

**MEDICO-ETHNOBIOLOGY AND INDIGENOUS KNOWLEDGE
SYSTEM OF MUNDA ETHNIC GROUP IN JHAPA, NEPAL
(A CASE STUDY OF MECHINAGAR MUNICIPALITY)**



Anju Ghimire

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Roll No: 05

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Submitted to

**Central Department of Zoology
Institute of Science and Technology**

**Tribhuvan University
Kirtipur, Kathmandu, Nepal**

December, 2016

DECLARATION

I hereby declare that the work presented in this thesis has been done by myself, and has not been submitted elsewhere for the award of any degree. All sources of information have been specifically acknowledged by reference to the author(s) or institution(s).

Date:

.....
Anju Ghimire



TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF ZOOLOGY
Kirtipur, Kathmandu, Nepal

RECOMMENDATION

This is to recommend that the thesis entitled “**MEDICO-ETHNOBIOLOGY AND INDIGENOUS KNOWLEDGE SYSTEM OF MUNDA ETHNIC GROUP IN JHAPA DISTRICT, NEPAL: A CASE STUDY OF MECHINAGAR MUNICIPALITY**” has been carried out by **Ms. Anju Ghimire** for the partial fulfillment of Master’s degree of Science in Zoology with special paper Ecology. This is her original work and has been carried out under my supervision. To the best of my knowledge, this thesis work has not been submitted for any other degree in any institutions.

Date:

.....

Dr. Nanda Bahadur Singh
Professor and Supervisor
Central Department of Zoology
Tribhuvan University
Kirtipur, Kathmandu, Nepal



TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF ZOOLOGY
Kirtipur, Kathmandu, Nepal

LETTER OF APPROVAL

On the recommendation of supervisor “Nanda Bahadur Singh” this thesis submitted by Anju Ghimire entitled “**MEDICO-ETHNOBIOLOGY AND INDIGENOUS KNOWLEDGE SYSTEM OF MUNDA ETHNIC GROUP IN JHAPA DISTRICT, NEPAL: A CASE STUDY OF MECHINAGAR MUNICIPALITY**” is approved for the examination and submitted to the Tribhuvan University in partial fulfillment of the requirements for Master’s degree of Science in Zoology with special paper Ecology.

Date:

.....

Dr. Ranjana Gupta
Professor and Head of Department
Central Department of Zoology
Tribhuvan University
Kirtipur, Kathmandu, Nepal



TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF ZOOLOGY
Kirtipur, Kathmandu, Nepal

CERTIFICATE OF ACCEPTANCE

This thesis work submitted by Ms. Anju Ghimire entitled “**MEDICO-ETHNOBIOLOGY AND INDIGENOUS KNOWLEDGE SYSTEM OF MUNDA ETHNIC GROUP IN JHAPA DISTRICT, NEPAL: A CASE STUDY OF MECHINAGAR MUNICIPALITY**” has been accepted as a partial fulfillment for the requirements of Master’s Degree of Science in Zoology with special paper Ecology.

EVALUATION COMMITTEE

.....
Supervisor
Prof. Dr. Nanda Bahadur Singh

.....
Head of Department
Prof. Dr. Ranjana Gupta

.....
External Examiner
Mr. Juddha Gurung
(Former Member Secretary of NTNC)

.....
Internal Examiner
Prof. Dr. Kumar Sapkota

Date of Examination:

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LIST OF ABBREVIATIONS

CBS	Central Bureau of Statistics
IKS	Indigenous Knowledge System
IUCN	International Union for Conservation of Nature
NEFIN	Nepal Federation of Indigenous Nationalities
TU	Tribhuvan University
VDC	Village Development Committe

ABSTRACT

Munda are one of the Highly Marginalized Janajati (Indigenous group) that has recently been added to the list of Indigenous Nationalities by NEFIN. However, they are yet to be recognized by the government as Janajatis of Nepal. They are rich in customs and traditions, especially with respect to the traditional medicinal knowledge and practices of using animals and plants for the treatment of different diseases. The indigenous knowledge present in this community is vanishing day by day due to modernizations and lack of awareness by the new generations about their culture and tradition. Thus, medico-ethnobiological study with the Indigenous knowledge system of Munda community of Mechinagar-11 of Jhapa district was documented. Data were collected through interviews with the key informants including conjurer (Dhamis/Jhakris), elderly members of the community and focal group discussions with the local people including children, youths and adults. Analysis of the data revealed the use of 25 animal species belonging to 18 orders and 24 families and 25 genera to treat 27 different diseases and 61 plant species belonging to 41 families and 56 genera for the treatment of 55 different diseases. The gastro-intestinal, integumentary, reproductive, respiratory, musculoskeletal, nervous, urogenital, ophthalmological, otorhinolaryngological, dental and cardiovascular were the most frequently treated diseases.

The status of medicinal animals and plants around the study area are degrading due to lack of effective management and conservation. Hence, the community must be made aware for the protection and conservation of those animals and plants.

1. INTRODUCTION

1.1 General background

Nepal is a country with limitless beauty, topographic contrast, floristic diversity and ethnic variations located in South Asia which comprises only 0.03% (147,181 sq. km) of land on global scale. Along with the magnificent, rich and varied biological resources, Nepal also endows an array of ethnic group rich in tradition culture and indigenous knowledge system. Likewise hundreds of ethnic groups with their traditional lifestyle and culture flourish Nepal and make it a unique country in the world. Nepal is a multi-ethnic, multi-lingual and multi-religious nation with about 126 ethnic groups speaking about 123 dialects (Bista, 1987; Bista, 2004; CBS, 2012). These different ethnic groups have settled throughout the country and have their own way of lifestyle, even in the use of animal and plant resources. Still, 87% of people living in rural area of Nepal depend directly or indirectly on the formal and informal system of traditional medicines for healthcare (Bhattarai, 1992). Biodiversity and bio-resources have high affinity in the case of ethnic groups in Nepal (Singh, 1995; Singh, 1997). The use of animals and plants parts as medicine is widespread in Nepal. The medicinal knowledge and practices are passed down entirely through the oral, traditional and personal experiences.

1.2 Medico-ethnobiology

Ethnobiology is a rapidly growing field of research, gaining professional, student, and public interest internationally. According to Clements (1998), the term ethnobiology first appeared in the research of Castetter (1935). Singh (1997) defines ethnobiology as the study of interrelationship as well as interdependency between a particular ethnic group and the existence of bio-resources in the given region. Ethnobiology encompasses the past and present human interactions with the environment, for instance the use of diverse flora and fauna by indigenous societies. Often, the medicine traditions are preserved by oral traditions (Roberta and Ballick, 2001).

Medico-ethnobiology deals with the traditional practices of using animals and plants for medicinal purposes by people of different cultures and traditions. It is mainly divided into medico-ethnozoology and medico-ethnobotany. All the ethnic groups have developed their own culture which is based on resource available in their surrounding environment (Shengji, 1996). All societies make use of the biological world in which they are situated, but there are wide differences in use, informed by perceived need, available technology and the culture's sense of morality and sustainability. Traditional medicine and ethnobiological information plays an important role in scientific research, particularly when the literature and field work data have been properly evaluated (Awadh *et al.*, 2004). Even today many local and indigenous communities in the Asian countries meet their basic needs from the products they manufacture and sell based on their traditional knowledge (Ignacimuthu *et al.*, 2006). Herbal drugs obtained from plants are believed to

be much safer; this has been proved in the treatment of various ailments (Mitalaya *et al.*, 2003). Globally about 85% of the traditional medicines used for primary healthcare are derived from plants (Fransworth, 1988). Thus the practice of ethno-medicine is an important vehicle for understanding indigenous societies and their relationships with nature.

1.3 Indigenous knowledge system

Indigenous knowledge system (IKS) is a body of knowledge built by a group of people through generations living in close contact with nature. IKS generally refers to knowledge systems embedded in the cultural traditions of regional, indigenous or local communities. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use (Johnson, 1992). Traditional knowledge typically distinguishes one community from another. Traditional indigenous knowledge takes on personal and spiritual meaning for some communities and it reflects the community's interest. It is of great importance not only to those who depend on it in their daily lives, but to the western society as well. Many animal and plant based medicines are derived from traditional knowledge system. Indigenous knowledge falls into two categories (Anonymous, 2006). On the one hand, there is knowledge that is inherited from generation to generation and is generally shared by most of the members of the society. The second category includes information gained through individual experience-empirical observations made by individual during the course of activities. Some forms of traditional knowledge find expression in stories, legends, folklore, rituals, songs and laws (Turner *et al.*, 2000; Kala, 2004; Kala, 2012). Other forms of traditional knowledge are expressed through different means (Acharya and Shrivastava, 2008).

Traditional knowledge is vulnerable to rapid change due to modernizations and displacement process. The loss of indigenous knowledge cannot be recovered. Therefore, documentation is essential for the conservation of both cultural and biological diversity.

1.4 Munda ethnic group

The indigenous people of the study area called Munda /Mudiyari. Munda is one of the Highly Marginalized Janajati that has recently been added in the list of Indigenous peoples by NEFIN. However, they are yet to be recognized by the government as Janajatis of Nepal. The census report shows that the total population of Munda all over Nepal is 1,286 among which 80.25% resides in eastern Nepal (CBS, 2012). They belong to the Munda subgroup of Austroasiatic languages speaking the Mundari language. They are found mostly concentrated in Jhapa, Morang and Sunsari districts of eastern Nepal. They are the largest tea tribal groups in Nepal. They have remained hunters for centuries but now they have been converted into the settled agriculturists. They were totally dependent on indigenous medicines for traditional healthcare, but now this is practiced

only in the remote rural areas due to the inclination of people towards modern medical services.

1.5 Objectives of the study

1.5.1 General objective

- To document and identify the medicinal animals and plants used by the Munda community of Mechinagar Municipality of Jhapa district and explore their therapeutic uses for the treatment of different diseases.

1.5.2 Specific objectives

- To explore the traditional knowledge of medicinal animals and plants used for the treatment of various ailments.
- To shed light on the ethnography of the Munda ethnic group.
- To study and document the indigenous knowledge system of the Munda ethnic group.

1.6 Rationale of the study

Munda belongs to one of the 126 recognized ethnic communities inhabiting mainly in the Eastern Region (Jhapa, Sunsari and Morang districts) of Nepal.

As they reside close to the natural environment, they have rich knowledge on the traditional utilization of natural resources for medicinal purpose. Comparatively very less attention has been paid for exploring the ethno-medicinal animals and plants used by the Munda community. The traditional tools and techniques and indigenous knowledge system prevailing in the Munda community is on the verge of extinction because of modernization and displacement processes. Thus the present work is centered in preservation and proper documentation of indigenous knowledge regarding the use of animals and plants, particularly for medicinal significance in the Munda community before it is lost forever from the face of the earth which can be of great use for the present and future generations.

1.7 Limitations

The limitations of the research work are as listed below:

- i) The present research work has been conducted for the partial fulfillment of Master's degree in Zoology at T.U, so time has been one of the most important limiting factors for the present study since it has to be submitted within the academic session and thus comprehensive study was not possible.

- ii) The researcher has no professional experience in research activities. Hence, methodological and financial limitations exist.
- iii) The Munda people are shy and elusive in nature and they hesitate to share information about their IKS related to the use of medicinal animals and plants, culture and tradition.
- iv) The present research work is concentrated in Mechinagar-11 of Jhapa district in Nepal and hence the outcomes of the study may not be generalized to other areas of Nepal.

2. LITERATURE REVIEW

The usage of animals and plants by human beings existed from the distant past and is continuing till today. The scientific study of human beings with their indigenous knowledge of animals and plants came in existence from the western countries. In Nepal many ethnobotanical studies have been carried out in the field of ethnobotany. Ethnobiological investigations including both animals and plants started in Nepal only since 1995 after the research on ethnobiology of the endangered Raute tribe came out. Thereafter, several researchers have worked in this field.

Manandhar (1990) investigated the ethnobotany of Danuwars of Siwalik and reported 80 medicinal plant species used to treat different diseases. Also, Manandhar (1995) carried out study on medicinal plants from Jajarkot district and documented 60 species to treat 25 diseases. Manandhar (1998) reported 52 medicinal plants from Banke district for treating 26 different diseases.

Singh (1995) carried out the study on endangered Raute tribe and reported 188 different plant species belonging to 58 families and 48 different animal species belonging to 16 orders, 23 families and 42 genera for various utilities. Out of 188 plant species recorded, 68 were wild and 96 were cultivated. Out of total, five species were used for medicinal purposes. He reported Raute use 48 wild and domesticated faunas out of which 38 were wild and 10 were domesticated.

Also in 21st century, a book entitled “National Register of Medicinal Plants in Nepal” with 150 different medicinal plants with their scientific names, medicinal uses and sites of availability (IUCN, 2000).

Balami (2003) carried out the study on ethnoecology of medicinal and aromatic plants in Kharpa Community Forest of Pharphing in Kathmandu and reported the use of 119 plant species for curing 35 different diseases like fever, diabetes, epilepsy, rheumatism, jaundice etc. Tamang (2003) conducted the ethnobiological study of Tamang people of Ghorsyang VDC of Nuwakot district and reported the use of 12 animals and 44 plant species used for medicinal purposes.

Koirala (2004) reported 60 species of animals and 182 species of plants in wild and cultivated form used by the Satar peoples of Korobari VDC of Jhapa district in their daily life for various purposes like food, medicine, toxicant, fuel, fodder, spice, thatch, etc. Similarly, Koirala (2004) studied the ethnobiology of Musahars of Bachauli VDC of Chitwan district and reported the use of 59 animals and 180 plant species out of which 30 animals and plant species had medicinal value in the Musahar community.

Nepali (2004) studied the ethno-medicine of the Gaine people in Arghakhanchi district and reported 69 plant species and 25 animal species utilized by the tribe for different medicinal purposes in different areas. Similarly, IUCN (2004) published a book entitled

“National Register of Medicinal and Aromatic Plants in Nepal” with 187 different plants with their scientific information, distribution, diagnostic character and medicinal uses.

Upadhya (2005) conducted the ethobiological study of animals and plants among the Meches of Jalthal VDC of Jhapa district in Nepal. He reported 154 plant species and 63 animal species being used for various purposes. Similarly, Siwakoti *et al.*, (2005) carried out ethnobiological study of plants and animals among Rajbanshi and Dhimal communities of Eastern Nepal and reported 76 plant species used for medicinal purposes by Dhimal and 77 plant species used by Rajbanshi.

Behera (2006) studied the ethomedicinal plants used by the tribals of Similipal Bioreserve in Orissa of India and investigated the use of 89 species of medicinal plants belonging to 52 families and 79 genera for the treatment of various diseases. Likewise, Ignacimuthu *et al.*, (2006) investigated the ethnobotany among the tribes in Madaurai district of Tamil Nadu (India) and documented the use of 60 ethnomedicinal plants species belonging to 32 families distributed in 53 genera for 81 remedies.

Kunwar and Bushmann (2008) carried out the research in Ethnobotany in the Nepal Himalayas and found an average of 21-28% of ethomedically important plants reported for Nepal and up to 55% of the flora from the study area had medicinal value. Rai (2008) studied the marginality of Munda in Morang district of Nepal.

Aryal (2009) investigated ethnobotany of Tharu people of Jayanagar VDC of Kapilvastu district of Nepal. He found 189 species of plants out of which 103 were cultivated, 68 were wild, including 71 species of medicinal plants and 42 species of fodder plants used by the Tharu people in his study.

Dey and De (2010) reported 25 plant species used by the aboriginals of Purila district, West Bengal, India in his study of the ethno veterinary uses of medicinal plants by Aboriginals.

Siwakoti (2011) carried out ethnobiological study on the utilization of plant resources among the Santal community of Eastern Nepal and reported the use of 110 species of plants to treat 14 kinds of diseases in Jhapa and Morang districts.

Rai (2013) recorded 27 animal species used to treat 28 ailments, and 87 plant species used to treat 65 types of disorder by studying the medico-ethnobiology of Rai community in Bhojpur district of Nepal. Similarly, Bhowmik *et al.*, (2013) conducted an ethnomedicinal study in Munda and Santal community of India and reported the use of 31 plant species belonging to 23 families distributed in 31 genera for 27 remedies with their ethnomedicinal justifications. Hasan *et al.*, (2013) studied the traditional utilization of medicinal plants in Makwanpur district and reported 76 medicinal plants to treat 54 types of diseases.

