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Ethnomedicinal Applications of Fish Species Among Local Communities of Medir Haor, Bangladesh

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ABSTRACT

Fish play a vital role in food security and cultural identity in Bangladesh; however, their use in traditional medicine remains inadequately documented. This study aimed to document the ethnomedicinal uses of fish species in Medir Haor, a wetland ecosystem in northeastern Bangladesh, and to assess the status of intergenerational knowledge transmission. Conducted between January and June 2025, the study employed community consultations, informal discussions (*adda*), and semi-structured interviews with traditional knowledge holders and local students. A total of 11 distinct therapeutic applications involving 10 fish species were documented. These ranged from the use of the Indian mottled eel (*Anguilla bengalensis*) for the treatment of hemorrhoids to the use of the striped snakehead (*Channa striata*) for anxiety, the latter uniquely associated with local beliefs related to supernatural entities. Additionally, four fish species were identified as being deliberately avoided due to perceived preventive health concerns. Notably, a pronounced intergenerational knowledge gap was observed, with younger respondents largely unaware of these ethnomedicinal practices. The findings indicate that this localized traditional knowledge, although still practiced by a limited group, is critically endangered. Immediate documentation is therefore essential to preserve this intangible cultural heritage, which holds considerable potential for future ethnopharmacological research and biocultural conservation. Overall, the study underscores the urgency of safeguarding ethnomedicinal knowledge against erosion driven by modernization and environmental change.

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Introduction

Fish is a fundamental component of the food security and cultural identity of Bangladesh, serving as a staple food for its population. The Bengali community is often encapsulated by the phrase, "*Mache Bhate Bangali*," which translates literally to "Bengalis are made of fish and rice." Beyond its nutritional role, fish holds diverse applications within the country. Notably, various fish species are utilized in traditional medicinal practices. Although this indigenous knowledge is less prevalent than in the past, its documentation is crucial for future scholarly research and may contribute to conservation efforts. The ethnomedicinal use of fish varies significantly across different geographical locations and communities. The Haor region, a wetland ecosystem of northeastern Bangladesh, has historically been geographically remote. Limited access to modern infrastructure led its inhabitants to develop extensive knowledge of remedies derived from local natural resources. The Haor boasts high fish availability and species diversity compared to other micro-ecosystems in the country. However, the increased availability of modern healthcare facilities has led to a significant decline in the practice of this traditional medicine. Documenting this indigenous knowledge is essential to preserve it for future generations, ensuring it can contribute to fields such as ethnopharmacology and cultural heritage. The global COVID-19 pandemic underscored the potential value of traditional knowledge systems. While many traditional beliefs are no longer in common practice, they retain importance within cultural and customary contexts. To understand and document both the tangible and intangible uses of fish, a study was conducted in the Medir Haor from January to June 2025. The methodology included community consultations, informal discussions (*adda*), and structured interviews in the villages of Nasirnagar, Nasirpur, and Tekanagar. The primary objectives of the study were to document the local indigenous knowledge concerning the ethnomedicinal uses of fish within the Haor basin and to assess the current state of intergenerational knowledge transmission.

Methodology

The study employed a multi-method approach to document the ethnomedicinal knowledge on fish within the community in the Medir Haor. Data were collected through two primary means: community consultations and individual interviews.

Community Consultations

Four separate community consultations were conducted, each comprising 8 to 10 participants. The composition of these groups was designed to capture diverse perspectives: two sessions were held with male fishers, one in Nasirpur village and other in Tekanagar village, one with a mixed-gender group of women, and one with a mixed group of elderly males in Nasirnagar village. The age of participants in these sessions ranged from 25 to 50 years.

Additionally, eight addas, a cultural term referring to informal, spontaneous gatherings for socializing and passing time, were strategically steered towards discussions on fish and their medicinal uses to capture organic, unprompted knowledge.

Individual Interviews

To gather in-depth, qualitative data, semi-structured, open-ended interviews were conducted with five elderly individuals, both male and female identified as key knowledge holders. The age ranged from 40 to 85 years old. Furthermore, to assess the contemporary state of this knowledge among younger generations, 25 students from three local schools were interviewed individually. The population status of medicinal fish species was assessed by monitoring the market catch and documenting species availability over a weekly period at Nasirnagar Bazar in morning and Nasirpur Bazar in evening.

