Journal of Wildlife and Ecology (2023). 7(3):93-108

Research Paper **Open Access**

From water to Remedy: Fishes as Ethnopharmacological Resources along the River Ravi, Punjab, Pakistan

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Citation: Muhammad, N., M. Altaf, A. M. Abbasi, A. M. Khan, and K. J. Iqbal. 2023. From water to Remedy: Fishes as Ethnopharmacological Resources along the River Ravi, Punjab, Pakistan. Journal of Wildlife and Ecology 7(3):93-108.

SUMMARY

Fisheries are extremely important in human communities, both culturally and educationally. Local knowledge is being lost as the planet undergoes rapid environmental and cultural changes. Knowing how public understand ecology and climate change and adopt habits in reaction to it is critical for understanding human resource usage. This project was designed to document and preserve information regarding the utilization of fish species among people in the vicinity of Ravi River in Pakistan. Informants in the research area have extensive knowledge of the cultural and traditional medicinal usage of fish species. To collect data from informants (n = 77), interviews as well as questionnaires were used. The ethnopharmacological and folklore data of taxa of fishes in the study area were documented and evaluated using Principal Component Analysis (PCA), Informants of ailment (IA) and Relative abundance of Informants of ailment (RIA). In total, 21 species of fish were used ethnomedicinally in the study region to heal a different sicknesses like antibacterial, antifungal, cancer, cold, cough, improve lactation in mothers, eyesight, flue, impotency, joint pain, memory, muscle, night blindness, paralysis, reduce overweight, skin burn, vitamin D, and weakness. During the investigation, it was discovered that *Oreochromis aureus* had the greatest RIA (RIA=0.49) and *Wallago attu* had the lowest (RIA=0.01). Our findings revealed that the study area's informants have significant traditional knowledge regarding the medical and other benefits of fish species. Additionally, full information of chemicals, and activities of chemicals produced from fish species with the highest IA and RIA, could be useful for drug study.

Keywords: Traditional knowledge, Medicine, Ethnozoology, Fishes

Received in July, 2023	**Accepted** in September, 2023

INTRODUCTION

Humans have traditionally relied on aquatic resources for a different of purposes. Fish management has always been vital. Freshwater fish has also had a significant impact, particularly as part of local dishes honoring specific monthly events. In order to study the relationships between fish as well as human beings, it is necessary to know the past of these ties. Environmental change and overfishing have already reduced fish

availability along Kenya's coastline (Belhabib et al., 2016; Morales et al., 2017; Svanberg and Locker, 2020).

Rivers, lakes, as well as streams are important features of the Asian environment, supporting a broad diversity of vegetation and animals. There are countless taxa of fishes in Asian waterways, and major significance to the marketplace in rural, generating healthy food both locally and urban population (Morales Muñíz, 2010; Sahrhage and Lundbeck, 2012; IUCN, 2015; Grizzetti et al., 2019). Fishermen may provide significant data for management and conservation of these lakes, streams and rivers, including the potential change in climate. Ethnoichthyology incorporates cultural behavior, as well as vernacular taxonomy, with species vernacular names based on myth, sound, habitat, environment, social relationships and morphological traits. Fish local names are valuable resources for conservationist, and national and international authorities (Costa-Neto, 1998; Kuljanishvili et al., 2020; Altaf et al., 2021; Catelani et al., 2021).

Researchers have identified over 32,000 fish species from around the world, with over 746 species confirmed from Pakistan till now (Nelson et al., 2016; Froese and Pauly, 2022). Ethnobiologists observed dynamic interactions between humans and the surrounding biota, as well as human impact on ichthyofauna. Fish have numerous cultural applications such as medicine, trade, tools, and food (Kinzelbach, 1999; Anderson et al., 2011; Svanberg et al., 2011; Muhammad et al., 2017a; Muhammad et al., 2017b; Muhammad et al., 2018; Altaf et al., 2020; Altaf et al., 2021). The customary utilization of taxa of fishes has though never been reported earlier in River Ravi. As a result, the purpose of present research was to document and preserve customary data and awareness about taxa of fishes and their folklore and medical usage by people living around the Ravi River in Pakistan. We attempted to answer these inquiries: i. What are the basic socioeconomic elements impacting the medical and cultural use of fish species? ii. Which species are most commonly used in the Ravi River? iv. What are the most important considerations when employing fish fauna for medical and cultural purposes? v. How many taxa of fishes are used as curative treatment in the Ravi River? vi. How can we preserve folklore understanding of the medical and folklore uses of taxa of fishes?

MATERIALS AND METHODS

STUDY AREA

The Ravi River, is present between India as well as Pakistan, is a vital part of the Indus River Basin and serves as the basin's headwaters (Figure 1). The Ravi River's waters flow into the Sea of Arabian via the Indus River, Pakistan. The river begins in the Himachal Pradesh town of Bara Bhangal, Kangra District. After flowing for “720 kilometers”, the river drains a whole catchment area of “14,442 square kilometers” in India. The Dhauladhar and Pir Panjal ranges from a triangle zone as it flows westward (Jain et al., 2007).

FISH DOCUMENTATION

Fish information was gathered in the vicinity of River Ravi (Figure 1) between January 2018 and December 2021 applying interviews as well as discussions with 77

informants, including questions on informant profile, cultural uses, and ethnopharmacological applications of taxa of fishes, after getting oral prior-informed approval. Profiles of informants were gathered as demographic data. The questionnaires were initially written in English and then translated into Urdu. Prior to the start of survey operations, permission from the "Institute of Forest Sciences, Islamia University of Bahawalpur, Pakistan" was obtained. Interviews, photographs, and specimens were collected at various locations and times during the early morning. Informants were chosen at random (Altaf, 2016; Altaf et al., 2018b; Altaf et al., 2020; Faiz et al., 2022; Iqbal et al., 2023). The images of taxa of fishes were also incorporated in the questionnaire. The book known as; taxa of Fishes of Pakistan, it was utilized for identification of fishes of River Ravi (Mirza, 2004).

