

## A Profile of Clinical Features and Outcomes in Snakebite Envenomation Patients at Bheri Hospital, Nepal

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Conflict of interest: Nil

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### Abstract:

Snakebite envenomation is a major public health issue in many parts of the world, especially in rural regions where access to medical care is limited. Nepal, with its vast rural areas and diverse ecosystems, is particularly vulnerable to snakebite incidents, which cause significant morbidity and mortality. Despite being a critical health problem, there remains a scarcity of comprehensive, localized data from specific hospitals, particularly Bheri Hospital in Nepal, which serves a large and diverse population. This review aims to assess the clinical features and outcomes of snakebite envenomation patients treated at Bheri Hospital, with the goal of providing a detailed understanding of the disease patterns, treatment efficacy, and potential improvements in healthcare practices.

Bheri Hospital, located in the Banke district of western Nepal, is a central healthcare facility in a region where snakebites are prevalent due to the rural setting and proximity to habitats of venomous snakes. Although there are studies on snakebites in other parts of Nepal and South Asia, specific data from Bheri Hospital is limited. Understanding the local epidemiology of snakebites, including the species involved, the timing of treatment, and the clinical presentations, is essential for improving patient outcomes. By reviewing the available clinical records, case reports, and patient outcomes, this study seeks to provide a comprehensive assessment of the hospital's approach to snakebite envenomation.

The review will focus on key clinical features of snakebites, such as local symptoms (pain, swelling, necrosis), systemic manifestations (hemotoxicity, neurotoxicity), and complications like renal failure, coagulopathy, and shock. Identifying the most common snake species responsible for envenomation in the region, the severity of their bites, and the resulting clinical manifestations is vital for tailoring effective treatment protocols. Given the diversity of snake species in Nepal, there is a need to assess whether specific regional characteristics affect clinical outcomes, such as the prevalence of bites from species like the cobra, krait, or pit viper, each of which has a different venom composition and clinical presentation.

Another important aspect of the review is to evaluate the outcomes of snakebite victims in relation to the timeliness and appropriateness of medical interventions. In many rural areas, snakebite victims face delays in receiving treatment due to geographic isolation, lack of awareness, and insufficient medical resources. This review will assess the average time to treatment, the use of antivenom, and any challenges encountered in the management of these patients. It will also evaluate whether the hospital's resources, including the availability of antivenom and the capacity of healthcare workers to administer appropriate care, influence patient outcomes.

Furthermore, this review will aim to identify potential gaps in care and areas for improvement in the clinical management of snakebite envenomation at Bheri Hospital. By analyzing trends in treatment delays, complications, and mortality rates, the study will highlight areas where improvements in healthcare infrastructure, staff training, and resource availability could enhance patient care. For example, if delays in the administration of antivenom are found to correlate with worse outcomes, recommendations can be made for improving access to treatment or raising public awareness about the importance.

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## Introduction

Snakebite envenomation and its consequences are significant public health problem in the tropical regions throughout the world. The majority of snake bites occur in rural areas in tropical and subtropical countries of Asia,

Africa and America with a high fatality rate. About 5.4 million snake bites occur each year, resulting in 1.8 to 2.7 million cases of envenoming (poisoning from snake bites). There are between 81,410 and 137,880 deaths and around three times as many amputations and other permanent disabilities each year. Envenoming affects women, children and farmers in poor rural communities in low- and middle-income countries. In Nepal, WHO estimates that 20,000 people are bitten by snakes each year, resulting in over 1000 deaths.<sup>4</sup> So far, 89 snake species have been recorded in Nepal. Among this great diversity of snakes, we know with certainty of 17 species of snake that are found in Nepal and have the front fanged type of venom apparatus and thus are considered to be highly venomous and dangerous. The commonest poisonous snakes in the Terai and inner Terai regions of Nepal are Krait and Cobra. In Nepal, incidence of snake bite shows a distinct seasonal pattern closely related to rainfall and temperature, and snake bite is observed in all age groups, the large majorities (90%) are in males aged 11- 50 years. Treatment for poisonous snakebite is divided into supportive care and antivenom administration. Krait venom blocks both the pre and postsynaptic receptors and needs prolonged mechanical respiration until their receptors are regenerated. Cobra venom blocks the postsynaptic receptors and needs more ASV and neostigmine.<sup>8</sup> This study aims to find the socio demographic characteristics, common sign and symptoms of envenomation and the factors affecting the outcome of snake bite envenomation.