Study area

The study area, Medir Haor, is a small *'haor'* in Bangladesh, encompassing an area of approximately 628 hectares. It is predominantly located within the Nasirnagar sub-district of the Brahmanbaria district. A *haor* is a bowl-shaped fluvial depression situated between the natural levees of rivers and is characterized by annual monsoon flooding. This landscape remains a vast water body for approximately five months during the monsoon season and transforms into agricultural land during the winter dry period.

Medir Haor contains seven perennial water bodies, locally known as *beels*: Korati Beel, Beel Balia Juri, Beel Gagutia, Beel Uttar Balla, Beel Bak Langon Atauri, Beel Kupa, and Chachua Medi. The Langon River is the primary river of the basin, supplemented by the perennial Kulkulia and Ruspsia rivers. Twenty villages are situated on the periphery of the Medir Haor basin. This study was conducted in three of the five villages located on the southern edge: Nasirnagar, Nasirpur, and Tekanagar.

These settlements are characteristic typical wetland villages of Bangladesh. While a minority of the population relies on open-water fisheries for their primary livelihood, the majority are engaged primarily in agriculture, practicing occasional fishing for household consumption. The demographic composition is predominantly Muslim (approximately 92% in Nasirnagar and Nasirpur), with a Hindu minority (around 8%). The entire population belongs to the Bengali community. The average literacy rate across the villages is approximately forty percent. Although Nasirnagar serves as the administrative center for the sub-district, it retains a suburban character.

Results

Ethnomedicinal use

The ethnomedicinal applications of fish species within the Medir Haor can be categorizable into two primary modalities: (1) their therapeutic use for treating ailments, and (2) their non-consumption as a preventive health measure.

Table 1. Therapeutic use of fishes in Medir Haor

SL.	Fish: 'Local name' (English name) ***Scientific name***	Therapeutic use
1	'Bamosh' (Indian mottled eel) *Anguilla bengalensis*	It is traditionally consumed as a treatment for hemorrhoids (piles). While no specific recipe is mandated, general consumption is believed to be beneficial.
2	'Sing Mach' (Stinging Catfish) *Heteropneustes fossilis*	To treat animal, all types of recipes of Stinging catfish is fine to treat the anemia if the condition is not severe. For severe cases, a bland preparation with ginger leaves but without spices is recommended. The dish known as '*sukta'*. Consumption of Stinging Catfish is believed to promote lactation in breastfeeding mothers.
3	'Magur Mach' (Walking catfish) *Clarias batrachus*	Walking Catfish is consumed to aid recovery from anemia and other ailments associated with low blood volume.

Table 1. Therapeutic use of fishes in Medir Haor (Contd.)

4	'Koi Mach' (climbing perch) *Anabas testudineus*	Climbing perch fish is considered a beneficial remedy for postpartum complications (puerperium) conditions in women. It is prepared in a regular manner but is specifically cooked without spices.
5	'Cheg bega' (Frog-spawn goby) *Chaca chaca*	The consumption of Frog-spawn goby fish is traditionally believed to be a treatment for sleep bruxism in children. Bruxism is characterized by the involuntary compression or grinding of teeth, which can sometimes produce a clicking sound during sleep. It is also helpful to stop bedwetting.
6	'Kolisha' (Banded gourami) *Trichogaster fasciata*	The pituitary gland of the Banded gourami fish (commonly known as Kholisha Macher Bhat) is dried, powdered, and feed to children as a traditional treatment for tumors.
7	'Mini Mach' (Gangetic leaffish) *Nandus nandus*	The liver of the Gangetic leaffish is kept on the check to treat the teeth pain. It was believed that the dental caries is caused by insects and those insects will come to the liver of the leaffish.
8	'Shol Mach' (Striped snakehead) *Channa striata*	If someone is experiencing excessive fear or a heightened preoccupation with supernatural entities barbequed Striped Snakehead is eaten. It is believed to alleviate these anxieties.
9	'Kailla Mach/Kalibaus' (Orangefin Labeo) *Labeo calbasu*	The consumption of Orangefin Labeo is believed to enhance lactation in breastfeeding mothers.
10	'Gutum Mach' (Guntea loach) *Lepidocephalichthys guntea*	Eating of Guntea loach is believed to increase blood volume and is used as a remedy for treating anemia.
11	Fish Oil	Fish oil, traditionally known as 'Macher Tel', is produced by boiling the visceral organs, including the intestines, liver, and associated fatty tissues located in the abdominal cavity of small fish. This oil is believed to possess energizing properties. Considered very beneficial for children, it strengthens bone development.

