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Medicinal plants used as abortifacients by the Scheduled Caste community of Manipur, India

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ABSTRACT

An ethnobotanical study was conducted to document the traditional knowledge of medicinal plants used as abortifacients by the *Lois*, a Scheduled Caste community residing in Phayeng, Khurkhul, Andro, Thanga and Kakching areas of Manipur. Information about these plants was gathered through personal interviews using a semi-structured questionnaire with elderly individuals from the selected study areas. The study identified eighteen (18) plant species from fourteen (14) different families that are utilized by the *Lois* people as abortifacients. Leaves were the most frequently used plant parts, while latex was found to be the least used plant part. Quantitative ethnobotanical indices, such as the Disease Consensus Index (DCI) were calculated to determine the level of agreement among informants regarding the uses of these plants for abortion. Furthermore, Preference Ranking was carried out for the eight selected species with high DCI value to assess their relative importance and effectiveness among the five study sites. Urbanization and modernization have led to a decline in traditional knowledge regarding plants used as medicine and many valuable plants are now at risk. It is crucial to preserve such ethnobotanical knowledge before this valuable traditional wisdom is lost forever.

KEYWORDS: Abortifacients, Ethnobotanical, Medicinal plants, *Lois*, Scheduled Caste

INTRODUCTION

The term "abortifacient" refers to physical or chemical substances that induce abortion (Mitra & Mukherjee, 2009). Historical records indicate that the use of plants with abortifacient properties has been a long-standing practice. Medical abortion techniques, including the use of pills, are often associated with significant disadvantages, such as complications and side effects like severe bleeding, feelings of nausea, persistent headaches, tiredness, diarrhoea, vomiting, hot flashes, fever, abdominal cramps and pain (Rajeswari & Rani, 2014). To mitigate these challenges, herbal abortifacient plants are considered a viable alternative. Ethnic communities are often the custodians of such indigenous knowledge and they still continue to rely on the plants available around them despite the advancement of allopathic medicines.

Manipur, a state in northeastern India, spans an area of 22,327 square kilometers and is situated between latitudes 23°83' N to 25°68' N and longitudes 93°03' E to 94°78' E (Devi, 2012). The state comprises two geographical divisions: the hills and the valley. The *Lois* community is considered the largest Scheduled Caste group in the state and is primarily concentrated in the foothills of the state. Historically, they were subjected to social discrimination and regarded as an untouchable caste, which led to their cultural isolation and the development of distinct traditions. As a result, their customs, beliefs, and practices differ significantly from other communities in Manipur. They commonly speak Manipuri, but their speech carries a unique and distinct tone, shaped by generations of isolated confinement and cultural segregation (Singh *et al.*, 2025). They practised various forms of livelihood - those living near Loktak Lake rely on fishing; villages like Thongjao and Andro are well known for their traditional black pottery, a craft passed down through generations using hand-rolling, shaping, and wood-fired kiln techniques, those in Phayeng, Khurkhul, Sekmai, and Andro are skilled in brewing Yu, a rice based alcoholic beverage that serves as both a source of income and a cultural tradition. Since time immemorial, they have an intricate relationship with plants including food, customs and other various health conditions, including gynecological issues. Since ancient times,

they practiced the traditional healthcare system known as Layeng pathap by local healers called Maiba (male) and Maibi (female). Treatments involved rituals, prayers, and offerings of culturally significant plant parts known as athempot to appease deities and ward off evil (Gourachandra, 1997). Living close to nature, they have limited access to modern healthcare facilities and rely on plants for treating various health ailments. Their deep knowledge of medicinal plants enables them to effectively address a wide range of diseases and conditions using natural remedies.

Hence, the present study has been taken up to document the ethnomedicinal plants used as abortifacients by the Scheduled Caste communities, primarily the *Lois* residing in Phayeng, Khurkhul, Andro, Thanga, and Kakching areas in Manipur. Moreover, research on reproductive health, particularly self-induced abortion, remains unexplored within this community. This research also aims to preserve traditional knowledge, assess its relevance in modern healthcare, and explore potential risks and benefits associated with these natural remedies.

