Journal of Wildlife and Ecology (2022). 6(4):150-162

Research Paper Open Access

Human behavior towards snakes in Pakistan

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SUMMARY

Human-snake conflict happens between humans and snakes, which has a negative impact on both. Humans kill the snakes due to a lack of awareness they have no idea which snakes are venomous and non-venomous. Some people use snakes for religion, fashion and medicinal purposes. Data was collected from all over Pakistan. Data analysis started on records starting from "May 2021" to February 2022. Recognized species of snake based on morphological appearance. Environmental degradation and increased urbanization have a significant impact on reptiles and snakes. The incidence of human-snake conflict was the highest summer, and was the lowest in season of winter. As a result, for all species, temperature exhibited a high positive association with the frequency of human-snake conflict. Data was gathered from various social groups, pages, and sites such as Facebook groups and WhatsApp groups, as well as data gathered by the naked eye, and locals contacted us and shared information and images about snake presence and human killings.

Keywords: Human-snakes conflict, Data analysis, Temperature effect, Data collection.

Citation: Ayoub, H., M. Altaf, J. Noor, F. Malik, J. Khan, M.M. Junaid, M. Khan, U. Ali, S. Batool. 2022. Human behavior towards snakes in Pakistan. Journal of Wildlife and Ecology. 6(4): 150-162.

Received: October, 2022; **Accepted**: December, 2022

INTRODUCTION

Human-snake conflict negatively impacts one or both sides. Human-snake conflict conditions can cause almost 1 to 5 million snakebites per year, as well as significant destruction, anguish, and anxiety on health of human (Kasturiratne *et al.*, 2008; Williams *et al.*, 2010). Wildlife populations and their habitats are declining due to enhancing population of human (Kinnaird *et al.*, 2003; Root *et al.*, 2003; Carrete *et al.*, 2007; Gusset *et al.*, 2009). Reptiles and amphibians are least studied, underreported, and less written in whole world (Shine *et al.*, 2000; Magle *et al.*, 2012). Reptiles and snakes are highly affected by, deforestation, habitat loss and agricultural intensification and urbanization (Seigel *et al.*, 2009; Bonnet *et al.*, 2016).

Snakes and derivatives have use in fashion, medicine, trade and religion. Snakes provide ecological benefits through food web and chain (Alves and Conservation, 2007; Beaupre *et al.*, 2009; Herrel and van der Meijden, 2014; Willson

and Winne, 2016). Snakebites are currently regarded an underappreciated illness in the tropics, with Asia being the most severely afflicted. India, in instance, has between “35,000” to “50,000” fatal bites of snakes each year, while Pakistan, Nepal, Bangladesh, and Sri Lanka each have tens of thousands of recorded snakebite incidences every year (Alirol *et al.*, 2010; Gutiérrez *et al.*, 2015). The expected social structure and authority that decide how expenditures are dispersed to support threatened species might have conservation consequences (Czech *et al.*, 1998; Shine *et al.*, 2000; Magle *et al.*, 2012; de Pinho *et al.*, 2014). Some of the causes that contribute to the unfavorable perceptions of snakes in human culture are evolutionary adaptations of the understanding of human, which influence the basic feelings of human (Prokop and Fančovičová, 2013; Prokop and Randler, 2018).

Poor assessments of snake conservation status, particularly in developing states, are the result of insufficient research study (Pandey *et al.*, 2016). To conserve wildlife, national and international laws have been adopted. These rules do not protect snakes in their native habitats completely (Czech *et al.*, 1998; Trouwborst *et al.*, 2017). Snakes are only kept in a tiny number of zoos as well as wildlife parks. Because of increased urbanization, movement of humans, and hunting habits, snake as well as human habitats are rarely demarcated in emerging nations (Bitanyi *et al.*, 2012). Postings on human-snake incidents on prominent internet round-tables reflect the genuine character as well as proportions of relative of that incidence in the relevant places where the posts were made. The study's main goal was to learn about people's attitudes on snakes in Pakistan.

