Utilizing Snake Rescue Data For Understanding Snake-Human Conflict

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Background

A crucial aspect of understanding snakebite is the overlap between the snake and human activities. However, there is a heavy reliance on research into venom and on models that depend on bite data. There is also an absence of any data regarding where within the confines of rural landscapes snake-human conflicts occur. An issue with collecting these data is the lack of a simple and efficient methodology that can be replicated with little error. There have been some studies that have developed a methodology to estimate high-risk areas of snake conflict, although these do not typically use distributional information on snakes. One opportunity to collect such data is via snake rescues. When snakes are caught during rescue calls, data derived from these events can potentially provide a large amount of relevant information.

Figure 1. The venomous snakes of Hooghly district: A) *Naja kaouthia* (Monocled Cobra); B) *Naja naja* (Spectacled Cobra); C) *Daboia russelii* (Russell's Viper); D) *Bungarus fasciatus* (Banded Krait); E) *Bungarus caeruleus* (Common Krait)

Methods

Study Area- The study was conducted in the Hooghly district of West Bengal by CONCERN, a licensed local not-for-profit organisation. The district lies along the southeastern margin of the Hooghly River and is a part of the lower Gangetic Delta. The medically relevant venomous snakes in the region are *Naja naja, Naja kaouthia, Daboia russelii, Bungarus fasciatus and Bungarus caeruleus* (Fig. 1).

Rescue Method- The team consists of 14 trained rescuers. They are equipped with a snake hook, a bagger, two snake bags and a torch. The protocol has been set that any rescues can only be performed if both members are wearing appropriate PPE, including covered shoes and full-length pants. No rescues can be undertaken under the influence of alcohol, lack of sleep, or lack of full fitness.

Data Collection- Data was collected from July 2020 to October 2022 during every rescue call made to the team. It was collected using the offline data collection phone application, Epicollect5 (https://five.epicollect.net/). The form collects information such as the date and time, species, site of rescue, GPS, and image of the snake.

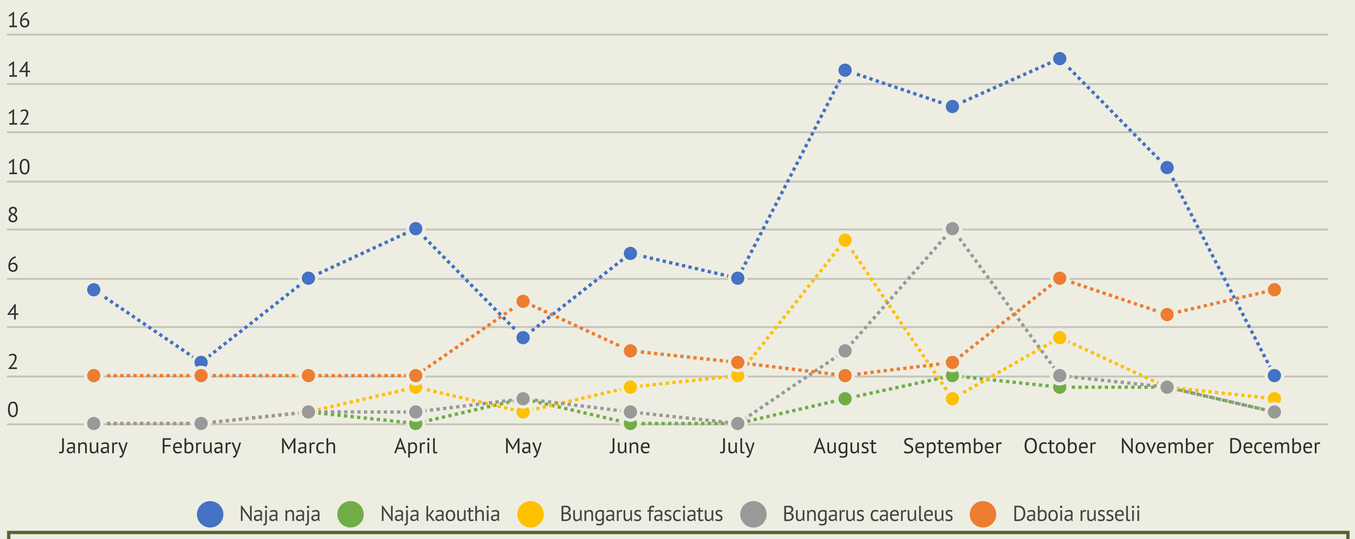

Figure 2. The average number of rescues for each species of snake in each month across the 3 years of the study. Total number of rescues throughout the study period: *N. naja*= 190, *N. kaouthia*= 17, *B. fasciatus*= 42, *B. caeruleus*= 38 & *D. russelii*= 78

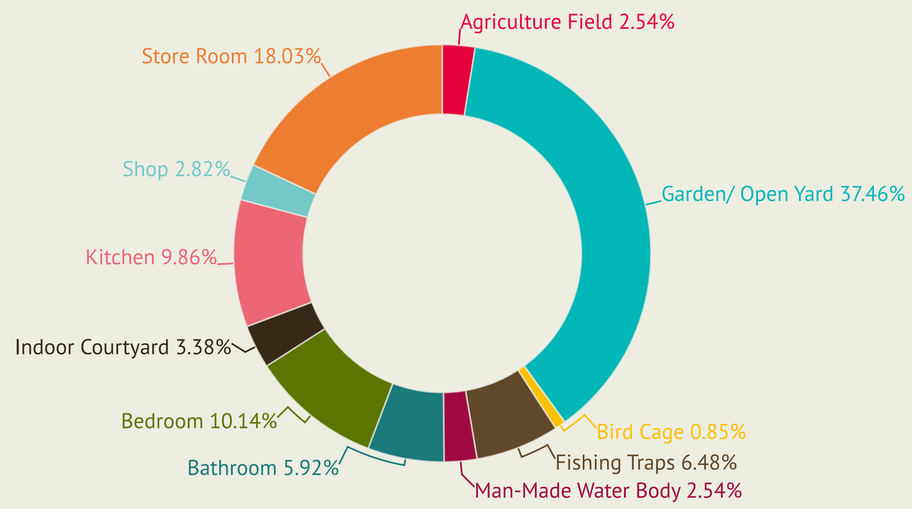

Figure 3. A pie chart illustrating the various sites of rescue encounters along with the proportion of these encounters occurring in each site.

Results & Discussion

A total of 588 rescues were done during the study period out of which 355 (60.37%) were the 5 species of venomous snakes and 233 (39.63%) were non-venomous species. 21 species of snakes were encountered during the rescues. There is a seasonal pattern to the rescue encounter for venomous snakes with the most rescues occurring during the Indian Summer Monsoon Rainfall Period (June to September) and a distinct drop during the winter dry months (November to February) (Fig. 2). *D. russelii* rescues were maintained even during November and December. Peaks for all the venomous snakes fall within the Indian Summer Monsoon Period, which aligns with the Kharif crop season of the agricultural cycle. During these months, farmers are growing crops such as rice, maize, groundnut, sesame, and various gourds. These fields are then harvested in October, which matches with the peak of the rescue calls for *D. russelii*. The results are not consistent with previous studies on the site of interactions, which in prior studies occurred predominantly in agricultural fields. Here, agricultural fields only have 2.54% of the venomous snake rescues (Fig. 3). With 50.13% of the rescues occurring within buildings and 47.33% occurring in sites used by humans (e.g. fishing traps), this study illustrates that conflict arises from a combination of snake distribution and human behaviour (Fig. 3).

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