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Cover: Whale Shark *Rhincodon typus* and Reef - made with poster colours. © P. Kritika.

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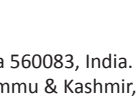

COMMUNICATION

Asiatic Black Bear *Ursus thibetanus* attacks in Kashmir Valley, India

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Abstract: Asiatic Black Bear attacks are reported rarely throughout the majority of their global range; however, this has not been the case in the Kashmir Valley where over the past 20–30 years attacks have been relatively common. There are several causes for the high number of attacks, though the foremost reason likely stems from the conversion of natural habitat to orchards and agricultural fields. Asiatic Black Bears actively crop raid orchards and agricultural areas putting them into close proximity to humans. The Jammu & Kashmir Wildlife Protection Department has collected data on 2,357 Asiatic Black Bear attacks in the Kashmir Valley between 2000 and 2020. A total of 2,243 (95.2%) resulted in injury and 114 (4.8%) resulted in death. The majority of injuries were reported as minor (57.4%, n=1126), 42.4% (n=832) as grievous, and 1.2% (n=21) caused permanent disability. The highest proportion of attacks occurred from July through November, coinciding with the harvesting season, and the least occurred from December through March, coinciding with when most Asiatic Black Bears are hibernating. Victims of bear attacks were most often working in farms or orchards, and were mostly between the ages of 31–40 years old. Most attacks occurred in the morning hours when people first entered the orchards or agricultural fields to work. The frequency of attacks has declined since 2016, which could be attributed to retaliation killings, better management by the wildlife department, and the engagement of NGO's with local people to create bear awareness and teach safety measures.

Keywords: Bear attacks, bear awareness, crop-raiding, hibernation, Jammu & Kashmir, retaliation-killing, victims, wildlife-conflict, Wildlife Protection Department.

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Author contributions: Aaliya Mir—1) project leader, 2) project coordination, 3) writing and analysis. Shanmugavelu Swaminathan—1) writing and analysis. 2) insights to bear activity Raashid Y. Naqash—1) data collection, 2) analysis and insights, Thomas Robert Sharp—1) writing and analysis, 2) background research on Asiatic Black Bear attacks 3) arrangement of manuscript to JoTT. Attur Shanmugam Arun—1) writing and analysis.

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INTRODUCTION

Asiatic Black Bears *Ursus thibetanus* though generally cryptic and shy, are involved in crop raiding and to a lesser extent attacks on humans (Chauhan 2003; Ali et al. 2018; Jamtsho & Wangchuck 2018; Image 1). Attacks are rare throughout much of their global range which encompasses 18 different countries (Garshelis & Steinmetz 2020), however, this is not the case in India's Kashmir Valley where they are relatively common (Chauhan 2003; Choudhury et al. 2008; Tak et al. 2009; Rasool et al. 2010). Bear attacks in the Kashmir Valley have increased in the last 20–30 years, possibly due to (1) expansion of agricultural practices such as fruit and nut orchards (that are particularly attractive to bears), (2) the lack of fire-arms among farmers, (3) the India-Pakistan border fencing blocking predator movement, continued human encroachment into wild habitat, and (4) a new generation of people not familiar with coexisting with large predators (Choudhury et al. 2008). Installations by security forces may also fragment the habitat and divert the bears into human dominated areas causing human-bear conflicts.

The Asiatic Black Bear is listed as 'Vulnerable' on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species due to habitat loss and the commercial trade for live bears and bear parts (Garshelis & Steinmetz 2020). They are also listed as an Appendix I species under CITES and a Schedule I species in India under the Wildlife Protection Act, 1972. There are few published accounts, or long-term data collections, of Asiatic Black Bear attacks. The majority of scientific literature on the topic are from locations with a relatively healthy number of black bears, namely India, Bhutan, and Japan. Often these accounts are listed alongside crop raiding and livestock depredation (Chauhan 2003; Charoo et al. 2011; Sanwal & Lone 2012; Ali et al. 2018; Zahoor et al. 2020). There is still a great deal that is not understood about Asiatic Black Bear attacks. However, most reported attacks are due to surprise encounters that occur in either the woods or in agricultural areas (Tak et al. 2009; Rasool et al. 2010; Akiyama et al. 2017; Penjor & Dorji 2020). As would be expected, the vast majority of attacks appear to be defensive, however, there have been a few accounts that appear to be more predatory (Yamazaki 2017).

