Our Nature | January 2024 | 22 (1): 41-46

ISSN: 1991-2951 (Print)
ISSN: 2091-2781 (Online)

Our Nature

Journal homepage: http://nepjol.info/index.php/ON

Ethnomedicinal Resources of a Newar Community in Gorkha, Nepal

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Abstract

Ethnobiology offers valuable insights into medicinal plants and animals, and their sustainable domestication and management. We explored the traditional medico-ethnobiological knowledge within a Newar community in Gorkha. We collected primary data through interviews, observations, and identified 49 plant and 11 animal species being used for treating ailments locally. Indigenous knowledge transmission mainly involved elders, healers, and parents. We also observed potentially eroding traditional knowledge among the younger generation. School and teachers had limited influence in passing on this knowledge. Preserving this wisdom requires community-focused traditional knowledge transfer mechanisms to integrate local wisdom into conservation and management efforts.

Keywords: Ethnomedicine, Indigenous knowledge, Traditional healing, Use value

DOI: https://doi.org/10.3126/on.v22i1.67350
Manuscript details: Received: 25.10.2023 / Accepted:10.11.2023
Citation: Adhikari, S.B., Karki S., Chhetri P.K. & Bista R., 2024 Ethnomedicinal Resources of a Newar Community in Gorkha, Nepal. *Our Nature* 22 (1): 41-46. DOI: https://doi.org/10.3126/on.v22i1.67350

Introduction

Plants and animals have been integral to indigenous healing practices worldwide (Borah and Prasad, 2017; Setlalekgomo, 2014). Traditional knowledge, deeply rooted in nature and culture, has evolved over centuries within specific ecological and linguistic contexts. Ethnomedicine, a crucial component of this traditional wisdom, is based on plants and animals for healing, independent of modern scientific methods (Timilsina and Singh, 2014), and remains significant, with around 70–80% of the world's rural population relying on traditional medicine for primary healthcare (Borah and Prasad, 2017). Notably, many modern drugs and essential chemicals identified by the World Health Organization have origins in traditional medicinal use of flora and fauna (Malla *et al.*, 2015; Setlalekgomo, 2014; Subba *et al.*, 2016).

Nepal, blessed with rich biodiversity, is home to approximately 9.5 million indigenous people representing diverse cultures and traditions (Indigenous Nationalities Commission, 2022). These ethnic communities possess unique knowledge systems, including traditional medicinal practices deeply rooted in their cultures (Malla *et al.*, 2015). Access to government healthcare facilities in Nepal is limited, with around 90% of the population residing in rural areas (Singh *et al.*, 2012). Consequently, many indigenous groups rely on wild plants and animals to address their basic healthcare recourse (Timilsina and Singh, 2014).

Despite the critical role of traditional medicine, the documentation of this knowledge is under threat. Various factors, such as changing lifestyles, evolving perceptions, traditional healers' secrecy, neglect by younger generations, commercialization, and socio-economic changes, put this invaluable knowledge at risk of extinction (Singh *et al.*, 2012). Hence, there is an urgent need to explore and document ethnomedicinal practices among indigenous communities to ensure the sustainable utilization of natural resources. This study aims to

document ethnomedicinal knowledge of a Newar community in Gorkha by exploring the diversity of plants and animals used for ailment treatment, the modes of preparation and administration, and the ailment categories treated with these species.

Materials and Methods

Study site

The study was conducted in Bhimsen Thapa Rural Municipality, in the Gorkha district of Nepal (Figure 1). The region's geographical variation results in diverse environments with rich flora, fauna, climates, people and cultures. The specific study site, located in Baguwa and Rithepani (28.03° N, 84.71° E), falls under the sub-tropical climate zone and the predominant forest type in the region at an altitude of 1000 m asl is *Schima wallichii*/ *Castanopsis indica* forest.