Paudyal and Singh (2014) carried out the study on ethnomedicinal uses of animals and plants among the migratory Tangbetons of Pokhara of Nepal and recorded 17 medicinal animal species belonging to eight orders and 12 families used to cure arthritis, thyroidism,

diarrhoea, over bleeding etc. Likewise, 60 species of medicinal plants belonging to 40 families were used by them for purification of blood, backache, joint pain, blood pressure, diabetes, common cold etc.

Sarkhel (2014) identified 20 ethnomedicinal plant species used by different tribal communities and medicinal healers in treatment of snakebite from Paschim Medinipur district, West Bengal. Similarly, Pradhan *et al.*, (2014) studied the herpetofauna used by several ethnic tribes like Munda, Gondo, Bhumia, Mirdha, Kandha, Saharas, etc. for medical purposes in the Gandhamardan Hills Range of Western Orissa, India and reported that from all the species of herpetofauna, the tribes use the body parts of three species of amphibians, four species of snakes, four species of lizards and one species of freshwater turtle as traditional medicine.

Tamang and Singh (2014) studied the medical ethnobiology and indigenous knowledge system among the Lapcha of Fikkal VDC of Illam District of Nepal. Findings of the research disclosed that altogether 19 animal species both wild and domesticated, belonging to 10 orders and 13 families for the treatment of 21 different diseases/ailments and some 61 species of medicinal plants belonging to 39 families and 58 genera for curing 36 different ailments by using their own indigenous knowledge.

Gupta *et al.*, (2015) conducted the study on ethno- medicinal plants used in the healthcare system in Tamar Block of Ranchi district in Jharkhand, India. The investigation revealed that the medicinal plants of 53 species of 47 genera belonging to 31 families commonly used by Munda and Oraon tribes of different villages for the treatment of various ailments.

K.C. (2015) carried out the study on medico-ethnobiology and indigenous knowledge system of Kissan community in Mechinagar-4 and Dhajjan-8 of Jhapa district and reported the use of 29 animal species belonging to 18 orders and 24 families for the treatment of 27 ailments. She also found that the Kissan community of the study area used 57 plant species belonging to 37 families for the treatment of 41 different ailments. The ailments treated were gastro-intestinal, respiratory, reproductive, integumentary, dental, cardiovascular, nervous, nervous/vascular, genital urinary, ophthalmology, renal and otorhinolaryngo.

3. MATERIALS AND METHODS

3.1. Study area

3.1.1 Location

Jhapa district is the Terai plains district of Mechi zone in the Province number one in eastern Nepal. It borders Illam district in the North, Morang district in the West and the Indian state of Bihar in the South and East and Bengal in the East. The district headquarters is Bhadrapur. It lies within $26^{\circ} 20'$ to $26^{\circ} 50'$ N latitude and $87^{\circ} 39'$ to $85^{\circ} 15'$ E longitude having an area of 1,606 sq. km. It lies at the altitudinal range of 125-381 m from the sea level.

Mechinagar is one of the eight Municipalities of Jhapa district located at an altitude of 100 m above sea level with an area of 54.67 sq. Kms. It is situated between $26^{\circ} 40'$ N and $88^{\circ} 07'$ E. It is the main entry point from India on Nepal's eastern border. Along with the Munda community, different other ethnic/caste groups also inhabit the area like Rai, Limbu, Tamang, Brahmin, Chhetri, Gurung, Kami, Newar, Rajbanshi, Majhi, Meche etc. Mechinagar is selected as the study area. However, a fairly large population of Munda resides in this Municipality, so the study is focused on this Municipality. The location map of the study area is shown below (**Figure 1**).

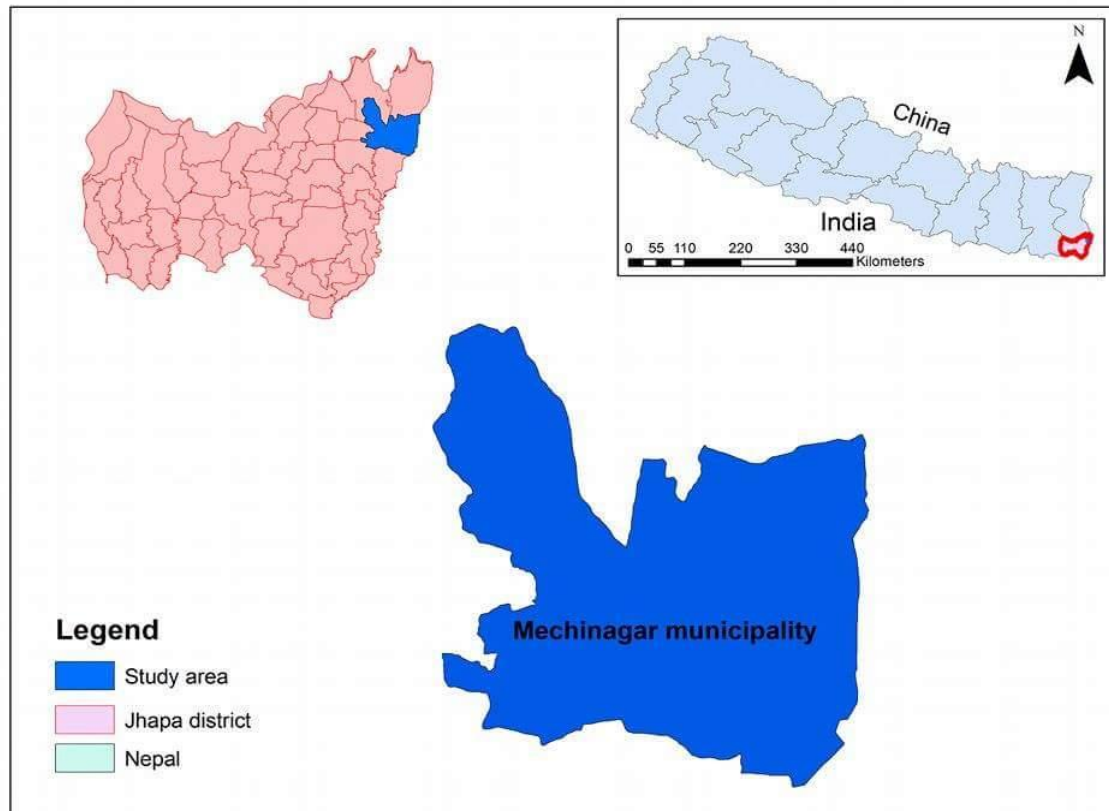


Figure 1: Location of the study area

3.1.2 Geography and climate

Jhapa observes moderate climate complexion as it lies in the Indo-gangetic plain and Churia low hills. Due to close proximity to the lower Himalaya, weather is calm throughout the year. Seasonal monsoon is well distributed throughout the district. The temperature is highest during May through September, though winter is not extreme, keeping aside fogging during morning. Climate variation is not extreme; however, the southern parts of the district are warmer than the northern ones. Jhapa district receives 250-300 cm of rainfall per year.

Jhapa district has been the largest producer of rice and is therefore known as the Grain grocery of Nepal due to its alluvial soil best suited for agriculture. Besides cereal crops like Rice and Wheat, it is also one of the largest producer of Jute, Tea, Betel Nut, Rubber and other cash crops.

Jhapa also has vast areas of forests such as Charali, Charkose Jhaadi, Hadiya, Jalthal and others. Its major rivers like Mechi, Kankai, Biring, Deonia, Aduwa, Bhuteni, Hadiya, Ninda etc. provide water for irrigation.

3.1.3 Vegetation and wildlife

The study area is near to the community forest. The forest consist a veritable accumulation of flora and fauna dominated by Sal (*Shorea robusta*), Semal (*Bombax ceiba*), Bamboo (*Bambusa arundinaceaea*), Sissau (*Dalbergia sissoo*) forests. A variety of vegetation ranging from grass to bushes is available in the forest. This tropical area is the rich for wildlife such as Buffaloes, Leopard, Monkey, Tiger and some other animals like Rhinoceros, Swamp Deer etc. The major birds like Parrot, Peacock, Jungle Fowl and Black Partridge are seen seasonally.

3.1.4 Demography

In Jhapa, fairly large population of Munda are concentrated in Mechinagar Municipality but they also live in Itabhata, Tokla Bagan, Satighatta Bagan, Nakalbari and also in Bhadrapur Municipality of Jhapa district in various numbers. The total population of Munda in Eastern Region of Nepal is 1,032 (CBS, 2012).

3.2 Field visit and observation

The study was conducted in 2016. Preliminary survey was done in November, 2015. For the collection of data, the area was visited three times in 1-7 March, 2016, 18-24 July, 2016 and 3-7 August, 2016 in order to document ethnography, medico-ethnobiology and the IKS. The condition of medicinal animals and plants were observed directly.

3.3 Data collection methods

To accomplish the dissertation work, two types of data were used; primary data and secondary data.

3.3.1 Primary data collection

Primary data were collected by the following methods:

3.3.1.1 Group discussion

The list of simple questions related to the objectives of the study was prepared as questionnaire (**Appendix 1**) so that respondents reply during the discussion. The people of different age groups including children, women, youths, adults and elderly people were involved during the discussion. The discussion gave the information on their origin, language, festivals, religion, dress and ornaments. Food and drink habit, association, economy, education and life cycle ceremonies.

3.3.1.2 Focal group discussion

A group of elderly persons of the community having indigenous knowledge were interviewed for traditional medicinal practices.

3.3.1.3 Interview with key-informants

The local healers like dhamis and jhakris were selected as the key-informants for interview. They were asked a number of questions about animals and plants used as medicine for different ailments, traditional healing practices, indigenous knowledge system etc. The information collected by discussion was of immense help to complete this research work.

3.3.1.4 Sample collection and identification

Photographs of both known and unknown species of animals and plants used for medicinal purposes available in the research area were taken and brought to Kathmandu. The unknown species were identified with the help of standard literatures and experts. The animal species are classified into order, family, genera and species whereas the plant species are taxonomically classified into family, genera and species.

3.3.2 Secondary data collection

Secondary data were very important for the completion and justification of the primary data. Relevant secondary data were collected from different sources like books, journals,

research articles, dissertation of different authors. E-library, local and national institutions were also consulted for help to make research work more effective.

3.4 Data analysis and presentation

The collected primary and secondary data from the study area were analyzed by using statistical methods wherever necessary. They were presented in different forms like tables, charts, bar diagrams, etc. wherever possible.

4. RESULTS

The results of the present research work have been presented into three categories; ethnography, medico-ethnobiology and indigenous knowledge systems as below:

4.1 Ethnography of Munda

The word ‘ethnography’ is derived from the Greek word (ethnos), meaning “folk, people, nation and (graphy), meaning “field of study”. Ethnography is a systematic study of people and cultures and describes specific human cultures and societies scientifically. The ethnographic survey of Munda community of Mechinagar Municipality in Jhapa district reveals the following information.

4.1.1 Historical background

The elderly people of Munda society believed that they are originally from India (Jharkhand, Ranchi) and entered Nepal from India via Jogbani to inhabit the forested areas in Eastern Nepal. Evidences show that Munda have inhabited the Eastern region of Nepal for over 200 years. During the period of British rule in India these group have been moved as cheap laborers to different parts of India and Nepal. Their displacement process started around the same time.

4.1.1.1 Munda folk cosmology

At the beginning of the time, the face of the Earth was covered over with water. Sun god (Sing-Bonga) brooded over the waters and the first beings that were born were a Kachua (Tortoise), Karakom (Crab) and Lenda (Leech). He commanded these first born of all animals to bring him a lump of clay (hasa) from out of the depth of the primeval ocean. The tortoise and the crab by turns tried their skill, but in vain. The persistent leech, however met with better success. It succeeded in fishing out a bit of clay from underneath the deep. And at his bidding, the Earth brought forth trees and plants, herbs and creepers of manifold varieties. He next filled the earth with birds and beasts of all sorts and sizes.

And then the most memorable incident of all happened. The bird swan laid an egg and out of this egg came forth a boy and a girl the first human beings. The common belief among the Mundas is that a Swan will not lay more than one egg in its lifetime. The first human pair was innocent of the relation of the sexes. So, the Sing-Bonga taught them the secret of making rice-beer. And the first pair brewed rice-beer as directed, and drank their fill. It tasted very sweet and inflamed their passions. And in due course they were blessed with offspring known as Munda.

There are interesting legends associated with the origin and migration of Munda people. According to the legends, their ancestors were cook during the regime of Ravan. They

were trained for archery on their interest after the defeat of Ravan by Ram. They succeeded in the training but due to large population size and narrow hunting place in Aayodhya their ancestors migrated to Ranchi and settled there. The ancient place of Munda all over Nepal, India, Bangladesh and Srilanka is Ranchi and Nagpur of India.

4.1.2 Physical appearance

The Munda people are dark-skinned, almost black in color, short stature, sturdy in limbs with irregular features, scanty beards, thick lips, broad and flat nose, low facial angles, with a long head. They are good looking people with short curly hair. They are of average height.

4.1.3 Language

Sadri is the common Lingua franca of the Munda community in Jhapa district. They use their own mother tongue “Sadri” when they communicate within their community and in Nepali when communicating with others. Although they have their own language to communicate, they lack their own script and use Devnagari.

They also speak Mundari, one of the Munda languages in the Austroasiatic language family. Discussion with the communities and the children indicated that nearly all of them speak Mundari language among themselves and they also speak “Sadri” the common language, Maithili, Rajbanshi, Hindi, Tharu and Nepali. Munda language is not used in media and in communication with other community members.

Some words in Munda language are shown below (**Table 1**).

Table 1: Some words in English, Nepali and Munda languages

S.N.	English	Nepali	Munda
1	Cow	Gai	Gaya
2	Crow	Kaag	Kauwa
3.	Daughter	Chori	Beti
4.	Eyes	Aankha	Aaekh
5.	Father	Buwa	Baba
6.	Fire	Aago	Aagen
7.	Goat	Bakhra	Bakari
8.	Grandfather	Hajurba	Aaja
9.	Guava	Aambak	Tamrus
10.	Head	Tauko	Mundi
11.	House	Ghar	Ghar
12.	Leg	Khutta	Godh
13.	Mother	Aama	Mai
14.	Pig	Sungur	Suwair
15.	Red	Rato	Laal

16.	Road	Bato	Dahar
17.	Son	Chora	Beta
18.	Sun	Gham	Bela
19.	Water	Paani	Jaal
20.	White	Seto	Sada

4.1.4 Education

Education status of the Munda people is poor as education level is intrinsically related with their income and economic status. As most of the Munda people need to thrive on daily labor works and earn low wages, they cannot send all children to school, forget about the quality education. Households that are very poor send their children to graze animals or as child labor. Others cannot furnish stationary and books to those that go to school and are discouraged to attend class. Poverty in the house affects to their attention in education. Most of the Munda have the access to only the government/public schools where the quality is often tend to be lower. However, children from households with better economic conditions go to better schools and colleges for education. Girls participation is still lower in schools and is only increasing at slow pace nowadays.

4.1.5 Association

4.1.5.1 Village polity

The Mundas live in small communities and based their villages around their personal kinship systems. The head of the Munda community is called Dewan who is the chief of the executive, judicial and all other functions within the society. The relatives of the Dewan are the most essential in every ceremony of the community. Each village has one head of the village known as Mukhiya or Karthaha. The village organization depends upon the Mukhiya. He plays an important role in the village in every occasion like marriage ceremony, birth ceremony, death rites as well as quarrel, disputes, justice etc. The Mukhiya is chosen by the village people during the village assemblage. The person who is honest, intelligent and trustworthy is selected as the Mukhiya and is honored by a special type of Pagari. After the death of the Mukhiya or after his disability, this pagari is granted to the next person's head.

4.1.5.2 Kin group

The basis of the social organization of Munda is the clan. Munda society is made up of separate clans called 'killi' many deriving their names from animals, plants or material objects. Since, descent was recognized through father the children belong to the paternal 'kilis.' Thus all those with same 'killi' are the descendants of same ancestor and the members of the clan regard themselves as one large family.

4.1.6 Family

Munda understanding of family is different from that of modern understanding of family. The family of the Munda is patriarchal and joint family. The father is not only the head of the family but also the priest.