Over the past 20 years, the Kashmir Valley has become a hotspot of Human-Asiatic Black Bear conflicts. This paper chronicles the number of Asiatic Black Bear attacks that occurred in the Kashmir Valley between the years of 2000 and 2020. It also looks at the trends and attempts to discern the causes.

Image 1. Wild Asiatic Black Bear *Ursus thibetanus* in the Kashmir Valley © Mradul Pathak.

Study Area

The Kashmir Valley is roughly 15,500 km^2 in size (about 140 km by 32 km) and is located between 32° & 34°N and 74° & 75°E (Figure 1). The average elevation is roughly 1,850 m. The valley is partially surrounded to the north by the Himalayan and Pir Panjal ranges, which have an average elevation of roughly 3,050 m. The climate is mild with precipitation occurring throughout the year, though spring is the wettest season. Summer is usually mild and fairly dry, but the relative humidity is generally high and the nights are cool. July is the warmest month with temperatures averaging around 24.4°C, and January is the coldest with average temperatures around 2.7°C. The biggest river in the valley is the Jhelum. Oak-Rhododendron forests (Image 2), cover the valleys and Blue Pine *Pinus excelsa* covers the slopes.

METHODS

Asiatic Black Bear attack data was collected by the Jammu & Kashmir Wildlife Protection Department, Kashmir Region, which was established in 1978 and is equivalent to the wildlife wing of the state forest departments in other states. There are five divisions, namely the Central, South, North, Wetland and Shopian, which maintain data on human-bear conflicts for the purpose of paying compensation for bear attacks. These efforts were intensified and payment augmented after