**Rational/justification:** Snakebite envenomation is a significant public health issue in rural Nepal, where it leads to high morbidity and mortality, especially in regions like Banke district, where Bheri Hospital serves a large and diverse population. Despite the high burden of snakebites, there is a lack of comprehensive, region-specific data on the clinical features, management, and outcomes of snakebites at Bheri Hospital. This gap in knowledge is concerning, as snakebite cases can vary greatly depending on factors such as the species of snake, the timing of medical intervention, and the availability of antivenom. Bheri Hospital, being a key healthcare provider in this rural area, is uniquely positioned to offer valuable insights into the local epidemiology of snakebites, including the most common species responsible for envenomations, the clinical manifestations observed, and the effectiveness of current treatment protocols. Given the challenges of accessing timely healthcare in

remote areas, where delays in treatment and lack of resources are common, this assessment is crucial for understanding how these factors influence patient outcomes. The findings will help identify gaps in care, such as delays in the administration of antivenom, lack of intensive care facilities for severe cases, or shortages in antivenom supplies, all of which can contribute to worsened outcomes. By evaluating the clinical features and outcomes, this study will provide essential data for optimizing resource allocation, refining treatment protocols, and improving overall clinical management at Bheri Hospital. Moreover, it will inform regional public health strategies, enabling better-targeted prevention and education campaigns, such as awareness of the most dangerous snake species, first aid, and the importance of seeking immediate medical care. These findings can also support national policies related to the distribution of antivenom, staff training, and the development of healthcare infrastructure in rural areas. Additionally, the review will contribute to the broader field of snakebite research, providing a foundation for future studies aimed at improving treatment methods, diagnostic capabilities, and prevention strategies. Ultimately, this assessment is critical not only for enhancing the care of snakebite victims at Bheri Hospital but also for informing national and regional health policies, improving patient outcomes, and reducing the impact of snakebite envenomation in rural Nepal.

**Conceptual Framework:** N/A

**General Objective:** The primary objective of this study is to profile of the clinical features and outcomes of snakebite envenomation patients at Bheri Hospital, Nepal, in order to better understand the patterns of snakebite incidents, identify the factors influencing patient outcomes, and improve management protocols. This will help inform healthcare strategies and contribute to reducing morbidity and mortality associated with snakebites in the region.

**Specific Objective:**

1. To identify the most common snake species responsible for envenomations at Bheri Hospital and understand their clinical impact on patients.
2. To evaluate the clinical features of snakebite envenomation (e.g., local symptoms, systemic manifestations such as hemotoxicity or neurotoxicity, and complications like renal failure or coagulopathy).
3. To analyze patient outcomes in terms of recovery, complications, and mortality rates associated with snakebite envenomations.
4. To investigate factors influencing patient outcomes, including the timing of medical

intervention, access to anti-venom, healthcare resources, and patient demographics (age, gender, underlying health conditions).

5. To identify gaps in current healthcare practices and recommend improvements in treatment protocols, resource allocation, and staff training at Bheri Hospital.
6. To provide evidence-based recommendations to improve regional public health strategies related to snakebite prevention, awareness, and treatment, ultimately reducing snakebite-related morbidity and mortality.

### Research Hypothesis

#### Study Variables:

1. Independent Variables • Snake species: The type of snake responsible for the envenomation (e.g., cobra, krait, viper, etc.). • Time to treatment: The time interval between the snakebite and the administration of medical treatment, including antivenom. • Patient demographics: Characteristics of the patients such as: o Age o Gender o Occupation (e.g., farmers, laborers, etc.) o Underlying health conditions (e.g., comorbidities like diabetes, hypertension, etc.) • Location of bite: The body part where the bite occurred (e.g., hand, foot, face). • Type of medical intervention: Whether the patient received antivenom, supportive care (e.g., oxygen therapy, dialysis), or other treatments. • Resource availability: Access to essential medical resources, such as antivenom, medical personnel, and intensive care facilities.

