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Original Article

Ethnobotanical Study of Medicinal Plants Used Traditionally for Managing Cuts and Wounds by the Rural People of Kailashpur, Assam, India

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ABSTRACT

Background: Folk medicinal knowledge of plants is vital in primary health care management system, predominantly in rural and remote areas. Managing cuts and wounds continues to be a significant healthcare issue, and it becomes even more critical when left untreated or improperly treated. The objective of this study is to carry out a survey on the use of medicinal plants for treating cuts and wounds in the village of Kailashpur in Assam. **Materials and Methods:** The information was collected through a semi-structured questionnaire from 30 informants in Kailashpur, Assam, India. Quantitative analysis of these data to find Use Value (UV), Frequency of Citation (FC), Relative Frequency of Citation (RFC), Family Use Value (FUV), Consensus Index (CI), Rehman's Similarity Index (RSI) and Jaccard Index (JI) also completed. **Results:** The present study documented 45 medicinal plant species belonging to 30 families and their mode of application. Compositae (5 species), Orchidaceae (4 species) and Leguminosae (3 species) were dominant families. Leaves were the most frequently used plant part (PPV 0.50). *Curcuma longa* and *Ocimum tenuiflorum* (UV 0.33) were the species most commonly used by the local people. Highest FC was calculated for *Ageratum conyzoids* (5.27), followed by *Tagetes erecta* (4.51). JI and RSI indicated that plant species reported in our study were more similar to the Tezpur region of Assam, India. **Conclusion:** The findings emphasize the significance of specific plant species in the treatment of cuts and wounds, and suggest that further scientific investigation can be pursued to discover potential therapeutics.

Keywords: Ethnomedicinal survey, Kailashpur village, Medicinal plants, Cuts, Wounds.

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INTRODUCTION

Wound healing is a complicated natural process that includes a complex cascade of biological, cellular and molecular events. Despite currently available measures to manage wounds like dressing, anti-inflammatory drugs, antimicrobial substances and healing-promoting agents, effective wound management is still challenging.[1,2] Research on plant-based approaches is opening a better possibility for effective treatment of wounds, owing to easy affordability, low cost and fewer side effects.[1,3]

Through trial and error, humans have discovered which plant species are more effective in treating specific ailments. Herbal medicine is a common practice in Traditional Chinese Medicine, Ayurveda, Unani, Russian herbalism, and other medical systems, which use botanicals as topical applications for treating wounds.[4,5] The pharmacological effects of botanicals' secondary metabolites stem from their biological functions Plants have shown great potential in managing and treating wounds, with many traditional remedies utilizing their extracts. Natural substances have the ability to promote healing and regeneration of tissue through a range of interconnected mechanisms. Medicinal plants aid wound healing by stimulating blood clotting, combating infection, and speeding up the healing process.[4] Recently, there has been an increased focus on using plant-based materials such as films, fibers, hydrogels, scaffolds, and ointments for wound management. These products are being developed and sold in the market. Furthermore, there has been a rise in the number of patents related to herbal formulations for treating wounds. Researchers are exploring new formulas, dressings, and medicinal plant compositions to develop cost-effective, efficient, stable, and sustainable delivery systems for wound management and treatment.[6] In addition to the codified system of medicine, folk medicine always plays a vital role in Indian societies. It was estimated that rural and ethnic people of India use about 8000 plant species and 25,000 herbal formulations to manage different ailments.[7] Assam is known for its cultural and folk diversity, with various ethnic groups practicing a wide range of traditions. In

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addition, the state is famous for its abundant and diverse flora, which contains numerous species of medicinal plants.[8] The present work aimed to document the medicinal plant species used in folk culture to manage cuts and wounds by the rural people of Kailashpur, Assam, India.

MATERIALS AND METHODS

Study Area

This survey was carried out in Kailashpur village, which goes administratively to the Tinsukia district of Assam, India (Figure 1). Kailashpur is located on the easternmost of Assam on the bank of river Dirak, which forms the boundary between Assam and Arunachal Pradesh at an altitude of 136 meters above sea level.

Informants and Data Collection

Some field surveys were organized to record ethnic knowledge on plant uses in managing cuts and wounds from March 2021 to February 2022. Data was gathered through semi-structured interviews and free listings through face-to-face interviews. Approval from local authorities and the Institutional Ethics Committee (AdtU/Ethics/PhD Scholar/2021/040) has been obtained for the present study. In addition, data was collected from the informants living in this area, which comprises people with the necessary knowledge of local ethnobotanical practices.