MATERIAL AND METHOD

STUDY SITES

We gathered information from all throughout Pakistan. During in the summer, the average ranges of temperature from “25°C” to “35°C”, but infrequent cold fronts in the winter can decrease temperatures below “10°C” in the lowlands and even below “0°C” at higher height (Figure 1).

DATA COLLECTION

We collected data from different social groups and pages like WhatsApp groups that include Wildlife of Pakistan, Mission Awareness Foundation, and some Facebook pages like Wildlife Society of Pakistan-IUB, Wildlife Society of Pakistan, Wild Asia, Wild MAF, of Pakistan. Some data was collected by the naked eye, and local people also contacted us and shared information and images about snake presence and human killing. We analyzed records starting from “May 2021” to February 2022.

SNAKES SPECIES IDENTIFICATION AND DATA ANALYSIS

We recognized species of snake based on morphological feature. The most common species were kraits, which are highly venomous. Data analyzed by experts and conservationists. Frequency tables and charts were used to provide data detail.

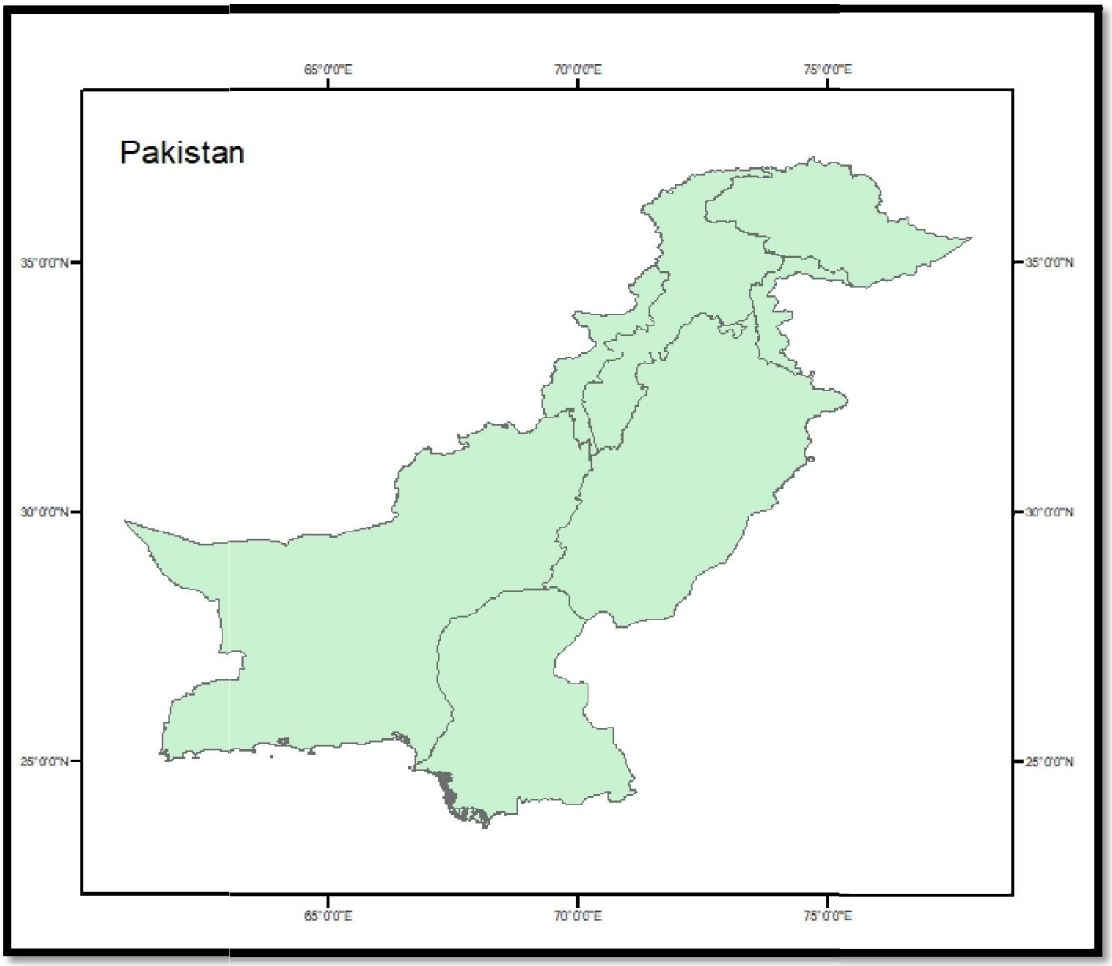

Figure 1: Map of study area.