4.1.6 Food and drink habits

Munda were animists for a long time. Their usual food included rats, shells and snails etc. They consume parboiled rice even today, which they think is good for their health. The practice of drinking black tea in the morning is prevailing, as tea is available as working in tea gardens as laborers. They prefer dal, rice while some people prefer eating rice with chilly and salt only or with tea. They drink rice beer (jaad) occasionally. Cusines are prepared during festivities and ceremonies. Arisa roti is made with the grounded powdered rice and sugar or jiggery. Chika roti is one of the main dishes made with the grounded powdered rice. During festival or any occasion of celebration they consume an alcoholic drink called “jaad”. Jaad is basically a rice wine made from fermented rice. Jaad is distributed among every men and women of the village in a “bowl of leaves” called “duna”.

4.1.7 Dress and ornaments

The Munda community possessed the unique costumes. They generally prefer to use plain dresses which do not contain attractive colors. They mostly put on white colored clothes rather than other as they believe white is pure. But the youths are mostly seen attracted to bright colored clothes.

4.1.7.1 Men

The traditional dress of Munda is dhoti, kamij, pajama and pagri (rolling dhoti around their head) for males during special occasions. But nowadays, men are seen wearing pant and shirts.

4.1.7.2 Women

Women of this community wear sari, saya, choli and patani. But nowadays, the women are seen wearing the cotton saris with the cholis or blouse. They are very fond of ornaments. The ornaments are mainly made up of silver but gold is also used by those who can afford. They use Tarpat and Piperpatta on ears, Sirpati on head and Dandapatura on the waist. Sikri, Thambia, Hansal and Chandawa (necklace made up of silver coins) are the ornaments for neck. Bera made up of silver is put on hands. They use Jhatiya (ring) and Paheri made up of silver in their feet.

4.1.8 Dances and songs

The Munda people have a rich range of folk songs, dances and tales, as well as traditional musical instruments. The Munda dance is a very common dance. All members of the community can participate in the dance, which is performed at social events and festivals. Madal, Nagera, Dholki, Kartal are the main musical instruments. Their special dance form is called as Nupur (an ankle) dance. They dance in chorus wearing Nupur in ankles. The dance style has only few steps. They move forward a few steps and then backward the same steps. Munda songs are often mixed with songs in other languages in such a way that one can rarely identify pure Munda elements in their songs.

4.1.9 Religion

Mundas now practice Hindu religion at least they think that is their traditional religion. Their religion has been eroded and influenced by other religion of the dominant groups around. Hinduism is an influence, though the Munda are not among the main guardians of Hindu traditions as followed by the Brahmans. The great deity, as protector and judge sometimes identified with the sun (e.g., Kharia Dharam, the Singhbonga etc.), sometimes depicted as a “diluted version” of Hindu gods (e.g., Mahadev Bhagwan). The two deities are linked rather like the different incarnations of Hindu gods.

They do not visit the temples instead they believe nature as the incarnation of god and goddess and worship river, forest, hills, animals and different trees. Recently some families started following Christian religion.

4.1.10 Festivals

Munda people are the followers of Hinduism. Due to Hindu culture, they celebrate ethnic culture as well as festivals related to Hindus. Some major festivals celebrated by the Munda community are as follows:

4.1.10.1 Dashain (Jatra Puja)

Munda worship their home and their clan deity (Pitri) during this festival. Kul puja require many sacrifices of cocks, hens, pigeons and pigs. There is no tradition of putting tika and receiving blessings from the elders during this festival but the relatives gather together and celebrate by eating chiura, meat and jaad for five days.. They put on new clothes and visit melas as per their economic status and celebrate this festival.

4.1.10.2 Tihar (Dhousi/Deepawali)

During tihar, Munda perform traditional gothpuja and laxmipuja. The houses, courtyard, sheds and agricultural fields are lighted. During Laxmipuja, Dhama puja is done by uprooting paddy plant, keeping a duck and its egg over it which is kept in the field and brought back to the place for Dhama puja. The duck and its egg is worshipped and cooked with Pidalu. This special dish is eaten only by the male members of the community. The paddy plant is returned back to the field and the place is also worshipped in the evening.

On the day of Gobardan puja, the houses are decorated with rice flour and red colour (sindur). The weapons used in houses and agricultural field are cleaned and worshipped. Red cock and pig are sacrificed during this puja. A special dish called “Khichadi” is prepared during this festival. This dish is prohibited to the female members. During tihar, ladoos and jaad are given to the guests and the neighbors as delicacy.

4.1.10.3 Phagu

In the month of February-March Phagu festival is celebrated and is characterized by communal hunt. The festival corresponds with Holi festival as they sprinkle color on one another. Holi is celebrated by offering red cock. Babar roti is the special dish prepared and fed to the family members and relatives. Color is played with great joy and enjoyment during this festival.

4.1.10.4 Mage

On a full Moon day of Poush month, Mage is celebrated by the Mundas. In this festival the spirits of deceased ancestors are the main objects of worship.

4.1.10.5 Sohrai

In the month of October-November Sohrai festival is celebrated. In the nights, lamps are lighted and on the following morning, the cattle shed is washed and sprinkled with rice beer.

4.1.10.6 Sarhual

It is the festival of flowers and is celebrated in the months of March-April. On this occasion, Sal (*Shorea robusta*) flowers are brought to propitiate all gods of the Mundas.

4.1.11 Economy

The Munda people had remained hunters for centuries but now they have been converted into the settled agriculturists. They owned sufficient land in the past and overtime had lost to dominant groups. Most of them are landless and some have very little land of their own due to which they do not have enough food for their families. Hence they work as

agricultural laborers in other people's farm. They work in tea gardens as daily wage earners.

They also collect minor forest products from forest to supplement their economy. Hunting, fishing and animal husbandry are subsidiary to agriculture. They rear livestock like pig, cow, hen, duck etc. They are skillful people and they weave their own handicraft products like the Patia mats (the mat from the weeds grown in the wetland), brooms and baskets and sell in the local market. They also prepare rice beer (Jaad) and sell in the market.

Some people of this community are Public Servants and nowadays, the youngsters of this society are going abroad in search of good job with good earning which has ultimately upgraded the status of some families.

4.1.12 Life cycle ceremonies

4.1.12.1 Birth rites

Birth is the natural process. Birth of a baby boy is celebrated as an earning hand to the family while birth of a baby girl is celebrated as a caretaker to the family. On the day of birth, at the time of delivery, the experienced women called 'Dagrin' is brought and left with the delivering women for all the care and help needed. After delivery, she cuts the umbilical cord of the child with an arrow and buries it near the door of the house. After the birth of child, the Dagrin takes bath using ointment made by mixing rice flour, turmeric powder and mustard oil. The mother and baby are considered untouchable till six days of birth and are prohibited in touching any material of the house and reside in a managed place in the home for feeding and sleeping till six days of the birth. She is fed with delicacy like meat; fish, eggs etc. depending on the condition of the family. After seven or nine days, the new born baby's hair is removed by Thakur (Hajam). Then both the new born baby and the mother are given a bath using ointment of rice flour, turmeric powder and mustard oil.

The name giving ceremony is performed after seven or nine days of birth. Some people keep the name of the new born baby based on the birth day, weather, time and incident during the birth while some say "Chaandi Naam Bichhek". Jaad and water is kept on the metal plate. The Dagrin peels off the paddy seed husk by her nail and drops a single seed on the plate with jaad and water on the name of the deity. Then she keeps on dropping other seeds in the name of god-goddess, rivers, streams and the name of all family members and relatives. Based on the first letter of the first seed dropped in the name of the home deity (Kuldevata) and the nearby seed to it, the name of the new born is kept. The new born baby is made to lick some drops of jaad/raksi. On the same day, the villagers and relatives make a gathering and enjoy local jaaad and raksi. The Dagrin is also fed with jaad and raksi. One Lota and a bowl filled with jaad/raksi called "Lotabatti" are given to Dagrin. Along with "Lotabatti", she is also given sari, blouse, petticoat, some money and see off is done.

4.1.12.2 Marriage system

4.1.12.2.1 Age of marriage

Marriage is a very important event in the life of the Munda people. It is considered as one of the main rituals of life which is a week-long festivity time for both the families. The marriage among the Munda takes place between two adults, which are in a way arranged by their parents. There is no fixed age for a Munda boy or girl to enter into marital union. It is the parents who decide when their sons or daughters should be given into marriage. There is no question of child marriage among the Mundas.

4.1.12.2.2 Type of marriage

The Munda are monogamous. In their local language they say, "Baria Kurikin, do ka baiua" (It will not do to keep two wives). They believed that monogamy was desired by Singbonga. So, they preferred to abide by the traditions of their ancestors, who held that monogamy is better.

Marriage among them is patriarchal and partilocal except for the 'Gharjia' marriage, in which the man has to go and live in the house of the wife. There exists no polygamy, polyandry and dowry system. Clan exogamy is the rule among Mundari people. There is no ban on widow remarriage; both the widow and the widower are allowed to remarry if they desire to do so. Widowhood is never considered a curse.

4.1.12.2.3 Custom practices associated with marriage

The boy along with his parents goes to the girl's home and if both the boy and girl agree for marital union, the stick is kept on the roof of the girl's house as the confirmation of marriage.

After some days, five to 10 males and females from the bridegroom's side visit the girl's home with food items (Chiura, murai, sakkhar, one bottle wine, chur-bidi), 25 babar rotis, new wooden logs in a dhaki and new dress and ornaments for girl. After completing this ceremony, the marriage date is fixed. This ritual is called 'Luga Pidhaek'.

'Lota-pani' is the engagement ceremony for fiancé. On the day of marriage, the boy along with Janti' visits the girl's home and the rituals are performed there. There is also a tradition of bringing the girl to the boy's home and performing the rituals which is called 'Chat Biwaha'. Marriage rituals are performed from the evening time and after the rituals, the bride and bridegroom along with 'Janti' returns in the morning. In every event alcohol and meat is considered as the basic food items.

In love marriage, the eloped boy and girl are called home after some duration of time and all the marriage rituals are performed. If the boy marries a girl from other cast, all the

people of the Munda community should be called for feast by his family. Likewise, if a girl from Munda community marries with a boy from other cast, people of the Munda community go to the boy's home and ask for some materials and calls all the people of the community for feast in the girl's house.

Divorce is performed in a ceremony, where the elders of the village are present. This ceremony is called 'Sakam-Chari'. In this ceremony a Sal leaf with a Bamboo pin in the middle is to be torn up and a Lota (container with water) is kicked off by the couple to signify the breaking of their bond. At the end both of them go around greeting the whole assembly just as they had greeted all on the day of their marriage.

4.1.12.3 Death rites

The Dewan or any elderly member of the family declares the person is dead and has no relation with the living people. After the death of a person, the body is kept outside the house. The relatives and villagers gather and take the dead body to the grave or pyre site. Before carrying the dead body, the females put ointment of turmeric and mustard oil from head to toe of the deceased. The dead body is kept on two bamboos khat tied by white cotton clothes or jute (pata) rope and carried by four people making it turn to the roof of the house three times.

The funeral procession is led by one of the elderly male carrying water mixed with cow dung in an earthen pot. During the funeral procession, some mud is dug out at five places behind the person carrying the dead body in front of the backward person and in between them fried paddy seeds and mustard is spread. After reaching the pyre or grave, the dead body is put on the side and every person going on the funeral feeds rice to the dead body. Cremation is done by the eldest son using Hay or Khar. The dead body is either buried or burnt. If burnt, there is a tradition to bury some part of the deceased. While burying, a long stick is kept vertical on the head of the dead body with some part that comes out and mud is filled on the grave. After filling the grave, the stick is taken out and a mud pot filled with water with a hole at the bottom is kept over the hole. It is believed that the hole provides space for breathe to the dead body.

Death pollution is purified in 13 days. Only the son who puts fire to the deceased (Dagbatti) is allowed to perform all the rituals. He stays in the "Ghouti" putting a garland of white cloth. Till 12 days, the food is offered in the name of the deceased by calling his/her name and home is made using six sticks of Sal tied by rope. Dhami revives the traditional mantras and the house is burnt by the son sitting in cremation. After this hens leg tied on a stick and diyo kept on nanglo is taken to the storeroom where some people stay lighting a diyo. There is a belief that if the flames of the diyo brought from outside bends towards the diyo lighted in the storehouse, the departed soul is happily living in the house. On the 13th day, offering of Pig and white cock is required and head and liver is cooked and fed first to five boys who eat only after the Dhami pays them some money. After this all the relatives feed and consider themselves pure from that day.

4.2 Medico-ethnobiology

Human beings have been using various animals and plants since long time. All the ethnic groups also have their own practices of using animals and plants for various purposes through the ancient past. Medico-ethnobiology deals with the traditional medicinal practices of using animals and plants. It is divided into medico-ethnozoology and medico-ethnobotany.

4.2.1 Medico-ethnozoology

Munda community of Mechinagar Municipality has been using a number of animal species both wild and domesticated in their traditional healing system as medicines to cure several diseases. Findings of this research disclosed that altogether 25 animal species both wild and domesticated belonging to 18 orders, 24 families and 25 genera being used for the treatment of 27 different diseases/ailments. The list of animals species used in the traditional medicine by the Munda community of the study area is shown below (**Table 2**).

Table 2: List of animals having medicinal values in the Munda community of Mechinagar Municipality, Jhapa District

S. N.	Class	Order	Family	Scientific Name	Common Name	Local Name	Munda Name	Habitat	Medicinal uses
1.	Mammalia	Artiodactyla	Bovidae	<i>Bos indicus</i>	Cow	Gai	Gaya	Domestic	Back and body pain, Common cold
2.	Mammalia	Artiodactyla	Bovidae	<i>Bubalus bubalis</i>	Buffalo	Bhaisi	Bhains	Domestic	Measles, Scabies
3.	Mammalia	Artiodactyla	Suidae	<i>Sus domesticus</i>	Pig	Sungur	Suwair	Domestic	Asthma, Pimples
4.	Mammalia	Carnivora	Canidae	<i>Canis aureus</i>	Jackal	Syal	Sikta	Wild	Goitre, Rheumatism, Tuberculosis
5.	Mammalia	Chiroptera	Rhinolophidae	<i>Rhinolopus</i> sp.	Bat	Chamera	Vadul	Wild	Asthma
6.	Mammalia	Rodentia	Hystricidae	<i>Hystrix brachyura</i>	Porcupine	Dumsi	-	Wild	Asthma, Abdomen pain
7.	Aves	Columbiformes	Columbidae	<i>Columba livia</i>	Pigeon	Parewa	Perwa	Domestic	Boils, Blisters, Carbuncles
8.	Aves	Cathartiformes	Cathartidae	<i>Gypaetus barbatus</i>	Bearded Vulture	Giddha	Haadfor	Wild	Back and body pain, Psychic disorder
9.	Aves	Galliformes	Phasianidae	<i>Gallus gallus</i>	Rooster	Kukhura	Murgi	Domestic	Burns, Body ache, Eczema
10.	Aves	Passeriformes	Corvidae	<i>Corvus splendens</i>	Crow	Kaag	Kauwa	Domestic	Cracks of sole of feet, Wounds

11.	Aves	Passeriformes	Ploceidae	<i>Passer domesticus</i>	Sparrow	Bhangera	Gorela	Domestic	Fever and headache
12.	Reptilia	Chelonia	Chelonidae	<i>Aspideretes</i> sp.	Turtle	Kachhuwa	Kachewa	Wild	Piles
13.	Reptilia	Squamata	Varanidae	<i>Varanus flavescens</i>	Golden monitor lizard	Sun gohoro	Gohoro	Wild	Arthritis, Rheumatism, Burns, Scabies
14.	Reptilia	Squamata	Colubridae	<i>Ptyas mucosus</i>	Rat Snake	Dhaman Sarpa	-	Wild	Back and body pain, Burns
15.	Reptilia	Squamata	Agamidae	<i>Calotes versicolor</i>	Oriental garden lizard	Chheparo	-	Wild	Eczema
16.	Amphibian	Anura	Ranidae	<i>Haplobatrachus tigerinus</i>	Indian bull frog	Paha	Vronda beng	Wild	Malnutrition
17.	Pisces	Cypriniformes	Cyprinidae	<i>Puntius gonionotus</i>	Silver carp	Pothimacha	-	Wild	Pneumonia
18.	Pisces	Cypriniformes	Claridae	<i>Clarias batrachus</i>	-	Mungri macha	Magur	Domestic	Back and body pain
19.	Arthropoda	Crustacea	Caanceridae	<i>Cancer pagarus</i>	Edible crab	Gangata	Kakad	Wild	Common ccold
20.	Arthropoda	Decapoda	Paleomonidae	<i>Paleomon malcolmsonii</i>	Prawn	Jhinge macha	-	Wild	Thorn prick
21.	Arthropoda	Hymenoptera	Apidae	<i>Apis indica</i>	Honeybee	Gharmouri	-	Domestic	Common cold, Back and body pain
22.	Arthropoda	Hymenoptera	Vespidae	<i>Vespa sylvestris</i>	-	Aringal	-	Wild	Cough,

									Pneumonia
23.	Annelida	Opisthophora	Megascolecidae	<i>Pheretima posthuma</i>	Earthworm	Gadeula	Chara	Wild	Fever, Measles, Pneumonia
24.	Mollusca	Opisthophora	Viviparidae	<i>Bellamya bengalensis</i>	-	Ghungi	Ghongi	Wild	Weakness
25.	Mollusca	Stylomatophora	Helicidae	<i>Anadenus</i> sp.	Slug	-	Chiplekira	Wild	Piles

4.2.1.1 Diversity of animal species

The animal species used were both wild and domesticated in nature. The present study showed that Munda community of the study area used 16 wild (64%) and nine domesticated (36%) animal species for traditional medicinal practices. Among the 25 animal species recorded for medicinal purposes from the study area, six were mammals, five were aves, four were reptiles, one was amphibian, two were pisces, four were arthropods, one was annelid and two were Mollusk.