Taxonomical Identification

Taxonomical identification of plants was performed to validate the samples collected during interviews. Herbariums were also prepared to support taxonomical identification. Nevertheless, the herbarium method was used only for unidentified plant species during data collection. Dr. Susmita Chakraborty, HOD, Botany Dept, Tinsukia College, Assam, identified photo documentation and plant herbarium. Botanical nomenclature was checked and validated in the relevant plant database (www.theplantlist.org).

Qualitative Analysis

Use Value (UV)

Use Value (UV) was calculated using the formula: UV = U /n, where U is the total number of uses each informant cited for particular taxa, and n is the total number of informants referenced the plant species.[9]

Frequency of Citation (FC)

FC was calculated based on the information provided by informants about a medicinal value of a plant in the study area and FC was calculated using the formula, [10]

Frequency of citation = (No. of times a particular species was mentioned/ Total no. of times that all species were mentioned) × 100

Relative Frequency of Citation (RFC)

RFC was determined by the relative value of plant species cited by informants and calculated by dividing the FC by the total number of survey respondents (N).[10]

Plant Part Value (PPV)

PPV was calculated using the formula: PPV= $RU_{(plant\ part)}$/RU, where, ∑RU (plant part) and ∑RU stand for the total number of cited uses for a particular plant part and the sum of all mentioned plant parts, respectively.[11]

Family Use Value (FUV)

FUV was calculated by: FUV =∑UVs/n_s, where, ΣUVs characterises the totality of use values for entire plant species of a particular family divided by the total number of species (n_s) in the same family.[12]

Consensus Index (CI)

CI was calculated using the formula: CI=n /N × 100, where n is the number of informants who mentioned specific medicinal plant species and N is the overall number of informants in the study.[13]

Rehman's Similarity Index (RSI)

RSI was calculated using the formula RSI= [d×100]/(a+b+c-d), where a represents the number of species that are unique to region A, b represents the number of species that are unique to area B, c represents the number of species that are common to both locations, and d represents the number of common species that are utilised for similar illnesses in both places.[14]

Jaccard Index (JI)

JI was used to assess the degree of species similarity between our data and previously published research from different regions using the formula: JI = (C × 100)/(A+B+C), where A represents the number of species identified in the current study, B represents the number of species identified in a different study, and C is the number of species identified in both investigations.[15]

RESULTS AND DISCUSSION

Socio-demographic Features of the Informant

A total of 30 informants (40–76 years, 20 men and 10 women) were interviewed. Local people depend very much on subsistence agriculture and livestock for their livelihood and have considerable knowledge of medicinal plants. Twelve informants were more than 60 years of age. About 40.0% of the informants had been in primary school, 36.7% had been in secondary school, and 23.3% had been in college. Among the participants, 10% are informants practising folk medicine in the study area. Throughout our survey, we collected a wealth of knowledge from local herbal practitioners regarding the utilization of plants for treating cuts

Table 1: Demographic profile of the informants.

Variable	Categories	No. of person	% of informants
Gender	Male	20	66.67%
	Female	10	33.34%
Age	40-50	10	33.34%
	50-60	8	26.67%
	60-70	9	30%
	≥70	3	10%
Educational background	Primary school	12	40%
	High school	11	36.67%
	College	7	23.34%
Occupation	Traditional healer	3	10%
	Retiree	5	16.67%
	Teacher	6	20%
	Government job	3	10%
	Housewife	3	10%
	Mechanic	1	3.33%
	Businessman	3	10%
	Farmer	4	13.33%
	Tutor	2	6.66%

and wounds. Moreover, elderly individuals provided valuable insights into the traditional usage of these plants. It was noted that individuals in rural areas, without any formal higher education, possessed substantial knowledge on folk medicinal practices that had been transmitted from generation to generation. The demographic profile of informants is presented in Table 1. This paper documents 45 plant species. Figure 2 includes photograph of some of the plants mentioned in this paper. used regularly in management of cuts and wounds. It might be predicted that the older informants comparatively have better traditional medicinal knowledge, and such knowledge is currently at risk since transfer between older and younger generations is not always guaranteed.

Figure 1: Geographical Location of Study area.

