

Research Article

ETHNO MEDICINAL PRACTICES OF SELECTED TRIBAL COMMUNITIES IN GOA- TRADITIONAL HEALING WISDOM AND CULTURAL HERITAGE

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ABSTRACT

Ethno medicinal practices includes the study of flora and fauna by various tribal communities. It is a hybrid discipline that integrates both natural and social science which examines the historical, sociological, anthropological, economic and environmental aspects of the relationships between humans, plants and animals. In the beautiful landscapes of Goa, where green forests meet rolling hills and serene rivers, exist vibrant and diverse tribal communities. These communities are an integral part of Goan cultural mosaic, each contributing its unique traditions, customs, and way of life. Despite their relatively small population size, these tribes hold a significant place in Goan cultural heritage, preserving ancient traditions and knowledge that have been passed down through generations. Spread across different regions of Goa, each community has its own distinct identity and connection to the land, shaping Goa's rich cultural tapestry. For the present study, a purposive sampling strategy was utilized to select participants, comprising 5 medicinal healers from Velip and Dhangar tribal communities each in Goa. Terms such as vaktoli and vakdali were used interchangeably to refer to medicinal healers within the communities.

Keywords: Dhangar, Traditional healer, Velip, Vaktoli, Zotherapy.

INTRODUCTION

Ethno medicinal use of plants has been known since ancient times and several plant and animals were used to cure the diseases in tribal communities. Traditional knowledge of Ethno medicine involves both disease causation and medication. They are continuous processes dealing with health seeking behavior, in every social, economic and biology events (Das and Choudhury 2012). 80% of human population is depending on plant sources (Farnsworth *et al.*, 1985). More than 52,000 flowering plant species are used for medicinal purpose. (Schippmann *et al.*, 2005). India is regarded, due to its rich medicinal plant diversity as Botanical Garden of the World (Vedavathy *et al.*, 1997). Tribal communities exhibit diverse customs, languages, and social structures, reflecting their unique historical experiences and interactions with the land. (Kumar and Jain 2023). Despite this diversity, there exists a common thread of shared values, beliefs, and practices that bind these communities together. From the celebration of

festivals to the practice of traditional healing, tribal cultures in Goa serve as repositories of ancient wisdom and living embodiments of resilience and adaptability (Naik *et al.*, 2014).

Traditional knowledge documentation of medicinal uses of plants has provided many important drugs of modern time. (Anon 1994). The tribal communities in Goa possess a wealth of traditional healing wisdom that has been cultivated over centuries. Their healing practices go beyond addressing physical ailments, encompassing holistic approaches to health that consider the interconnectedness of the body, mind, and spirit. Drawing upon the abundant biodiversity of their surroundings, tribal healers utilize a diverse array of medicinal plants, herbs and natural remedies to treat a wide range of health issues (Kesarkar and Khan 2021). Moreover, these healing traditions are deeply rooted in spiritual beliefs and cultural rituals, reflecting a profound reverence for nature and a harmonious relationship with the environment. (Kandari *et*

al., 2012) Despite the resilience of tribal healing traditions, they face numerous challenges in the modern era. Rapid urbanization, deforestation, and encroachment on traditional lands threaten the availability of medicinal plants and resources essential for traditional healing practices. Moreover, limited access to modern healthcare services and lack of recognition of traditional healing by mainstream institutions further exacerbate the challenges faced by tribal healers in preserving their traditions.

Research plays a crucial role in documenting, validating, and promoting traditional healing practices among tribal communities. By conducting ethnographic studies, pharmacological research, and community-based participatory research, scholars can contribute to the preservation and recognition of indigenous knowledge systems. The traditional use of medicinal plants in hinterland of tribal dominated Chhota Bhangal Western Himalaya was studied by Uniyal *et al.*, (2006). Health and ethno medical practices among the Malayali tribes of Tamil Nadu were recorded by Jaiswal *et al.*, (2022). Similarly traditional and ethno botanical medicine of plants in Bhagirathi valley in western Himalaya (Uniyal *et al.*, 2002b), traditional phototherapy among the inhabitants of Parvtai valley in Western Himalaya (Sharma *et al.*, 2004), in Chitteri hills (Kadhirvel *et al.*, 2010), Malayali tribes in Kolli hills (Vaidyanathan *et al.*, 2013 and tribal people of Purandar in Maharashtra (Bhosle *et al.*, 2009) were reported. The natural environment plays a central role in supporting traditional healing practices among Goa's tribal communities. From the towering trees of the Western Ghats to the meandering rivers and streams, Goa's natural landscapes serve as pharmacies and sanctuaries, offering healing and solace to those in need. Moreover, the spiritual significance attached to natural landscapes underscores the deep connection between tribal communities and their environment, emphasizing the importance of environmental conservation and stewardship.