Availability of the medicinal fishes in the Medir Haor

The population of those recorded 10 medicinal fish species has been recorded from Nasirnagar and Nasirpur fish markets. The fish caught from the Medir Haor are sold there, along with cultivated pond production. Only 2 species of fishes were found rare, and those are also considered threatened in IUCN Red list for the country. IT is assumed that there is no relation between rarity and medicinal importance in fish, which is usually found for the medicinal plants.

Table 2. Fish species not consumed as a disease prevention measure in Medir Haor

SL.	Fish: 'Local name' (English name) *Scientific name*	Avoidance of Consumption as a Preventive Health Measure
1	Head of Mangur Mach	The consumption of the head of the Walking catfish is associated with the formation of urinary tract stones in males. Men often avoid eating the head of this fish. As a preventive measure to deter male children from consuming the Walking catfish head, a cultural belief warns that doing so will result in the death of the individual's future wife.
2	'Mrigel Mach' (Migral Crap) *Cirrhinus cirrhosus*	Pregnant women will eat not Migal Crap, her baby may develop epilepsy.
3	'Boal Mach' (Helicopter catfish) *Wallago attu*	Patients of postpartum condition are advised not to eat Helicopter catfish. The flesh of the Helicopter catfish develops an unpleasant odor during the month of Karthik (mid-October to mid-November). This is attributed to the fish's purported consumption of Grey Musk Shrew (*Suncus murinus*) during this period. Consumption of the fish at this time is consequently avoided, as it is believed to cause skin diseases.
4	'Punti Mach' (Swamp barb) *Puntius sophore*	Patients suffering from *Sutika Rog* (a postpartum condition) are strictly prohibited from consuming Swamp barb fish.

Table 3. The population of the medicinal fishes in the Medir Haor

SL.	Fish: 'Local name' (English name) *Scientific name*	State of Population in Medir Haor	IUCN Red list status for Bangladesh
1	'Bamosh' (Indian mottled eel) *Anguilla bengalensis*	Rare	Vulnerable
2	'Sing Mach' (Stinging Catfish) *Heteropneustes fossilis*	Common	Least Concern
3	'Magur Mach' (Walking catfish) *Clarias batrachus*	Common	Least Concern
4	'Koi Mach' (climbing perch) *Anabas testudineus*	Common	Least Concern
5	'Cheg bega' (Frog-spawn goby) *Chaca chaca*	Rare	Endangered
6	'Kolisha' (Banded gourami) *Trichogaster fasciata*	Common	Least Concern
7	'Mini Mach' (Gangetic leaffish) *Nandus nandus*	Frequent	Least Concern
8	'Shol Mach' (Striped Snakehead) *Channa striata*	Common	Least Concern
9	'Kailla Mach/Kalibaus' (Orangefin Labeo) *Labeo calbasu*	Frequent	Least Concern
10	'Gutum Mach' (Guntea loach) *Lepidocephalichthys guntea*	Common	Least Concern

Population Status

Common species were highly abundant and observed consistently across all sampling periods. The term 'Frequent' denotes species that were regularly encountered. Rare species were characterized by low population densities and infrequent observations.

IUCN Red List Status for Bangladesh: Endangered species considered to be facing a very high risk of extinction in the wild. Vulnerable Species facing a high risk of becoming endangered in the near future. Least Concern category encompassing widespread and abundant taxa.

State of intergenerational knowledge transmission

An alarming gap in intergenerational knowledge transmission was identified. None of the 25 students interviewed were aware of the medicinal applications of fish species, though all were cognizant of their general nutritional value. Nearly all participants recognized that small fish, specifically 'Mola Mach' (Mola carplet) *Amblypharyngodon mola* and 'Dhela Mach' (Cotio fish) *Osteobrama cotio*, are beneficial for eye health. Four interviewees reported consuming catfish for recuperative purposes; however, they attributed its efficacy solely to its nutritional content rather than any specific medicinal properties.

This knowledge gap appears to be exacerbated by a disruption in intergenerational communication. No participant could recall any discussions or traditional narratives from parents or grandparents concerning the therapeutic uses of fish. While respondents had not previously been curious about this subject, their participation in the interview process stimulated interest and a desire to learn more. Furthermore, this absence of information is reflected in formal education, as local textbooks detail the nutritional importance of fish but make no mention of their medicinal value.