Folk Knowledge of Medicinal Plants

Forty-five plants from 30 families were identified during the study (Table 2). *Compositae* (5 species), *Orchidaceae* (4 species), *Leguminosae* (3 species), *Euphorbiaceae*, *Acanthaceae*, *Apocynaceae, Solanaceae Rutaceae*, and *Zingiberaceae* (2 species each) were the most dominant plant family. Among the plant species majority are herbs (16 species), followed by shrubs (15 species), trees (8 species), epiphytes (4 species) and climbers (2 species). Results of this study showed that the family Lamiaceae (0.33) exhibited the higher FUV, followed by Caricaceae (0.3), Crassulaceae (0.26), Meliaceae (0.26), Acanthaceae (0.21), Zingiberaceae (0.21) (Table 3). FUV determines the species of a particular plant family and their use in treating a specific disease.[12] Therefore, FUV represents the value of a particular plant family that the inhabitants of Kailashpur employ as medicine. Family Lamiaceae, Caricaceae, Crassulaceae, Meliaceae, Acanthaceae, Zingiberaceae represented higher FUV. High FUV readings could result from the plant species mentioned by many people in the research area.

In our study, leaf was most frequently employed in ethnomedicine, followed by root and seed. Based on the PPV index, leaf was reported as the dominant plant part for cut and wound in the study area (PPV 0.508), followed by seed and flower (0.101 each), root (0.06), tuber (0.05), latex, fruit, and whole plant (0.03 each), aerial part, stem, rhizome, and bark (0.01 each) respectively. In managing cuts and wounds, people apply most

Table 2: Ethnomedicinal data of plants used in Kailashpur village, Assam for cut and wounds and their qualitative analysis.

Sl. No	Scientific name	Local name	Family	Types of plant	Part used	Mode of administration	UV	FC	RFC	CI
1	*Aegle marmelos* (L.) Corrêa	Bel	Rutaceae	Tree	Leaf	Leaves are ground into a paste, barely heated and put to the wound.	0.1	0.56	0.018	0.1
2	*Aerides multiflora* Roxb.	Ronga kopou ful	Orchidaceae	Epiphyte	Leaf, Tuber, seed	Leaf paste and seed powder is used in the treatment of haemorrhage and wound healing.	0.03	0.75	0.025	0.13
3	*Aerides odorata* Lour.	Ganesh kopou	Orchidaceae	Epiphyte	Leaf, Seed	Leaf paste and seed powder is used for bleeding and wound healing.	0.03	0.94	0.031	0.17
4	*Ageratum* conyzoides (L.)	Gendhali Bon	Compositae	Herb	Leaf	Leaf paste is applied to stop bleeding and wound dressing.	0.03	5.27	0.17	0.93
5	*Aloe vera* (L.) Burm.f.	Sal kuwori	Xanthorrhoeaceae	Herb	Leaf	Leaf juice is used to treat wound.	0.16	3.01	0.10	0.53
6	*Alstonia scholaris* (L.) R. Br.	Sotiyona	Apocynaceae	Tree	Latex	Latex is used to treat cut and wound.	0.13	1.31	0.043	0.23
7	*Amaranthus tricolor* L.	Bisalyakarani	Amaranthaceae	Herb	Leaf	Leaf paste is applied to treat haemorrhage and wound.	0.06	2.25	0.075	0.4
8	*Andrographis paniculata* (Burm.f.) Nees	Kalmegh	Acanthaceae	Shrub	Leaf	Leaf paste is applied to wound.	0.16	0.56	0.018	0.1
9	*Argemone mexicana* L.	Siyal Kata	Papaveraceae	Herb	Root	Root paste is applied to wound.	0.06	1.12	0.037	0.2
10	*Azadirachta indica* A. Juss.	Neem	Meliaceae	Tree	Leaf, Bark	Leaf and Bark paste is used in wound healing. Boil leaves water are used for washing the wound.	0.26	3.20	0.106	0.57
11	*Bryophyllum pinnatum* (Lam.) Oken	Dupor tenga	Crassulaceae	Herb	Leaf, inflorescence	Leaf and inflorescence paste is used to treat fresh wound.	0.26	0.94	0.031	0.17