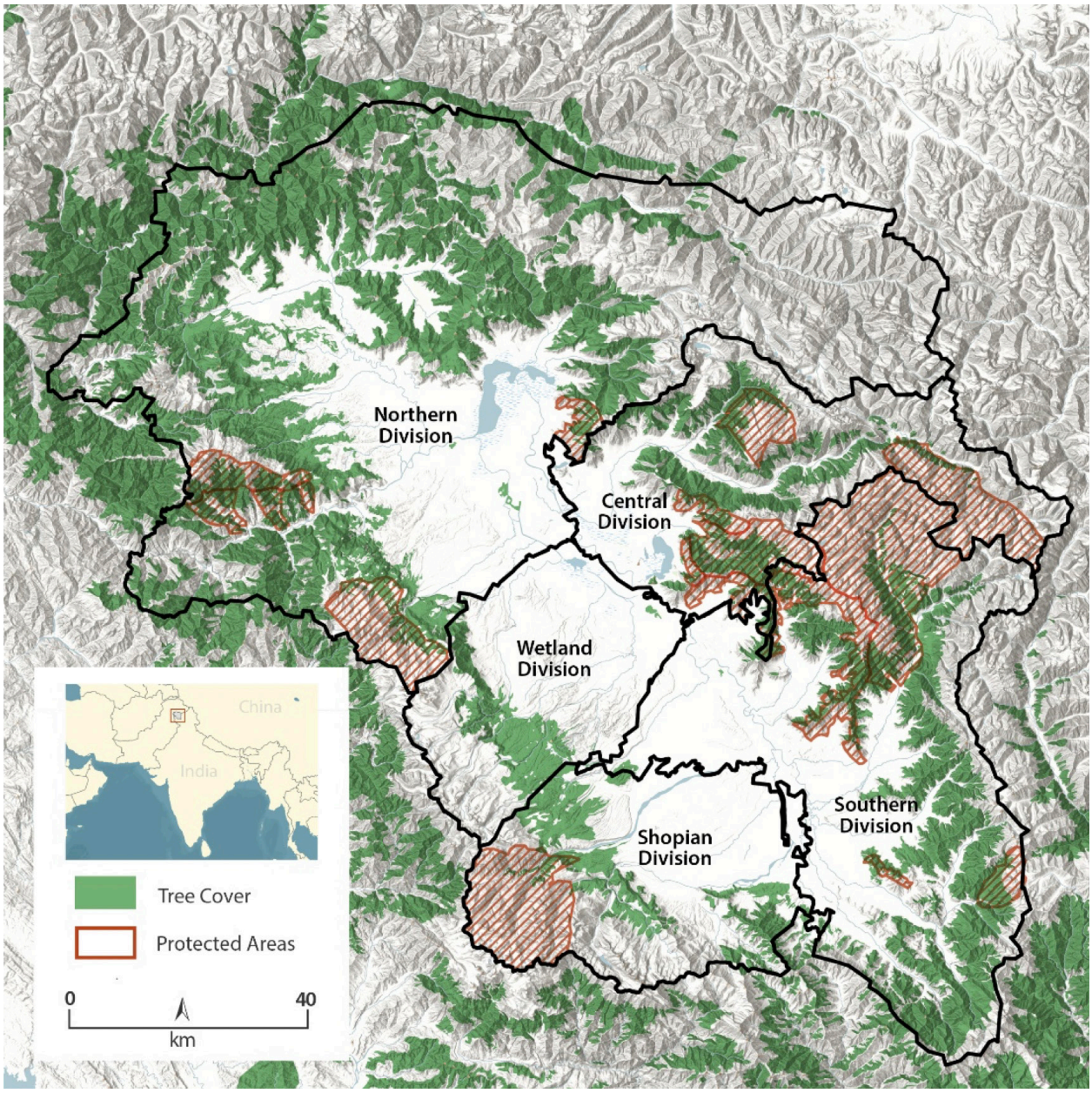

Figure 1. Wildlife divisions in the Kashmir region responsible for handling human-wildlife conflicts including Asiatic Black Bear attacks.

2013. We used this data to assess bear attack patterns over time. Ex gratia rates prior to and after 2014 are given in Table 1. The processing of a case starts with the filing of a police and medical report which is produced to the block level officer of the wildlife department who subsequently forwards it to the higher offices which includes the range officer, wildlife warden, regional wildlife warden, and finally to the chief wildlife warden. The ex gratia application goes through a lot of scrutiny during processing.

RESULTS

Attacks and Deaths by Year

A total of 2,357 bear attacks were reported in the Kashmir Valley between 2000 and 2020, of which 2,243 (95.2%) resulted in injury and 114 (4.8%) in death (Table 2). The Wildlife Protection Department did not have the resources prior to 2006 to collect detailed bear attack data, and therefore bear attacks prior to 2006 are likely underrepresented in the data set. The maximum number of reported attacks in a single year was 282 in 2010 and included 10 deaths. The number of reported

Table 1. Ex gratia paid (in INR) to victims of Asiatic Black Bear attacks prior and post 2014.

Years	Minor injuries	Grievous injuries	Permanent incapacitation	Death
Prior to 2014	5000	Up to 33,000	50,000	100,000
2014-2020	15000	Up to 100,000	Up to 300,000	300,000
* Department of Forest, Ecology and Environment 2014				

Table 2. Asiatic Black Bear attacks resulting in injury or death between 2006 and 2020 in Kashmir Valley, India.

Year	Number of recorded attacks	% of recorded attacks from the total number of attacks recorded from 2006–2020	Number of recorded deaths	% of recorded attacks that resulted in death the same year
2006	87	3.7	7	8.0
2007	93	4.0	8	8.6
2008	155	6.6	7	4.5
2009	182	7.8	8	4.4
2010	282	12.1	10	3.5
2011	275	11.8	13	4.7
2012	226	9.7	7	3.1
2013	256	10.9	12	4.7
2014	185	7.9	5	2.7
2015	205	8.8.	5	2.4
2016	135	5.8	6	4.4
2017	71	3.0	5	7.0
2018	63	2.7	5	7.9
2019	66	2.8	7	10.6
2020	49	2.1	4	8.2

attacks and deaths started diminishing in 2016, and by 2020 the number of attacks was down to 49 with four deaths (Figure 2).

Differences Between Districts

The majority of attacks occurred in the South and North divisions. These two divisions are the largest and have the most forest coverage. Additionally, these divisions are undergoing rapid deforestation and urbanization. The Wetland and Shopian divisions used to be part of the North and South divisions, respectively. The Wetland Division does not consist of much prime bear habitat and this results in fewer attacks. The Central Division, which includes Dachigam National Park, has excellent bear habitat. However, the wildlife department in this division is well funded and equipped to deal with human-wildlife interactions and therefore are able to keep bear attacks in check despite the large bear population.