The district is home to many ethnic groups residing in various parts of the region. Among them, the Newar communities are found dispersed, with significant concentrations in areas such as Gorkha Bazar, Ghairung, Khoplang, Palungtar, Manakamana, Masel, etc. In Bhimsen, the Newar communities are particularly prevalent in wards 1, 2, 3, 4, 5, and 9. We studied two communities in ward number 5, Baguwa and Rithepani.

Field survey, data collection and analysis

Standard ethnobotanical tools were employed in primary data collection, including participant observation and open and semi-structured interviews (Alexiades, 1996) with 33 participants, consisting of local faith healers (*Dhami/Jhankri*), elderly community members, teachers, and students. Detailed data on local names, traditional uses, parts used, and modes of use of the plants and animals were recorded in February to March 2018. We also sought assistance from teachers, experts, and published literature for data accuracy such as specimen identification.

The plant and animal species were documented with their local names (Newari names in parentheses wherever available), the scientific name, family, life form, plant and animal parts used, methods of preparation and administration, as well as the specific diseases or problems that each species was known to heal.

Quantitatively, medicinal significance was assessed two metrics—Use Value (UV) and Relative Frequency of Citation (RFC)—based on the survey data and the usage reports provided by the informants. UV serves as an indicator of the relative importance of species in the local context for medicinal purposes. It was calculated as the total

sum of number of use reports mentioned by each informant for a particular species (Ui) divided by the total number of informants reporting on that specific species (N). A higher UV value signifies extensive utilization of the species by the locals to address various ailments. RFC is an index calculated by dividing the number of informants mentioning a particular useful species (which is the frequency of citation, FC) by the total number of informants (N) (Parthiban *et al.*, 2016). RFC value literally represents the proportion of informants who recognize a particular species as having practical values.

Results and Discussion

Ethnomedicinal diversity

The Newar community was found to boast profound indigenous knowledge for curing various types of ailments, utilizing both locally available and non-native plant and animal species. Their medicinal practices involve a wide array of animals, plants, and plant parts, such as roots, leaves, bark, tips, flowers, fruits, as well as animal-derived components like eggs, meat, blood, and whole bodies. This intricate system of resources fulfills their daily life needs and aligns with their beliefs in treating different diseases.

Among reported 11 distinct animal species from different families (Appendix 1), three species—duck, chicken, and cow—are domesticated, while all others are native to the region. Some of the reported species and uses align with other research, such as Timilsina and Singh (2014), which also recognized the therapeutic utility of Jackal meat in arthritis treatment. Interestingly, while Timilsina and Singh (2014) observed the use of slug for back pain and bone fractures, the Newar community employs it for jaundice and hyperthermia/heatstroke.

Animal and plant parts used

Animal-derived substances like meat, blood, eggs, and whole bodies are utilized to treat respiratory problems, jaundice, and gastrointestinal issues. Among the plant species, herbs constitute the largest proportion, accounting for 37% followed by 9% creepers (Figure 2). The prevalence of herbs is likely due to their easy availability in waste lands and along roadsides, coupled with their higher effectiveness in treating various ailments (Singh *et al.*, 2012). Most of the medicinal plant species are locally available, but a few, such as cardamom, sweet flag, and fenugreek, are brought from markets. The dominance of herbs as the most utilized plant life form, followed by trees and shrubs, aligns with findings from other studies in different locations, such as Humla (Rokaya *et al.*, 2010) and the western Terai (Singh *et al.*, 2012).

In terms of plant parts used, leaves are the most frequently employed, followed by aerial shoots and roots (Figure 3). The preference for leaves may be attributed to their easy collection compared to underground parts. From a scientific perspective, leaves are actively involved in photosynthesis and the production of metabolites, making them valuable sources of medicinal compounds (Parthiban *et al.*, 2016). Following leaves, roots or rhizomes are preferred, likely because they contain a higher concentration of bioactive compounds compared to other plant parts (Rokaya *et al.*, 2010). Similar findings regarding the frequent use of leaves were reported in studies conducted in Okharpauwa Nuwakot (Timilsina and Singh, 2014) and Tamil Nadu, India (Parthiban *et al.*, 2016).