Sl. No	Scientific name	Local name	Family	Types of plant	Part used	Mode of administration	UV	FC	RFC	CI
12	*Caesalpinia bonduc* (L.) Roxb.	Letaguti	Leguminosae	Tree	Seed	Seed paste is applied to wound.	0.16	0.56	0.018	0.1
13	*Camellia sinensis var assamica* (J.W. Mast.) Kitam.	Sah gos	Theaceae	Shrub	Leaf	Leaf paste is used to decrease the healing time.	0.16	2.25	0.075	0.4
14	*Carica papaya* L.	Omita	Caricaceae	Tree	Latex	Latex from leaf or fruit is applied to treat bleeding and wound.	0.3	1.50	0.05	0.27
15	*Catharanthus roseus* (L.) G. Don	Nayantora	Apocynaceae	Shrub	Leaf	Leaf paste is applied to treat cut and wound.	0.23	1.31	0.04	0.23
16	*Centella asiatica* (L.) Urb.	Bor manimuni	Apiaceae	Herb	Aerial part	Paste from aerial part is applied to wound.	0.04	2.63	0.087	0.47
17	*Chromolaena odorata* (L.) R. M. King and H. Rob	Baghdhoka	Compositae	Shrub	Leaf	Leaf paste is used to treat haemorrhage and wound.	0.06	3.38	0.112	0.6
18	*Clitoria ternatea* L.	Aparajita	Leguminosae	Shrub	Seed Root	Paste from seed and water is applied on the wound.	0.03	2.25	0.075	0.4
19	*Curcuma longa* L.	Halodhi	Zingiberaceae	Herb	Rhizome	Paste from rhizomes is administered to wounds and it is also used to treat pain and inflammation related to wound.	0.33	3.01	0.10	0.53
20	*Cymbidium aloifolium* (L.) Sw.	Gejeng kopou	Orchidaceae	Epiphyte	Leaf, seed	Leaf paste and seed powder is applied on the wound.	0.03	1.12	0.037	0.2
21	*Cynodon dactylon* (L.) Pers.	Dubori bon	Poeceae	Herb	Whole plant	Paste from fresh plant is used to cure bloody wound.	0.13	3.57	0.119	0.63
22	*Cyperus rotundus* L.	Keya bon	Cyperaceae	Herb	Tuber	Tuber paste is applied on the wound.	0.1	3.38	0.112	0.6
23	*Datura metel* L.	Dhatura	Solanaceae	Shrub	Leaf, Flower	Leaf and flower paste is used to treat painful wound.	0.13	0.94	0.031	0.17

Sl. No	Scientific name	Local name	Family	Types of plant	Part used	Mode of administration	UV	FC	RFC	CI
24	*Eclipta prostrata* (L.)	Keheraj	Compositae	Herb	Roots	Leaf paste is used for the treatment of wound.	0.1	1.50	0.05	0.27
26	*Euphorbia hirta* L.	Gakhiroti bon	Euphorbiaceae	Herb	Whole plant	Leaf paste is used to treat wound.	0.13	2.07	0.069	0.37
27	*Euphorbia tithymaloides* L.	Ranghita	Euphorbiaceae	Shrub	Leaf	Leaf paste is applied on the wound.	0.06	1.31	0.04	0.23
28	*Heliotropium indicum* L.	Hati huria	Boraginaceae	Shrub	Leaf	Leaf paste is used as remedy for the treatment of wound.	0.13	1.50	0.05	0.27
29	*Hibiscus rosa-sinensis* L.	Joba ful	Malvaceae	Shrub	Flower	Leaf paste is used to treat the wound.	0.1	3.76	0.125	0.67
30	*Hydrolea zeylanica* (L.) Vahl	Lehati haak	Hydroleaceae	Herb	Leaf	Leaf paste is applied on the wound.	0.13	2.07	0.069	0.37
31	*Hypericum assamicum* S. N. Biswas	Siyal Kata	Hypericaceae	Herb	Leaf	Leaf paste is used in the treatment of wound.	0.13	1.89	0.063	0.34
32	*Justicia gendarussa* Burm. f.	Tita ful	Acanthaceae	Shrub	Leaf	Poultice from fresh leaf is applied on the wound.	0.26	1.31	0.043	0.23
33	*Kaempferia rotunda* L.	Bhumi champa	Zingiberaceae	Herb	Tuber	Poultice from tuber is applied on the wound.	0.1	0.94	0.031	0.17
34	*Lantana camara* L.	Jarmani bon	Verbenaceae	Shrub	Flower	Leaf paste is used to stop bleeding.	0.03	3.57	0.119	0.64
35	*Lawsonia inermis* L.	Jetuka	Lythraceae	Shrub	Leaf	Poultice from fresh leaf is used for wound dressing.	0.13	3.95	0.131	0.7
36	*Mikania micrantha* Kunth	Premlota	Compositae	Climber	Leaf	Poultice from fresh leaf in haemostasis and wound dressing.	0.06	3.76	0.125	0.67
37	*Mimosa pudica* L.	Nilaji Bon	Leguminosae	Herb	Leaf	Poultice from fresh leaf is applied on the wound to treat haemorrhage.	0.16	3.20	0.106	0.57