Injuries

The exact type of injuries sustained by the victims were not readily available, however, we were able to classify the injuries in three categories based on reports and the amount of ex gratia paid. The three categories are minor, grievous, and permanent disability. Injuries were considered minor if the victim was treated at a local hospital and did not need to stay in the hospital for more than a day for the treatment (Image 3). Injuries were considered grievous if the victim needed to be referred for special treatment, usually to a specialty hospital, where they can undergo specialized procedures and stay for an extended period (Image 4). Finally, permanent disability when the victims were permanently incapacitated. Overall, the majority of injuries were reported as minor (57.4%, n=1126), 42.4% (n=832) as Grievous, and 1.2% (n=21) resulted in permanent disability.

Attacks by Month

A total of 1,449 attacks were documented by month (Figure 3). August (n=309, 21.3% of the total attacks)

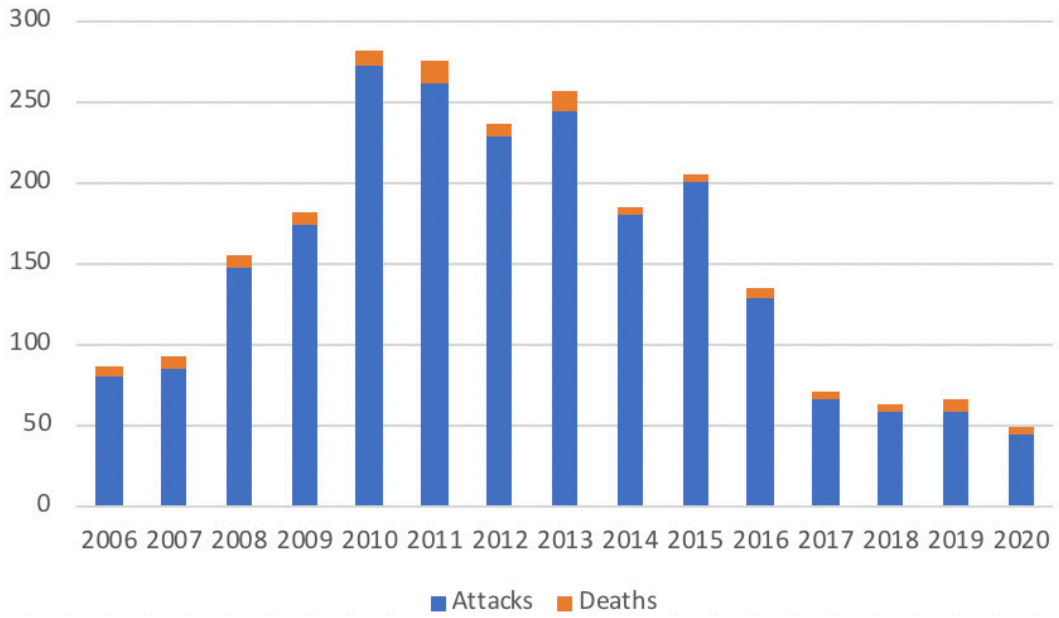

Figure 2. Asiatic Black Bear attacks resulting in injury or death between 2006 and 2020 in and around the Kashmir Valley, India.