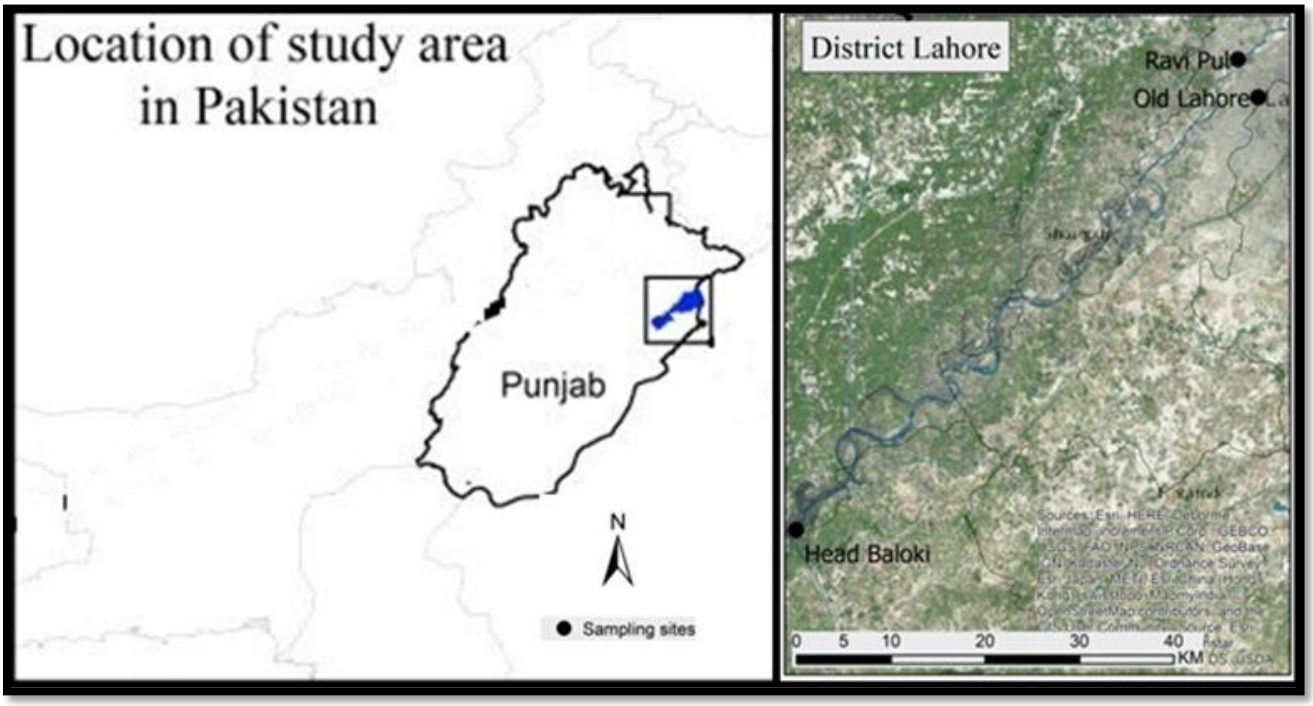

Figure 1: The map of River Ravi, Pakistan.

QUANTITATIVE ANALYSIS

The data of species were noted and checked with Principal Component Analysis (PCA), Informants of ailment (IA) and Relative abundance of Informants of ailment (RIA).

RELATIVE ABUNDANCE OF INFORMANTS OF AILMENT (RIA)

The RIA indicates the significance of all fishes of River Ravi (Ilker et al., 2009; Vitalini et al., 2013) and was checked through (Tardío and Pardo-de-Santayana, 2008);

$$RIA = IA/N \quad (0<RIA>1)$$

Where “IA” are the informant of ailments and “N” the total informants number.

RESULTS

DEMOGRAPHY OF INFORMANTS

During the surveys, data were collected from total 77 informants (men =76 as well as women n=1) with ages from adults. Data collected from different people of study area i.e. fishermen (31), teachers (n=2), students (n=14), housewives (n=1), farmers (n=15), shopkeepers (n=9) and traditional healers (n=5). The informants were uneducated (23.4%) and educated (76.6%) (Figure 2).

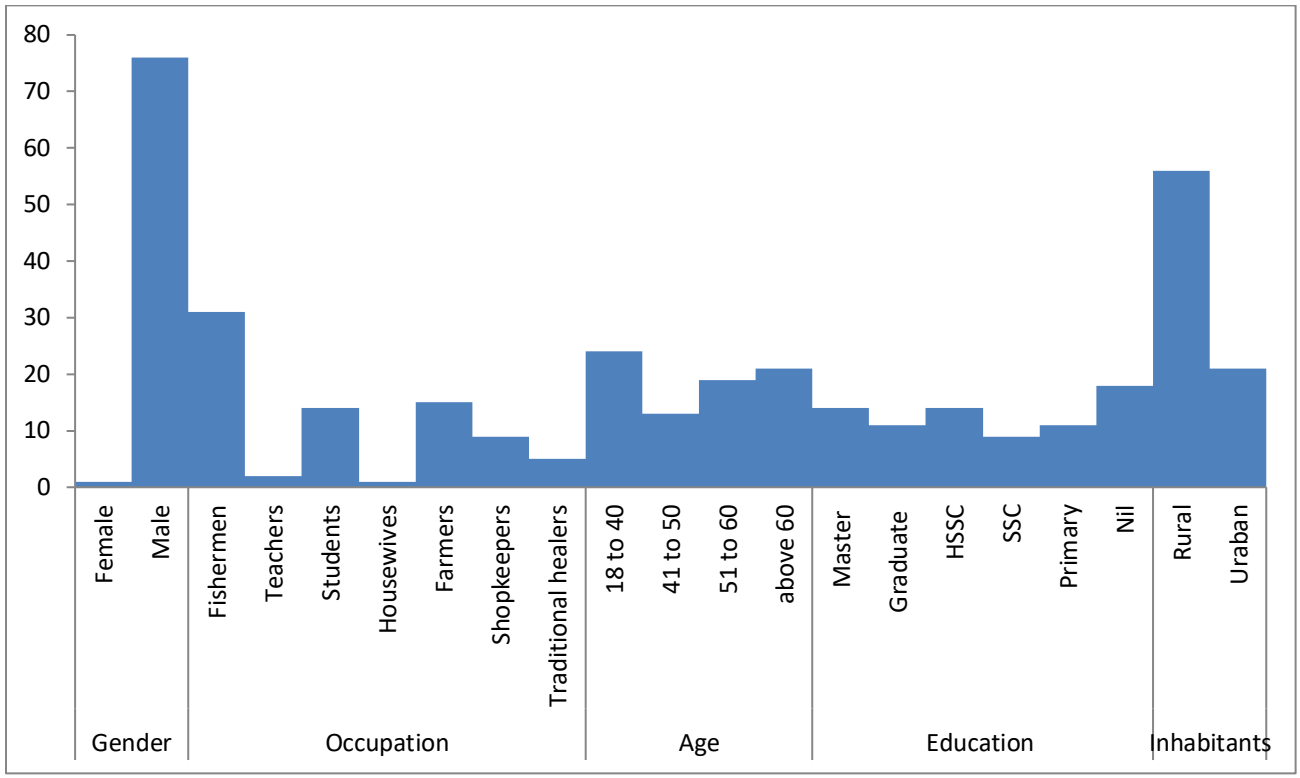

Figure 2: Profile of Respondents (n=77).