MATERIALS AND METHODS

The study was conducted through field visits, interview-based surveys, and informal discussions, primarily with women folk (Figure 4k & l) from the *Lois* community residing in Phayeng, Khurkhul, Andro, Thanga and Kakching areas of Manipur (Figure 1). The study was conducted during the period of June 2024 to December 2024. During the study, detailed information about the collected plants was documented, including their vernacular names, the parts used, and the modes of administration, along with the ingredients used as abortifacients. The gathered information was cross-referenced with existing ethnobotanical literature to ensure accuracy.

Study Sites

Phayeng

Phayeng, located in Imphal West District, Manipur, lies at an altitude of 813 meters above mean sea level (24°50'48.35" N and 93°49'01.90" E). Situated approximately 16 kilometers west of Imphal City, it falls under the Sekmai Assembly Constituency (Rajkumari, 2020). Agriculture is the primary livelihood of the residents, while piggery, poultry, sericulture, fish farming, and rice beer production serve as secondary occupations (Devi, 2023).

Andro

Andro village (24°43'31.01" N and 94°02'38.40" E), located at the eastern foothills of the Nongmaijing (Langmaiching) hill range in Imphal East District of Manipur, lies approximately 30 km east of Imphal city at an altitude of 784 meters above sea level. The village is traditionally known for brewing *yu* (local liquor) and pottery (Rajkumari, 2020).

Thanga

Thanga is situated about 53 km south of Imphal, within the Manipur valley. Due to its geographical isolation, Thanga remains closely connected to nature, often regarded as a sacred place associated with deities and spirits. Fishing is their primary livelihood (Singh, 2022).

Khurkhul

Khurkhul village, situated in the Imphal West district of Manipur, is one of the largest *Loi* villages in the Lamshang sub-division. Located approximately 17 km north of the state capital along the Imphal-Leimakhong road (Singh & Singh, 2019).

Kakching

Kakching, a town in the southern region of Manipur, is another largest settlements of the *Lois* community. Geographically, Kakching is situated at 24.48° N latitude and 93.98° E longitude, with an elevation of 2,546 feet. The town lies 44 km away from Imphal, the capital of the state, and 70 km from the international frontier with Myanmar (Singh *et al.*, 2025).

Demographic Profile

Altogether a total of twenty five (25) informants, preferably women were selected from the study sites. Their other variable, like age, education, etc., were listed in the Table 1.

Data Collection

Plant based information for calculations of the Disease Consensus Index (DCI) was collected from the informants using a semi-structured questionnaire containing ten (10) questions. These ten (10) questions were used for the calculation of DCI –

a. Local name of the plant species.
b. General overview or characteristics of the plant species
c. Method of preparing the medicine.
d. Mode of administering the treatment
e. Characteristics such as odor, flavour, texture, etc.
f. Main symptoms experienced by the patient after consuming the herbal remedy
g. How often the dose is administered.
h. Feedback from patients after using the medicine
i. Understanding of the location where the species was collected or the conditions in which it grows
j. Will the same medicinal plant species be recommended to other community members as well?

Table 1: Demographic profile of the informants

Demographic categories	Variables	Number of informant
Gender	Woman	25
Age	<40 years old	8
	41-60 years old	12
	>60 years old	5
Education level	Illiterate	4
	Primary level	8
	Secondary level	7
	High educational level	6
Occupation	Housewife	8
	Farmer	7
	Employee	5
	Retired employee	5

Data Analysis

Determination of one plant value

The Disease Consensus Index for a single plant was calculated using an evaluation system, wherein a value of (1) indicates "yes," signifying the understanding of knowledge and (0) represents "no," indicating the absence of knowledge. The results were derived through mathematical analysis. For each informant, the maximum possible value (OP) for one plant is consistently 1. This calculation was based on a questionnaire containing 10 questions.