The share of mammals was 24%, aves was 20%, reptiles was 16%, amphibian was 4%, pisces was 8%, arthropods was 16%, annelids was 4% and mollusks was 8% (**Figure 2**).

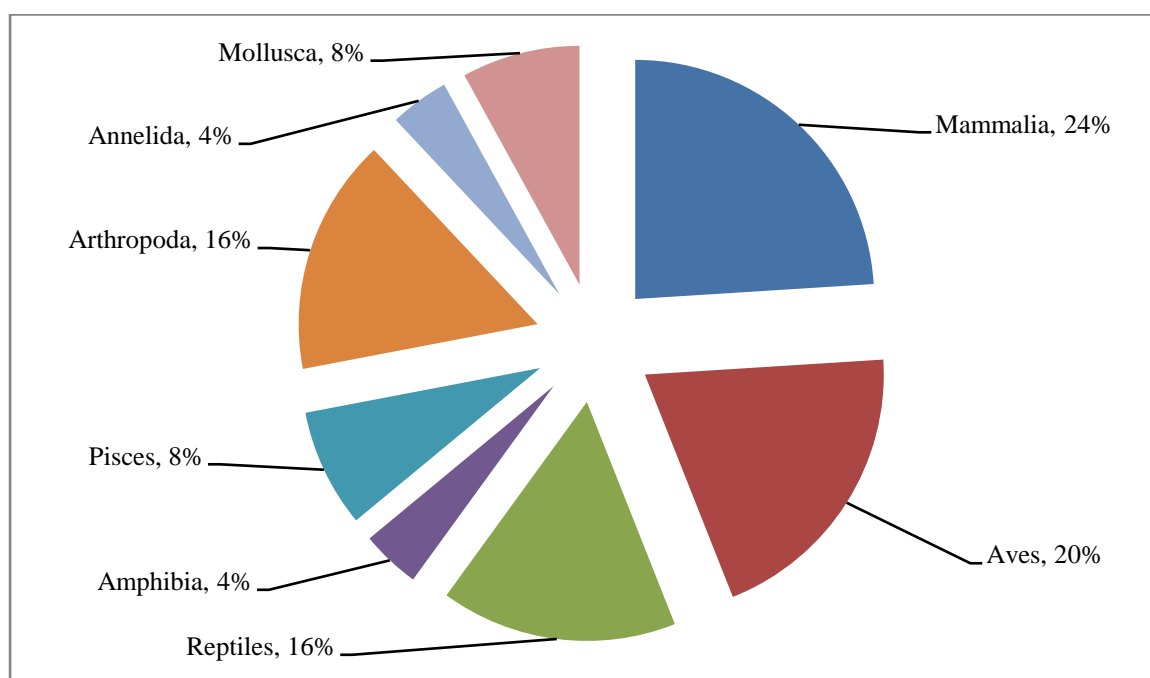


Figure 2: The share of animals belonging to different classes

4.2.1.2 Diseases/Ailments treated

In the present study, Munda community of the study area was found to use 25 species of animals for the treatment of 27 different diseases/ailments (integumentary, gastrointestinal, musculoskeletal, respiratory, glandular, nervous and otorhinolaryngological). The list of diseases and animal species used by local Munda in Mechinagar Municipality of Jhapa district for curing those diseases are listed below (**Table 3**).

Table 3: List of diseases and animal species used for the treatment

S.N.	Name of diseases	Types of diseases	Animal species used
1.	Abdomen pain	Gastrointestinal	Porcupine (<i>Hystrix brachyurum</i>)

2.	Arthritis	Musculoskeletal	Golden Monitor lizard (<i>Varanus flavescens</i>)
3.	Asthma	Respiratory	Pig (<i>Sus domesticus</i>), Porcupine (<i>Hystrix brachyurum</i>), Bat (<i>Rhinolopus</i> sp.)
4.	Back and body pain	Musculoskeletal	Cow (<i>Bos indicus</i>), Vulture (<i>Gypaetus barbatus</i>), Rat Snake (<i>Ptyas mucosus</i>), Honeybee (<i>Apis indica</i>), <i>Clarias batrachus</i> , Rooster (<i>Gallus gallus</i>)
5.	Blisters	Integumentary	Pigeon (<i>Columba livia</i>)
6.	Burns	Integumentary	Rooster (<i>Gallus gallus</i>), Rat Snake (<i>Ptyas mucosus</i>), Golden Monitor lizard (<i>Varanus flavescens</i>)
7.	Boils	Integumentary	Pigeon (<i>Columba livia</i>)
8.	Carbuncle	Integumentary	Pigeon (<i>Columba livia</i>)
9.	Common cold	Respiratory	Cow (<i>Bos indicus</i>), Crab (<i>Cancer pagarus</i>), Honeybee (<i>Apis indica</i>)
10.	Cough	Respiratory	Wasp (<i>Vespa sylvestris</i>)
11.	Cracks of sole of feet	Integumentary	Crow (<i>Corvus splendens</i>)
12.	Eczema	Integumentary	Rooster (<i>Gallus gallus</i>), <i>Calotes versicolor</i>
13.	Goiter	Glandular	Jackal (<i>Canis aureus</i>)
14.	Fever	-	Sparrow (<i>Passer domesticus</i>), Earthworm (<i>Pheretima posthuma</i>)
15.	Headache	Nervous	Sparrow (<i>Passer domesticus</i>)
16.	Malnutrition	-	Indian Bull Frog (<i>Hepalobatrachus tigrinus</i>)
17.	Measles	Integumentary	Buffalo (<i>Bubalus balis</i>), Earthworm (<i>Pheretima posthuma</i>)
18.	Piles	Gastrointestinal	Slug (<i>Anadenus</i> sp.), Turtle (<i>Aspideretes</i> sp.)
19.	Pimples	Integumentary	Pig (<i>Sus domesticus</i>), Turtle (<i>Aspideretes</i> sp.)
20.	Pneumonia	Respiratory	Silver Carp (<i>Puntius gonionotus</i>), Wasp (<i>Vespa sylvestris</i>), Earthworm (<i>Pheretima posthuma</i>)
21.	Psychic disorder	-	Vulture (<i>Gypaetus barbatus</i>)

22.	Rheumatism	Musculoskeletal	Vulture (<i>Gypaetus barbatus</i>), Jackal <i>Canis aureus</i>), Golden Monitor lizard (<i>Varanus flavescens</i>)
23.	Scabies	Integumentary	Buffalo (<i>Bubalus balis</i>), Golden Monitor lizard (<i>Varanus flavescens</i>)
24.	Thorn prick	Otorhinolaryngological	Prawn (<i>Paleomon malcolmsonii</i>)
25.	Tuberculosis	Respiratory	Jackal <i>Canis aureus</i>)
26.	Weakness	-	<i>Bellamyia bengalensis</i>
27.	Wounds	Integumentary	Crow (<i>Corvus spp</i>)

The different diseases/ailments were classified on the basis of the affected parts of the body. The results depicted that 43.48% of the diseases were integumentary, 8.69% were gastro-intestinal, 13.04% were musculoskeletal, 21.74% were respiratory, 4.35% were glandular, 4.35% were Nervous and 4.35% were otorhinolaryngological (**Figure 3**). Fever, malnutrition, weakness and psychic disorder could not be classified in the medical term.

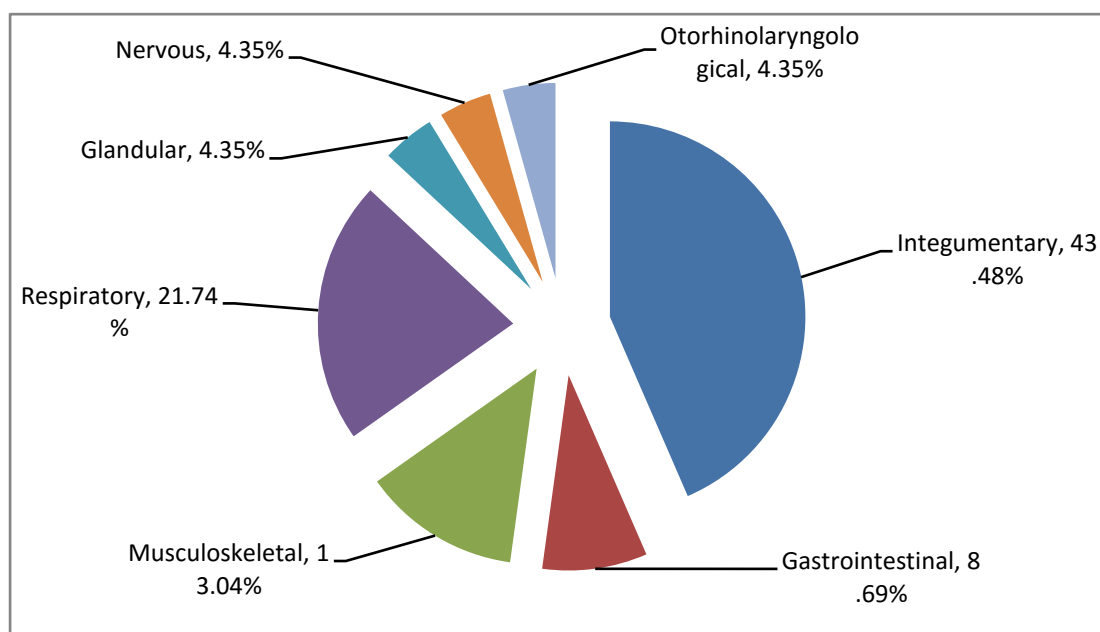


Figure 3: The share of different types of ailments

4.2.1.3 Animal organs used

The whole body of the animal species or their organs and products from the animals were used for traditional medicinal practices. The used organs are mandibles, bones, flesh,

shells, bile etc. and the animal products used are milk, honey, saliva, blood, meat, fat, eggs, fecal matters etc.

4.2.1.4 Routes of administration

In the present study, both external and internal administration routes of treatment were observed. The internal medication was done by inhalation and oral absorption while the external medication was done by applying, pricking, massaging, protective amulets etc.

The sharing of internal and external medication were 55.56% and 44.44% respectively. Among the total treatments, 52.78% were oral types, 25% were applied, 13.88% were massaged, 2.78% were inhaling, and 2.78% as protective amulet and 2.78% were by pricking the affected part (**Figure 4**).

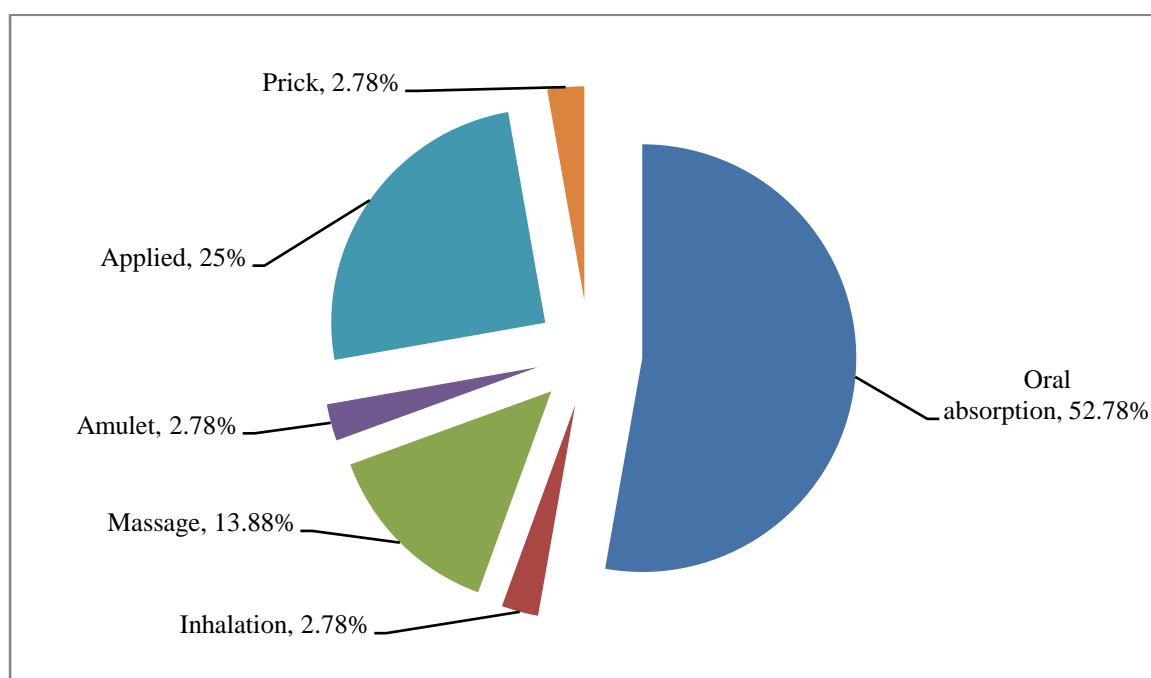


Figure 4: The different methods of application of parts/products of animals

4.2.1.5 Description of animal species used in medication

The animals used in the traditional medicine by local Munda of the study area are described on the basis of information collected during field visit. The detailed descriptions are given in alphabetical order of family of the animal species.

Family- Apidae

1. Apis indica

Local name: Gharmouri

Medicinal Uses:

- a) The honey is consumed by patient suffering from back and body pain.

- b) Massage with honey on the back and body to get relief from pain.
- c) Consuming the paste prepared by cooking honey, rhizome of Aduwa (*Zingiber officinarum*), Lahsun (*Allium sativum*) and Marich (*Piper nigrum*) seeds in cow's ghee cures common cold.

Dose: 2 teaspoonfuls twice a day for 2 days.

Family- Agamidae

2. Calotes versicolor

Local name: Chheparo

Medicinal Uses:

- a) The whole body of the animal is boiled in Mustard (*Brassica campestris*) oil and applied on the affected part for curing eczema.

Family- Bovidae

3. Bos indicus

Local name: Gai

Medicinal Uses:

- a) Honey, Aduwa (*Zingiber officinarum*), Garlic (*Allium sativum*) and Marich (*Piper nigrum*) are fried in Cow's ghee and consumed to cure common cold.

Dose: 2 teaspoonfuls in the evening for 3 days.

- b) The ghee is applied in the affected part of the body and massaged well to get relief from back and body pain.

4. Bubalus bubalis

Local name: Bhaisi

Medicinal Uses:

- a) Dried dung of bhaisi is burnt and is applied to cure scabies and measles.

Family- Canceridae

5. Cancer pagarus

Local name: Gangata

Medicinal Uses:

- a) The whole body is cooked well and made soup which is beneficial for the patients suffering from common cold.

