involving common villagers and recognized traditional herbal practitioners known as "Kaviraj". All the informants were interviewed directly in Bangla languages. Interviews were documented with notebooks. Information provided by them was cross verified from the informants of other localities as well as through literature. Plant specimen were collected and housed to the Department of Botany, Abdulpur Government College,

Natore. Plant species were identified with local names by respondents and then identified up to species (Ahmed et al. 2009; Uddin & Hassan 2018) and many relevant published articles.

STUDY AREA

The study area is under the Lalpur Upazila (Sub-district) located in between 24°07' and 24°18' north latitudes and in between 88°52' and 89°08' east longitudes (Ahmed & Kibria 2019). It is bounded by Bagatipara and Baraigram Upazilas on the north, Ishwardi, Bheramara and Daulatpur (Kushtia) Upazilas on the south, Baraigram Upazila on the east, Bagha (Rajshahi) Upazila on the west. The area of Lalpur Upazila is 327.92 sq km, and consist of 10 unions (The smallest local government units of Bangladesh) and 217 villages (Rahman et al. 2019; Figure 1). More than 100 bonesetter or Kaviraj or herbal practitioners are lived in the village "Islampur" under Changdhupail union. Every day, so many people are come to take treatment from different places.



Figure 1: Geographical map of study area

RESULTS AND DISCUSSION

Fracture of a bone can occur at any time to anybody, due to a bad fall or by accident. Whatever the case, it requires immediate attention. In the study area, Kaviraj or herbal practitioners are diagnosing bone fractures with the help of an X-ray film of the affected part. Then they used mustard oil massage therapies in shaping the bones back to their original form. They have sufficient skill in manipulating bones and aligning it in the right manner, which is vital in the management of bone fractures. Then they put the fresh leaves of *Dendrocnide sinuata* for 2-3 minutes at the site of the fracture considering the age of the patient and the nature of the fracture. According to patients,

it is an unbearably irritating leaf but it is quite effective in breaking bones. They then cut the leaves of *Barleria prionitis* and *Justicia gendarussa* as well as the stems of *Cissus quadrangularis* into small pieces. Then added a pinch of salt and 2-3 small pieces of ginger (*Zingiber officinale*) to the chopped parts and made a paste with 50 to 100 ml of mustard oil. Those pastes were applied to the broken area twice or thrice a day for 7 days to until cure as required. It was observed that five medicinal plants were used in bone fracture treatment which belonging to four families. The observed plants are enumerated in Table 1 with their botanical names, family names, local names and parts used.

Table 1: List of plants used in the treatment of bone fracture

Scientific Name	Family Name	Habit	Local name	Parts Use
<i>Barleria prionitis</i>	Acanthaceae	Shurb	Sulmardan	Leaf
<i>Cissus quadrangularis</i>	Vitaceae	Climber	Calcium/Pur pata	Stem
<i>Dendrocnide sinuata</i>	Urticaceae	Shurb	Vhutraj	Leaf
<i>Justicia gendarussa</i>	Acanthaceae	Shrub	Bis torok	Leaf
<i>Zingiber officinale</i>	Zingiberaceae	Herb	Ada	Rhizome



Plate 1: A) Vegetative part of *Dendrocnide sinuata*; B) Flower of *Dendrocnide sinuata*

These plants were mostly collected from the local homestead garden. Among the observed plants, *Cissus quadrangularis* was well-known plants for its bone healing properties. It is also known as “Bone Setter”, as it has prominent role in bone diseases. Many researchers report on *C. quadrangularis* justifies its effectiveness in bone healing (Singh 2017; Gupta & Kumar 2018; Dutta et al. 2019; Marak & Mathew 2020). According to Supparmaniam et al. (2015), *Justicia gendarussa* treatment may be favorable for bone fracture healing, with a potential mechanism of stimulating the alkaline phosphatase (ALP) activity in osteoblast cell. Ahmed et al. (2009) and Rahman et al. (2012) reported that the paste made from leaves of *J. gendarussa* is used in fracture, itches and wound. Besides that Dutta et al. (2019) and Marak & Mathew (2020) also reported *J. gendarussa* is useful in bone fracture. *Barleria prionitis* was reported by Sankaranarayanan et al. (2010) and Talukdar et al. (2015) in the treatment of irritation and stiffness of limbs. A report was published by Marak & Mathew (2020) about the use of *Zingiber officinale* in bone fracture. Another plant, *Dendrocnide sinuata* has been used in the treatment of various diseases such as Jaundice, urogenital disorder, toothache, dysentery (Sarkar & Devi 2017); mumps (Bairagi et al. 2019). Tanti et al. (2010) reported about the antioxidant effects of *D. sinuata* and its antibacterial activity against Gram-negative bacteria. Assaf et al. (2020) also reported its anti-inflammatory, anti-microbial and some others health benefit activity. But not a single report has been published about the use of *D. sinuata* in the treatment of bone fracture. During the study, it was observed that the highly irritant leaf of *D. sinuata* leaf was an important ingredient for the treatment of bone fracture in this study area. Every Kaviraj were use this leaf in bone

fracture treatment and planted at their homestead garden. This plant has highly irritant small stinging hairs on its surface that cause acute burning pain when coming in contact with the skin. It is the first report about the use of *Dendrocnide sinuata* leaves in the treatment of fractured bone (Plate 1). The present study thus presents an enormous potential for further scientific studies to be carried out on the plants reported.

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