Disease consensus index

The Disease Consensus Index (DCI) was derived from the equation given by Andrade-Cetto *et al.* (2006) in Mexico. Disease Consensus Index is a

$$DCI = \left(\frac{\sum_{i=1}^{\infty} V_{xi}}{Cc} mVx \right) Pm^{-0.1}$$

Here, "Cc" represents the ideal responses from informant reports, while "Vx" denotes the ideal answers for each species. The variable "x" represents a single plant species, while (∑Vxi) denotes the total of individual values assigned to that species within the community. "mVxi" refers to the statistical mean of these individual values for one plant. The term "Cc" stands for the correlation coefficient, indicating the highest number of informants who cited the use of the plant. Meanwhile, "Pm-0.1" serves as a compensation factor that evaluates the variability in plant use, considering both the preparation methods and the specific parts of the plant utilized.

Preference ranking

Preference ranking was carried out for selected eight plant species with high DCI values (above 0.15) that are used as abortifacients across five study sites. Five key informants, selected purposively based on their experience, participated in the ranking process. They were asked to rate the selected plants used as abortifacients among the *Lois* community using the following scale: 5=best, 4=very good, 3=good, 2=less used, 1=least used, and 0=not used. This analysis helps determine the users preferred choices or the most suitable plant species used as abortifacients (Martin, 1995; Cotton, 1996).

RESULTS

The study identified eighteen (18) plant species from fourteen (14) different families that are utilized by the *Lois* community residing in the study area as abortifacients (Figure 4). These plants are arranged in alphabetical order with their scientific name, vernacular name, mode of preparation and their calculated value of Disease consensus index (DCI) as listed in the Table 2.

Preference ranking for the eight plants – A. *calamus*, A. *galanga*, A. *comosus*, *B. ceiba*, *C. papaya*, *J. adhatoda*, *L. aspera* and *T. indica* (Figure 4b, d, f, h & j) as indicated by key informants for the five sites are given in the below table (Table 3). The ranking of each plant differ slightly in each of the study sites.

DISCUSSION

The present study focus on the plants used as abortifacients by the *Lois* and documented the used of eighteen (18) plant species from fourteen (14) different families (Figure 2). The collected

Table 2: Traditional health-seeking behaviour of the *Lois* community of Manipur

S. No.	Scientific name	Vernacular name	Part used	Mode of preparation and use [Pm]	∑Vxi	mVxi	DCI
1	*Abrus precatorius* L. (Fabaceae)	Chaning Meimubi	Roots & Seeds	Two form: Decoction, Powder	7.4	0.43	0.120
2	*Acorus calamus* L. (Acoraceae)	Ok hidak	Rhizome	One form: Decoction	8.6	0.45	0.155
3	*Alpinia galanga* (L.) Willd. (Zingiberaceae)	Kanghu	Rhizome	One form: Paste	9.2	0.48	0.178
5	*Ananas comosus* (L.) Merr. (Bromeliaceae)	Kihom	Unripe fruits/ leaves	Two form: Fruit, Juice	8.7	0.58	0.188
6	*Azadirachta indica* A. Juss. (Meliaceae)	Neem	Leaves	One form: Decoction	7.6	0.40	0.121
7	*Bombax ceiba* L. (Malvaceae)	Tera	Seeds	One form: Powder	8.7	0.51	0.178
8	*Carica papaya* L. (Caricaceae)	Awathabi	Unripe fruits/ latex of raw fruit	Two form: Fruit, Juice	9.6	0.53	0.191
9	*Hibiscus rosa-sinensis* L. (Malvaceae)	Jubakusum	Root bark	One form: Paste	6.4	0.49	0.126
10	*Justicia adhatoda* L. (Acanthaceae)	Nongmangkha angouba	Leaves	One form: Juice	8.2	0.48	0.158
11	*Leucas aspera* (Willd.) Link (Lamiaceae)	Mayang lambum	Fresh stem & roots	Two form: Juice, Decoction	6.8	0.52	0.132
12	*Mimusops elengi* L. (Sapotaceae)	Bokul	Leaves	One form: Decoction	5.1	0.36	0.074
11	*Moringa oleifera* Lam. (Moringaceae)	Sajana	Root	One form: Decoction	6.8	0.42	0.115
13	*Nerium oleander* L. (Apocyanaceae)	Kabilei	Root or leaves	Two form: Juice, Decoction	7.4	0.46	0.127
14	*Ocimum gratissimum* L. (Lamiaceae)	Ram tulsi	Leaf/Stem	Two form: Juice, Decoction	5.8	0.32	0.069
15	*Plumbago zeylanica* L. (Plumbaginaceae)	Til hidak	Root	One form: Decoction	7.8	0.39	0.121
16	*Solanum torvum* Sw. (Solanaceae)	Sing khanga	Leaf	One form: Decoction	8.2	0.37	0.122
17	*Tamarindus indica* L. (Fabaceae)	Mange	Fruit	One form: Fruit	9.9	0.49	0.196
18	*Vitex negundo* L. (Lamiaceae)	Urikshibi	Seeds	One form: Paste	6.9	0.43	0.119