With rapid urbanization, industrialization, modern education system the original ethno medicinal practices are gradually disappearing from the tribal communities of Goa (Naik *et al.*, 2014). Despite their enduring relevance and cultural significance, traditional healing practices in Goa's tribal communities face a range of challenges and threats. Urbanization, deforestation and environmental degradation are leading to the loss of traditional medicinal plants and habitats, threatening the availability and sustainability of these resources. Additionally, socioeconomic factors such as poverty, migration and globalization are eroding traditional social structures and value systems, leading to decline in the transmission of traditional knowledge and skills. Moreover, the lack of recognition and support for traditional healing practices within mainstream healthcare systems further marginalizes tribal healers and limits access to culturally appropriate healthcare services. In the face of these challenges, tribal communities in Goa have demonstrated remarkable resilience and adaptability, drawing upon their deep cultural heritage and collective strength to innovate and adapt traditional healing practices to changing circumstances. Community-based initiatives

aimed at preserving traditional knowledge, conserving biodiversity, and promoting sustainable resource management are empowering tribal communities to reclaim agency over their health and well-being.

Moreover, the integration of traditional healing practices with modern healthcare system offers promising opportunities for enhancing healthcare delivery, particularly in rural and underserved areas where access to mainstream healthcare services are limited. The recognition and protection of traditional healing practices within legal and policy frameworks are essential for safeguarding the rights and interests of tribal communities in Goa. Legislative measures aimed at protecting traditional knowledge, biodiversity, and cultural heritage can provide a legal basis for the preservation and promotion of traditional healing practices. Research can play a big role in helping tribal communities in Goa. By studying their healing practices and sharing what we learn, we can help raise awareness about their traditions and the challenges they face. (Velip *et al.*, 2023, Gaonkar *et al.*, 2024) This can lead to better support and resources for tribal communities, helping them preserve their culture and way of life. Learning about the healing practices of tribal communities in Goa isn't just about medicine - it's about respecting and celebrating their rich culture and traditions. Present study is designed with an intention to identify traditional medicinal practitioners and document their knowledge of ethno medicinal practices of tribal communities in Goa.

MATERIALS AND METHODS

A questionnaire was developed to collect comprehensive data on various aspects of the healers' practices, beliefs, and experiences. The questionnaire consisted of multiple sections, covering various aspects of the healers' personal background, ethical considerations, approach to healing, patient assessment methods, success stories, medicinal plant and animal usage, preparation methods, and disease treatment modalities. Each section was carefully designed to elicit detailed information while maintaining cultural sensitivity and respect for indigenous knowledge systems. Prior to the survey Ethno medicinal studies and surveys that reported plants used traditionally in treating various diseases were referred. All potentially qualified papers were examined. We introduced ourselves and explained the objectives of the research to the participants, fostering rapport and trust. Data collection was carried out through face-to-face interviews with the selected healers, comprising five medicinal healers from Velip and Dhangar tribal communities in Goa with the help of community leaders, local contacts, and snowball sampling techniques, ensuring a diverse representation of healers from different geographical areas and cultural backgrounds. Other terms such as "Vaktoli" and "Vakdali" were used interchangeably to refer to medicinal healers within the communities. The study was conducted in various tribal settlements and rural areas of Goa. These communities have a rich Cultural heritage and a long history of traditional healing practices, making them ideal settings for exploring ethno medical knowledge and beliefs. Each

interview, conducted lasted 2-3 hours and was conducted in Konkani. Prior to data collection, informed consent was obtained from all participants, who were provided with detailed information about the study's purpose, procedures, and potential risks and benefits. Confidentiality and anonymity were assured, and participants were informed of their right to withdraw from the study at any time without consequence. However, all participants agreed to publish their identity. Data, including the plant name, local name or vernacular name, parts used, reported traditional uses, detail of informants, and area of the survey was recorded.