RESULTS AND DISCUSSION

NUMBER OF SNAKES AND SNAKES REPORTED

During study total 31 species i.e. *Bungarus caeruleus, Naja naja, Naja oxiana, Eryx johnii, Ptyas mucosa, Daboia russelii, Gloydius himalayanus, Python molurus, Spalerosophis diadema, Boiga trigonata, Lycodon mackinnoni, Xenochrophis piscator, Amphiesma stolatum, Platyceps ventromaculatus, Echis carinatus, Oligodon russelius, Dendralephis tristis, Bungarus sindanus razai, Oligodon taeniolatus, Spalerosophis diadema arenarius, Platyceps rhodorachis, Lycodon aulicus, Tephlops porrecctus, Eirenis persicus, Ramo typhlops braminus, Eryx conicus, Hydrophis curtus, Macrovipera lebetina obtuse, Spalerosophis schirazianus, Leptotyphlops macrorhynchus* and *Enhydris schistosa* and 222 numbers of snakes are reported from whole Pakistan (Table 1). While 123 numbers of snakes were killed in Punjab, 51 in Khyber Pakhtunkhwa (KPK), 21 in Sindh, Azad Jammu and Kashmir (AJ&K), 5 in Balochistan (Figure 2). The most common krait, which is highly venomous, is reported (Figure 3). The mean monthly frequency of human-snake conflict was the highest in summer, and was the lowest in winter. Human-snake conflict incidences were the lowest in urbanized areas and higher in areas with mostly shrub land cover.

Temperature demonstrated a favorable link with human-snake conflict events in terms of functional features. The list includes both extremely poisonous and non-venomous snakes (Table 1). Temperature exhibited substantial positive associations with human-snake conflict occurrences for each species in the species specific models.

Table 1: Snakes encounter reported in Pakistan.

Sr.	Local Name	Scientific name	Location	Date
1.	Common krait	*Bungarus caeruleus*	Shujaabad	23 “May 2021”
			Ali pur	23 “May 2021”
			Lahore	24 “July 2021”
			Swat	24 “July 2021”
			Faisalabad	25 “July 2021”
			Kahutta Rawalpindi	29 “July 2021”
			Dina	30 “July 2021”
			Bahawalpur	8 “August 2021”
			Gujranwala	9 “August 2021”
			Attock	10 “August 2021”
			Mandi-Bahaudin	10 “August 2021”
			Faisalabad	12 “August 2021”
			Rahim Yar Khan	14 “August 2021”
			Kharian	16 “August 2021”
			Chakwal	17 “August 2021”
			Faisalabad	18 “August 2021”
			Bannu	20 “August 2021”
			Mandi-Bahaudin	20 “August 2021”
			Khushab	21 “August 2021”
			Faisalabad	21 “August 2021”
			Jhelum	21 “August 2021”
			Charsadda KPK	23 “August 2021”
			Pind-Dadan khan	27 “August 2021”
			Khushab	28 “August 2021”
			RajanPur	29 “August 2021”
			Pattoki	29 “August 2021”
			Islamabad	31 “August 2021”
			Kashmir	1st “September 2021”
			Sialkot	2nd “September 2021”
			Jhang	2nd “September 2021”
			Mianwali	2nd “September 2021”
			Faisalabad	7 “September 2021”
			Gujarat	9 “September 2021”
			Abotabad	9 “September 2021”
			Sargodha	11 “September 2021”
			Khushab	13 “September 2021”
			Patuki	13 “September 2021”
			Mianwali	14 “September 2021”