DCI=Disease consensus index

Table 3: Preference ranking (PR) for eight plant species against abortifacients among *Lois* community

Species	Study site	Respondents (R1 – R5)					Total Score	Rank
		R_1	R_2	R_3	R_4	R_5		
Acorus calamus L.		1	4	0	1	2	8	6th
Alpinia galanga (L.) Willd.		2	3	2	1	2	10	4th
Ananas comosus (L.) Merr.	*Phayeng*	2	2	4	2	4	14	3rd
Bombax ceiba L.		2	3	2	2	0	9	5th
Carica papaya L.		3	4	1	4	3	15	2nd
Justicia adhatoda L.		0	1	2	3	1	7	7th
Leucas aspera (Willd.) Link		1	2	2	0	0	5	8th
Tamarindus indica L.		3	2	4	3	4	16	1st
Acorus calamus L.		1	4	0	1	2	8	6th
Alpinia galanga (L.) Willd.		2	3	2	1	1	9	5th
Ananas comosus (L.) Merr.	*Khurkhul*	2	2	4	2	3	13	3rd
Bombax ceiba L.		2	3	2	2	1	10	4th
Carica papaya L.		3	4	2	4	3	16	1st
Justicia adhatoda L.		0	1	2	3	0	6	7th
Leucas aspera (Willd.) Link		1	2	1	0	0	4	8th
Tamarindus indica L.		3	2	2	3	4	14	2nd
Acorus calamus L.		1	4	0	1	0	6	7th
Alpinia galanga (L.) Willd.		2	3	2	1	2	10	4th
Ananas comosus (L.) Merr.		2	1	4	2	2	11	3rd
Bombax ceiba L.	*Andro*	2	3	2	1	1	9	5th
Carica papaya L.		3	4	1	4	1	13	2nd
Justicia adhatoda L.		0	1	1	3	3	8	6th
Leucas aspera (Willd.) Link		1	2	1	0	0	4	8th
Tamarindus indica L.		3	4	2	3	4	16	1st
Acorus calamus L.		1	1	0	1	2	5	8th
Alpinia galanga (L.) Willd.		3	3	2	1	4	13	3rd
Ananas comosus (L.) Merr.		0	2	4	2	3	11	5th
Bombax ceiba L.		2	3	2	1	4	12	4th
Carica papaya L.	*Kakching*	3	4	2	4	3	16	2nd
Justicia adhatoda L.		0	1	1	3	2	7	6th
Leucas aspera (Willd.) Link		1	2	3	0	0	6	7th
Tamarindus indica L.		3	4	3	3	4	17	1st
Acorus calamus L.		1	0	0	2	3	6	7th
Alpinia galanga (L.) Willd.		2	3	4	2	0	11	4th
Ananas comosus (L.) Merr.		2	1	1	2	3	9	5th
Bombax ceiba L.	*Thanga*	2	3	2	2	3	12	3rd
Carica papaya L.		3	4	1	4	2	14	1st
Justicia adhatoda L.		0	1	1	3	2	7	6th
Leucas aspera (Willd.) Link		1	2	2	0	0	5	8th
Tamarindus indica L.		3	1	2	4	3	13	2nd

plant specimens were tabulated with both their botanical and vernacular names. Details regarding the medicinal parts used, methods of preparation or administration, and the Disease Consensus Index (DCI) were also recorded (Table 2).