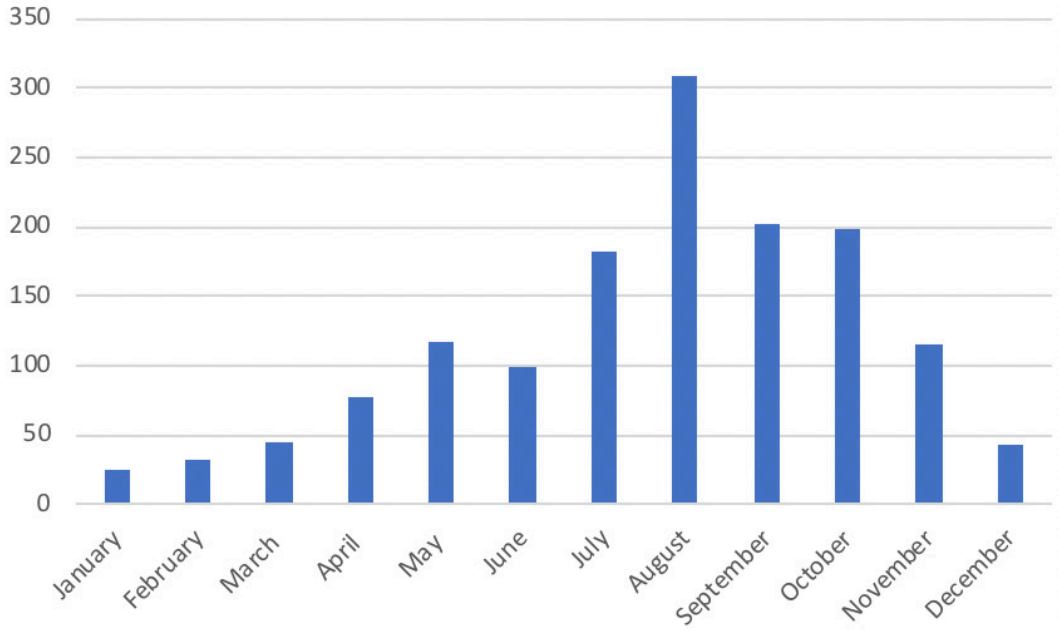

Figure 3. Asiatic Black Bear attacks by month from 2000-2020 in Kashmir, India.

had the most attacks, followed by September (n=203, 14%), October (n=198, 13.7%), and July (n=182, 12.6%). The least number of attacks took place in the month of January (n=26, 1.8%), February (n=32, 2.2%), December (n=44, 3.0%), and March (n=45, 3.1%).

Attacks by Time of Day

A total of 410 attacks were documented by the time of day in which they occurred (Figure 4). The highest number of attacks occurred between the hours of 0901–1000 h (n=75, 18%), and 218 attacks (53%) took place between 0801–1200 h.

Age of People Attacked

A total of 482 attacks were documented by the age of the victims (Figure 5); 226 of the victims (47%) were

Image 2. Asiatic Black Bear habitat in Kashmir Valley © Mradul Pathak

Image 3. Minor injury due to Asiatic Black Bear. © Wildlife SOS

Image 4. Grievous injury due to Asiatic Black Bear. © Wildlife SOS

between 31 and 50 years of age.

Activity of People Attacked

The activity of 277 people attacked in the Shopian Division between 2010 and 2019 was documented. People working in, or walking to, fields or orchards made up 176 (63.5%) of the attacks. The second largest group of people attacked were made up of shepherds & herders, and accounted for 33 (11.9%) attacks. People walking to areas not necessarily related to fields or orchards (n=23, 8.3%) and people near & around their homes (n=22, 7.9%) also made up relatively high percentages, though

Table 3. Asiatic Black Bear attacks by month from 2000–2020 in Kashmir, India.

January	February	March	April	May	June	July	August	September	October	November	December
26 (1.8%)	32 (2.2%)	45 (3.1%)	78 (5.4%)	118 (8.1%)	99 (6.8%)	182 (12.6%)	309 (21.3%)	203 (14.0%)	198 (13.7%)	115 (7.9%)	44 (3.0%)