RESULTS AND DISCUSSION

An intriguing finding of our study was the variation in the number of diseases treated by healers across different communities. Velip healers demonstrated an extensive repertoire by treating an impressive 25 diseases, suggests

varying degrees of medicinal knowledge and practices within these communities, with the Velip community showcasing a particularly rich tradition of healing. Such diversity underscores the importance of respecting and preserving these ethno medicinal practices, as they offer valuable insights into the local flora and their medicinal properties. It is crucial to recognize and integrate these traditional healing methods into formal healthcare systems to ensure holistic and culturally sensitive healthcare delivery to tribal communities in Goa. Medicinal healers from the Velip tribal community, steeped in their cultural traditions and intimate knowledge of the local flora and fauna, provide valuable insights into the Ethno medical practices specific to their community. By documenting their healing techniques and areas of specialization, sheds light on the unique contributions of Velip healers to Goa's traditional healthcare landscape. (Table.1).

Table 1. Survey of Velip community ethno medicinal practices.

| S. No | Name | Years of experience | Common ailments treated | Vaidya Mitra card |
|-------|---------------------------|---------------------|--|-------------------|
| 1 | Shri. Subhash Gaonkar | 30 | - Fracture -Cut/Wound -Arthritis -Muscle pain -Joint Pain | Yes |
| 2 | Shri. Nakano Gaonkar | 40 | -Snake bite -Dog bite | Yes |
| 3 | Shri. Purso Chandru Velip | 35 | -Common cold -Diabetes -Piles -Kidney stone -Menstrual pain -Water warts -Dhat syndrome -Ring worm -Jaundice -Cholesterol | No |
| 4 | Shri. Bal Bombo Velip | 35 | -Acne -Water warts -Ring worm -Skin rashes -Cut wound -Haematoma -Conjunctivitis | Yes |
| 5 | Shri. Baba Tolu Gaonkar | 25 | -Diarrhea -Fever -Kidney stone -Dhat syndrome -Common cold -Sore throat -Conjunctivitis -Burns -Water warts | Yes |

Medicinal healers from the Dhangar tribal community, known for their resilience and resourcefulness, draw upon their intimate knowledge of the land and ancestral wisdom to address the health needs of their community. By documenting their healing practices and area of specialization, the contributions of Dhangar healers to the rich tapestry of Goan ethnomedicine recorded. (Table.2).

Table 2. Survey of Dhangar community ethnomedicinal practices.

| S. No | Name | Years of experience | Common ailments treatment | Vaidya Mitra card status |
|-------|----------------------|---------------------|--|--------------------------|
| 1 | Shri. Bombo Bavdan | 15 | Piles Acne Dhat | No |
| 2 | Smt. Laxmi Zoro | 20 | Stomach Pain Swollen Gums Haematoma Common Cold Round Worm | No |
| 3 | Shri. Tukaram Bavdan | 30 | Jaundice Kidney Stone Dhat Chicken Pox Diabetes | Yes |
| 4 | Shri. Babu Yamkar | 25 | Toothaches Swollen Gums Acne Water Warts -Skin Rashes | No |
| 5 | Shri. Janu Zoro | 38 | Round Worm Piles Chicken Pox Ring Worm Skin Rashes | Yes |

Table 3. Ethno botanical inventory of medicinal plants and its uses.

| S.No | Botanical name | Common name | Local name | Part used | Medicinal use |
|------|-----------------------------------|------------------------------------|------------|---------------------|---|
| 1. | <i>Tabernaemontana orientalis</i> | East Indian Rosebay | Anant | Root, Bark | Kidney stone, Tooth ache |
| 2. | <i>Anethum graveolens</i> | Dill | Shepu | Leaves | Loss of appetite |
| 3. | <i>Andrographis paniculata</i> | King of Bitter / Kalmegh | Kirayte | Leaves | Stomach ache, Common cold, Round worm |
| 4. | <i>Mangifera indica L.</i> | Mango | Aamo | Leaves Plant gum | Diarrhea Cracked heels |
| 5. | <i>Catharanthus roseus</i> | Madagascar Periwinkle | Sadafuli | Leaves | Diabetes |
| 6. | <i>Hemidesmus indicus</i> | Indian Sarsaparilla | Dudhvel | Entire plant | Cold and fever |
| 7. | <i>Annona reticulate L.</i> | Custard Apple / bullock's heart | Sitaphal | Leaves, Seeds | Stomach ache Diabetes |
| 8. | <i>Microcos paniculata</i> | Chinese Hibiscus / Microcos | Chivor | Root, Leaves | Diarrhea, jaundice |
| 9. | <i>Chromolaena odorata</i> | Siam Weed / | Pat | Leaves | Wound |