From this study, it was observed that the various parts of the plants are utilized as abortifacient. Among them leaves were found to be the most commonly used plant parts (Figure 3) with seven (7) species, while latex were found to be the least used plant parts with one (1) species. The highest number of plants were reported from the family Lamiaceae with three (3) species, followed by Malvaceae and Fabaceae with two (2) species each followed by Apocyanaceae, Sapotaceae, Zingiberaceae, Moringaceae, Acanthaceae, Acoraceae, Plumbaginaceae, Caricaceae, Solanaceae, Bromeliaceae, Meliaceae each with one (1) species respectively. The medicinal preparation was given in the form of decoction, paste, powder, juice and so on. Among the plants, *Tamarindus indica* L. (0.196) is found to have highest DCI level followed by *Carica papaya* L. (0.191), *Ananas comosus* (L.) Merr. (0.188), *Alpinia galanga* (L.) Willd. (0.178) and so on. While the least DCI is found in *Ocimum gratissimum* L. with 0.069. This may be due to their least preference and less usage among the community.

Tamarindus indica L., which holds the highest DCI value, is often used in numerous traditional treatments. The fruit of *Tamarindus indica* is known for its laxative properties, attributed to its high content of malic acid, tartaric acid, and potassium (Havinga *et al.*, 2010, Bhadoriya *et al.*, 2011). Abdominal pain can result from various causes, with diarrhoea and constipation being the most common. In traditional practices, the leaves of *Tamarindus indica* are used in the treatment of diarrhoea, the fruit is used to relieve constipation, and the soft part of the bark and roots are utilized to alleviate abdominal discomfort (Havinga *et al.*, 2010; Bhadoriya *et al.*, 2011). It is also reported that various parts of tamarind (Leaves, Stem bark, and fruit pulp) have hepatoprotective, antibacterial, antioxidant, amtiemetic, hypolipidemic activities (Radha & Kusum, 2024).*Carica papaya* L. with the second highest DCI value, is another plant with wide usage in traditional medicine. Eating ripe papaya in the morning helps with indigestion, flatulence, constipation and improves appetite. Decoction of the root is used for abdominal discomfort and the seeds help detoxify the liver (Aravind *et al.*, 2013). Papaya possesses several notable medicinal properties including Diuretic, Anti hypertensive, Anti-helminthic, Wound healing, antibacterial, anti fungal, Hypolipidemic, anti tumor and free radical scavenging activities (Milind & Gurditta, 2011). *Ananas comosus* (L.) Merr. is used to treat digestive problems, inflammation and sore throats. It is also known for its antimalarial, antidiabetic, abortifacient, anticancer, antioxidant, and antidiarrheal effects (Kumar *et al.*, 2022). The rhizome of the *Alpinia galanga* (L.) Willd. plant is utilized as therapeutic treatment for numerous kinds of ailments as it contains antioxidant, anti ulcerative, anti hepatotoxic, immunodulator, anti allergic activities, anti tumor, anti bacterial, anti fungal, anti inflammatory (Khare, 2007). The seeds of *Alpinia galanga* (L.) Willd. possess therapeutic properties for gastric disorders and cardiotonic lesions, and exhibit diuretic, antiplatelet, antifungal, and antitumor effects (Chopra *et al.*, 2006). All these plants are found to possess potential therapeutic properties and have been in used in traditional medicines since time immemorial. Therefore, the claim of used of these plants as abortifacient by the Schedule caste community of Manipur needs to be thoroughly investigated for further discovery of novel compounds.