			Mir poor	15 “September 2021”
			Phoolnagar	15 “September 2021”
			Pattoki	17 “September 2021”
			Islamabad	18 “September 2021”
			Lodhran	18 “September 2021”
			Bhakar	24 “September 2021”
			Mandibhaudin	26 “September 2021”
			Nakiyal	27 “September 2021”
			KPK	3rd “October 2021”
			Noshehra	18 “October 2021”
			Rajan Pur	30 “November 2021”
			Faislabad	8 “January 2022”
			Kotla Jam	6 “February 2022”
			Hafizabad	26 “February 2022”
2.	Black Cobra	*Naja naja*	Bahawalnagar	23 “May 2021”
			Mandi-Bahaudin	11 “August 2021”
			Tando Allah Yar	14 “August 2021”
			Kathoor Karachi	15 “August 2021”
			Faisalabad	17 “August 2021”
			Gujrat	20 “August 2021”
			Sindh	21 “August 2021”
			Badin	21 “August 2021”
			Faisalabad	23 “August 2021”
			FatehJhang	29 “August 2021”
			Bahawalnagar	1st “September 2021”
			Jhelum	2nd “September 2021”
			RajanPur	2nd “September 2021”
			Lodhran	11 “September 2021”
			Bahawalpur	11 “September 2021”
			Hafizabad	19 “September 2021”
			Chichawatni	19 “September 2021”
			Rawalpindi	19 “September 2021”
			Rahim Yar Khan	20 “September 2021”
			Azad Kashmir	21 “September 2021”
			D.I. Khan	21 “September 2021”
			Lodhran	10 “October 2021”
			Bannu	23 “October 2021”
3.	Brown Cobra / Russian Cobra / Caspian Cobra / Central Asian Cobra	*Naja oxiana*	Lower dir	29 “May 2021”
			Swat	9 “August 2021”
			Swabi	12 “August 2021”
			Kohat	14 “August 2021”
			Kohat	15 “August 2021”
			Charssada	16 “August 2021”
			Lower Dir	21 “August 2021”
			TillaJogian Jhelum	22 “August 2021”
			Gujar Khan	27 “August 2021”

			Chakdara (Lower Dir)	2nd “September 2021”
			D.G khan	13 “September 2021”
			Sahiwal	15 “September 2021”
			Mardan	16 “September 2021”
			Hangu	20 “September 2021”
			Swat	25 “September 2021”
			Sargodha	26 “September 2021”
			Shangla Swat	13 “October 2021”
4.	Smooth / Red Sand Boa / Sand Boa	*Eryx johnii*	Jhelum	23 “May 2021”
			Gujar khan	30 “May 2021”
			Kushab, Punjab	17 “August 2021”
			Bakhar	23 “August 2021”
			Lodhran	26 “August 2021”
			Islamabad	28 “August 2021”
			Bahria Town Lahore	28 “August 2021”
			Chashma barrage	16 “September 2021”
			Kandhkot	30 “September 2021”
			Chiniot	5 “October 2021”
5.	Rat Snake	*Ptyas mucosa*	Kohatkpk	23 “May 2021”
			Balakot	29”May 2021”
			Lower Dir	8 “August 2021”
			Rawalpindi	20 “August 2021”
			Peshawar	27 “August 2021”
			Mirahrawlakot	2nd “September 2021”
			Mir poor	14 “September 2021”
			Umerkot Sindh	25 “September 2021”
6.	Russell’s Viper	*Daboia russelii*	Bagh	23 “May 2021”
			Islamabad	24 “July 2021”
			Swat	25 “July 2021”
			Rawalpindi	13 “August 2021”
			Peshawar	20 “August 2021”
			Islamabad	2nd “September 2021”
			Margalla hills	5 “September 2021”
			Gharo, Sindh	16 “September 2021”
			Neelum valley	7 “November 2021”
			Noshehra	13 “November 2021”
7.	Himalayan pit viper	*Gloydius himalayanus*	Kalam, Sawat	23 “May 2021”
			Kashmir	17 “September 2021”
			kohistan	4 “October 2021”
8.	Indian rock python	*Python molurus*	Mir Pur	23 “May 2021”
			Bimber	29 “May 2021”
			Azad jamu Kashmir	3 June 2021
			Azad Kashmir	3 June 2021
			Gujrat	25 “August 2021”
			Khariyan	18 “September 2021”