| | | | | | |
|----|-----------------------------------|------------------------------------|-----------------------|---------------|---|
| | Christmas Bush | | | | |
| 10 | <i>Piper nigrum</i> | Black Pepper | Meri | Seed | hematoma |
| 11 | <i>Psidium guajava</i> | Guava | Peru | Leaves | Stomach ache |
| 12 | <i>Guazuma ulmifolia</i> | West Indian Elm / Bastard Cedar | Bakdafal | Fruit | Chicken pox |
| 13 | <i>Zingiber officinale</i> | Ginger | Aale | Rhizome | Fever, cold |
| 14 | <i>Carica papaya L.</i> | Papaya | Papoi | Seeds, leaves | High blood pressure and dengue |
| 15 | <i>Cucumis sativus</i> | Cucumber | Tovshe | Fruit, seeds | Wound, Stomach pain |
| 16 | <i>Luffa acutangula</i> | Ridge Gourd / Angled Luffa | Ghosale | Fruit | Stomach pain or Abdominal pain |
| 17 | <i>Cucurbita maxima</i> | Pumpkin | Dudhi | Fruit | Stomach ache |
| 18 | <i>Cucumis trigonus</i> | Wild Cucumber | Karit | Fruit | Cold, fever |
| 19 | <i>Shorea robusta</i> | Sal | Sail | Root | Jaundice |
| 20 | <i>Terminalia arjuna</i> | Arjuna Tree | Arjun | Bark | Wound, Diabetes, Menstrual cycle problems |
| 21 | <i>Careya arborea</i> | Wild Guava / Slow Match Tree | Kumyo | Leaves | Stomach pain |
| 22 | <i>Mimusops elengi</i> | Spanish Cherry / Bakul Tree | Vovola | Flower | Pink eye |
| 23 | <i>Syzygium cumini</i> | Java Plum / Jamun | Jambla | Seed | Diabetes |
| 24 | <i>Saraca asoca</i> | Ashoka Tree | Ashok | Leaves, fruit | Fever, Kidney stone |
| 25 | <i>Szechuan pepper</i> | Sichuan Pepper / Teppal | Teppal | Seed | Toothache, vomiting |
| 26 | <i>Rauvlfia serpentine</i> | Indian Snakeroot / Sarpagandha | Aatki | Root | Stomach ache |
| 27 | <i>Aerva lanata</i> | Mountain Knot Grass | Mutkka dyache zhad | Fruit | Kidney stone |
| 28 | <i>Terminalia paniculata</i> | Kindal Tree | Kindal | Bark | Wound, Jaundice |
| 29 | <i>Curcuma longa</i> | Turmeric | Halad | rhizome | Wound |
| 30 | <i>Mimosa pudica</i> | Touch-me-not / Sensitive Plant | Lajjalu | Root, stem | Piles |
| 31 | <i>Cynodon dactylon</i> | Bermuda Grass | Haryali | Root | Snake bite |
| 32 | <i>Aloe barbadensis miller</i> | Aloe Vera | Alovera | Leaves | acne |
| 33 | <i>Ocimum sanctum</i> | Holy Basil / Tulsi | Tulsi | Leaves | Cold, fever |
| 34 | <i>Ligustrum lucidom</i> | Glossy Privet | Rajnani | Leaves | Water warts |
| 35 | <i>Coriandrum sativum</i> | Coriander / Cilantro | Kotambir | Seed | Fever, cold |
| 36 | <i>Acgle marmelos</i> | Bael / Bengal Quince | Belva | Fruit | Inflamed gums |
| 37 | <i>Setaria italica</i> | Foxtail Millet | Kangu tandul | Millet | Chicken pox |
| 38 | <i>Myristica fragrans</i> | Nutmeg | Jai fal | Seed | Round worm |
| 39 | <i>Stachytarpheta jamaicensis</i> | Blue Porterweed | Goshe | Leaves | Round worm |
| 40 | <i>Trachyspermum ammi</i> | Ajwain / carom Seeds | Vovo | Seed | Round worm |
| 41 | <i>Azadirachta indica</i> | Neem | Kodu limbu | Leaves | Fever |
| 42 | <i>Shorea robusta</i> | Sal Tree | Sal | Root | Diarrhea |
| 43 | <i>Citrus limon</i> | Lemon | Limbu | Fruit | Common cold |
| 44 | <i>Murraya koenigii</i> | Curry Leaf Tree | Kadi patta | Leaves | Diarrhea |
| 45 | <i>Capsicum annuum</i> | Chilli Pepper / Bell | Zala mirsang | Fruit | Cut, wound |