PRINCIPAL COMPONENT ANALYSIS (PCA)

In Figure 3, folklore data was examined through PCA, with nine variables such as FC (frequency of citation), IA (Informants of Ailment), SUP (Superstitious), COM (Commercial), ENT (Entertainment), FOO (Food), EXP (Export), Too (Tool) and NAR (Narratives). The main component analysis revealed the total of all the Eigen values of the entire fauna. The initial Eigen value (933.278) was the highest, suggesting the greatest slope power in the distribution of knowledge along C1 i.e. Component 1. First two PCA components produced 99.1% variance in samples (C1: 74.2%); "component 2" is truncated as (C2: 16.8%). These variables are IMA (r = 0.34769), SUP (r = -5.13), COM (r = 0.46878), ENT (r = 0.46878), FOO (r = 0.46878), EXP (r = 0.46878), TOO (r = -0.00) and NAR (r = 0.008594) was positively related with PC1 whilst IMA (r = 0.93064), SUP (r = 9.11), COM (r = -0.17199), ENT (r = -0.17199), FOO (r = -0.17199), EXP (r = -0.17199), TOO (r = 0.00) and NAR (r = -0.12484) is negatively correlated with Component 2 and (r = 0.39521) is positively correlated with "C2" (Figure 3).

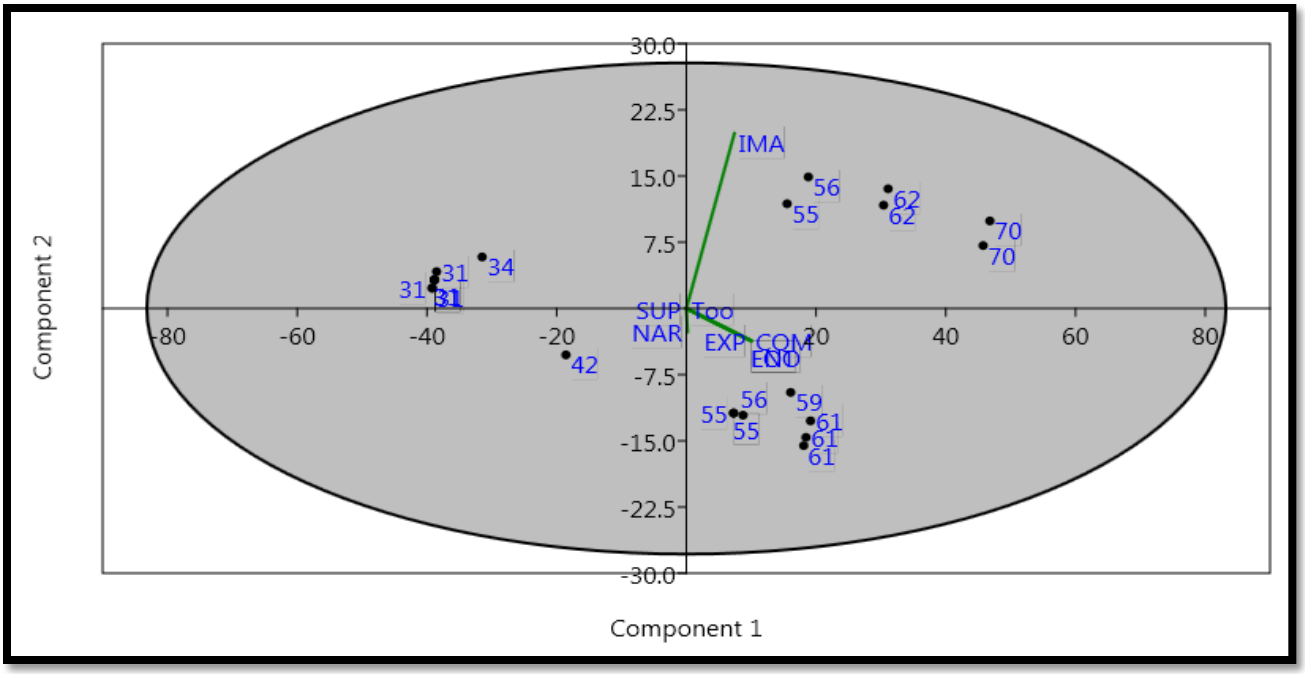

Figure 3: Cultural uses of fishes of Southern Punjab analysis through Principal component analysis.

INFORMANTS OF AILMENT (IA)

The fish species indicated by the greatest respondents' number of were often used to treat a range of disorders. *Oreochromis aureus* had a maximum IA (38), followed by *Cyprinus carpio*, *Labeo rohita*, *Ctenopharyngodon idella*, *Labeo calbasu*, and *Cirrhinus mrigala* (36, 35, 34, 33 and 29, respectively) (Table 1).

RELATIVE ABUNDANCE OF INFORMANTS OF AILMENT (RIA)

During the study noted that the highest RIA was document for *Oreochromis aureus* (RIA=0.49) and the lowest was reported for *Wallago attu* (RIA=0.01)

DISCUSSION

The collection of data of informants is crucial in ethno-ichthyological research since it is used to analyze and characterize characteristics connected to ethnopharmacological and folklore utilization taxa of fishes. Because of their higher exposure to modernity, educated families and people in the vicinity of River Ravi were less known with the use of various taxa of fishes to heal universal sicknesses. During the fieldwork, un-educated informants were found to have more ethno-medicinal knowledge than educated informants. People who are uneducated frequently consume fish products. Because they would rather self-medicate than look for help from native Hakeem (i.e. health practitioners). Comparable results were noted in Thailand (Wester and Yongvanit, 1995), Spain (Vallejo and González, 2014a), Pakistan (Altaf et al., 2020; Iqbal et al., 2023), Europe (Svanberg and Locker, 2020), Ethiopia (Gedif and Hahn, 2003; Giday et al., 2009) and Bangladesh (Deb and Haque, 2011). We discovered that rural informants had less awareness regarding species conservation and sustainable usage than urban interviewees. Gathering

informant social and ethnic data is especially important in social research because this factor is crucial in assessing and understanding the replies received (Easthope, 1995).