The preference ranking analysis of eight widely used plant species for abortifacient purposes were conducted across five study sites - Phayeng, Khurkhul, Andro, Kakching, and Thanga among the five randomly selected key informants (Table 3). This analysis aimed to determine the most preferred and widely used species among the users. In the first site of Phayeng region, *Tamarindus indica* was ranked 1st, *Carica papaya* as 2nd, *Ananas comosus* as 3rd and the last 8th rank was occupied by *Leucus aspera*. While in the second site of Khurkhul region, *C. papaya*

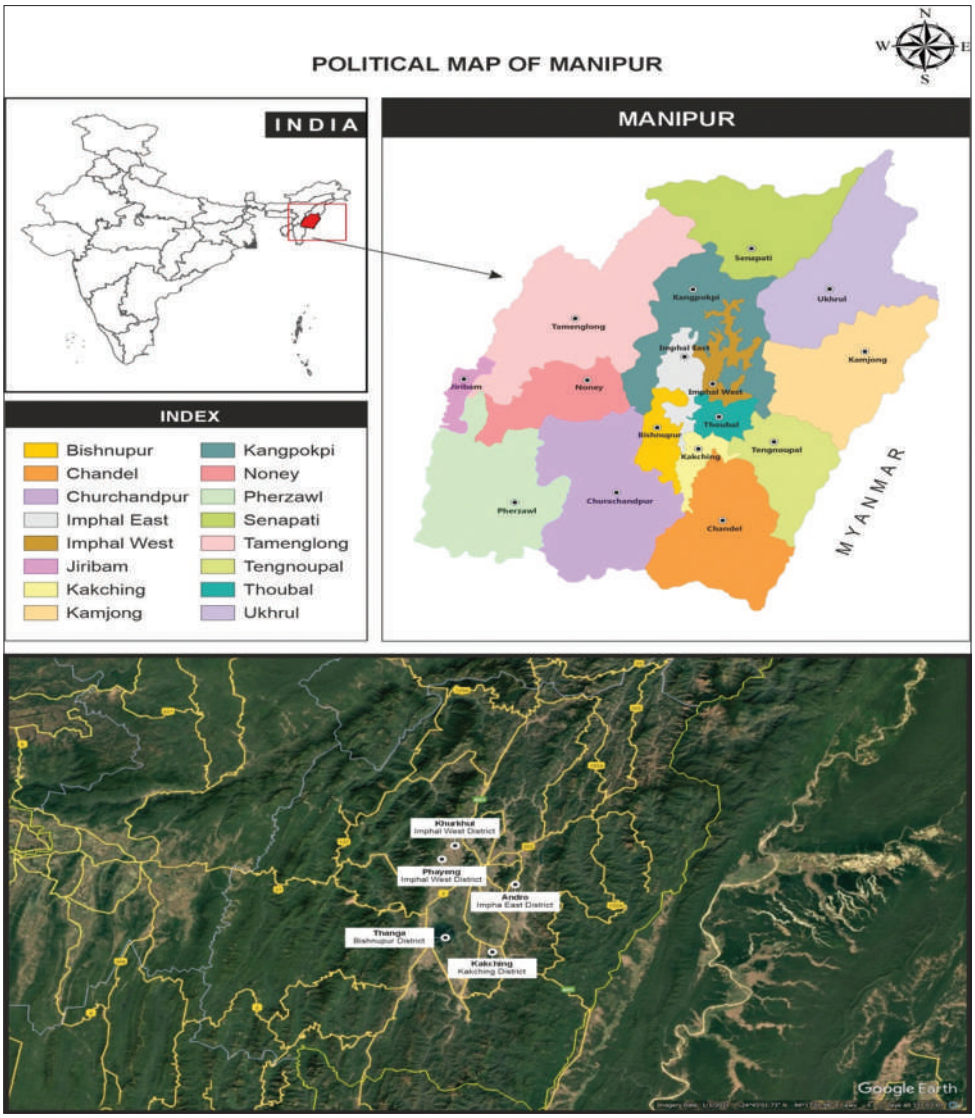

Figure 1: Map of Manipur showing the study sites viz:- Phayeng, Andro, Khurkhul, Thanga, Kakching