• Pre-hospital care: Whether the patient received any form of first aid or care before reaching the hospital (e.g., use of traditional remedies, application of tourniquets, etc.). 2. Dependent Variables • Clinical features: o Local symptoms: Swelling, pain, necrosis, or local tissue damage. o Systemic symptoms: Hemotoxicity (e.g., bleeding, clotting disorders), neurotoxicity (e.g., paralysis, respiratory failure), renal dysfunction, or shock. • Treatment outcomes: o Effectiveness of antivenom administration (i.e., whether it reversed or mitigated symptoms). o the need for additional interventions, such as ventilatory support, dialysis, or surgical interventions. • Patient recovery: o Recovery rate (e.g., complete recovery, partial recovery, or no recovery). o Length of hospital stay. o the occurrence of complications during recovery (e.g., infection, organ failure). • Mortality rate: Whether the patient survived or died following envenomation. • Complications: o Acute complications: Organ failure, neurological damage, or other life-threatening conditions. o Long-term complications: Chronic renal damage, limb amputation, or other long-term disabilities. • Patient follow-up: Information on long-term outcomes or post-discharge complications, if available.

**Research Method:** quantitative

**Research design:** Cross Sectional

**Description of research design:** The study will be descriptive in that it aims to systematically describe the clinical features, treatment outcomes, and patient demographics associated with snakebite envenomation at Bheri Hospital. By collecting and analyzing patient data, the study will provide an in-depth understanding of the patterns of snakebites, including the types of snakes involved, the common clinical presentations, and the outcomes of treatment.

**Study Population:** The study population for this research will consist of all patients who have been treated for snakebite envenomations at Bheri Hospital, Banke District, Nepal, during a defined period. This population will include both adults and children from various demographic groups, including rural and urban residents within the hospital's catchment area. Inclusion Criteria: 1. Patients diagnosed with snakebite envenomation: This includes individuals who have been clinically diagnosed with a snakebite, confirmed either by a clinical assessment or, where possible, by identification of the snake species (e.g., through patient reports or local identification). 2. Patients who received treatment at Bheri Hospital: Only those patients who sought medical care at Bheri Hospital and received at least some form of treatment (e.g., antivenom, supportive care, or wound management) will be included. 3. Both adults and children: The study will include patients of all ages who present with snakebite envenomations. 4. Patients from both rural and urban areas: The study will encompass patients from diverse demographic backgrounds, including those from rural, agricultural communities who may be at higher risk for snakebites. 5. Patients with complete medical records: Only those patients whose medical records are complete, including information on clinical features, treatment interventions, and outcomes, will be included in the analysis. Exclusion Criteria: 1. Non-snakebite envenomations: Patients who have been diagnosed with other types of envenomations (e.g., insect or marine animal stings) will be excluded. 2. Inadequate or incomplete records: Patients with incomplete or missing medical records (e.g., missing information on clinical features, treatment, or follow-up) will be excluded from the study. 3. Patients treated in other hospitals: Patients who were not treated at Bheri Hospital or who were referred to other hospitals after initial consultation will be excluded. Demographics and Characteristics: • Age: The study will include patients across all age groups (children, adults, elderly), to assess potential differences in clinical outcomes and response to treatment across age categories. • Gender: Both male and female patients will be included, with potential analyses on gender-based differences in snakebite

severity or outcomes. • Occupation: Given the high incidence of snakebites among farmers and agricultural workers, the study will capture data on patient occupation, as this may correlate with the risk of snakebites. • Geographic Origin: Patients from both rural and urban areas of the Banke district and surrounding regions will be included, with specific attention to rural populations who are at a higher risk for snakebites due to agricultural and outdoor activities.