The inhabitants in the research area also consumed meat from fish caught in the Ravi River. Ecological considerations like source accessibility, Taxa of fish status in the food web or food chain, or the value of taxa of fishes in the economic and community ties within the region can all be used to address medicinal and cultural reasons. Fish were used for a variety of purposes like ethnopharmacological and customary uses (Vallejo and González, 2014b; Gupta et al., 2016; Altaf et al., 2020; Altaf et al., 2021; Hassan et al., 2022).

All documented fishes i.e. *Mystus cavasius, Rita rita, Sperata sarwari, Xenentodon cancila, Channa punctata, Channa gachua, Channa striata, Channa marulius, Oreochromis aureus, Labeo calbasu, Ctenopharyngodon idella, Cyprinus carpio, Cirrhinus mrigala, Labeo rohita, Carassius auratus, Catla catla, Macrognathus pancalus, Notopterus Notopterus, Chitala chitala, Wallago attu* and *Bagarius bagarius* were consumed in local food of in study area (Figure 4). The majority of Muslims live in Punjab, which consumes a lot of fish. People eat fish in a different of ways, including smoked, barbequed, fried, and so on. In Kashmir, for example, residents enjoyed eating fish and employed customary techniques for preservation such as smoking, pickling, and sun drying hours to conserve fish food (Hassan et al., 2022).

Labeo rohita is widely consumed in food of local people. This superb food fish's rapid development and high nutritional content sparked studies into its aquaculture possibilities. For example, *Oreochromis aureus* is a common dish with a nice flavor in the fishing community, demonstrating a complex interaction of symbolic and cultural characteristics, as well as materialistic or practical ones, such as the accessibility of this natural asset in the region (Hussain et al., 2015; Muhammad et al., 2019; Altaf et al., 2020; Djidohokpin et al., 2020; Iqbal et al., 2023). Fisheries play a vital part in global food provisioning (Suleman, 1961; Gross, 1975; Naylor et al., 2000; Mora et al., 2011; Iqbal et al., 2023). According to the Tacon and Metian (2009)Tacon and Metian (2009), more than 75 percent of fish production in 2002 was consumed by humans in whole world, and the amount of fresh fish consumption is increasing.

According to the locals, drinking milk after eating any fish can result in Vitiligo (Figure 4). In Pakistan, for example, "if the *Sperata sarwari* parts of body at house; than any type of magic will not impact on human" (Iqbal et al., 2023). In one more research, Djidohokpin et al. (2020) traditional healers frequently use “snakehead fish” as a magical thing to prevent women from commended disloyalty. In his book on Mapuche secrets and legends, Calvo (2016) was written that “if any person eat fish, than it will be bad omen for this person”. According to Alves et al. (2012)) written that Brazilians used scales of tarpon fish to remove bad omen”. Neuenschwander et al. (2011) wrote that “some fish have mystical properties that can work as an aphrodisiac”. Narrative is a tale regarding fish that has no positive or negative impact on humans; for example, "*Channa striata* and *Channa marulius* species of fish have a unique feature of head like a human and body like a fish, which locally known as Jal Pari and Jal Para respectively" (Figure 4), while Altaf et al. (2020) discusses a similar story.

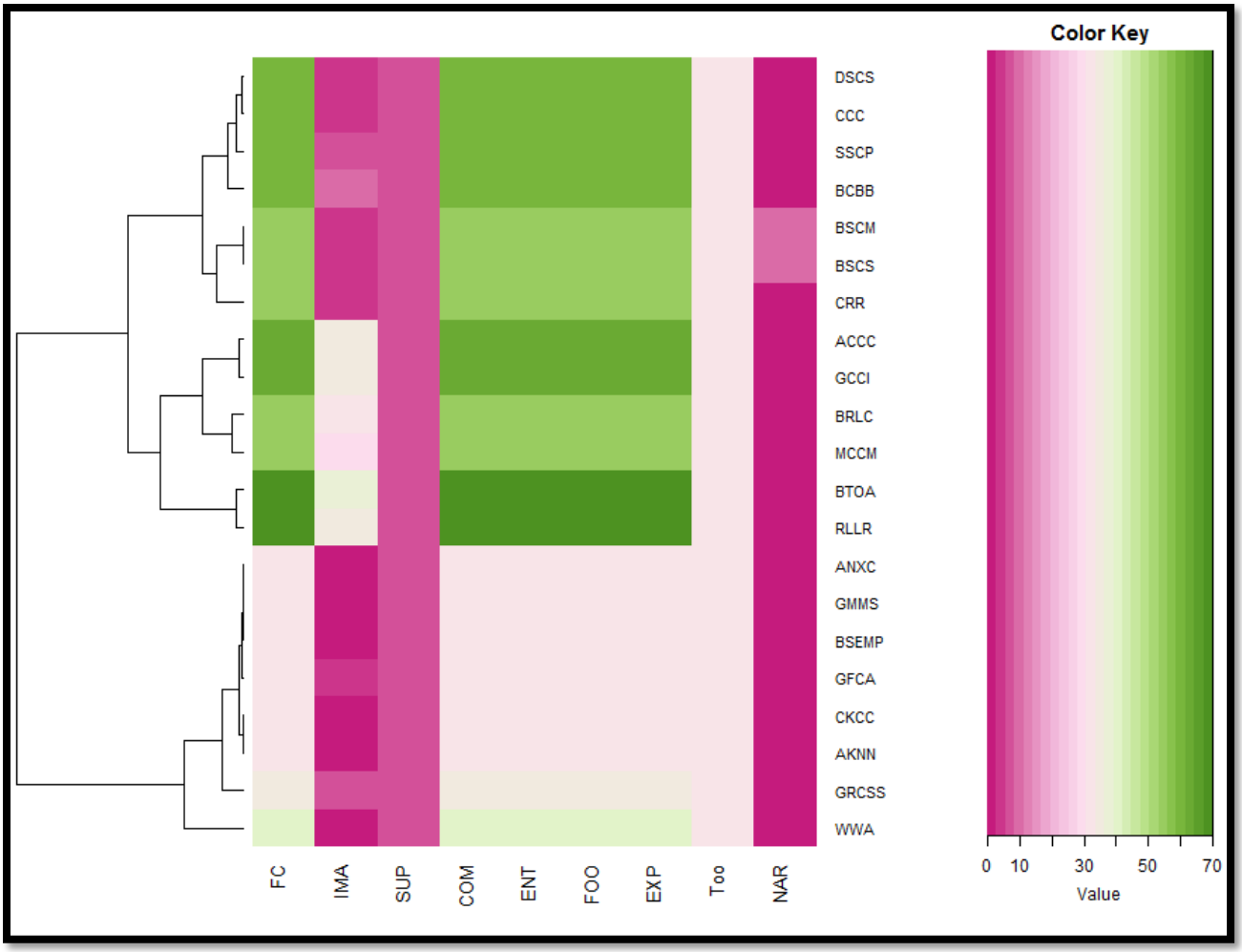

Figure 4: Cultural uses of fishes of study area, FC (frequency of citation), IA (Informants of Ailment), SUP (Superstitious), COM (Commercial), ENT (Entertainment), FOO (Food), EXP (Export), Too (Tool) and NAR (Narratives), codes are shown in Table 1.