			Azad Kashmir	24 “September 2021”
			Haripur	28 “October 2021”
9.	Royal Rat Snake	*Spalerosophis diadema*	Rawalpindi	23 “May 2021”
			Lower Dir	30 “May 2021”
			Bagh	11 “August 2021”
			Dadu Sindh	17 “August 2021”
			Bimbher	18 “August 2021”
			Neelum	20 “August 2021”
			Oghi KPK	20 “August 2021”
			Khyber	23 “August 2021”
			Peshawar	30 “August 2021”
			Chakwal	30 “August 2021”
			Fatah Jung	10 “September 2021”
			Attock	11 “September 2021”
			Jamshoro	13 “September 2021”
			Karachi	16 “September 2021”
			Sukkur	18 “September 2021”
			Swat	25 “September 2021”
			Karachi	1st “October 2021”
			Layyah	10 “October 2021”
			Maria bagh	13 “October 2021”
10.	Cat Snake	*Boiga trigonata*	Battgram	9 June 2021
			Islamabad	23 “August 2021”
			Attock	7 “November 2021”
11.	Himalayan Wolf Snake	*Lycodon mackinnoni*	Sangar, Swat	23 “May 2021”
			Muzaffarabad	21 “August 2021”
			Muzaffarabad	27 “August 2021”
			South Waziristan	31 “August 2021”
12.	Checkered Keel Back	*Xenochrophis piscator*	Sialkot	20 “August 2021”
			PuharPur	27 “August 2021”
			Azad Kashmir	13 “September 2021”
			Eastern Punjab	16 “September 2021”
			Kala Bagh	3rd “October 2021”
13.	Buff Striped Keel Back	*Amphiesma stolatum*	Islamabad	26 “August 2021”
			Mansehra	30 “August 2021”
			PindiBhatian	16 “September 2021”
			Mianwali	25 “September 2021”
			Shorkot	9 “October 2021”
14.	Glossy-bellied Racer Snake	*Platyceps ventromaculatus*	Multan	8 “August 2021”
			Bakhar	9 “August 2021”
			Karachi	15 “August 2021”
			Karachi	16 “August 2021”
			Arifwala	17 “August 2021”
			Multan	27 “August 2021”
			Bhakkar	28 “August 2021”
			uchsharif	29 “August 2021”

			Bannu	31 “August 2021”
			Karachi Clifton	17 “September 2021”
			Jamshoro	18 “September 2021”
			Karak, KPK	19 “September 2021”
			Lodhran	25 “September 2021”
			Mianwali	29 “September 2021”
15.	Saw Scaled Viper	*Echis carinatus*	Gujar khan	9 “August 2021”
			Karachi	11 “September 2021”
			Kohat	12 “September 2021”
			Chakwal	13 “September 2021”
			Therparkar	16 “September 2021”
			Karak, Kpk	21 “September 2021”
			Karachi	21 September2021
			Chakwal	22 “September 2021”
			Swabi	24 “September 2021”
			Rohi	30 “September 2021”
			Bannu	11 October2021
			Jhelum	18 “October 2021”
16.	Russell’s kukri/ Banded kukri	*Oligodon russelius*	Ali pur	9 “August 2021”
			Dera Ismail khan	27 “August 2021”
17.	Bronze back Tree Snake	*Dendralephis tristis*	Haripur	12 “August 2021”
18.	Northern Punjab Krait	*Bungarus sindanus razai*	Mianwali	14 “August 2021”
19.	Streaked kukri	*Oligodon taeniolatus*	Kohat	18 “August 2021”
			Malir, karachi	6 “October 2021”
20.	Red Spotted diadem snake	*Spalerosophis diadema arenarius*	Bakhar	29 “May 2021”
			Layyah	18 “August 2021”
21.	Jan’s cliff racer Snake	*Platyceps rhodorachis*	Malakand	23 “August 2021”
			ManglaCantt	27 “August 2021”
			Karak KPK	17 “September 2021”
22.	Wolf Snake	*Lycodon aulicus*	Chichawatni	2nd “September 2021”
			Jhelum	20 “September 2021”
23.	Blind Snake	*Tephlops porrecctus*	Kashmoor Sindh	25 “August 2021”
			Sargodha	28 “September 2021”
			Mingora, swat	8 “October 2021”
			Haroonabad	13 “October 2021”
			Faisalabad	18 “November 2021”
			Charsadda, kpk	26 February 2022
24.	Dark headed Dwarf Racer Snake	*Eirenis persicus*	Neelum AJK	28 August2021
			Baluchistan	25 “September 2021”
25.	Brahminy Blind Snake	*Ramo typhlops braminus*	Attock Punjab	29 “August 2021”
26.	Russell’s Boa	*Eryx conicus*	Dera Ismail Khan	31 “August 2021”