Mode of preparations and administrations

Figure 2c illustrates the medical preparations and their corresponding modes of administration. Regarding the route of administration, an overwhelming majority of plant medicines, approximately 79%, were ingested (swallowing, drinking, or chewing).

Additionally, 19% of plants were applied topically, involving the direct application to the surface of the body.

Juice from plant parts such as stems, leaves, flowers, roots etc. was the most frequent form of preparation (usage frequency of 24) followed by the powder form. In many cases, the raw forms of plants were also employed. The juice preparation involves the smashing of plant parts, while the powder form is obtained through the grinding of dried materials. These are the more common ways of uses (Acharya and Acharya, 2010; Malla *et al.*,2015; Rokaya *et al.*, 2010; Singh *et al.*, 2012; Thapa, 2013).

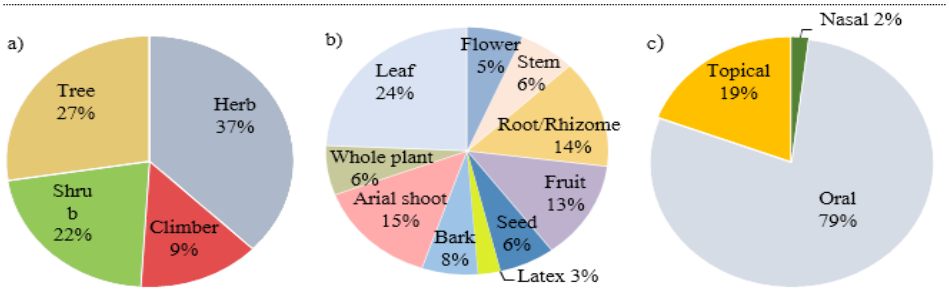

Figure 2. a) Proportion of plant habit, b) plant parts use cited and c) route of application for treatment

Ailments treated

Ailments treated by plant species have been grouped into twelve distinct ailment categories (Figure 3). Notably, 25 plant species were reported to be used for gastrointestinal. Following closely behind, respiratory issues were addressed by 16 plant species, while 14 species showed efficacy in treating fever. Some previous studies elsewhere such as Rokaya *et al.* (2010) in Humla, Timilsina and Singh (2014) in Chepang communities of Makawanpur, and by Singh *et al.* (2012) in Western Terai also observed a significant use of medicinal plants to treat gastrointestinal ailments. This study identified a smaller number of animal species being used medicinally, but interestingly, most of them displayed higher use values for treating similar conditions like arthritis, bone fractures, and back pain, as reported by Timilsina and Singh (2014). This overlapping efficacy reinforces the reliability and consistency of the reported medicinal uses within various parts and communities of Nepal.