Sl. No	Scientific name	Local name	Family	Types of plant	Part used	Mode of administration	UV	FC	RFC	CI
38	*Mimusops elengi* L.	Bokul	Sapotaceae	Tree	Leaf, Flower	Leaf and flower paste is applied on the haemorrhage and wound.	0.1	1.50	0.05	0.27
39	*Moringa oleifera* Lam.	Sojina	Moringaceae	Tree	Leaf	Leaf paste is used to cure normal as well as diabetic wound.	0.2	0.94	0.031	0.17
40	*Ocimum tenuiflorum* L. (Ocimum sanctum)	Tulshi	Lamiaceae	Shrub	Leaf	Leaf paste is taken for minor cut and wound healing.	0.33	1.50	0.05	0.27
25	*Phyllanthus emblica* L.	Amlokhi	Phyllanthaceae	Tree	Fruit	Fruit juice is applied on the wound.	0.2	1.31	0.043	0.23
41	*Piper betle* L.	Pan	Piperaceae	Climber	Leaf	Leaf paste is applied to stop bleeding and used in wound healing.	0.13	3.57	0.119	0.64
42	*Rhynchostylis retusa* (L.) Blume	Kopou ful	Orchidaceae	Epiphyte	Leaf, Seed, Aerial root	Juice and paste prepared by fresh leaf and root works on cut and wound healing. Seed power is also used to treat haemorrhage.	0.06	4.33	0.144	0.77
43	*Solanum virginianum* L.	Tita bhekuri	Solanaceae	Shrub	Leaf, Fruit	Paste from leaf and fruit is useful to treat normal as well as diabetic wound.	0.16	1.50	0.05	0.27
44	*Tagetes erecta* L.	Narji Ful	Compositae	Shrub	Leaf, Flower	Paste from leaf and flower is used to reduce the bleeding time and wound healing.	0.1	4.51	0.150	0.8
45	*Zanthoxylum nitidum* (Roxb.) DC.	Tejmui	Rutaceae	Herb	Stem, Leaf	Juice of stem and leaf is used to stop bleeding.	0.1	4.14	0.138	0.74

UV- Use value; FC- Frequency of citation; RFC- Relative frequency of citation; CI- Consensus index.

herbal remedies directly to local areas as a paste or a poultice. Paste (70.58%) was the most popular method of preparation since it is easy to use in cuts and wounds, followed by poultice (9.8%), powder (7.84%), and juice (5.89%). People topically use preparations like paste, juice and powder to stop bleeding and cure wounds. PPV value is the proportion of exploited plant parts employed as medicinal bioresources.[11] In this study, leaf was reported as the dominant plant part for cut and wound in the study area (PPV 0.508). Leaves were preferred due to their widespread availability, straightforward harvesting, and ease of preparation for remedies; additionally, the leaves are where photosynthesis takes place and occasionally where secondary metabolites that give the plant its biological characteristics are stored.[11]. In this study also, leaves were preferred, which may be due to their easy availability, harvesting and processing. Respondent employs various techniques for the preparation for formulation. Folk medicinal formulations are available in juice, powder, infusion, decoction, paste, tincture, and raw form.

UV, FC, RFC, CI

UV recorded in this study ranged from 0.03 to 0.33 (Table 2). The highest UV was calculated for *Curcuma longa* and *Ocimum tenuiflorum* (0.33), followed by *Carica papaya* (0.3). Compared to other species, UV of different orchid species like *Aerides multiflora, Aerides odorata, Cymbidium aloifolium, Rhynchostulis retusa* was less intense (0.03). A high UV score denotes that a specific plant species is widely accepted for a given therapeutic purpose and less cited species show insignificant folk medicinal applications.[10]