All fish are commercially exploited (Figures 4 and 5). Locals in the research area harvested fish for profit and traded them to meet economic requirements. They were caught for food, export, aesthetic purposes, and so on. Ground fish bones are used to produce toothpaste in Chinese tradition. Many different types of fish are traded and either dried or preserved. In Punjab, Pakistan, two fish species, Indian glassy fish and Bronze featherback, are used as aquarium ornaments (Grey et al., 2006; Altaf et al., 2020; Olden et al., 2020).

As reported by the research area's residents, every kind of fish (whether fingerlings or small pieces) were used as a “tool” to catch larger fishes (Figure 4); whilst fish sizes were extremely small (Albright and Lucas, 2021). As previously reported, local residents used fish meat as hook for a variety of fish from the river by Altaf et al. (2021). Furthermore, bait fish are small fish caught by fisherman and used as bait to catch larger fish (Djidohokpin et al., 2020). Typically, baitfish species are common and grow rapidly (Olden et al., 2020). Kaiya was an Australian aboriginal weapon with a fish tail spines cluster that was employed in initiation rites, and

warfare (McConnel, 1953). All of the species discovered in the research area were used for recreational fishing (Figure 4). Because most species are used in ethnopharmacological to treat maladies or for strange ceremonies, catching them is a tremendous source of pleasure and enjoyment (Schramm and Fedler, 1991; Kerr, 1999).

Figure 5: Cultural uses of fishes in study area.

Respondents in the vicinity of River Ravi were well-versed in the cultural and folkloric medical benefits of taxa of fishes. A total of 21 fish species from 9 families (Table 1 and Figure 6) and 6 orders (Figure 7) were used orally and/or topically (Figure 8) to treat a wide range of antibacterial, antifungal, cancer, cold, cough, improve lactation in mothers, eyesight, flu, impotency, joint pain, memory, muscle, night blindness, paralysis, reduce overweight, skin burn, vitamin D, and weakness (Figure 9 and 10).

Meat was the most frequently ingested part, appearing in 10 healing recipes, further followed by oil, brain, scale and bile, which appeared in 7, 2, 1 and 1 recipes, respectively (Figures 10 and 11). During the current investigation, fish flesh was used to treat Antibacterial, Antifungal, Cough, Impotency, Muscle, Night blindness, paralysis, reduce overweight, and Weakness. Fish oil was used to treat colds, flu, vitamin D deficiency, and joint pain. Fish scales were used to treat antibacterial, antifungal, and cough conditions, whereas skin was solely used to treat skin burn. Fish brain is used to heal eyesight and memory, and fish bile is utilized to treat cancer (Table 2).

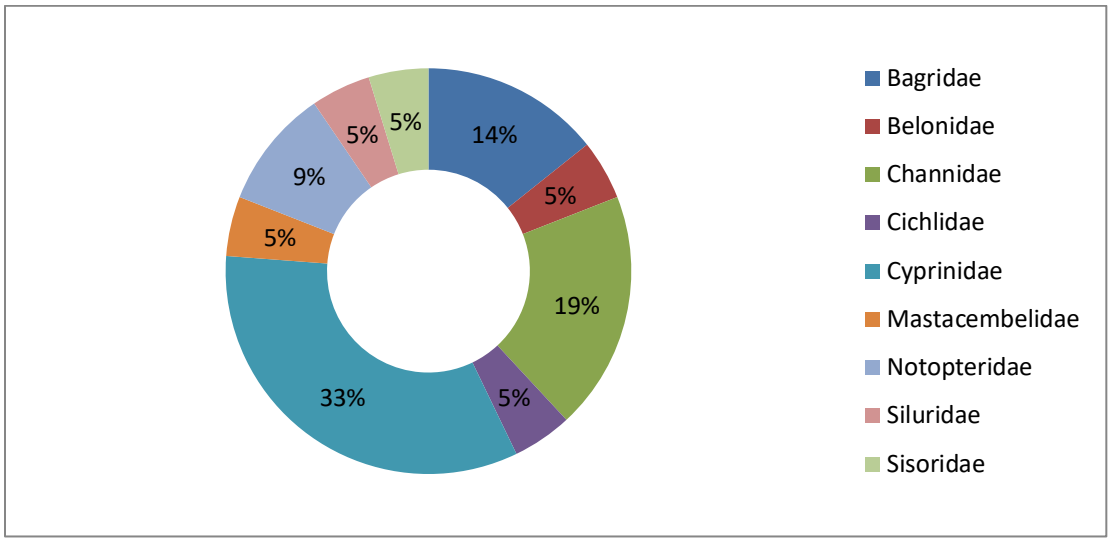

Figure 6: Families of fishes of study area.

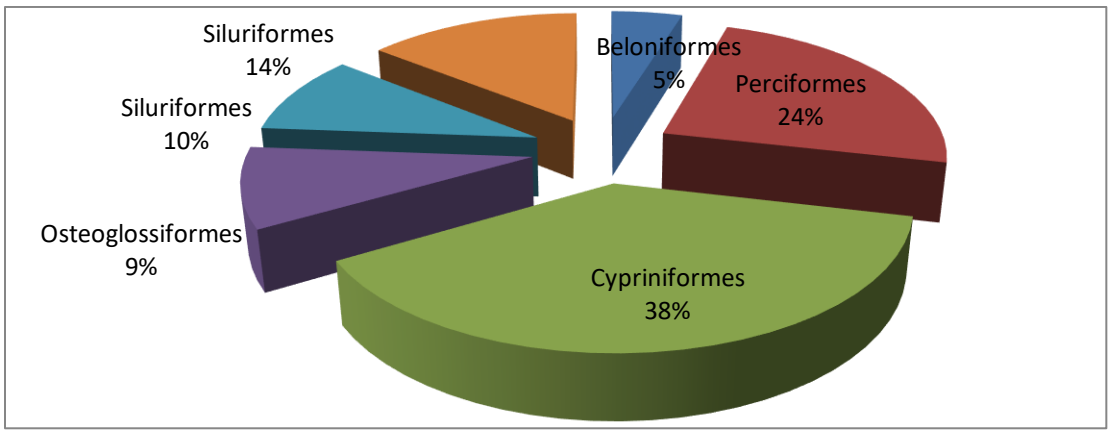

Figure 7: Orders of fishes of study area.