27.	Shaw sea snake	*Hydrophis curtus*	Sonmiani beach Baluchistan	1st "September 2021"
28.	Blunt Nose Viper	*Macrovipera lebetina obtusa*	Kirthar	2nd "September 2021"
29.	Persian diadem	*Spalerosophis schirazianus*	Zeyarat	16 "September 2021"
30.	Long Nose Worm Snake⁄ Beaked thread snake	*Leptotyphlops macrorhynchus*	Lahore	24 "September 2021"
31.	Hooked sea snake	*Enhydris schistosa*	Gawadar beach	16 "September 2021"
	Total			222

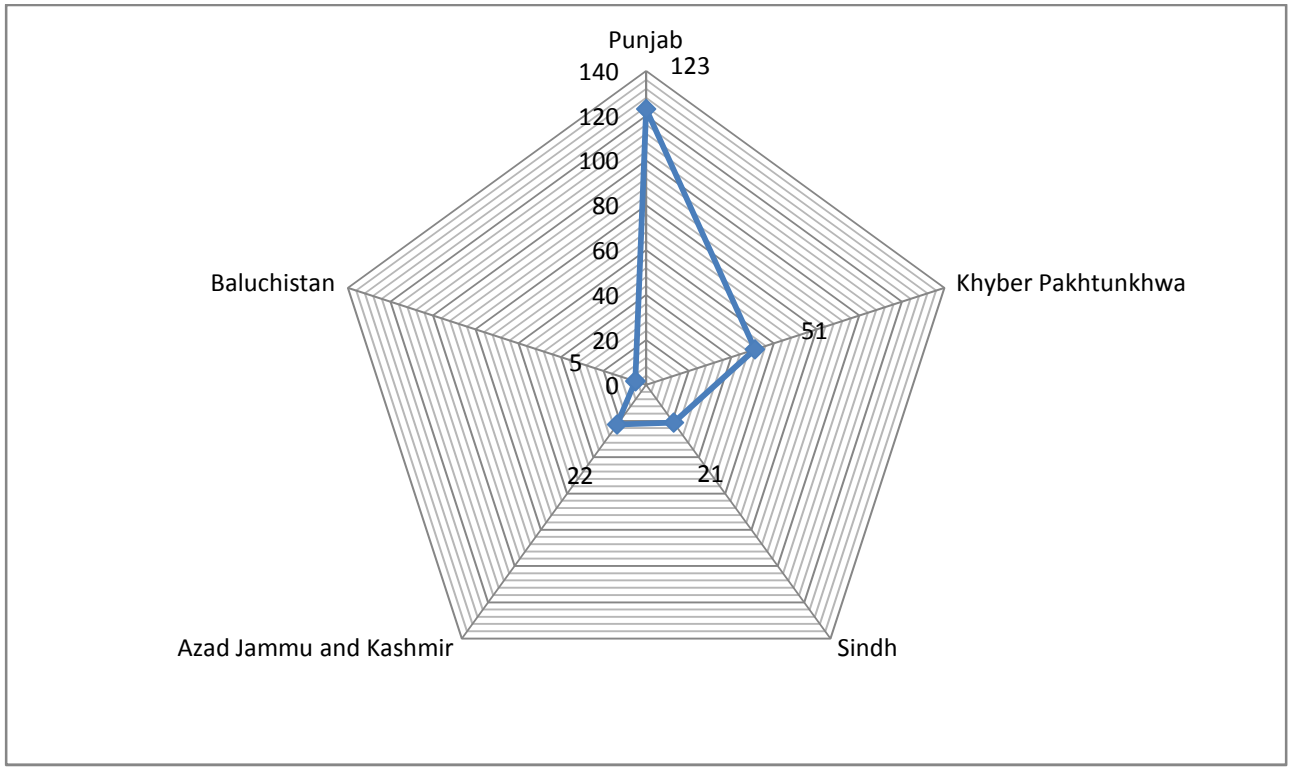

Figure 2: Snake encounter reports in provinces of Pakistan.

DISCUSSION

Animal conservation in their natural habitats is a pressing issue that requires a variety of actions. The introduction of new technologies, e.g. the internet, provides another chance to capitalize on their benefits for conservation of animal. Some authors support the internet as a new interface for ecotourism, wildlife management, and partnership among different conservation stakeholders (Huettmann, 2005; Gusset and Dick, 2010; Bitanyi *et al.*, 2012).

It has also been utilized as a tool for learning diverse viewpoints on animal conservation and raising funds for it (Rastogi *et al.*, 2013; Veríssimo *et al.*, 2017). As a result, the internet gives a novel channel for studying people's perspectives and

attitudes about conservation. Snakes are less studied, and thus benefits little from resources owed to aid in their conservation in the wild. Asia also has the largest incidence of human-snake confrontations and bites of snake events in the whole world, imposing a severe economic as well as medical impact on the area despite an absence of understanding of the elements that contribute to these cases (Kasturiratne *et al.*, 2008; Williams *et al.*, 2010).