| | | | | | |
|----|-------------------------------|----------------------------------|--------------|--------|----------------------------------|
| 46 | <i>Cymbopogon</i> | Pepper Lemongrass | Ganzan | Leaves | Digestion, vomiting, cough |
| 47 | <i>Kalanchoe brasiliensis</i> | Brazilianm Kalanchoe | Fatfate pana | Leaves | Common cold |
| 48 | <i>Coleus amboinicus</i> | Indian Borage / Cuban Oregano | Vatlav pana | Leaves | Common cold |
| 49 | <i>Morinda citrifolia</i> | Noni / Indian Mulberry | Bartondi | Fruit | Cancer |
| 50 | <i>Phyllanthus emblica</i> | Indian gooseberry | Aavalo | Bark | Kidney stone, Piles, Diarrhea |



Stachytarpheta jamaicensis



Hemidemsus indicus



Mangifera indica



Govenia urticulata



Psidium guajava



Hibiscus rosa-sinensis



Morinda citrifolia



Alae barbadensis



Ocimum sanctum



Andrographis paniculata



Mimosa pudica



Chromolaena odorata



Szechuan pepper



Cucumis sativus



Zingiber officinale



Allium sativum

Figure 1. Medicinal plants used by the tribal communities in Goa.

Based on information provided by the Vaktoli ethnobotanical knowledge of tribal communities was recorded in Table 3. (Figure 1) Our analysis revealed a variety of plant parts utilized in traditional healing practices, with leaves being the most commonly used part (in 12 plants), followed by bark (10 plants), fruit (8 plants), and seeds (7 plants). Additionally, rhizomes were used in 5 plants, flowers in 7 plants, and the entire plant in 1 instance. Documentation of these traditional uses, offers valuable insights into the pharmacological properties and therapeutic potentials of indigenous medicinal plants, which serves as a comprehensive reference guide to the medicinal flora of Goa's tribal communities, providing valuable information for researchers, Healthcare practitioners, and conservationists alike.

Utilization of animal-based remedies in the traditional healing practices of tribal communities in Goa. It outlines the name of each animal, the specific part(s) used for medicinal purposes, the method of medicine preparation, and the common ailments treated. From insects to mammals, a diverse array of animal species contributes to the ethno medical pharmacopeia, addressing a range of health concerns through traditional methods of preparation and application. This documentation not only highlights the resourcefulness of tribal healer but also underscores the importance of biodiversity conservation and the preservation of indigenous knowledge systems. (Table.4).

Table 4. Animal-based medicines and their uses.

| Scientific names | Local name | Part used |
|-------------------------------|-----------------------------|-------------------------|
| <i>Semnopithecus entellus</i> | Monkey/makod | Excreta |
| <i>Bos gaurus</i> | Gaur/gava reda | Excreta |
| <i>Lepus nigricollis</i> | Indian hare/soso | Intestine ,meat, blood |
| <i>Paradoxurus SP.</i> | Civet cat/javvath | Intestine, testes, meat |
| <i>Bos taurus</i> | Cow/gaay | Urine |
| <i>Rusa unicolor</i> | Sambar/meru | Meat |
| <i>Urva auro-punctata</i> | Mongoose | Bone |
| <i>Homo sapiens</i> | Human/munis | Urine |
| <i>Moschiola indica</i> | Mouse deer/pisoi | Foetus |
| <i>Sus scrofa</i> | Wild boar/ran dukor | Bone marrow |
| <i>Ocyrceros griseus</i> | Malabar grey hornbill/bonnu | Meat |
| <i>Crematogaster SP.</i> | Ants/huron | Eggs, Larvae, Extracts |

Insights into the preparation methods of traditional medicines used by tribal healers in Goa, along with the associated diseases treated recorded in Table 5. Documenting these preparation techniques and their therapeutic applications, contributes to the preservation and dissemination of indigenous healing knowledge, fostering a deeper understanding of traditional healthcare practices within tribal communities in Goa.