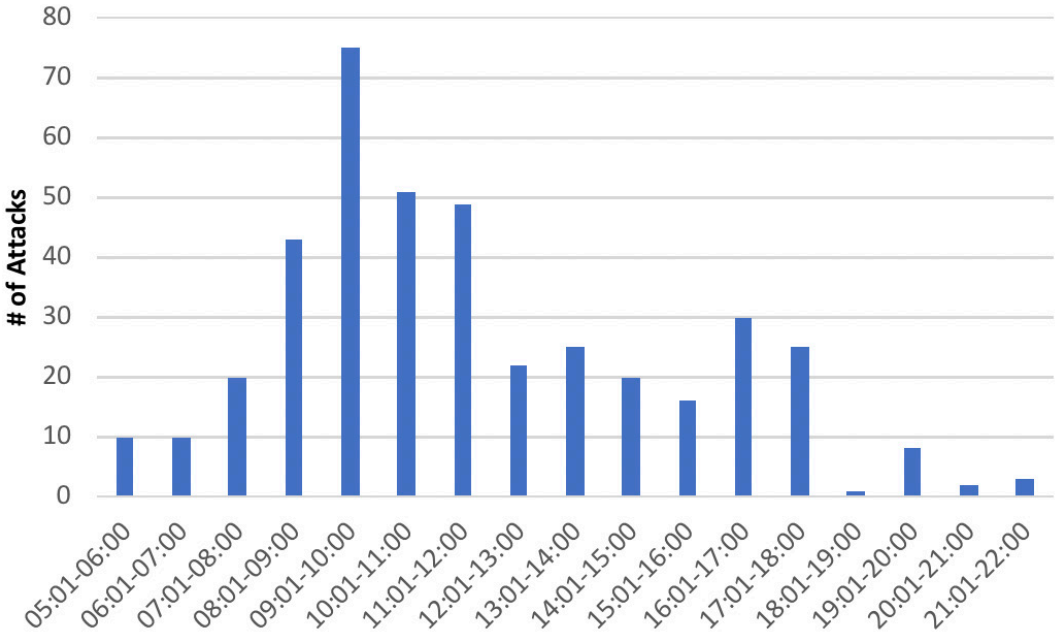

Figure 4. Asiatic Black Bear attacks by time of day from 2000–2020 in Kashmir, India.

many of these people were working in their vegetable gardens. Other activities made up the remainder of the attacks (n=23, 8.3%).

DISCUSSION

General Patterns in Kashmir Valley

There is no data to suggest that the Asiatic Black Bear subspecies, *U. t. laniger* that occurs in northern India, is any more aggressive than other subspecies (Matt Hunt, co-chair IUCN Asiatic Black Bear Expert Team, pers. comm. August 8 2021). It is therefore more likely that the increased number of attacks are related to: 1) bears being in close proximity to humans, 2) a relatively high density of bears in the area, and finally, 3) how humans react to the presence of bears. Along these lines, it is important to note that in orchards, the bears not only eat the fruit and nuts but also potentially do extensive damage to the trees, such as breaking off productive branches. Because of this the bears are often actively chased and shooed away from the orchards. This aggressive interactions between humans and bears could be a contributing factor for the high rate of attacks in the region.

Reasons for the Decreases in Bear Attacks

The decrease in bear attacks since 2016 is likely due to 3 main reasons: 1) a number of bears have been killed in retaliation, 2) proactive work by the wildlife department, and 3) bear awareness programmes conducted by non-governmental organisations (NGOs). The total number of bears killed remains unknown, however, some of these killings have been documented, including incidents when bears have been tied and the tree set on fire. Other bear killings go unnoticed, such as, when bears are secretly poisoned or shot. To date there have been no prosecutions for killing bears.

The wildlife department was able to be much more proactive starting in 2016. The political scenario in Kashmir has been very fragile in recent times, particularly from 2010–2016. Once the wildlife department was up and running, it was still poorly equipped and dealing with frequent closures in the valley. Even communication was hampered as mobile phone connectivity was not steady. These issues paralyzed normal life and resulted in fewer