Discussion

The study of zootherapy, the art and science of using animals and animal-derived products for therapeutic purposes has historically emphasized the socio-cultural dimensions of its practitioners and users (Adeola, 1992; El-Kamali, 2000). While fish is widely regarded as a functional food in Bangladeshi society, ethnographic research indicates that among traditional communities, such as fishers, fish and other aquatic species hold a multi-contextual role as both a nutritional source and a medicinal resource (Deb & Haque, 2011).

This dual function is evident across various cultural contexts. For instance, an ethnomedical study in Manipur, India, documented the consumption of *Heteropneustes fossilis* to treat anemia within the Bishnupriya community (Chanu et al., 2016). A parallel use was recorded in Medir Haor, Bangladesh, where *Anguilla bengalensis* is utilized for the treatment of piles. It is noteworthy that while practices in Manipur and Cameroon (Oishi, 2001) often involve the application of specific fish body parts as targeted remedies, the application in Medir Haor typically involves the consumption of the whole fish as a dietary medicine.

Fish undoubtedly represent a significant ethnomedicinal resource throughout Asia, supported by a substantial body of traditional knowledge (Nazar et al., 2024). However, this study reveals notable specificities and absences in the knowledge system of Medir Haor. For example, the Striped Snakehead (*Channa striata*), a species recognized for its wide-ranging medicinal applications elsewhere, was found here to be exclusively associated with the treatment of anxiety. This application was uniquely coupled with a strong socio-cultural belief involving a ghost entity known as *Mecho Bhoot*, to which the Snakehead is considered a favorite offering. Conversely, species like, *Clarias batrachus* (Magur), *Heteropneustes fossilis* (Singhi), and *Anabas testudineus* (Koi), which are documented in other regions for treating infections, alleviating pain, and aiding post-operative recovery (Mohanty et al., 2011), were not reported for such uses in Medir Haor. This discrepancy underscores the localized nature of traditional knowledge and highlights the need for region-specific documentation. A critical challenge facing these knowledge systems is their gradual erosion. The pervasive influence of modern technology and biomedicine, coupled with the fact that this knowledge is primarily transmitted orally, places it at high risk of being lost (Gupta & Dey, 2017). This erosion is exacerbated by a growing intergenerational knowledge gap, as opportunities for storytelling and informal knowledge transfer from elders to the youth diminish.

To counter this loss, proactive measures are urgently required. Immediate, nationwide documentation is the essential first step to preserve this intangible cultural heritage. Furthermore, innovative strategies for knowledge management should be explored, such as leveraging digital platforms and social media to engage younger generations (Chakraborty, 2025). The integration of this knowledge into formal education, though a complex process, could be initiated by incorporating it into the environmental education programs already being implemented by various development organizations.

Ultimately, the systematic documentation of piscine ethnomedicinal knowledge is not merely an act of cultural preservation. It serves as a vital foundation for future pharmacological research, enabling the scientific validation of therapeutic compounds and contributing to the sustainable exploitation of biodiversity for drug discovery (Sonar et al., 2025), which could, in turn, incentivize the conservation of these species and their habitats. The documentation of fish utilization, particularly for medicinal purposes, requires immediate attention. It is essential to preserve and document this knowledge, as it currently remains unavailable for further study and future reference. Given the escalating anthropogenic activities, the alarming rate of biodiversity loss, and the degradation of natural habitats, the invaluable knowledge and insights related to fish are at risk of extinction, rapidly disappearing if not adequately documented (Lokman et al., 2024).

The fisheries sector of Bangladesh is being progressing. Diversified fishes have been cultivated. Scientist area contributing on the breeding technology of many fishes. Attempt towards conservation of threatened fishes is needed. To conserve this threatened species in their natural habitat, over-exploitation and habitat loss should be protected. As emphasized by Hanif et al. (2015), successful conservation strategies for threatened fishes are contingent upon detailed studies of their life histories. Given that species such as *Anguilla bengalensis* and *Chaca chaca* are still present in the Medir Haor, targeted conservation attempts, including habitat restoration and protection measures, are recommended.

Conclusion

There is an urgent need to record how different communities use fish as medicine. This important knowledge is usually passed down by word of mouth and is not yet well represented in scientific literature, making it easy to lose. The situation is made worse by growing human impacts, the fast disappearance of species, and the damage to natural environments. Since there is a gap of intergeneration knowledge management the document these practices need to done quickly otherwise this unique knowledge could be lost forever. Action to make the young generation aware and responsive to local biodiversity is necessary.

Competing interest

The author declares no competing interests.

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