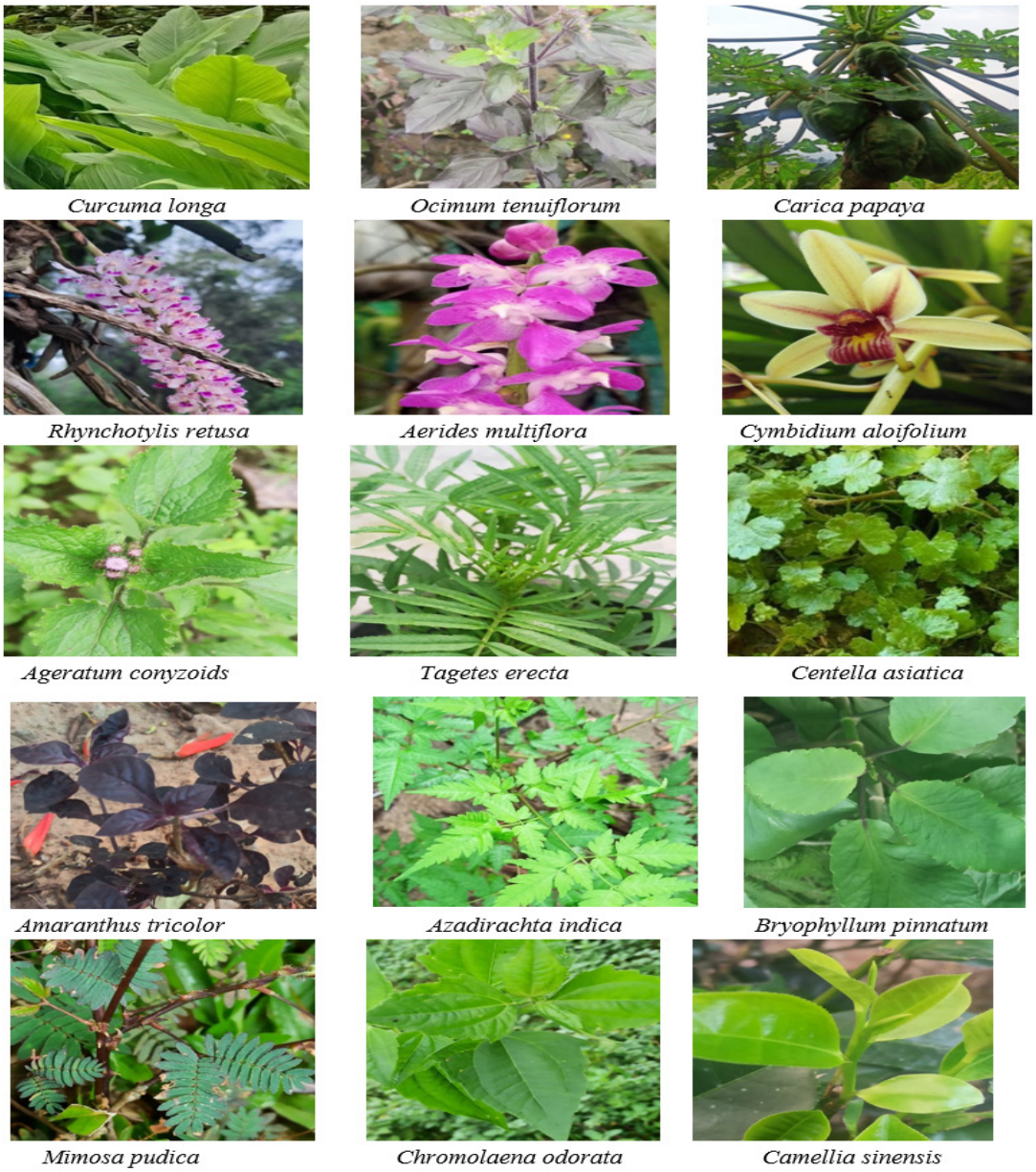

Figure 2: Images of few plants documented in this study for their haemostatic and wound healing effect.

Table 3: Family Use Value (FUV).

Sl. No.	Family Name	n_s	ΣUV	FUV
1	Acanthaceae	2	0.42	0.21
2	Amaranthaceae	1	0.06	0.06
3	Apiaceae	1	0.04	0.04
4	Apocynaceae	2	0.36	0.18
5	Boraginaceae	1	0.13	0.13
6	Caricaceae	1	0.3	0.3
7	Compositae	5	0.35	0.07
8	Crassulaceae	1	0.26	0.26
9	Cyperaceae	1	0.1	0.1
10	Euphorbiaceae	2	0.19	0.09
11	Hydroleaceae	1	0.13	0.13
12	Hypericaceae	1	0.13	0.13
13	Lamiaceae	1	0.33	0.33
14	Leguminosae	3	0.35	0.11
15	Lythraceae	1	0.13	0.13
16	Malvaceae	1	0.1	0.1
17	Meliaceae	1	0.26	0.26
18	Moringaceae	1	0.2	0.2
19	Orchidaceae	4	0.15	0.03
20	Papaveraceae	1	0.06	0.06
21	Phyllanthaceae	1	0.2	0.2
22	Piperaceae	1	0.13	0.13
23	Poeceae	1	0.13	0.13
24	Rutaceae	2	0.2	0.1
25	Sapotaceae	1	0.1	0.1
26	Solanaceae	2	0.29	0.14
27	Theaceae	1	0.16	0.16
28	Verbenaceae	1	0.03	0.03
29	Xanthorrhoeaceae	1	0.16	0.16
30	Zingiberaceae	2	0.43	0.21

In the rural population of the study area, plant species with strong UV indices were very useful, and these plants are the primary choice for the treatment. Locals widely employ these species to treat cuts and wound. *C. longa* and *O. tenuiflorum* are well-known medicinal plants widely used in different traditional medicine and are also investigated scientifically. Therefore, these plant species should also be considered significant for drug discovery research. Compared to other species, orchid species like *Aerides multiflora, Aerides odorata, Cymbidium aloifolium, Rhynchostulis retusa* with low UV value also used traditionally to manage cuts and wounds. This finding could be explained by the species' limited accessibility and minimal folk medicinal applications.