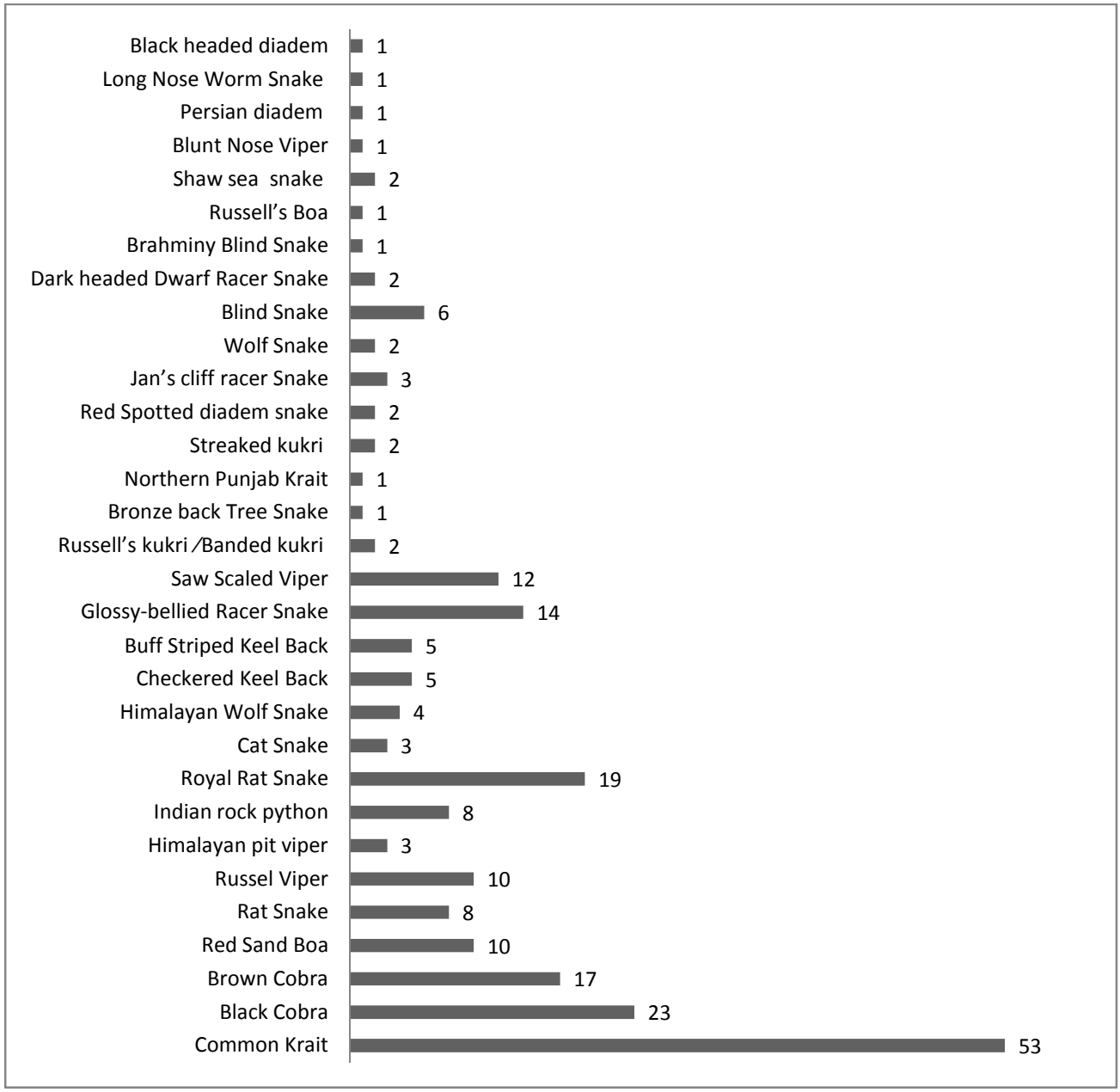

Figure 3: Total species and numbers of killed snakes reported.

As humans continue to expand, such conflicts will only worsen, and this study is a crucial first step in improving our ecological understanding of human-snake conflict in order to create effective mitigation strategies. This implies that regularly

seen snakes have ecological or biological characteristics that enhance the chance of human-snake conflict, and that these characteristics might be addressed when developing preventative methods. A lot of the mentioned species, for example, appear to be terrestrial, active hunters that feed on rodents or small vertebrates, while a more thorough study of human-snake conflict species composition across Asia is required. The incidence of human-snake conflict episodes grew in late spring, peaked in October, and was lowest throughout the winter months. As a result, for all species, temperature exhibited a high positive association with the frequency of human-snake conflict. This is not surprising given that the majority of snakes in Pakistan are active in the summer and brumate in the winter (Lau, 1998).

CONCLUSION

This might be due to a misunderstanding of the difference between “venomous” and “non-venomous” snakes. Our research demonstrates that “venomous snakes” weren't more likely to be feared than “non-venomous snakes”. Fake stories snake-related injuries as well as deaths may intensify the negative view of snakes. Particular traditional beliefs, on the other hand, may help to safeguard some snake species from damage. Despite this, the majority of snakes seen in this research were killed due to fear or for hunger. The utilization of social media data might help to change the opinions and attitudes of these internet-savvy Pakistani communities, as well as educate them on the need of conserving snakes and other species.

Our research found that humans killed “venomous” and “non-venomous snakes” owing to a lack of understanding. Furthermore, our research found that venomous snakes are not more likely to be afraid than “non-venomous” snakes. As a result, for all species, temperature exhibited a high positive association with the occurrence of human-snake conflict. The frequency of monthly human-snake conflict was highest in late spring to early summer, peaked in the fall, and was lowest in the winter. Human-snake conflict was lowest in urbanized areas and higher in areas with predominantly shrub land cover.

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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: Ayoub, Noor and Altaf have designed this project, collected data and Ayoub, Junaid and Khan have written this article; while all authors have critically analyzed this article and approved as final.