Family- Canidae

6. Canis aureus

Local name: Syal

Medicinal Uses:

- a) Consumption of fresh meat by cooking in Mustard (*Brassica campestris*) oil cures tuberculosis.
- b) Consumption of wine by fermentation of its meat cures rheumatism.
- c) Goitre is cured by pricking at the goiter spot by its bone.

Family- Cathartidae

7. *Gypaetus barbatus*

Local name: Giddha

Medicinal Uses:

- a) Meat is cooked and consumed to get relief from back and body pain.
- b) For Psychic disorders, bones are put on making amulets to protect them from black magic.

Family- Cheloniidae

8. *Aspiderates* sp.

Local name: Kachhuwa

Medicinal Uses:

- a) Raw meat and shell is rubbed and the paste is eaten to cure piles.

Family- Claridae

9. *Clarias batrachus*

Local name: Mungri

Medicinal Uses:

- a) The meat is very beneficial to the patient suffering from body pain.

Family- Colubridae

10. *Ptyas mucosus*

Local name: Dhaman Sarpa

Medicinal Uses:

- a) Fat is melted and applied on the affected part to treat burns
- b) Fat is melted and massage is done to treat back and body pain.

Family- Columbidae

11. *Columba livia*

Local name: Parewa

Medicinal Uses:

- a) The fecal matter is applied to as a paste to treat boils, blisters and carbuncles.

Family- Corvidae

12. *Corvus splendens*

Local name: Kaag

Medicinal Uses:

- a) Raw blood is applied to treat wounds of skin and cracks of sole of feet.

Family- Cyprinidae

13. *Puntius gonionotus*

Local name: Pothi Machha

Medicinal Uses: Grind 3 fishes, 3 Marich (*Piper nigrum*) seeds and 3 Tulsi (*Ocimum tenuiflorum*) leaves and consume the paste for curing pneumonia.

Dose: 1 teaspoonful for 3 days.

Family- Helicidae

14. *Anadenus* sp.

Local name: Chiplekira

Medicinal Uses:

a) Saliva is consumed or the paste prepared by rubbing the whole body is mixed with raw milk of cow and consumed for curing piles.

Dose: 1 teaspoonful in a glass of milk regularly for a month twice a day.

Family- Hystricidae

15. *Hystrix brachyuran*

Local name: Dumsi

Medicinal Uses:

a) The alimentary canal is boiled and consumed to treat asthma.

b) The dried fecal matter is inhaled by the patient suffering from abdomen pain.

Family- Megascolecidae

16. *Pheretima posthuma*

Local name: Gadeula

Medicinal Uses:

a) Pasty mass prepared by grinding three Earthworms (*Pheretima posthuma*), three Tulsi (*Ocimum tenuiflorum*) leaves and three Dubo (*Cynodon dactylon*) tips is consumed to cure measles, fever and pneumonia.

Dose: 1 teaspoonful twice a day for 3 days.

Family- Paleomonidae

17. *Paleomon malcolmsonii*

Local name: Jhinge Machha

Medicinal Uses:

a) Mandibles are crushed and the pasty mass is applied on the thorn prick area.

Family- Phasinidae

18. *Gallus gallus*

Local name: Kukhura

Medicinal Uses:

a) The fat is applied in the burnt wound and eczema for fast healing.

b) The consumption of soup made from its meat is given to the patient suffering from back and body ache.

Family- Ploceidae

19. *Passer domesticus*

Local name: Bhangera

Medicinal Uses:

a) The cooked meat is given to the patient suffering from fever and headache.

Family- Ranidae

20. *Haplobatrachus tigerinus*

Local name: Paha

Medicinal Uses:

a) The meat is very nutritious and the meat cooked by removing the skin and intestine is energetic and gives relief from weakness. It is also given to the children suffering from malnutrition.

Family- Rhinolophidae

21. *Rhinolopus* sp.

Local name: Chamero

Medicinal Uses:

a) The cooked meat is very beneficial to treat the patient suffering from asthma.

Family- Suidae

22. *Sus domesticus*

Local name: Sungur

Medicinal Uses:

a) The fat is extracted and applied to cure pimples.

b) The bile is consumed by person suffering from asthma.

Family- Varanidae

23. *Varanus flavescens*

Local name: Sun-gohoro

Medicinal Uses:

a) Burnt flesh is mixed with coconut oil and the paste is applied on burns.

b) Massage with fat for Rheumatism (joint pain) and arthritis to relieve pain.

c) The fat is extracted and applied on the surface of the skin to cure scabies.

Family- Vesppidae

24. *Vespa sylvestris*

Local name: Aringal

Medicinal Uses:

a) The soup made by cooking the whole species is consumed to treat cough and pneumonia in children.

Family- Viviparidae

25. *Bellamyia bengalensis*

Local name: Ghungi

Medicinal Uses:

a) The soup made by cooking the whole species is consumed to get relief from weakness.

5.2.2 Medico-ethnobotany

The present research work revealed that the Munda people of the study area had profound knowledge about different plant species having medicinal value used in their traditional healing practices. It was found that they make use of some 61 species of plants belonging to 41 families and 48 genera for curing 55 different ailments by using their own indigenous knowledge. The list of plant species used in the traditional medicine by the Munda community of the study area is shown below (**Table 4**).

Table 4: Plants having medicinal value in the Munda community of Mechinagar Municipality, Jhapa District

S.N.	Family	Scientific Name	Common Name	Local Name	Munda Name	Life Forms	Medicinal Uses
1	Anacardiaceae	<i>Magnifera indica</i>	Mango	Aap	Aam	Tree	Blood dysentery, Diarrhoea, Diabetes, Hair fall,
2.	Annonaceae	<i>Annona squamata</i>	Custard apple	Sarifa	-	Tree	Fever, Headache, Wounds
3.	Apiaceae	<i>Centella asiatica</i>	Water penny wort	Ghortapre	Beng saag	Herb	Cuts and wounds, Indigestion, Urinary troubles, Urticarial infections
4.	Araceae	<i>Acorus calamus</i>	Sweet flag	Bojho	Bojho	Herb	Cough, Sore throat
5.	Araceae	<i>Calocasia esculenta</i>	-	Kachhu	Pidalu	Herb	Cuts and wounds
6.	Asclepiadaceae	<i>Calotropis gigantean</i>	Swallow wort	Ank	-	Shrub	Fracture, Rheumatism
7.	Asteraceae	<i>Ageratum conyzoides</i>	-	Illame jhar		Herb	Urticarial infections
8.	Asteraceae	<i>Eupatorium adenophorum</i>	Milkweed	Banmara	-	Shrub	Rheumatism, Sprain
9.	Bignoniaceae	<i>Oroxylum indicum</i>	-	Tatelo	Totela	Tree	Jaundice, Pneumonia, Wounds
10.	Bombaceae	<i>Bombax ceiba</i>	-	Semal	-	Tree	Boils, Menstrual disorders, Urinary troubles
11.	Cactaceae	<i>Opuntia stricta</i>	Prickly pear	-	Nagphani	Shrub	Burns, Diabetes, Obesity
12.	Caricaceae	<i>Carica papaya</i>	Papaya	Mewa	-	Shrub	Scabies, Ringworms
13.	Caryophyllaceae	<i>Drymaria cordata</i>	-	Abhijalo	-	Herb	Cuts and wounds, Sinus

14.	Chenopodiaceae	<i>Chenopodium album</i>	-	Bethu	Bethe	Herb	Back and body pain
15.	Compositae	<i>Artemisia vulgaris</i>	Mug wort	Titepati	-	Herb	Anemia, Cuts and wounds, Roundworms
16.	Compositae	<i>Tegetes erecta</i>	Marigold	Sayapatri	Gendaphool	Herb	Cuts and wounds, Fever
17.	Convolvulaceae	<i>Cuscuta reflexa</i>	Aakashbeli	Pahela lahara	Aalakjaria	Climber	Liver Jaundice
18.	Cucurbitaceae	<i>Momordica charantia</i>	Bitter gourd	Titekarela	-	Climber	High Blood Pressure
19.	Cyperaceae	<i>Cyperus rotundus</i>	-	Motha	Nagarmotha	Herb	Rheumatism, Obesity
20.	Dipterocarpaceae	<i>Shorea robusta</i>	Sal	Sal	Saakhu	Tree	Carbuncles, Diarrhoea, Wounds
21.	Euphorbiaceae	<i>Euphorbia royleana</i>	Cactus	Siundi	Siuri	Shrub	Leprosy, Urticarial infections, Whooping Cough
22.	Euphorbiaceae	<i>Emblica offiinalis</i>	Amala	Amala	Emli	Tree	Diarrhoea and Dysentery, Hairfall
23.	Fabaceae	<i>Dalbergia sissoo</i>	-	Sissau	Sisham	Tree	Anemia, Gonorrhoea
24.	Fabaceae	<i>Mimosa pudica</i>	Humble plant	Lajjawati jhar	Lajwanti	Herb	Diabetes, Diarrhoea, Indigestion, Piles
25.	Gentianaceae	<i>Swertia angustifolia</i>	-	Chiraito	Charauti	Herb	Fever, Stomach ache, Vomiting
26.	Graminae	<i>Cynodon dactylon</i>	-	Dubo	-	Grass	Fever, Pneumonia
27.	Labiatae	<i>Mentha spicata</i>	Super mint	Pudina	Pudina	Herb	Gastritis, Stomachache
28.	Labiatae	<i>Ocimum basilicum</i>	-	Babari	-	Herb	Urticaria
29.	Labiatae	<i>Ocimum tenuiflorum</i>	Basil	Tulasi	Tulsi	Herb	Cough, Dermatitis, Pneumonia,

							Sore throat, Sexual disorders
30.	Lauraceae	<i>Cinnamomum tamala</i>	-	Tejpaat	-	Tree	Sore throat, Low appetite
31.	Leguminosae	<i>Acacia catechu</i>	Cutch tree	Khair	Khadira	Tree	Night Blindness
32.	Leguminosae	<i>Terminalia indica</i>		Titri	-	Tree	Stomachache
33.	Leguminosae	<i>Trigonella foenumgraecum</i>	-	Methi	-	Herb	Cough
34.	Liliaceae	<i>Aloe vera</i>	India Olive	Ghiukumari	Ghritkuwari	Herb	Burns, High Blood Pressure, Menstrual disorders, Syphilis
35.	Liliaceae	<i>Allium cepa</i>	Onion	Pyaj	-	Grass	Ear pain
36.	Liliaceae	<i>Allium sativum</i>	Garlic	Lasun	-	Grass	Gastritis
37.	Loranthaceae	<i>Viscum articulatum</i>	-	Hachaur	Hadchur	Shrub	Bone fracture
38.	Lythraceae	<i>Lawsonia inermis</i>	-	Mehendi	Mehendi	Shrub	Wounds
39.	Malvaceae	<i>Hibiscus rosa-sinensis</i>	-	Ghantifool	-	Shrub	Causing abortion, Contraceptive
40.	Meliaceae	<i>Azadirachta indica</i>	Neem	Neem	-	Tree	Anemia, Diabetes, Malarial Fever, Scabies,
41.	Moraceae	<i>Ficus benghalensis</i>	Banyan	Bar	Bor	Tree	Carbuncles, Diarrhoea, Rheumatism
42.	Moraceae	<i>Ficus religiosa</i>	Peepal	Peepal	-	Tree	Constipation, Potency and Physical strength, Vomiting
43.	Myrtaceae	<i>Psidium guajava</i>	Guava	Ambak	Tamrus	Tree	Diarrhoea and dysentery, Headache, Vomiting
44.	Myrtaceae	<i>Syzygium armaticum</i>	Clove	Lwang	Loung	Tree	Toothache

45.	Myrtaceae	<i>Syzygium cumini</i>	-	Jamun	Jamun	Tree	Constipation, Diabetes Diarrhoea and dysentery,
46.	Oxalidaceae	<i>Oxalis corniculata</i>	Indian Sorrel	Chariamilo	-	Herb	Acidity
47.	Piperaceae	<i>Piper nigrum</i>	Black pepper	Marich	-	Climber	Cough
48.	Poaceae	<i>Oryza sativa</i>	Paddy	Dhan	Dhano	Herb	Gastritis
49.	Poaceae	<i>Saccharum</i> sp.	Sugarcane	Ukhu	Ganna	Grass	Jaundice
50.	Rhamnaceae	<i>Ziziphus mauritiana</i>	Berry	Bayer	Boher	Shrub	Abdominal pain during pregnancy
51.	Rubiaceae	<i>Anthocephalus kadamba</i>	-	Kadam	Kadamba	Tree	Eye inflammation
52.	Rutaceae	<i>Aegle marmelos</i>	Bail	Bel	Belidaru	Tree	Constipation, Diabetes, Gastritis
53.	Rutaceae	<i>Citrus aurantifolia</i>	Lime	Kagati	Kagati	Shrub	Acidity, Indigestion, Vomiting
54.	Solanaceae	<i>Datura metel</i>	Kalo dhaturo	Dhaturo	-	Shrub	Burns, Scabies
55.	Solanaceae	<i>Solanum tuberosum</i>	Potato	Aalu	Aalu	Herb	Burns
56.	Umbelliferae	<i>Trachyspermum ammi</i>	Lovage	Jwano	-	Herb	Gastritis
57.	Verbenaceae	<i>Latana camara</i>	Wildsage	Putus	-	Shrub	Malarial fever, Tetanus
58.	Zingiberaceae	<i>Curcuma angustifolia</i>	Turmeric	Besar	Hardi	Herb	Cough, Mestrual disorder
59.	Zingiberaceae	<i>Curcuma caesia</i>	Black Turmeric	Haledo	Haledo	Herb	Low appetite
60.	Zingiberaceae	<i>Imperata cylindrical</i>	-	Siru	-	Grass	Wounds
61.	Zingiberaceae	<i>Zingiber officinale</i>	Ginger	Aduwa	Aduwa	Herb	Cough, Vomiting

4.2.2.1 Diversity of the medicinal plants

The total of 61 medicinal plants was recorded from the study area. Among the 61 medicinal plant species, five were grasses, three were climbers, 23 were herbs, 12 were shrubs and 18 were trees. The share of grasses, climbers, herbs, shrubs and trees were 8.20%, 4.92%, 37.70%, 19.67% and 29.51% respectively (**Figure 5**).

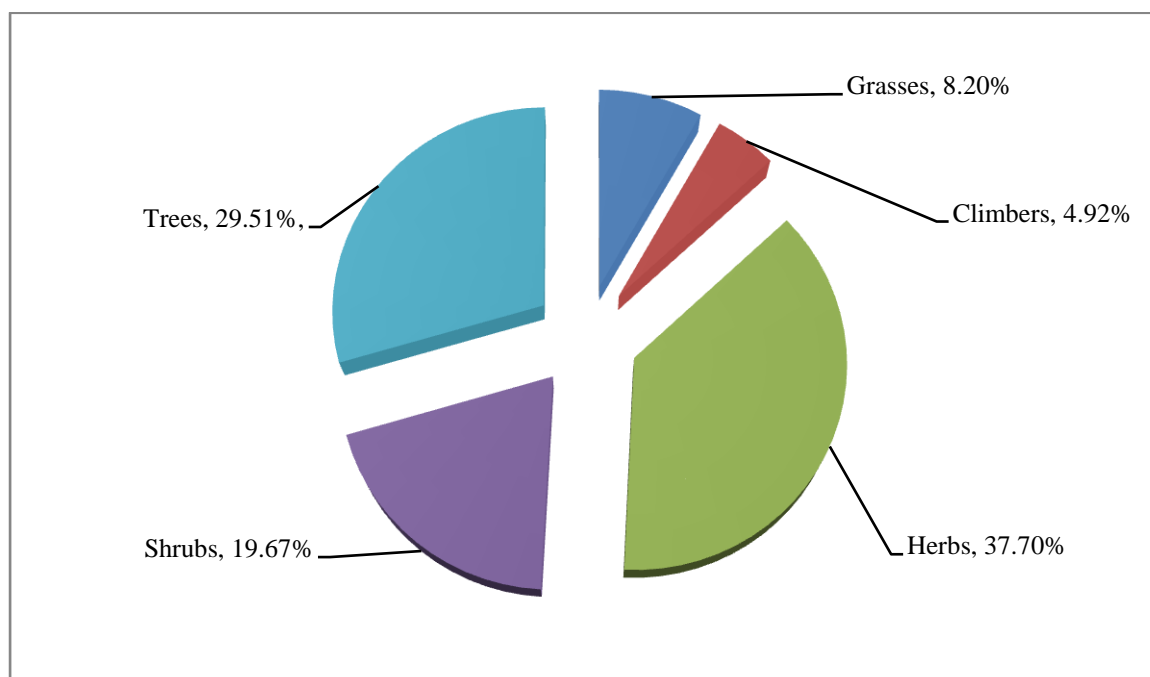


Figure 5: The share of plants belonging to different life forms

4.2.2.2 Diseases/ailments treated

The different plant species recorded for medicinal value from the study area have been used for curing 55 different diseases/ailments. The list of diseases and plant species used by Munda community in Mechinagar Municipality of Jhapa district for curing those diseases are listed below (**Table 5**).