FC offers helpful cues about the utilisation of more common plant species by the informant[10] and FC ranges between 0.56 to 5.27. The highest FC value was 5.27 for *Ageratum conyzoids*, followed by *Tagetes erecta* (4.51) (Table 2). FC offers helpful cues about the utilisation of more common plant species by the informant.[10] Therefore, plant species with higher FC recorded in this study may offer helpful insight for new chemical entities. Because these plants are the most well-known and have been used by most informants for a long time, they can be considered a reliable source and help to explain the high values of FC. To validate their potency, the plant species with high FC should be evaluated for their biological efficacy on a priority basis, along with phytochemical screening. In this study, lower FC value was

Table 4: Comparison between present and previous studies at neighbouring, regional, and global level using JI and RSI.

Sl. No.	Study Area	Number of Plants			Jaccard index (JI)	Rahman's similarity index (RSI)	References
		in another study area (A)	in current study area (B)	Common plant (C)			
1	Tezpur, Assam	19	45	11	14.67%	17.18%	Das *et al.*, 2012[16]
2	Assam	85	45	11	7.80%	8.46%	Saikia *et al.*, 2006[17]
3	Assam	132	45	17	8.76%	9.60%	Dohutia *et al.*, 2016[18]
4	Assam	30	45	3	3.84%	4%	Sharma and Pegu, 2011[19]
5	Dibrugarh, Assam	174	45	27	10.98%	12.32%	Gogoi and Nath, 2021[20]
6	Sikkim	36	45	4	3.70%	4.93%	Panda and Mandal, 2013[21]
7	Nagaland	30	45	3	3.84%	4%	Nongdam, 2014[22]
8	Arunachal Pradesh, India	34	45	4	4.81%	5.06%	Namsa *et al.*, 2009[23]
9	Uttara Kannada district, Karnataka	106	45	11	6.79%	7.28%	Bhat *et al.*, 2012[24]
10	Western Ghat, India	90	45	10	6.9%	7.40%	Muniappan and Savarimuthu 2015[25]
11	Wayanadu district, Kerala, India	34	45	7	8.13%	8.87%	Thomas *et al.*, 2014[26]
12	Tamil Nadu, India	82	45	10	7.3%	7.87%	Ramaya *et al.*, 2009[27]
13	Maharashtra, India	39	45	6	6.67%	7.14%	Wadankar *et al.*, 2011[28]
14	Andhra Pradesh, India	26	45	6	7.8%	8.45%	Naidu *et al.*, 2019[29]
15	Pakistan	106	45	3	1.94%	1.98%	Malik *et al.*, 2019[30]
16	Pakistan	85	45	4	2.98%	3.07%	Umair *et al.*, 2017[31]
17	Bangladesh	42	45	5	5.43%	5.74%	Rahman *et al.*, 2022[32]
18	Bangladesh	71	45	13	10.07%	11.20%	Khan *et al.*, 2014[33]
19	Ghana	104	45	4	2.61%	2.68%	Agyare *et al.*, 2009[34]
20	Nepal	48	45	5	5.10%	5.37%	Joshi *et al.*, 2000[35]

recorded for *Aegle armelos* (0.56), *Andrographis paniculata* (0.56). A lower FC value indicates that the plant is not popular among the informants or use by the smaller number of people for the specific therapeutic use. But the plants with lower FC might have potential to be developed as drugs and might be investigated scientifically.

The highest RFC value was found to be 0.018 (*Ageratum conyzoids, Andrographis paniculata, Caesalpinia bonducella*), and lowest RFC value was noted for *Ageratum conyzoids* (0.17) (Table 2). The highest CI value was 0.1 for *Aegle marmelos*, followed by 0.93 for *Ageratum conyzoids* (Table 2). The highest RFC value offers a helpful nudge toward the user-specific plant family used by local healers.[10] High RFC values for the ethnomedicinal plant species suggested their extensive use and widespread awareness among the local populations. A high consensus index score denotes that a specific plant species is widely used for a given therapeutic purpose and is the maximum cited plant species in the study area.[13] In ethnomedicinal surveys, the CI is a significant metric

that evaluates the degree of consensus among informants on the usage of a particular plant species. It aids in identifying the most valuable species to a particular culture, as well as determining the relative significance of different uses of a species and its overall relevance.[13] The CI is an objective means of assessing a species' cultural importance, and it can guide conservation efforts to ensure that crucial species are not overlooked or undervalued.