Table 5. Traditional Medicine Preparation Methods: Procedures, Associated Diseases and Remedial Formulations.

| S. No. | Medicine preparation | Procedure for preparation | Associated disease |
|--------|----------------------|---|--|
| 1 | Herbal infusions | Boil plant parts (leaves, flower) in water to make therapeutic teas | Various ailments, including digestive and respiratory issues |
| 2 | Decoctions | Boil plant materials (root, bark) to create concentrated liquid. | Commonly used for treating respiratory and digestive problems |
| 3 | Paste formulations | Grind or mash plants into a paste for ingestion or topical application | Skin conditions, digestive issue |
| 4 | Oil extracts | Infuse plant materials into oils for massage or topical use | Massage for muscular pain, topical application for skin issues |
| 5 | Powdered formulas | Grind dried plant parts into a fine powder for consumption or application | Internal ailments, digestive disorders |
| 6 | Smoke inhalation | Burn specific plants to produce medicinal smoke | Respiratory issues, mouth ulcer, dental cavity |

| | | | |
|---|--|---|--|
| 7 | Fermented preparations | Allow plant materials to undergo fermentation for medicinal solutions | General health, digestive problems |
| 8 | Ritualistic medicines | Integrate culture and spiritual practices into the preparation | Often associated with various spiritual and health rituals |
| 9 | Splinting the limb with stick or cloth | To prepare a splint using stick or cloth, pad it with soft material, position it firmly in place, ensuring circulation and seeking medical assistance promptly. | Bone fracture |

Table 6. Outlines traditional remedies utilized by tribal communities. Each entry details ailment and its general and specific symptoms, medicine preparation method and its application procedure. Decoction is used for 11 disorders, paste formulation for 5, Powder formulation for 5, herbal infusion for 5, oil extraction for 3 and smoke inhalation for 2 disorders as reported by Vaktoli participated in the survey. (Figure 2).

Table 6. Ethno medicinal practices of tribal communities in Goa,

| S. No | Disease | Symptoms | Preparation Method | Application |
|-------|----------------|---|-------------------------------------|---|
| 1 | Jaundice | -Yellow skin and -white part of the eye -weight loss | Decoction | Oral administration |
| 2 | kidney stone | - Server pain in the back and side frequent urination -discomfort during urination. | Decoction | Oral administration |
| 3 | Piles | -Pain and discomfort during bowel movement -itching around and swelling near the anus. | Decoction | Oral administration |
| 4 | water warts | - Skin small bump redness | Decoction Powdered formulas | -oral administration -apply on infected part |
| 5 | Dhat syndrome | -Loss of appetite | Decoction | -oral administration |
| 6 | Common cold | -cough -sneezing -sore throat -running nose headache | Herbal infusion Smoke inhalation | -oral administration |
| 7 | Ring worm | -Itchy skin -ring shaped rash -cracked skin | Paste formulation | -apply on infected part |
| 8 | Acne | -white head -Inflamed nodules | Paste formulation | -apply on body |
| 9 | Cut/Wound | -bleeding blood -scratches -swelling | Paste formulation | -Apply on wound |
| 10 | Round worm | -stomach pain -worm in stool | Decoction | -oral administration |
| 11 | Conjunctivitis | -itching -burning -red color patches and swelling | Herbal infusion | Wash with water |
| 12 | Diabetes | -loss of weight -frequent urination -loss of appetite | Decoction | Oral administration |
| 13 | Cholesterol | -high blood pressure -pain while | Decoction | Oral administration |