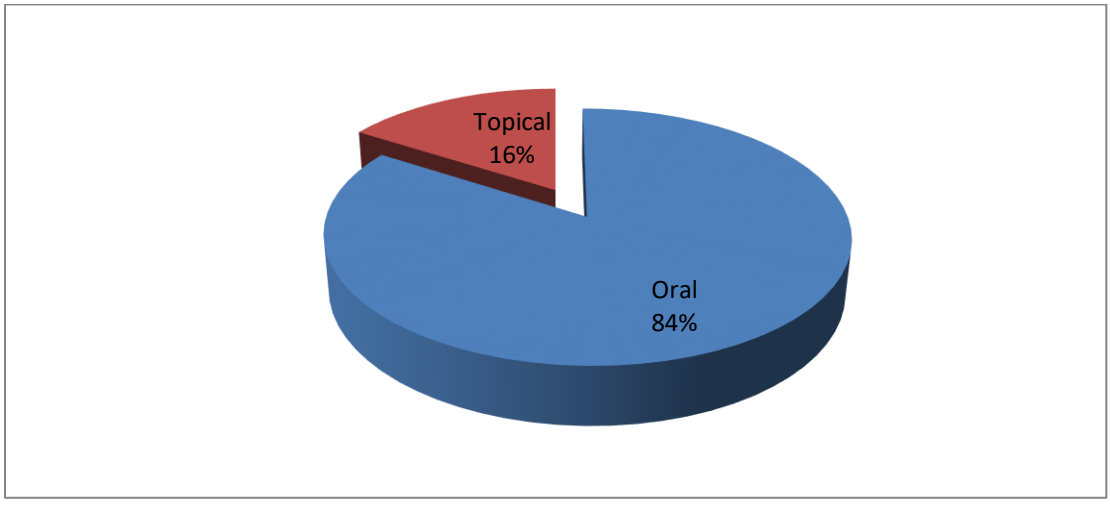

Figure 8: Parts of fishes used either oral or/and topical way in study area.

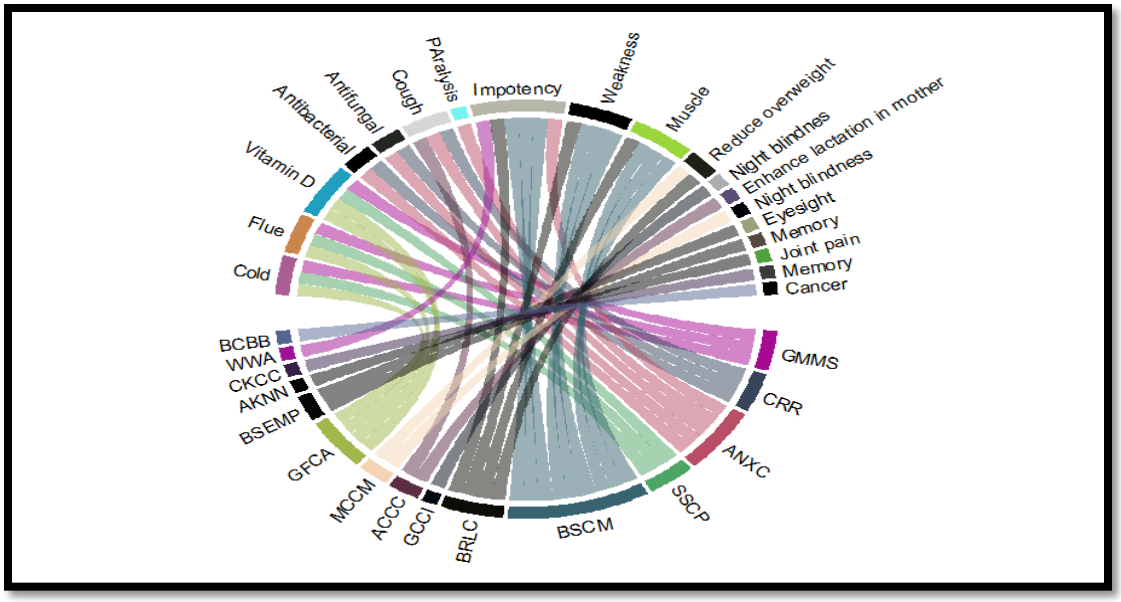

Figure 9: Species uses against disease in study area (codes are present in Table 2).

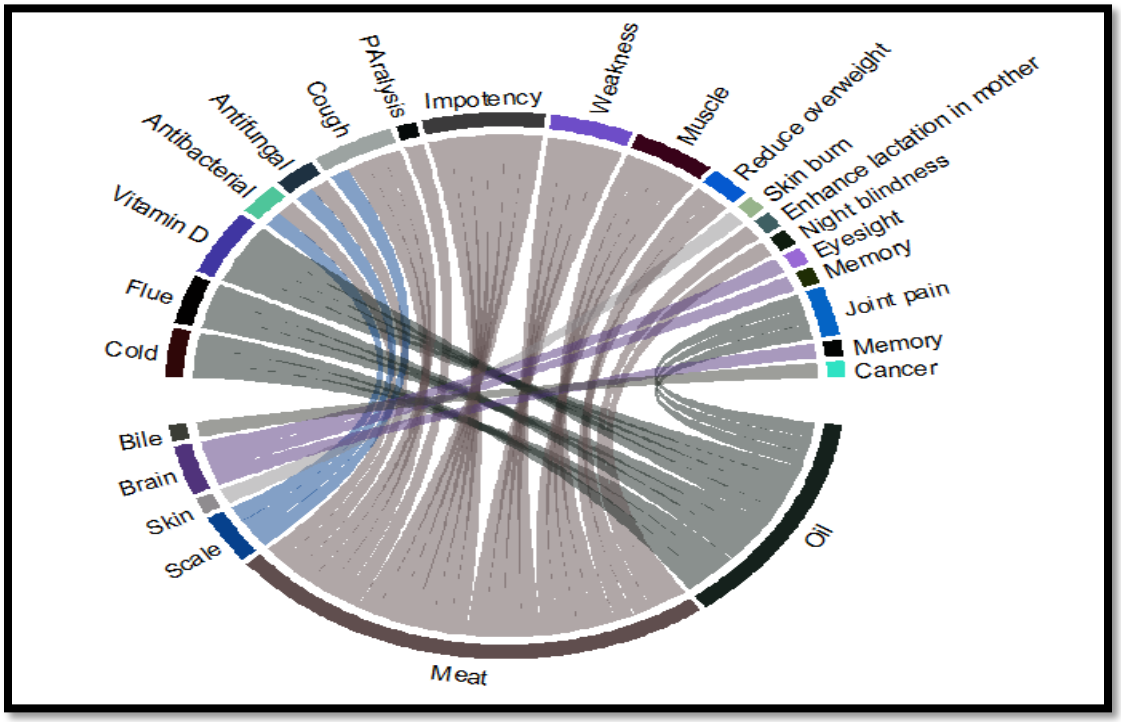

Figure 10: Body parts uses against diseases in study area (codes are present in Table 2).