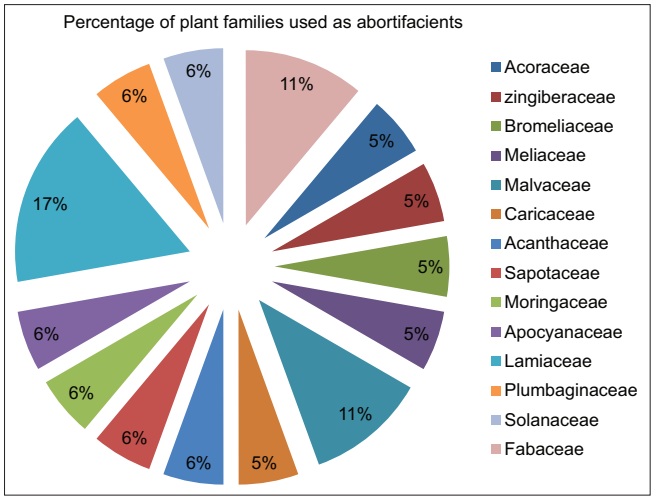

Figure 2: Pie Chart showing the number of families

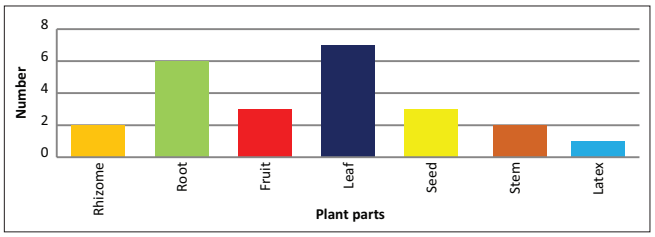

Figure 3: Bar graph showing the number of plant parts used as abortifacients

was rank 1st, *T. indica* occupied 2nd rank, *A. comosus* as 3rd and *L. aspera* occupied 8th rank. Again *T. indica* occupy 1st position in the third site of Andro, 2nd rank by *C. papaya*, 3rd by *A. comosus*, while 8th rank by *L. aspera*. In Kakching region *T. indica* was rank 1st, 2nd by *C. papaya*, *Alpinia galanga* was rank 3rd and last by *Acorus calamus* (8th rank). In Thanga region, 1st rank was

Figure 4: Plants used by the Schedule community as abortifacients. a) Nerium oleander L., b) *Leucas aspera* (Willd.) Link, c) *Ocimum gratissimum* L., d) *Justicia adhatoda* L., e) *Mimusops elengi* L., f) *Ananas comosus* (L.) Merr., g) *Moringa oleifera* Lam., h) *Tamarindus indica* L., i) *Solanum torvum* Sw., j) *Carica papaya* L., k and l) Interview with informant

occupied by *C. papaya*, 2nd by *T. indica*, 3rd by *Bombax ceiba*, while *L. aspera* rank last (8th) in this region also. This ranking shows the knowledge sharing and similarity of choice of plants among the informants. *T. indica* and *C. papaya* was the most prefer choice of plants for abortifacients among the informants often occupying 1st and 2nd rank in almost all the study sites. However, *L. aspera* was the least choice in all the sites. This may be due to lack of knowledge on this plant. All these plants are readily available in their nearby vicinity and easily accessible.

CONCLUSION

The traditional knowledge of abortifacient plants among the *Lois*, a Scheduled Caste communities in Manipur reflects a deep understanding of local flora and its medicinal properties. However, the unregulated use of these plants underscores the need for documentation, scientific validation, and health education. Integrating traditional knowledge with modern healthcare can enhance reproductive health outcomes while preserving cultural heritage. Further research and policy interventions are essential to address the ethical, legal, and health challenges associated with this practice. The local government and the scientific communities are recommended to prioritise such research work before extinction.

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AUTHOR'S CONTRIBUTIONS

Survey, data collection of the research is conducted by Anjali, data compilation and drafting of manuscript is done by Dr. Rita and Dr. Ranibala. Dr. Sanjibia is involved with the reviewing and tabulation of the article. T. Tamphamani helps in compilation of manuscript result.

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