JI and RSI

The highest JI value (14.67%) shows that plant species reported in our study are more similar to the study conducted in Tezpur, Assam, followed by Dibrugarh, Assam (10.98%), and the lowest JI (2.61%) reported with a study conducted in Ghana (Table 4). RSI calculates specific plant species and related therapeutic usage to reveal cultural similarities between ethnic groups in research areas. Using RSI, the study shows the highest 17.18% similarity between ethnic communities of Tezpur, Assam, where 11 plant species were common in medicinal usage in both study areas, followed by ethnic communities of Dibrugarh (12.32%) (Table 4). JI was used to compare data with information from ethnobotanists from different parts of Assam and other states and countries.[15] Previously published twenty ethnobotanical surveys from neighbouring areas and other countries were compared to our study. RSI was developed to compare and contrast the knowledge of traditional medicine among the various study areas.[14] High score of JI and RSI reported with Dibrugarh, Assam which is a nearby locality of our study area, thus indicating similar habitat and high relation between traditional medicinal uses of plants.

Local people usually collect the plant species that grow naturally in different areas. However, a few plants, like *O. santum, C. longa, C. papaya* were also collected from the cultivated source. Many of the plants utilised by the locals of Kailashpur village are mentioned in the ancient medical literature. These plants are also used in various traditional medicinal systems like Ayurveda, Unani, and Siddha for their capacity to cure wounds. *Ageratum conyzoides, Centella asiatica, Azadirachta indica,* and *Chromolena odorota* are some specific instances. However, many of these plants are also reported for similar ethnomedical uses, though the method of preparation and administration modes may vary. In diverse animal experimental models, secondary plant metabolites or active chemicals are the active agents that stimulate the process of wound repair. The most significant and specific examples include the asiatic acid, madecassic acid, and asiaticoside from *Centella asiatica*,[36-38] curcumin from *Curcuma longa.*[39] In addition, the anti-inflammatory, antimicrobial, haemostatic and wound-healing potentials of the species belonging to the taxonomic groups *Asteraceae, Euphorbiaceae, Zingiberaceae, Lamiaceae*, and *Mileaceae*,[37] traditionally employed by the locals of Kailashpur village were thoroughly defined.

Current plant-based treatments for wound-related illnesses available to the local population seem to be extremely promising, safe, and cost-effective. However, based on the geographical position, this area is one of the understudied areas of Assam concerning the use of plants against cuts and wounds. The findings of this study support prior botanists' claims that North East India and several regions of Assam are still underexplored. Systematic investigation of these plants will help find better, cost-effective therapeutics to effectively manage cuts and wounds.

CONCLUSION

The present survey documented that the inhabitants of Kailashpur village use 45 medicinal plants to manage cuts and wounds. The documentation of ethnomedicinal knowledge and the quantitative analysis of findings establish a connection between rural populations and scientific communities, which could prove significant in the discovery of potential therapeutics. Furthermore, investigating the biological properties of medicinal plants with novel therapeutic uses is justified on an investigational scale for possible drug leads. Therefore, the information presented in this study may be beneficial for future research into the phytochemical and pharmacological properties of these plants.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

UV: Use value; **FC:** Frequency of Citation; **RFC:** Relative Frequency of Citation; **PPV:** Plant Part Value; **FUV:** Family Use Value; **CI:** Consensus Index; **RSI:** Rehman's Similarity Index; **JI:** Jaccard Index.

SUMMARY

The objective of the present work is to conduct an ethnomedicinal survey of medicinal plants and document the plants used to treat cuts and wounds in Kailashpur village, Assam. Present study listed 45 plants belonging to 30 families used to manage cuts and wounds. Compositae is the most dominant family and paste is the mostly used preparation. Frequency of citation, relative frequency of citation, family use value, consensus index, Rehman's similarity index and Jaccard index was estimated. Use value ranged from 0.33 to 0.03, *C. longa* and *O. tenuiflorum* most

used plant species. Few orchid species also used to cute cuts and wounds. This study highlighted that important plant species has potential to investigate further to find the better therapeutics to manage cuts and wounds in better way.

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