Catfish was used for the antibacterial, antifungal, cough (Figure 9), and has been documented to cure joint problems, healing of skin burns, treat cold, sexual problems, energy and joint pain (Arshad et al., 2014; Altaf et al., 2018a). Spotted snakehead was utilized to treat impotency, weakness, muscle (Figure 9) and this was

reported earlier to cure pain, impotency and weakness, joint and sexual issues (Mahawar and Jaroli, 2008; Saikia and Ahmed, 2012; Teronpi et al., 2012; Altaf et al., 2018a). *Channa marulius* was utilized to therapy of weakness, muscle, reduce overweight (Figure 9), whilst it has been documented to cure sexual issues, memory, rheumatic, impotency, and cold (Deb and Emdad Haque, 2011; Saikia and Ahmed, 2012; Arshad et al., 2014; Muhammad et al., 2017b).

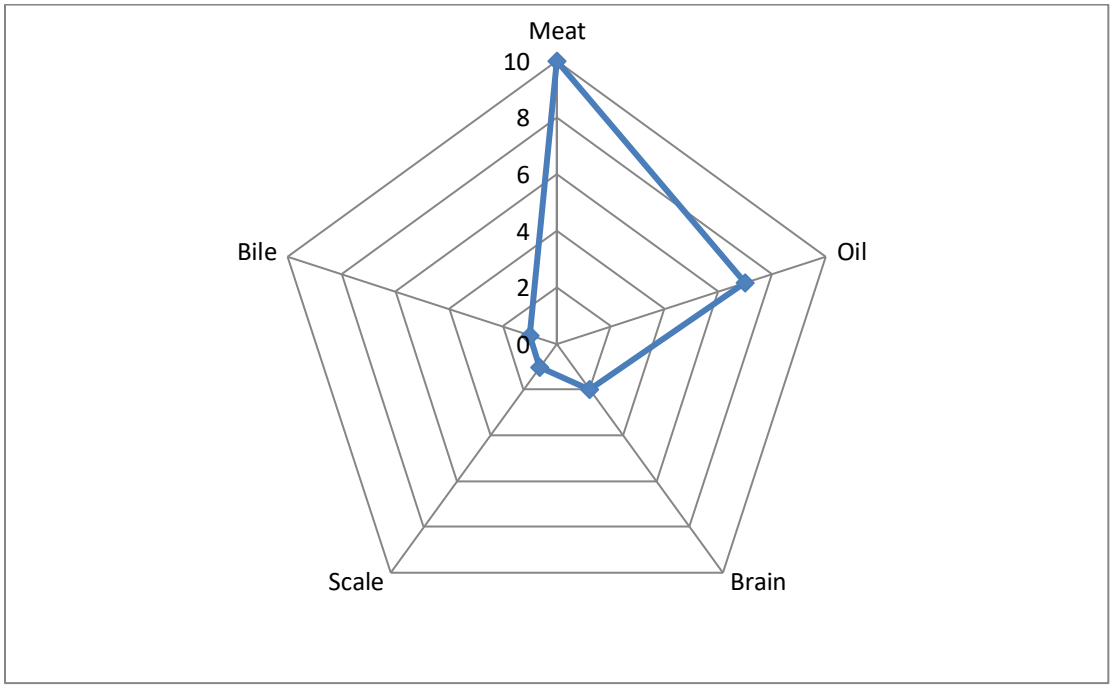

Figure 11: Parts of fishes used in tradition medicine in study area.

In another research, Aischgrund Carp was employed for the cure of vitamin D (Figure 9) and the same species is used to cure central nervous system disease, lumbago, memory, eyesight, joint, backbone problems, cough, energy, erysipelas and overweight problems (Vallejo and González, 2014b; Altaf et al., 2018a). Peoples used Gardd carp to cure of night blindness, reduce overweight (Figure 9), whilst earlier research showed that this taxa used to heal the CNS, cough, cold, joint, eyes problems, backbone pain, joint pain, and sexual problems (Muhammad et al., 2017c; Altaf et al., 2018a). Likewise, Roho labeo was employed for the curing of memory, eyesight (Figure 9) and in the past noted to cure urine problem, weakness, rheumatic issues, memory, stomachache, sexual issues, energy, backbone and joint pain (Saikia and Ahmed, 2012; Arshad et al., 2014; Borah and Prasad, 2017; Altaf et al., 2018a). Asiatic knifefish, was employed to heal of joint pain (Table 2), while in the past documented uses to heal chicken poxand joint pain (Deb and Haque, 2011; Mukti et al., 2012). Wallago is used for the cure of impotency (Table 2), while in the past used to treat of memory, dysentery, joint problems piles, liver, cold, liver and sexual problems (Benítez, 2011; Barros et al., 2012; Mawla et al., 2012; Altaf et al., 2018a). Bagarid catfish is used to heal cancer (Figure 9), in the other studies it was used to cure body pain, body burns, stomach pain, impotency and joint issues (Chakravorty et al., 2011; Saikia and Ahmed, 2012).

CONCLUSION

Fish are used for more than just sickness treatment; they can also be used for sustenance or in folklore. Freshwater catfish, for example, was shown to be a favorite snack among fisherman and local people. Our study revealed that the study region's interviewees have significant customary awareness regarding the ethnopharmacological and folklore benefits of taxa of fishes. Additional research should focus on the variations in ethnoichthyological knowledge of this area in order to safeguard and protect precious data, which may be beneficial for the long-term usage, conservation and management of the native taxa of fishes along the Ravi River in Pakistan. Furthermore, a detailed investigation of active compounds from fish with high RIA could be useful for therapeutic research.

ACKNOWLEDGEMENTS

The authors of this article are grateful to the indigenous peoples in the vicinity of River Ravi for giving important data.