Table 5: List of diseases and plant species used for treatment

S.N.	Name of diseases	Types of disease	Name of plants used
1.	Acidity	Gastrointestinal	Kagati (<i>Citrus auratifolia</i>), Chariamilo (<i>Oxalis corniculata</i>)
2.	Abdominal pain during pregnancy	Reproductive	Bayer (<i>Ziziphus mauritiana</i>)
3.	Anemia	Circulatory	Sissau (<i>Dalbergia sissoo</i>), Titepati (<i>Artemisia vulgaris</i>), Peepal (<i>Ficus religiosa</i>), Neem (<i>Azadirachta indica</i>)

4.	Back and body pain	Musculoskeletal	Bethu (<i>Chenopodium album</i>)
5.	Blood dysentery	Gastrointestinal	Aap (<i>Magnifera indica</i>)
6.	Boils	Integumentary	Semal (<i>Bombax ceiba</i>)
7.	Bone fracture	Musculoskeletal	Hadchaur (<i>Viscum articulatum</i>)
8.	Burns	Integumentary	Ghiukumari (<i>Aloe vera</i>)
9.	Carbuncles	Integumentary	Sal (<i>Shorea robusta</i>), Bar (<i>Ficus bengalensis</i>)
10.	Causing abortion	Reproductive	Ghantifool (<i>Hibiscus rosa-sinensis</i>)
11.	Constipation	Gastrointestinal	Jamun (<i>Syzygium cumini</i>), Bel (<i>Aegle marmelos</i>)
12.	Contraceptive device	Reproductive	Ghantifool (<i>Hibiscus rosa-sinensis</i>)
13.	Cough	Respiratory	Tulasi (<i>Ocimum tenuiflorum</i>), Methi (<i>Trigonella foenumgraecum</i>), Marich (<i>Piper nigrum</i>), Besar (<i>Curcuma angustifolia</i>), Aduwa (<i>Zingiber officinale</i>)
14.	Cut wounds	Integumentary	Titepati (<i>Artemisia vulgaris</i>), Ghortapre (<i>Cantella asiatica</i>), Kachu (<i>Calocasia esculenta</i>), Abhijalo (<i>Drymaria cordata</i>), Sayapatri (<i>Tegetes erecta</i>)
15.	Dermatitis	Integumentary	Tulasi (<i>Ocimum tenuiflorum</i>)
16.	Diabetes	Gastrointestinal	Aap (<i>Magnifera indica</i>), Jamun (<i>Syzygium cumini</i>), Bel (<i>Aegle marmelos</i>), Ambak (<i>Psidium guajava</i>), Neem (<i>Azadirachta indica</i>), Bojho (<i>Acroorus calamus</i>), Ukhu (<i>Saccharum</i> sp.), Lajjawati jhar (<i>Mimosa pudica</i>)
17.	Diarrhoea	Gastrointestinal	Aap (<i>Magnifera indica</i>), Sal (<i>Shorea robusta</i>), Bar (<i>Ficus bengalensis</i>), Lajjawati jhar (<i>Mimosa pudica</i>), Jamun (<i>Syzygium cumini</i>)
18.	Dysentery	Gastrointestinal	Ambak (<i>Psidium guajava</i>), Amala (<i>Emblica officinalis</i>), Jamun (<i>Syzygium cumini</i>)
19.	Ear pain	Otorhinolaryngological	Pyaj (<i>Allium cepa</i>)
20.	Eye inflammation	Ophthalmological	Kadam (<i>Anthocephalus kadamba</i>)

21.	Fever	-	(Neem (<i>Azadirachta indica</i>), Tulasi (<i>Ocimum tenuiflorum</i>), Sayapatri (<i>Tegetes erecta</i>), Chiraito (<i>Swertia angustifolia</i>), Sarifa (<i>Annona squamata</i>), Dubo (<i>Cynodon dactylon</i>), Putus (<i>Lantana camara</i>))
22.	Gastritis	Gastrointestinal	Jwano (<i>Trachyspermum ammi</i>), Bel (<i>Aegle marmelos</i>), Lahsun (<i>Allium sativum</i>), Dhan (<i>Oryza sativa</i>), Pudina (<i>Mentha spicata</i>)
23.	Gonorrhoea	Urogenital	Sissau (<i>Dalbergia sissoo</i>)
24.	Hair fall	-	Aap (<i>Magnifera indica</i>), Amala (<i>Emblica officinalis</i>))
25..	Headache	Nervous	Sarifa (<i>Annona squamata</i>), Ambak (<i>Psidium guajava</i>)
26.	High Blood Pressure	Cardiovascular	Ghiukumari (<i>Aloe vera</i>), Tite karela (<i>Momordica charantia</i>)
27.	Indigestion	Gastrointestinal	Kagati (<i>Citrus auratifolia</i>), Ghortapre (<i>Cantella asiatica</i>), Lajjawati jhar (<i>Mimosa pudica</i>)
28.	Jaundice	Gastrointestinal	Tatelo (<i>Oroxylum indicum</i>), Ukhu (<i>Saccharum sp.</i>)
29.	Leprosy	Integumentary	Siudi (<i>Euphorbia royleana</i>)
30.	Liver Jaundice	Gastrointestinal	Pahela lahara (<i>Cuscuta reflexa</i>)
31.	Low appetite	-	Haledo (<i>Curcuma caesia</i>), Tejpat (<i>Cinnamomum tamala</i>)
32.	Malarial fever	Nervous	Putus (<i>Lantana camara</i>), Neem (<i>Azadirachta indica</i>)
33.	Menstrual disorders	Reproductive	Ghiukumari (<i>Aloe vera</i>), Semal (<i>Bombax ceiba</i>), Besar (<i>Curcuma angustifolia</i>)
34.	Night blindness	Ophthalmological	Khair (<i>Acacia catechu</i>)
35.	Obesity	Gastrointestinal	<i>Opuntia stricta</i> , Motha (<i>Cyperus rotundus</i>)
36.	Piles	Gastrointestinal	Lajjawati jhar (<i>Mimosa pudica</i>)
37.	Pneumonia	Respiratory	Tatelo (<i>Oroxylum indicum</i>), Dubo (<i>Cynodon dactylon</i>), Tulasi (<i>Ocimum tenuiflorum</i>)
38.	Potency and physical strength	-	Peepal (<i>Ficus religiosa</i>)

39.	Rheumatism	Musculoskeletal	Bar (<i>Ficus bengalensis</i>), Motha (<i>Cyperus rotundus</i>), Ank (<i>Calotropis gigantea</i>)
40.	Ringworms	Integumentary	Mewa (<i>Carica papaya</i>)
41.	Roundworms	Gastrointestinal	Titepati (<i>Artemisia vulgaris</i>)
42.	Scabies	Integumentary	Mewa (<i>Carica papaya</i>), Dhaturu (<i>Datura metel</i>), Neem (<i>Azadirachta indica</i>)
43.	Sexual disorders	Reproductive	Tulasi (<i>Ocimum tenuiflorum</i>)
44.	Sinus	Otorhinolaryngological	Abhijalo (<i>Drymaria cordata</i>)
45.	Sore throat	Respiratory	Bojho (<i>Acrorus calamus</i>), Tejpat (<i>Cinnamomum tamala</i>), Tulasi (<i>Ocimum tenuiflorum</i>)
46.	Sprain	Musculoskeletal	Ank (<i>Calotropis gigantea</i>)
47.	Stomach ache	Gastrointestinal	Amala (<i>Embllica officinalis</i>), Chiraito (<i>Swertia angustifolia</i>), Pudina (<i>Mentha spicata</i>), Kadam (<i>Anthocephalus kadamba</i>)
48.	Syphilis	Urogenital	Ghiukumari (<i>Aloe vera</i>)
49.	Tetanus	Gastrointestinal	Putus (<i>Lantana camara</i>)
50.	Toothache	Dental	Lwang (<i>Syzgium armatum</i>)
51.	Urinary troubles	Urogenital	Semal (<i>Bombax ceiba</i>), Ghortapre (<i>Cantella asiatica</i>)
52.	Urticaria (Skin allergy and irritation)	Integumentary	Ghortapre (<i>Cantella asiatica</i>), Babari (<i>Ocimum basilicum</i>), Illame jhar (<i>Ageratum conyzoides</i>), Siudi (<i>Euphorbia royleana</i>)
53.	Vomiting	Gastrointestinal	Peepal (<i>Ficus religiosa</i>), Ambak (<i>Psidium guajava</i>), Kagati (<i>Citrus auratifolia</i>)
54.	Whooping cough	Respiratory	Siudi (<i>Euphorbia royleana</i>)
55.	Wounds	Integumentary	Tatelo (<i>Oroxylum indicum</i>), Sarifa (<i>Annona squamata</i>), Sal (<i>Shorea robusta</i>), Mehendi (<i>Lawsonia inermis</i>), Siru (<i>Imperata cylindrical</i>)

The different diseases were classified on the basis of their affected parts. The highest was the gastrointestinal 36.54%, followed by integumentary 19.23%, reproductive 7.70%, respiratory 7.70%, musculoskeletal 7.70%, urogenital 5.77%, nervous 3.84%,

ophthalmological 3.84%, otorhinolaryngological 3.84% and renal/cardiovascular 1.92% (**Figure 6**). Fever, hair fall and potency and physical strength could not be classified in medical term.

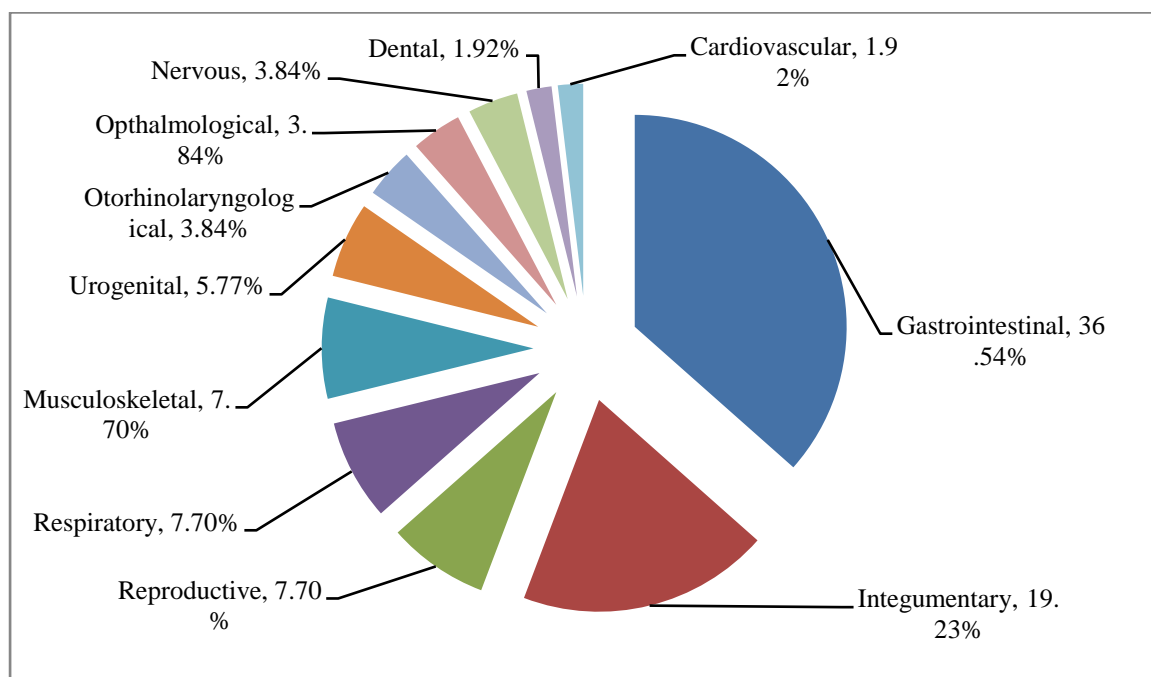


Figure 6: The types of diseases treated by using plants

4.2.2.3 Plant parts used

Different parts of the plants were used in the traditional medicine system by the Munda people of the study area. The parts of the plants most used for medicinal purposes were leaves, roots, rhizomes, bulb, stem, bark (roots and stems), fruits, flowers, seeds etc. In some cases latex, resin or whole plant body was used for medication.

4.2.2.4 Forms of medication

The plant species used as traditional medicine products were used in different forms like powder, paste, decoction, juice, whole plant extract etc. It was made by crushing and grinding the parts to be used or the whole plants to extract important drugs out of them.

4.2.2.4 Routes of administration

Both external and internal routes of administration were observed in the present study. Internal medication was done by oral absorption, inhalation, inner dental etc. while external medication was done by applying, massaging etc.

Among the total medication, internal and external were 73.74 % and 26.26 % respectively. Majority of medication was administered orally which comprised of 69.70%, followed by

application 22.22 %, massaging 4.04%, inhalation 2.02%, inner dental and drops 1.01% (Figure 7).

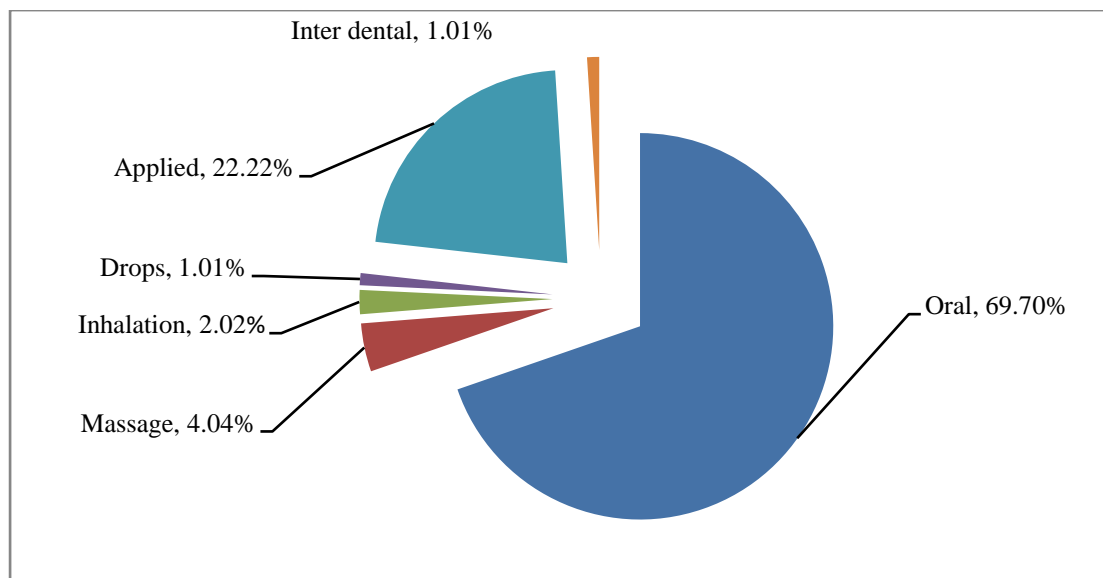


Figure 7: The different methods of application of parts/products of plants

4.2.2.6 Description of plants used in medication

The plants used in the traditional medicine by Munda community of the study area are described on the basis of information collected during the field visits. The detailed descriptions are given in alphabetical order of family of the plant species.

Family- Anacardiaceae

1. *Magnifera indica*

Local name: Aap

Medicinal Uses:

- a) The juice from the bark of stem is consumed to cure diarrhoea and dysentery.
- b) Powder made from shade-dried soft leaves is consumed regularly to control diabetes.