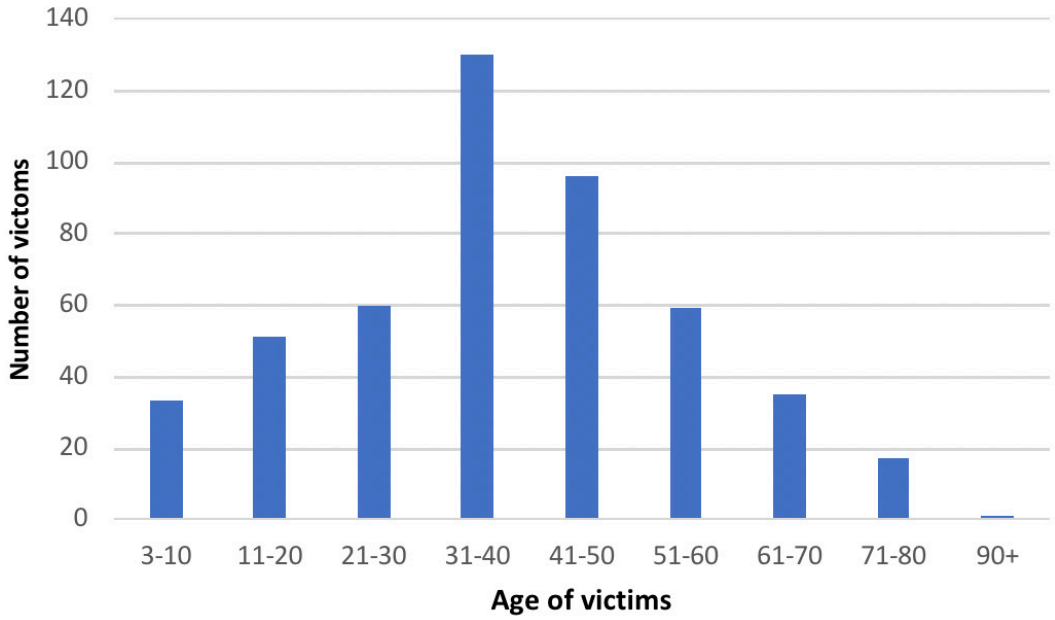

Figure 5. Asiatic Black Bear attacks by age of the victim from 2000–2020 in Kashmir, India.

reports of wildlife-human conflicts. Because of this, people often took affairs into their own hands. Since 2016, the wildlife department has had greater man power & the necessary equipment including cages, tranquilizing guns, and vehicles as well as mobile connectivity, to deal with wildlife issues. Presently 42 control rooms work 24 hours a day, seven days a week, to attend to the wildlife distress calls. The number of rescue calls to the wildlife department as well as to other NGOs, including Wildlife SOS, has increased, which has led to a more professional handling of human-wildlife conflicts and has reduced the number of bear encounters and injuries to people.

Bear awareness & safety programs are also believed to have played an important role in reducing human-bear conflicts by educating people. These programs are largely being coordinated by NGOs in the region and stress awareness, especially when entering or conducting activities around orchards.

Asiatic Black Bear Attack Overview

The causes and mitigation strategies for Asiatic Black Bear attacks are not well understood, especially in comparison to attacks by other bear species, namely, Grizzly Bears *Ursus arctos*, American Black Bears *Ursus americanus*, Sloth Bears *Melursus ursinus*, and even Polar Bears *Ursus maritimus*. This may be partly due to Asiatic Black Bear attacks being relatively rare. Existing studies tend to agree that the vast majority of Asiatic Black Bear attacks are defensive, most often occurring due to a surprise encounter (Thakur et al. 2007; Tak et al. 2009; Rasool et al. 2010; Akiyama et al. 2017). This certainly appears to be the case in Kashmir, India, however, predatory attacks on humans by Asiatic Black Bears have been reported in Japan (Yamazaki 2017; Oshima et al. 2018). This is perhaps not surprising as Asiatic Black Bears are omnivorous and have been reported throughout parts of their range to actively hunt, kill, and eat primates, ungulates, and wild boar (Neas & Hoffman 1987; Hwang 2003; Gursky-Doyen & Nekaris 2007). Predatory attacks on humans appear to be exceptionally rare.

Behavioral approaches to safety in Asiatic Black Bear country should primarily focus on avoiding bear encounters and secondarily surviving defensive attacks with the fewest number of injuries. Making noise while moving into an area that bears may occur, giving the bear a chance to leave the area before the human and bear find themselves at close quarters, is a proven method to avoid attacks by Grizzly & Sloth Bears (Ordiz et al. 2013; Ratnayeke 2014; Sahlén et al. 2015; Sharp et al. 2020). This method would likely be effective in avoiding surprise encounters with Asiatic Black Bears as well.

There are advisories on what to do in case of a defensive attack by a bear. Herrero (2002) advocated falling to the ground and balling up while covering the head and face with your arms for surviving a defensive grizzly bear attack. Asiatic Black Bears, like Grizzly & Sloth Bears, focus on the head and face during an attack (Thakur et al 2007; Rasool et al. 2010). Falling to the ground and covering up allows attack victims to protect

themselves from injury while allowing the Asiatic Black Bear to run off which they almost always do after overpowering a person.

CONCLUSION

The number of Asiatic Black Bear attacks in Kashmir have decreased notably since 2016, probably due to bears being removed from the area as well as government and non-government agencies working to lessen the number of negative encounters. The number of annual attacks should be monitored and tracked to detect future changes. Further studies are required to more fully and accurately understand the best methods to avoid and survive Asiatic Black Bear attacks. It is likely that certain behavioral strategies that work for avoiding or minimizing attacks from other bear species, namely Brown Bears & American Black Bears, will also work for the Asiatic Black Bear. However, this cannot be known with certainty without further research.

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