| | | | | |
|----|----------------|--|--|---|
| | | walking -chest pain | | |
| 14 | Chicken pox | -red spots on skin -fever Scab | Powdered formulas | Apply on body and also drink |
| 15 | Hematoma | -pain -swelling -redness | Paste formulations | Apply on affected part |
| 16 | Sore throat | -throat pain | Paste formulations | Apply near the throat |
| 17 | Stomach pain | -pain in stomach -vomiting sensation | Powdered formulas | -Oral administration |
| 18 | Ear pain | -pain in ear -hearing problems | Oil extract | -put few drops in the ear |
| 19 | Swollen gums | -swollen -bad breath -dark red gums | Powdered formulas | -paste, powdered on swollen jaw |
| 20 | Fracture | -swelling -pain | Splinting the limb with stick or cloth | Massage with oil, put bamboo and maida, then wrap tightly with any piece of cloth |
| 21 | Toothache | -pain when eating cold or hot item -pain in gums and tooth | Smoke inhalation | -Cloves put on tooth -gargling |
| 22 | Muscle pain | Joint pain in various parts of the body muscles like neck, thigh etc. | Oil extracts | Massage with oil |
| 23 | Menstrual pain | -stomach pain | decoction | Oral administration |
| 24 | Joint pain | -joint pain in various parts of the body | Oil extracts | Massage with oil |
| 25 | Diarrhea | -frequent loose motions -stomach ache Fatigue and weak -vomiting | Decoction | Oral administration |
| 26 | Fever | -feeling weak -shivering -body temperature increase | Herbal infusion | Oral administration |
| 27 | Skin rashes | -patches -itching -swelling -burning | Paste formulations | Apply on skin |
| 28 | Burns | -itching -pus and boils -Pain and burning at the place | Paste formulation | Apply on burn part |
| 29 | Headache | -pain in the fore and whole head - sometimes, side tooth pain | Oil extracts | Massage with oil |
| 30 | Snake bite | -vomiting -fainting -fear and panic | Decoction Powdered formulas | -Oral administration -apply on swollen or infected part |
| 31 | Dog bite | -swelling -pain | Decoction Powdered formulas | -oral administration -apply swollen or infected part |



Figure 2. Medicines prepared by the tribal communities in Goa.

Several reports are available on the usage of medicinal plants (Chopra *et al.*, 1986, Kadirvel *et al.*, 2010, Vaidyanathan *et al.*, 2013) and on tribal medicine (Vedavathi *et al.*, 1998, Sawant and Rodrigues, 2015). Our study involved conducting comprehensive surveys within two tribal communities in Goa: Velip and Dhangar. During the surveys, tribal healers generously shared a wealth of personal information, including their name, age, place of residence, years of experience in healing and where they acquired their knowledge. These discussions often evolved into rich narratives, providing context and depth to their healing practices. Additionally, healers recounted anecdotes and stories passed down through generations, illustrating the cultural significance and historical roots of their healing traditions. Tribal healers elaborated extensively on their methods for treating various ailments, offering detailed descriptions of preparation techniques, disease symptoms, and the utilization of medicinal plants and animals.

Valuable flora, the main source of herbal medicine are disappearing at a rapid pace. A notable observation was the affordability and accessibility of traditional medicine compared to modern healthcare services. Tribal healers often operated on a sliding scale fee structure, ensuring that their services remained accessible to all members of the community, regardless of socioeconomic status. In instances where patients were unable to afford monetary payment, healers accepted alternative forms of compensation, such as food or goods, fostering a sense of community and reciprocity. (Iyengar and Dholakia, 2012). Many tribal healers adhere to a code of ethics governing the sharing of their knowledge and healing practices. They emphasized the importance of reciprocity and mutual respect in knowledge exchange, ensuring that information

is shared only with those who demonstrate genuine interest and commitment to learning.

Furthermore, healers emphasized the need for confidentiality and discretion in their interactions with patients, respecting the privacy and dignity of those seeking their care. The majority of medicinal healers we encountered were esteemed elders within their communities, boasting decades of experience and wisdom accumulated over a lifetime of healing. Their advanced age symbolized not only their expertise but also their deep connection to ancestral knowledge and cultural heritage. Despite the challenges of aging, these healers remained steadfast in their commitment to serving their communities and preserving their healing traditions for future generations. Gunias, Bhagats, and Baigas from Andhra Pradesh and Chattisgarh specialize in treating 45 illnesses arising from the supernatural.