Dose: 2.5 gm. powder per day.

- c) Pasty mass of cotyledons is applied on hair to control hair fall.
- d) Stem bark decoction is taken to treat blood dysentery.

Dose: 15 ml in empty stomach twice a day continuously for 3 days.

Family- Annonaceae

2. *Annona squamata*

Local name: Sarifa

Medicinal Uses:

- a) Bark juice is drunk to control fever and headache.

Dose: 50 ml for 3 consecutive days.

Family- Apiaceae

3. *Centella asiatica*

Local name: Ghortapre

Medicinal Uses:

- a) The leaves are crushed and the paste prepared is consumed to cure indigestion.
- b) Whole plant extract is useful in curing urinary problems.

Dose: 30 to 50 ml

- c) Dried leaf powder is applied to cure cut wounds, skin allergy and irritation.

Family- Araceae

4. *Acrorus calamus*

Local name: Bojho

Medicinal Uses:

- a) Rhizome paste is given to get relief from chronic cough.

Dose: 1 teaspoonful twice a day for 10 days.

- b) Rhizomes are washed and dried properly and taken orally for curing sore throat.

5. *Calocasia esculenta*

Local name: Kachu

Medicinal Uses:

- a) Crushed petiole is applied on fresh cut and wounds to stop bleeding.

Family- Asclepiadaceae

6. *Calotropis gigantea*

Local name: Ank

Medicinal Uses:

- a) Latex is applied on the joints and massaged to get instant relief from rheumatism and sprain.

Family- Asteraceae

7. *Ageratum conyzoides*

Medicinal Uses:

- a) The aqueous extract of leaves exhibits anti-fungal and anti-bacterial properties. The boiled leaf paste or leaf juice is applied on skin before bed for the treatment of skin diseases.

8. *Eupatorium adenophorum*

Local name: Banmara

Medicinal Uses:

- a) Leaves extract is used to massage on the joints to get relief from rheumatism.

Family- Bignoniaceae

9. *Oroxylum indicum*

Local name: Tatelo

Medicinal Uses:

- a) Endosperm of two seeds are pasted and eaten daily to cure pneumonia.
- b) Bark soaked in water overnight is drunken by mixing lime powder to cure jaundice.

Dose: 1 glass in the morning for 7 days.

- c) Bark powder is applied on chronic wounds.

Family- Bombaceae

10. *Bombax ceiba*

Local name: Semal

Medicinal Uses:

- a) Tap root of young plants and flowers are diuretic and its paste is consumed to treat urinary troubles.

- b) Paste of tap roots and bark of young plants mixed with raw milk of cow is taken regularly to regulate irregular menstruation.

Dose: 1 gm. paste in 2ml milk once a day for about a week.

- c) Flower's paste is applied on Boils for ripening purpose.

Family- Cactaceae

11. *Opuntia stricta*

Local name: Nagpheni

Medicinal Uses:

- a) Pasty mass of whole plant is applied on burns.

- b) Paste from the root is taken to control diabetes and obesity.

Family- Caricaceae

12. *Carica papaya*

Local name: Mewa

Medicinal Uses:

- a) Latex is applied for the treatment of ringworms and scabies.

Family- Caryophyllaceae

13. *Drymaria cordata*

Local name: Abhijalo

Medicinal Uses:

- a) Leaf is pasted and applied on cut wounds to stop bleeding.

- b) Leaves paste is inhaled by the patient suffering from sinusitis.

Family- Chenopodiaceae

14. *Chenopodium album*

Local name: Bethu

Medicinal Uses: Whole plant is cooked and consumed to get relief from constipation and back and body pain.

Family- Compositae

15. *Artemisia vulgaris*

Local name: Titepati

Medicinal Uses:

a) Leaf extract is given to kill Roundworms.

Dose: 5 to 10 ml depending on age for three alternate days.

b) The whole plant is mashed and juice from it is applied in cuts to stop bleeding and fast healing.

16. *Tegetes erecta*

Local name: Sayapatri

Medicinal Uses:

a) The leaf juice is applied to the cuts and wounds which help to make the wound dry and heal soon.

b) Leaves paste is taken orally to cure fever.

Family- Convulvulaceae

17. *Cuscuta reflexa*

Local name: Pahele lahara

Medicinal Uses:

a) The juice is extracted from the tendrils and taken orally in regular manner until liver jaundice is treated.

b) Warm the body by steam of boiled tendrils to cure jaundice.

Family- Cucurbitaceae

18. *Momordica charantia*

Local name: Tite karela

Medicinal Uses:

a) The fruit is taken as vegetable by the patient of high blood pressure.

Family- Cyperaceae

19. *Cyperus rotundus*

Local name: Motha

Medicinal Uses:

a) The rhizome paste is given in Rheumatism and Obesity.

Family- Dipterocarpaceae

20. *Shorea robusta*

Local name: Sal

Medicinal Uses:

- a) Fruit paste is prescribed in diarrhoea and dysentery.
- b) In Sal resin an essential oil is found which is antiseptic. This oil is applied to cure skin diseases.
- c) The paste of bark is applied in the wounds for fast healing.

Family- Euphorbiaceae

21. *Emblica officinalis*

Local name: Amala

Medicinal Uses:

- a) The powder made by crushing dried fruits is taken with lukewarm water to cure dysentery and stomachache.
- b) Paste prepared by its powder soaked in water is applied in the scalp next day and washed with water after an hour controls hair fall.

22. *Euphorbia royleana*

Local name: Siundi

Medicinal Uses:

- a) The latex is applied in the affected area to cure urticarial problems (skin allergy and irritation).
- b) Lukewarm latex and common salt is taken with hot water for curing whooping cough and leprosy.

Family- Fabaceae

23. *Dalbergia sissoo*

Local name: Sissau

Medicinal Uses:

- a) Leaf juice is consumed to control gonorrhoea.

Dose: 15 ml thrice a day

- b) Squash of leaf powder is prepared and given to patient. It cures blood impurities and blood disorder (Anemia).

Dose: 5 gm. powder in a glass of water daily for a week.

24. *Mimosa pudica*

Local name: Lajjawati jhar

Medicinal Uses:

- a) In Piles, leaf powder is given with milk.

Dose: 5 gm. powder in a glass of milk thrice a day for three months.

- b) Leaf juice is consumed to get relief from indigestion.

Dose: 3 ml juice for a week.

c) Diabetic patients take decoction of its roots regularly.

Dose: 100 ml up to 15 days (10-15 ml daily).

d) The juice extracted from the roots is given to patient suffering from diarrhea.

Family- Gentianaceae

25. *Swertia angustifolia*

Local name: Chiraito

Medicinal Uses:

a) Root bark soaked in water overnight is taken the next morning to cure fever.

b) Juice made from stem is taken orally for the patient suffering from stomach ache and vomiting.

Family- Graminae

26. *Cynodon dactylon*

Local name: Dubo

Medicinal Uses:

a) Whole plant mixing with tulasi leaves is made paste. The paste is given to patients by adding honey to cure fever and pneumonia in children.

Family- Labiatae

27. *Ocimum basilicum*

Local name: Babari

Medicinal Uses:

a) Leaf juice is applied externally for urticarial infections (skin allergy and irritation).

28. *Ocimum tenuiflorum*

Local name: Tulasi

Medicinal Uses:

a) Leaf extract is warmed with honey and eaten to get relief from cough and cold.

Dose: one teaspoonful twice a day for a week.

b) Raw leaves are chewed for curing sore throat.

c) Powder of roots or seeds and equal amount of jiggery is taken. The mixture is consumed with cow's milk to cure sexual disorders.

Dose: 2 gm. of the mixture regularly for one to six months.

d) Dried leaves powder mixed with lemon juice are applied on the affected area of skin to cure dermatitis.

29. *Mentha spicata*

Local name: Pudina

Medicinal Uses:

- a) Leaves are boiled with water adding garlic and jwano to it and given to the patient for controlling gastric troubles.
- b) The leaves are chewed raw or made paste and taken orally to get rid of stomachache.

Family- Lauraceae

30. *Cinnamomum tamala*

Local name: Tejpaat

Medicinal Uses:

- a) Green leaves are chewed to cure sore throat.
- b) Leaf powder is eaten with water to increase appetite.

Dose: One teaspoonful for three days.

Family- Leguminosae

31. *Terminalia indica*

Local name: Titri

Medicinal Uses:

- a) Paste of three seeds is eaten to cure stomachache.

Dose: one teaspoonful once in the morning in empty stomach for three days.

32. *Trigonella foenumgraecum*

Local name: Methi

Medicinal Uses:

- a) The dried seeds are fried. The powder made from the fried seeds is taken regularly with hot water for curing cough.

33. *Acacia catechu*

Local name: Khair

Medicinal Uses:

- a) Stem bark paste made with seven long peppers (*Piper longum*) is taken for the treatment of night blindness.

Dose: one teaspoonful thrice a day for three months.

Family- Liliaceae

34. *Aloe vera*

Local name: Ghiukumari

Medicinal Uses:

- a) In Syphilis, leaf pulp is applied on the affected area to cure burns.
- b) Leaf pulp is given for diabetic patient to control diabetes.
- c) Leaf pulp with honey is given to cure irregular menstruation.

Dose: one teaspoonful pulp and honey for seven days.

- d) Leaf pulp is consumed regularly to control high blood pressure.

35. *Allium sativum*

Local name: Lasun

Medicinal Uses:

a) The bulb paste boiled in water adding pudina leaves is taken by patient suffering from gastritis to relieve pain.

36. *Allium cepa*

Local name: Pyaj

Medicinal uses:

a) The juice extracted by crushing the bulb is dropped inside ear for pain relief.

Family- Loranthaceae

37. *Viscum articulatum*

Local name: Hadchaur

Medicinal Uses:

a) Bark powder mixed with albumen of local hen's egg is applied on the affected area and tied with bamboo to heal the fractured bone.

Family- Lythraceae

38. *Lawsonia inermis*

Local name: Mehendi

Medicinal Uses:

a) Paste of leaves is applied on wounds for fast healing.

Family- Malvaceae

39. *Hibiscus rosa-sinensis*

Local name: Ghantifool

Medicinal Uses:

a) Stem bark paste is given to woman for causing abortion.

Dose: 15 gm. continuously for five days.

b) Mixture of pasty mass of flower buds with rust of iron and liquor is taken by woman at the days of menstruation as a contraceptive device.

Dose: 3 gm. pasty mass of flower buds, 2 gm. iron rust and 2ml liquor for 5 days.

Family- Meliaceae

40. *Azadirachta indica*

Local name: Neem

Medicinal Uses:

a) Bathing with decoction from leaves cures scabies and urticarial infections.

b) Dried leaves powder is taken to cure blood impurities (Anemia).

c) Inhalation of tablet prepared by leaves powder and half the amount of phitkiri with sugar syrup cures fever and malarial fever.

Dose: one tablet twice a day for three days.

d) Aqueous extract of leaves is taken for the treatment of diabetes.

Dose: 15ml once a day in empty stomach continuously for a month.

Family- Moraceae

41. *Ficus religiosa*

Local name: Peepal

Medicinal Uses:

a) Powder of its fruit with milk is given to promote potency and physical strength

Dose: 3 gm. powder with a glass of milk thrice a day for a week.

b) Ripe fruits are eaten to cure blood disorders and vomiting.

c) Seven fruits are given to patients regularly for the treatment of constipation.

Dose: Seven fruits per day for a month.

42. *Ficus benghalensis*

Local name: Bar

Medicinal Uses:

a) Milky latex from the stem is applied externally and massaged to treat pain with rheumatism.

b) Latex from stem is applied to carbuncles for healing soon.

c) Juice extracted from leaves is given to patient suffering from diarrhea.

Family- Myrtaceae

43. *Psidium guajava*

Local name: Ambak.

Medicinal Uses:

a) Unripe fruits are consumed to control diarrhea and dysentery

b) In vomiting, decoction of leaves is given.

c) Dried flower powder is prescribed to smoke as cigarette to get relief from headache.

44. *Syzygium cumini*

Local name: Jamun

Medicinal Uses:

a) Bark juice is prepared and taken to control diarrhoea and dysentery.

Dose: 15 ml. juice twice a day for five days.

b) The fruit is very essential for the patient of diabetes and constipation.

45. *Syzygium aromaticum*

Local name: Luang

Medicinal Uses:

a) Dried bulb is chewed slowly to get relief from toothache. Oil extracted from seeds is used to treat toothache.

Family- Oxalidaceae

46. *Oxalis corniculata*

Local name: Chariamilo

Medicinal Uses:

- a) Leaf juice is taken by the patient of acidity.

Family- Piperaceae

47. *Piper nigrum*

Local name: Marich

Medicinal Uses:

- a) Seeds are crushed to make powder and are orally taken by the patient to get relief from cough.

Family- Poaceae

48. *Saccharum officinarum*

Local name: Ukhu

Medicinal Uses:

- a) Stem juice is prescribed for the treatment of jaundice till recovery.

49. *Oryza sativa*

Local name: Dhan

Medicinal Uses:

- a) Five grains with stale water is taken in the early morning for one month for getting relief from gastric troubles.

Family- Rhamnaceae

50. *Ziziphus mauritiana*

Local name: Bayer

Medicinal Uses:

- a) Stem bark paste is taken as a cure for abdominal pain during pregnancy.

Family- Rubiaceae

51. *Anthocephalus kadamba*

Local name: Kadam

Medicinal Uses:

- a) Stem bark paste with common salt is applied below the eyes as a cure for eye inflammation.
- b) Juice of leaves with common salt is taken as a cure for stomachache.

Dose: 2 ml juice with 1 gm. salt in empty stomach for three days.

Family- Rutaceae

52. *Aegle marmelos*

Local name: Bel

Medicinal Uses:

- a) Fruit pulp is taken to cure diabetes, constipation and diabetes.

53. *Citrus aurantifolia*

Local name: Kagati

Medicinal Uses:

- a) The fruit mixed with water is given to reduce acidity.
- b) The fruit juice is taken as anti-vomiting and to patient suffering from indigestion.

Family- Solanaceae

54. *Datura metel*

Local name: Dhaturu

Medicinal Uses:

- a) One seed paste is eaten as a single dose to treat scabies.
- b) Leaves are crushed and paste is applied to cure burns.

55. *Solanum tuberosum*

Local name: Aalu

Medicinal Uses:

- a) Tuber of the plant is crushed and applied to cure burnt skin.

Family- Umbelliferae

56. *Trachyspermum ammi*

Local name: Jwano

Medicinal Uses:

- a) The dry seeds are chewed for gastric troubles.
- b) Seeds powder and Garlic (*Allium sativum*) paste is boiled in water and drunk to get relief from gastric troubles.

Family- Verbenaceae

57. *Lantana camara*

Local name: Putus

Medicinal Uses:

- a) Decoction of whole plant is taken for the treatment of tetanus and there is strict prohibition of taking of sour food during the treatment.

Dose: 15 ml decoction for 15 days.

- b) In malarial fever, the decoction of leaves is taken.

Dose: 10 ml twice a day for a week.

Family- Zingiberaceae

58. *Concuma angustifolia*

Local name: Besar

Medicinal Uses:

a) Dried rhizome powder is crushed into powder and taken with water for treating cough and menstrual disorder.

59. *Curcuma caesia*

Local name: Haledo

Medicinal Uses:

a) Dried rhizome powder is taken with water to increase appetite.

60. *Imperata cylindrical*

Local name: Siru

Medicinal uses:

a) Dried stem powder is anthelmintic to wounds and is applied in the wounds for healing soon.

61. *Zingiber officinale*

Local name: Aduwa

Medicinal uses:

a) Dried rhizome powder is consumed to cure cough and vomiting.

4.3 Indigenous knowledge systems

Munda people of the study area had a lot of traditional knowledge systems and skills to meet their needs. The indigenous knowledge was used in various aspects like fishing, farming, hunting, medicinal skills, weaving and knitting etc. Although a small group, they are self-reliant and produce most of their needs by themselves. The traditional and indigenous knowledge was passed from one generation to another through involvement of young generation in different occasions in the society. The indigenous knowledge in various fields is described under different sub headings as below:

4.3.1 Food processing techniques

Munda people drink black tea in the morning as healthy drink and have the habit of consuming parboiled rice for better digestion. Traditionally they used to consume boiled meat and vegetables but with the passage of time they started using oil in their cooking. At each meal, they drop a few grains of rice in the name of deceased ancestors.