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***Competing interests**:* Authors have declared that no competing interests exist.
***Funding**:* Authors have no source of funding for this work.
Authors' contributions: Noor and Altaf have designed this project, collected data and written this article; while all authors have critically analyzed this article and approved as final.

Table 1: Cultural data gathered from native people of study area.

Sr.	English Name Vernacular name	Scientific name Species authority	Code	Family Order	FC
	Gangetic mystus	*Mystus cavasius*		Bagridae	31
1	Keengar	Hamilton, 1822	*GMMS*	Siluriformes	
	Catfish	*Rita rita*		Bagridae	56
2	Khaga	(Hamilton, 1822)	*CRR*	Siluriformes	
		Sperata sarwari			34
	Giant river-catfish	(Mirza, Nawaz & Javed,		Bagridae	
3	Shinghara	1992)	*GRCSS*	Siluriformes	
	Asian needlefish	*Xenentodon cancila*		Belonidae	31
4	Kaan	(Hamilton, 1822)	*ANXC*	Beloniformes	
	Spotted snakehead	*Channa punctata*		Channidae	61
5	Dola	(Bloch, 1793)	*SSCP*	Perciformes	
	Dwarf snakehead	*Channa gachua*		Channidae	61
6	Doli	(Hamilton, 1822)	*DSCS*	Perciformes	
	Banded snakehead	*Channa striata*		Channidae	55
7	Soli	(Bloch, 1793)	*BSCS*	Perciformes	
	Bullseye Snakehead	*Channa marulius*		Channidae	55
8	Sol	(Hamilton, 1822)	*BSCM*	Perciformes	
	Blue tilapia	*Oreochromis aureus*		Cichlidae	70
9	Chirra	(Steindachner, 1864)	*BTOA*	Perciformes	
	Black rohu	*Labeo calbasu*		Cyprinidae	56
10	Kalbaso, Kala Raho	(Hamilton, 1822)	*BRLC*	Cypriniformes	
	Gardd carp	*Ctenopharyngodon idella*		Cyprinidae	62
11	Grass carp	(Valenciennes, 1844)	*GCCI*	Cypriniformes	
	Aischgrund Carp	*Cyprinus carpio*		Cyprinidae	62
12	Gulfam	Linnaeus, 1758	*ACCC*	Cypriniformes	
	Mrigal carp	*Cirrhinus mrigala*		Cyprinidae	55
13	Mori	(Hamilton, 1822)	*MCCM*	Cypriniformes	
	Roho labeo	*Labeo rohita*		Cyprinidae	70
14	Raho	(Hamilton, 1822)	*RLLR*	Cypriniformes	
	Goldfish	*Carassius auratus*		Cyprinidae	31
15	Silver	Linnaeus, 1758	*GFCA*	Cypriniformes	
	Catla	*Catla catla*		Cyprinidae	61
16	Thaila	(Hamilton, 1822)	*CCC*	Cypriniformes	

	Barred spiny eel	*Macrognathus pancalus*		Mastacembelidae	31
17	Garoj	(Hamilton, 1822)	*BSEMP*	Cypriniformes	
	Asiatic knifefish	*Notopterus notopterus*		Notopteridae	31
18	Pari	(Pallas, 1769)	*AKNN*	Osteoglossiformes	
	Clown knifefish	*Chitala chitala*		Notopteridae	31
19	Battu	(Hamilton, 1822)	*CKCC*	Osteoglossiformes	
	Wallago	*Wallago attu*		Siluridae	42
20	Mali	(Bloch & Schneider, 1801)	*WWA*	Siluriformes	
	Bagarid catfish	*Bagarius bagarius*		Sisoridae	59
21	Foji khaga	(Hamilton, 1822)	*BCBB*	Siluriformes	

Table 2: Statistical analysis of Ethnopharmacological uses of fishes of River Ravi.

English Name	Scientific name	Code	Part use	Mode of Use	Treatments	IA	RIA
Gangetic mystus	*Mystus cavasius*	GMMS	Oil	Oral	Cold, flue, vitamin D	2	0.03
Catfish	*Rita rita*	CRR	Scale, meat	Topical, oral	Antibacterial, antifungal, cough	4	0.05
Giant river-catfish	*Sperata sarwari*	GRCSS	Meat	Oral	Impotency, paralysis	7	0.09
Asian needlefish	*Xenentodon cancila*	ANXC	Oil	Oral	Cold, flue, vitamin D	2	0.03
Spotted snakehead	*Channa punctata*	SSCP	Meat	Oral	Impotency, weakness, muscle	7	0.09
Dwarf snakehead	*Channa gachua*	DSCS	Meat	Oral	Impotency, weakness, muscle	5	0.06
Banded snakehead	*Channa striata*	BSCS	Meat	Oral	Impotency, weakness, muscle	5	0.06
Bulls-eye Snakehead	*Channa marulius*	BSCM	Meat	Oral	Impotency, weakness, muscle, reduce overweight	5	0.06
Blue tilapia	*Oreochromis aureus*	BTOA	Skin	Oral	Skin burn	38	0.49
Black rohu	*Labeo calbasu*	BRLC	Meat	Oral	Cough, enhance lactation in mother	33	0.43
Gardd carp	*Ctenopharyngodon idella*	GCCI	Meat	Oral	Night blindness, reduce overweight	34	0.44
Aischgrund Carp	*Cyprinus carpio*	ACCC	Oil	Oral	Vitamin D	36	0.47
Mrigal carp	*Cirrhinus mrigala*	MCCM	Oil	Oral	Cold, flue, vitamin D	29	0.38
Roho labeo	*Labeo rohita*	RLLR	Brain	Oral	Memory, eyesight	35	0.45
Goldfish	*Carassius auratus*	GFCA	Oil	Topical, oral	Joint pain	3	0.04
Catla	*Catla catla*	CCC	Meat	Oral	Cough	4	0.05
Barred spiny eel	*Macrognathus pancalus*	BSEMP	Oil	Topical, oral	Joint pain	2	0.03
Asiatic knifefish	*Notopterus notopterus*	AKNN	Oil	Topical, oral	Joint pain	1	0.01
Clown knifefish	*Chitala chitala*	CKCC	Brain	Oral	Memory	1	0.01
Wallago	*Wallago attu*	WWA	Meat	Oral	Impotency	1	0.01
Bagarid catfish	*Bagarius bagarius*	BCBB	Bile	Oral	Cancer	9	0.12

Note: IA (Informants of ailment), RIA (relative abundance of Informants of ailment)