These healers, possessing inherited wisdom, address diverse maladies with a unique expertise that binds the community together (Soni and Pradhan, 2016, Soni, 2020). "Bhopas" or "Bhagats," from Maharashtra are the custodians of age-old wisdom, treating physical and spiritual ailments, involving prayers, rituals, and herbal medicines. (Patil & Bhaskar, 2006). The hidden ethnobotanical treasure of Bondla wildlife sanctuary of Goa was reported by Keshari and Bishnupriya (2022). Healers shared candid insights into the challenges they encounter in their healing practices, ranging from environmental hazards, such as the danger of encountering wild animals in forested areas, to socio-economic factors, such as the increasing scarcity of medicinal plants due to deforestation and habitat destruction. These challenges underscored the resilience and adaptability of healers in navigating complex and ever-changing landscapes. Similar observations were reported by Joshi (2019). To mitigate the

seasonal variability in the availability of medicinal plants, healers employ various strategies for collection and preservation. They meticulously harvest plant materials during peak seasons, utilizing traditional knowledge to identify the most potent and effective specimens. Additionally, healers employ preservation techniques, such as drying or processing, to ensure the longevity and potency of medicinal resources throughout the year. Similar observations were made in Velip (Velip *et al.*, 2023), Gawda and Dhangar communities. (Gaonkar *et al.*, 2024).

Tribal healers actively participate in programs and workshops aimed at expanding their knowledge and skills. These initiatives provide valuable opportunities for healers to interact with peers, exchange knowledge, and acquire certifications that further enhance their professional development and practice. Moreover, community-based learning initiatives foster a sense of camaraderie and solidarity among healers, strengthening networks of support and collaboration within the tribal community. Many medicinal healers hold licenses, such as the Vaidya Mitra Card, which authorize them to harvest medicinal plants for their purposes. This official recognition and validation of their expertise contribute to the legitimacy and professionalism of their practice, affirming their role as valuable contributors to healthcare within their communities. By preserving and promoting these practices, communities not only safeguard their healthcare traditions but also reaffirm their cultural resilience and identity in the face of external pressures and modernization. Moreover, traditional healing ceremonies and rituals serve as vital expressions of cultural identity and spiritual connection, reinforcing bonds of community and belonging among tribal members. (Gagnon & Berteaux, 2009) The reliance on natural resources for medicinal purposes underscores the intimate connection between traditional healing practices and environmental stewardship. By preserving forests and habitats, tribal communities contribute to the conservation of biodiversity and ensure the sustainable availability of medicinal plants for future generations. Furthermore, traditional ecological knowledge passed down through generations serves as a valuable resource for promoting ecosystem health and resilience in the face of environmental threats. (Berkes, 2008) The passing down of traditional healing knowledge from older generations to younger ones ensures the continuity and preservation of indigenous healing traditions. Through apprenticeships and mentorship programs, younger members of tribal communities learn the intricacies of traditional healing practices, ensuring their perpetuation and relevance in the modern world. Societal domination of western medicine and lack of recognition to the stakeholders of biological resources, place and value of traditional knowledge base has been impeding the entry of traditional medicine into healthcare services and related field such as nutrition, environmental management. By fostering partnerships between traditional healers, modern healthcare providers, and policymakers, we can create synergistic approaches to healthcare delivery that integrate the strengths of both traditional and modern systems. (Usher, 2000) Furthermore, investments in research, education, and

infrastructure are needed to ensure the sustainability and resilience of traditional healing practices in the face of evolving challenges and opportunities

CONCLUSION

In conclusion, our research journey into the traditional healing practices of Goa's tribal communities has provided profound insights into the resilience, richness, and cultural significance of these age-old traditions. Through meticulous surveys, engaging discussions, and immersive experiences with tribal healers, we have uncovered a treasure trove of knowledge that transcends mere medicinal remedies to encompass holistic approaches to health and well-being. Our findings underscore the deep-rooted connection between traditional healing and cultural identity. Despite facing formidable challenges, such as environmental degradation, habitat loss, and socio-economic pressures, tribal healers exhibit remarkable adaptability and resilience. They navigate these obstacles with ingenuity and resourcefulness, finding innovative solutions to sustain their healing traditions and provide vital healthcare services to their communities. Research can play a big role in helping tribal communities in Goa. By studying their healing practices and sharing what we learn, we can help raise awareness about their traditions and the challenges they face. This can lead to better support and resources for tribal communities, helping them preserve their culture and way of life. By working together and sharing knowledge, we can continue to thrive for generations to come.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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