The favorite drink is rice beer and each family has its own. They prepare it by fermentation of boiled rice mixed with certain kinds of vegetable roots (Ranu). The liquor is stored in earthen jars and becomes ready for use in five days. It is taken at night almost every day. Rice beer is needed in every occasion.

4.3.2 Food preservation and storage

Munda people have special way of preserving paddy seeds in special storehouses called Mohri (straw plastered with dung) that keeps it safe from insects. They use ointment of mustard oil and turmeric powder to preserve pulses in storage from insects.

4.3.3 Agriculture practices

Agriculture was the main occupation of the Munda people. They had sufficient land in the past but most of them lost their land to the dominant groups and are landless now. Due to lack of sufficient land for agriculture, they earn others land for their livelihood and are found in other occupations like animal rearing, daily wage laborers in tea gardens and factories.

4.3.4 Arts, crafts and technology

Some people of the Munda community were excellent in basket work and weaving. Especially females were found involving in such arts and crafts. Males were found making bamboo baskets (doko) and 'Dhakki' from the bamboo. 'Nanglo' is also made for food processing from bamboo. Different kinds of nets and fishing hooks are also made for fishing purpose. A funnel shaped fishing instrument called 'Dhoksa' is also made from bamboo. Agricultural instruments like plough (halo) and yoke (juwa) are also made from the stem of Sal (*Shorea robusta*), Sissoo (*Dalbergia sissoo*) and Semal (*Acacia catechu*). Women were seen making a special type of broom from local grass and weeds and local straw. They also made Patiya mat out of processed jute which is used for multi-purposes.

Different types of musical instruments and hunting weapons are prepared by themselves. Bow and arrow and katapult (rubber and wooden made instrument to shoot animals and birds, where stones are used) are the main instruments used for hunting purposes. There is a tradition of hitting an arrow using fur of Dumsi in the forest and making musical instruments from wood of the tree that is hit by an arrow. Hide of buffaloes and skin of goats are used for making musical instruments.

4.3.5 Livestock and poultry practices

The Mundas rear pigs, hens and goats for food, but are killed and eaten chiefly at festivals and sacrifices. They also rear cows and buffaloes for the purpose of milk. Oxen are also reared for agricultural purposes. The fecal matter of poultry and dung of livestock was used as manure for the better growth of different vegetables growing on the fields.

4.3.5.1 Medicinal practices for livestock

- Whole body of Golkakri (*Solena heterophylla*) and Dudhejhar (*Euphorbia hirta*) is fed as fodder to cows and buffaloes for increasing milk.

- Paste prepared from the rhizomes of Bojho (*Acorus calamus*) is applied on the body of animals to remove lice. Its juice is also used to treat scabies in animals.
- Leaf paste of Sissau (*Dalbergia sissoo*) is used for the treatment of foot diseases in cattles.
- The prepared by mixing the powder of Besar (*Curcuma angustifolia*) and oil of Tori (*Brassica campestris*) is applied on the wounds of livestock for healing soon.
- Leaf juice of Sissau (*Dalbergia sissoo*) is mixed with curd and given to animals for the treatment of diarrhea.

4.3.6 Biodiversity conservation

The Munda people use natural resources for various purposes like food, fodder, medicines etc. Natural resources also have cultural and religious values in the Munda community. They worship nature and natural resources as the incarnation of god. They generally use broken and dead plants but seldom cut young and small trees in the forest. The local healers of the community have planted some medically important plant species around the houses for easy access in emergency. The mostly planted species are Ghiukumari (*Aloe vera*), Neem (*Azadirachta indica*), Amala (*Embllica officinalis*), Sissau (*Dalbergia sissoo*) etc.

The Munda people are animist and fond of meat. They were seen aware in the conservation of plant species but had no knowledge regarding the conservation of animals. They kill animals wherever and whenever possible. This practice has been controlled after the establishment of the forest as community forest.

4.3.7 Pest management

The people of this community use organic pesticides and insecticides for controlling pests in the agricultural fields. For controlling aphids in the vegetable fields, they use cow urine which kills the aphids. Likewise, for controlling different insects and fungus in paddy and potato fields, they burn fire near the fields so that the insects and fungus are destroyed and the production is upgraded.

4.3.8. Hunting, trapping and fishing

Hunting and fishing is the unique activities of Munda people. They really love hunting and fishing. They are fond of hunting due to their settlements near the forests. They use different parts of the animals like meat, hide, skin etc. for different medicinal purposes and making musical instruments. The animals are also hunted for consumption purpose. It is observed that in the Munda family females are allowed to go hunting which is uncommon in other societies. They are familiar with the ecology and behaviour of the wildlife which helps them for ease in hunting. The generally hunt species are Deer (*Axis axis*), Parrot (*Pavo cristatus*), Wild Boar (*Sus scrofa*), Myna (*Acridotheres tritis*) etc.

They trap rats in the agricultural fields generally during the months of October, November and December. They trap rats by filling water in the holes and smoking the holes. Due to suffocation the rat comes out and is trapped.

The people of this community also trap crabs and ghungi by bare hands during the months of July, August and September when they are abundantly found in the paddy fields and wetlands.

Both males and females of the Munda family go for fishing. They go to nearby rivers, ponds, paddy fields, marshy lands and large drains of tea gardens where fish is available. Fishing is done in great extent during the summer season, though there is no exception in the winter season. Fishing is done in various ways which are as follows:

- a) Water is thrown out of the place and fishes left in the wet mud are caught.
- b) Bamboo made fishing instruments called 'Dhoksa' are put in the rivers, ponds and large drains in the evening and the fishes are collected in the mornings.
- c) Fishing nets and hooks are used to catch fishes in the rivers, ponds and brooks.

5. DISCUSSION

Munda community has plenty of traditional knowledge with respect to medicinal usage including both plants and animals. The medico-ethnobiological study carried out in Mechinagar Municipality of Jhapa district showed that plant species were mostly used in comparison to animal species for treating various diseases. The results of the present study showed the use of 25 animal species belonging to 19 orders, 24 families and 25 genera for the treatment of 27 different diseases by the local people. Among the 25 animal species used, six species were mammals, five species were aves, four species each of reptiles and arthropods, two species each of pisces and annelida and one species each of amphibian and Mollusca. For different medicinal purposes, different parts and products of animal species such as bones, flesh, meat, shell, meat, milk, blood, honey, stomach, bile, saliva, fat, eggs, fecal matters etc. were used as well as in some cases whole organism was used. A total of five species was used for healing back and body pain, three species were used for treating asthma, rheumatism, common cold and pneumonia, and two species were used for the treatment of eczema, fever, measles fever, pimples and scabies. Likewise, one species was used for treating abdomen pain, arthritis, blisters, burns, carbuncles, boils, goiter, headache, malnutrition, psychic disorder, wounds, thorn prick, tuberculosis, weakness and cracks of sole of feet.

The present study revealed the cooked meat and alcohol from the meat of *Canis aureus* was used for the treatment of rheumatism which was supported by other researcher (Kaudinya, 1998; Dhakal, 2004; Thapa, 2008; Paudyal and Singh, 2014; K.C., 2015). The stomach of *Hystrix brachyura* was used to treat asthma in this study. Similar result was found by (Tamang, 2003; Thapa, 2008).

Thakur (2008) reported the urine of the same species in curing paralysis, epilepsy and asthma. Thapa (2008) reported the use of *Anadenus* sp. for the treatment of fractured bones while the same species was reported for the treatment of piles in the present study. Koirala (2004) reported the use of *Gallus gallus* for curing burns. Similar result was found in the present study. However, Dhakal (2004) reported its use for bone fracture.

The results also showed that 61 types of plant species belonging to 41 families and 48 genera were used for the treatment of 55 different diseases. Among the total, five were grasses, three were climbers, 23 were herbs, 12 were shrubs and 18 were trees. A total of eight plant species were used for treating diabetes, seven species were used for curing fever, five species for treating cough and wounds, four species for treating cuts, diarrhea, gastritis, stomach pain and urticaria, three species were used for treating anemia, dysentery, menstrual disorders, pneumonia, rheumatism, scabies, sore throat and vomiting. Similarly, two species were used for the treatment of carbuncles, acidity, constipation, hair fall, high blood pressure, indigestion, jaundice, liver jaundice, low appetite, malarial fever, obesity and urinary troubles. Likewise, one species was used for

the treatment of abdominal pain during pregnancy, back and body pain, burns, blood dysentery, causing abortion, dermatitis, gonorrhoea, syphilis, tetanus, toothache, whooping cough, potency and physical strength, piles, leprosy, ear pain, eye inflammation, night blindness, sexual disorders, contraceptive device, roundworms and ringworms.

Ficus benghalensis was used to treat diarrhoea, carbuncles and rheumatism in the present study. However, Paudyal and Singh (2014) reported the same species for the treatment of fever and cough. The use of *Viscum articulatum* for curing bone fracture was supported by other researcher (Ghimire, 1999; Oli, 2003; Rai, 2003). Similarly the use of *Zingiber officinale*, *Ocimum sanctum* and *Acorus calamus* for the treatment of cough in the present Joshi and Joshi (2007) reported the same results.

In the present study, *Imperata cylindrical* was used to cure wounds while Oli (2003) reported the same species used to cure intestinal worms. Likewise, Rai (2003) reported the use of this species for the treatment of piles and diarrhea. Also, *Swertia angustifolia* was used to cure stomachache and vomiting in this study. K.C. (2015) found the similar results.

In Munda community, the local healers and the elderly people had better knowledge about the use of animals and plants for medicinal purpose. They also had the knowledge on food processing, food storage and preservation, hunting and fishing, arts and crafts, agriculture practice and biodiversity conservation. The change in the daily practice of the people and advancement of modern health facilities has changed their livelihood. Thus, the traditional healing practices is depleting and losing its attraction.

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Munda community of the study area believed that they are originally from India (Nagpur, Ranchi) and had migrated to Nepal during the British Regime in India. They possess distinct physical features having thick lips, broad nose, curly haired and almost black in color. They speak their own mother tongue called Sadri, and have ornaments such as chaduwa, jhatiya, paheri hasali, bera etc. They celebrate festivals like Jatra Puja, deepawali, phagu, mage, sarhual, soharai, sarhual etc. Alcohol and meat are the basic food items during festivals and occasions. The village association includes Dewan and Mukhiya for solving the problems within the community. Most of the people of this community are economically poor and have a low living standard.

The present study revealed that Munda community of the study area had a profound knowledge on the usage of animals and plant species for traditional healing system as medicines. The plant species were mostly used for medicinal purposes in comparison to animal species. The local healers (dhamis/jhakris) were the most popular ones in the villages for utilizing the animals and plant species for medicine. The elderly people and women also had knowledge on traditional medicine by their experiences and practices. The younger generations were inclined towards modern health facilities due to lack of awareness and reluctance of older generations in sharing their knowledge. Thus, the traditional healing practice of the community is declining day by day. Despite these facts, still many of the villagers depend on traditional medicines for their primary health care for the treatment of simple diseases like cough, common cold, cuts and wounds, diarrhea and dysentery, burns etc.

The major findings of the present medico-ethnobiological study and indigenous knowledge system have been summarized below.

- People of the Munda community are still dependent on traditional healing practices using animals and plants for their primary health care.
- They use 25 animal species belonging to 18 orders, 24 families and 25 genera to treat 27 different types of diseases.
- They also use 61 species of plants belonging to 41 families for the treatment of 55 different types of diseases.
- Most of the people of this community are engaged in agriculture and wage earners as laborers in tea gardens and factories.
- Munda people of the study area had a lot of traditional knowledge systems and skills to meet their needs. The indigenous knowledge was used in various aspects like fishing, farming, hunting, art, craft and technology, medicinal skills, weaving and knitting etc.

6.2 Recommendations

Munda community of the study area are rich in traditional healing practices and have been using animals and plants for medicinal purposes but are careless to their traditional practices because of inclination towards the modern health services. The following recommendations have been forwarded for the resource conservation.

1. Education and awareness programmes

The people should be provided with education for the preservation and conservation of natural habitats of animals and plants. Awareness programmes on the importance of traditional medicines should be conducted so that the local people become aware about the conservation of animals and plants for sustainable use.

2. Motivation and trainings

Most of the people are economically poor and are engaged in agriculture using ancient methods. They should be motivated and given trainings for the use of modern agriculture techniques to produce better yield and improve the living standard. The local healers should be motivated for documentation of their knowledge to the youngsters for the benefit of their community and mankind at large.

3. Cultivation of medicinal plants

The people should be encouraged to cultivate medicinal plants. Technical support should be provided for enhancing nursery to cultivate medicinal plants, such cultivation leads to protection of different threatened species.

4. Discourage hunting and killing

Killing of wild animals in haphazard manner should be discouraged. The adults, males and disabled should be selected for hunting purpose in necessity instead of females and juveniles.

5. Formation of protection committee

Committee should be formed in the area for the sustainable use of medicinal animals and plants. Exploitation of medicinal animals and plants should be strictly prohibited.

6. Biochemical analysis

Biochemical analysis of parts of animals and plants used by Munda ethnic groups should be done.

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APPENDICES

Appendix 1: Questionnaires

I. For group discussion

Date:

1. General information of respondent

i. Name:

ii. Sex:

iii. Age:

iv Occupation:

v. Education:

2. What types of diseases are the most common here?

3. What are the diseases you cure for?

4. What animals and plant species are used for curing each disease?

5. Who is the local healer in the community?

6. How are traditional medicines prepared by using different animals and plants for different diseases?

For preparation of traditional medicine and treatment

i. Name of the disease:

ii. Name of medicinal animal and plant used:

iii. Organ/ products/parts used:

iv. Form of medication and route of administration:

v. Preparation process:

vi. Treatment procedure:

7. Is the knowledge of traditional medicine widespread in your community?

8. Where are the medicinal animals and plants brought from?

9. Is there any effort taken for the preservation of such animals and plants?

10. Do you rely only on traditional medicines for healthcare?

II. Schedule for ethnography

A. Description of the respondents

i. Name:

- ii. Sex:
- iii. Age:
- iv. Occupation:
- v. Education:

B. Population

- i. Total members in the family:

C. Language

- i. What is your mother tongue?
- ii. Which language is preferred for communication?

D. Physical Features

- i. Complexion:
- ii. Shape of face:
- iii. Eyes:
- iv. Lips:
- v. Hair:
- vi. Nose:
- vii. Height:

E. Dress and Ornaments

- i. What are the traditional dresses for Munda males and females?
- ii. What do you wear nowadays?
- iii. What are the special ornaments of your community?

F. Food and Drink habits

- i. What is your staple food?
- ii. What are the cuisines prepared during festivals and ceremonies?
- iii) What are your special drinks?

G. Education

- i. Are all the members literate?
- ii. Do all the children go to school? If yes, what type?

H. Religion

- i. What is your traditional religion?
- ii. Which God/Goddess do you worship?

I. Festivals

- i). What is your main festival?
- ii. Are animals sacrificed during festivals?
- ii. If yes, in which festival what animals are sacrificed?

J. Origin

- i. Is this your original place? If not, from where and when did you migrate to this place?
- ii. Are there any myths behind your origin?

K. Life Cycle Ceremonies

a. Birth

- i. What are the rituals performed during the child birth?
- ii. What differences occur in the ritual performed between boy and girl child?

b. Marriage

- i. Is there any child marriage?
- ii) What is the specific age to get marry?
- iii) What types of marriage occur in your community?
- iv) Does any dowry system exist?

c. Death

- i. What will you do to the dead body?
- ii. How long is the mourning time?

Appendix 2: Representative Photographs



Figure 1: Fermentation of rice beer



Figure 2: Munda woman cooking ghungi



Figure 3: *Acrorus calamus* plant



Figure 4: Workers in tea garden



Figure 5: Fishing instruments



Figure 6: Local healer



Figure 7: Place of worship



Figure 8: *Oroxylum indicum* tree



Figure 9: Interview with the local healer



Figure 10: *Aloe vera* plant



Figure 11: Munda home in background



Figure 12: Musical instruments