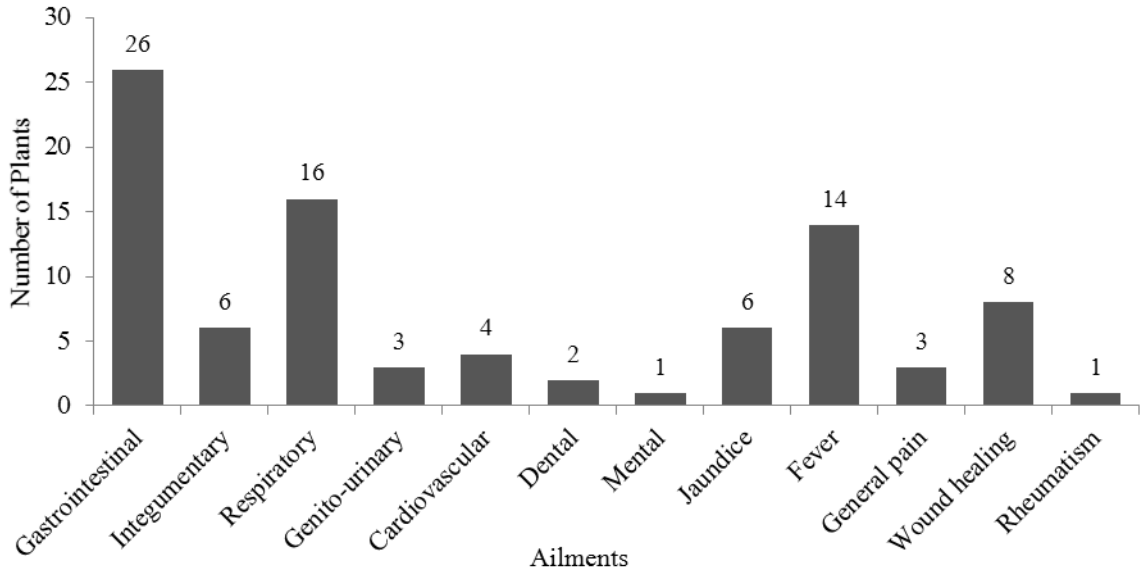

Figure 3. Number of plant species used for different diseases

Local importance of medicinal plants and animals

Turmeric tops the list with the highest relative frequency of citation (by 26 out of 30 informants) and use value of 0.79. Mugwort follows as the second most used species reported with a use value 0.73 and use report of 24. Aloe also was reported to

have high use value. Among the animal species, the cow emerged as the most used, with an impressive use value of 0.76, followed by slug (0.45) and sparrow (0.42). On the other end of the spectrum, plant species such as plumeria (UV=0.03), monkey jack (UV=0.03), velvet leat (UV=0.03), and *Tectaria* (UV=0.06) were found to have low use values. It is important to note that low UV values do not necessarily imply insignificance; rather, they indicate that traditional knowledge about these species is at risk of being lost over time.

Transfer of knowledge on medicinal flora and fauna

The transfer of medicinal knowledge primarily occurs from the elderly to the younger generation. However, observations revealed that young and educated individuals were less knowledgeable in ethnomedicine. The surveyed teachers and students noted that the education system has not prioritized the transfer of this valuable knowledge. None of the participants possessed any written records or classical manuscripts on these practices. This declining trend in knowledge transfer and low use value of most species is not unique to this area; similar patterns have been identified in Nepal and globally (Acharya and Acharya, 2010; Chekole, 2017; Singh *et al.*, 2012). The fading ethnobiological knowledge in the young stems from dwindling intergenerational interaction and growing reliance on modern healthcare systems.

Conclusions

Documenting and preserving folk ethnomedicinal wisdom concerning regional flora and fauna assumes paramount significance. This study revealed that the Newar community possesses rich resources of medico-ethnobiology, utilizing a diverse range of animal and plant species to treat various ailments. We have reported usages of some species in different ailments than their usages documented in previous studies in other communities and parts of Nepal. Some species have high use value and citation report whereas, most of the species have lower value (84.78% of plant species having UV values lower than 0.50) indicating a possible debilitation in the ethnomedicinal knowledge transfer. Preserving and transmitting traditional medicinal knowledge becomes imperative to safeguard the rich cultural heritage and ecological wisdom of the Newar community. Increasing awareness of value of local flora and fauna, creating indigenous-led conservation strategies, and prompting knowledge transfer is crucial. Prioritizing scientific assessment and pharmacological evaluation can unlock the full potential of these resources for both the local community and scientific advancements.

Author contributions

All authors were involved in conceptualization and design of the study, S. Bista Adhikari reviewed literature and collected data, S. Bista Adhikari and S. Karki analyzed data and prepared manuscript, P.K. Chhetri and R. Bista edited and reviewed the manuscript.

Acknowledgements

The authors are thankful to all the supportive teachers at Gorkha Campus Gorkha for constructive suggestions and assistance in plant identification. Special recognition is due to local teachers, especially Kabiraj Shrestha and Uttar Narayan Shrestha, local healers, farmers, and students.

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