**Sampling unit:** The sampling unit for this study is the individual patient diagnosed with snakebite envenomation and treated at Bheri Hospital during the study period. Each patient will be treated as a distinct unit of analysis, with data collected on their clinical features, management, and outcomes. The study will use census sampling to ensure that all eligible cases are included in the analysis, providing a complete and accurate picture of snakebite treatment and outcomes at the hospital

**Sample size:** The study will aim to include all eligible snakebite cases treated at Bheri Hospital during the specified study period. The exact sample size will depend on the total number of snakebite cases treated during this period and the availability of complete medical records. A sufficiently large sample will provide statistical power for analyzing the clinical features, treatment outcomes, and factors influencing patient recovery.

**Number of participants and Justification:** The study will include 40 participants, who have been diagnosed with snakebite envenomation and treated at Bheri Hospital, Banke District, Nepal, during the study period. This sample size is chosen to provide a manageable, yet representative, overview of snakebite cases at the hospital.

Justification for the Number of Participants (40)

**Preliminary Data and Hospital Caseload:** Based on preliminary data from Bheri Hospital, the average number of snakebite cases treated annually is estimated to be within a range that allows for a sample size of 40 patients to be achievable. The study will include all eligible snakebite patients within a specified time period (e.g., over the past year or two). Given the high incidence of snakebites in the region, 40 patients is considered a reasonable number to analyze within the study period.

**Statistical Power and Feasibility:** While larger sample sizes typically provide more robust statistical power, a sample of 40 participants is sufficient to identify key patterns in clinical features, treatment outcomes, and other variables in this descriptive and observational study. This size allows for meaningful analysis while maintaining feasibility in terms of time and resources available for data collection and analysis. The focus is on obtaining comprehensive

and accurate data for these 40 cases rather than achieving high statistical precision.

**Gender Representation:** The study includes a gender-divided sample of 25 males and 15 females. This representation reflects the general trend in rural areas where males, particularly farmers and agricultural workers, are at higher risk for snakebites due to outdoor activities. However, by including 15 female participants, the study ensures the representation of both genders, providing insights into potential gender-based differences in snakebite outcomes, risk factors, and responses to treatment.

**Practical Considerations:** A sample size of 40 is also chosen for practical reasons, as it allows for manageable data collection, review of medical records, and patient follow-up within the available timeframe. Additionally, this number enables the research team to maintain focus on collecting detailed, high-quality data for each patient without being overwhelmed by the volume of cases.

**Homogeneity of the Study Population:** Since the study will focus on patients treated at Bheri Hospital, a relatively small but consistent sample size allows for in-depth analysis of this specific population, ensuring that the results reflect the clinical realities and challenges of snakebite treatment in this particular healthcare setting.

**Data Saturation:** With a sample size of 40 participants, the study is expected to reach data saturation, where no new significant themes or findings are likely to emerge. This is sufficient for identifying the key clinical features, treatment outcomes, and influencing factors related to snakebite envenomations in this context.

**Sampling Technique:** The non-probability, purposive sampling technique will be used to select 40 patients diagnosed and treated for snakebite envenomation at Bheri Hospital. This technique is chosen because it allows for the intentional selection of relevant cases based on the study's inclusion criteria, ensuring that the data collected are directly applicable to the research objectives. The purposive approach enables the study to gather detailed information from all available cases, with a focus on clinical features, treatment outcomes, and patient demographics.

**Criteria for sample selection:**

**Inclusion Criteria:** 1. Diagnosis of Snakebite Envenomation: Only patients who have been clinically diagnosed with a snakebite and confirmed to have envenomation (i.e., exhibiting signs or symptoms of venom toxicity) will be included. 2. Treatment at Bheri Hospital: The patient must have received treatment at Bheri Hospital, Banke District, Nepal, for the snakebite. This ensures that all participants are part of the hospital's patient

population and have been managed according to the hospital's protocols. 3. Complete Medical Records: The patient must have complete medical records available for review. This includes data on the clinical features (e.g., type of symptoms), the treatments administered (e.g., antivenom, supportive care), and the outcomes (e.g., recovery, complications, mortality). This ensures that reliable data can be extracted for analysis. 4. Age: Both adults (18 years and older) and children (under 18) who meet the inclusion criteria will be included. This allows for an understanding of how snakebite envenomations affect different age groups. 5. Time Frame: The study will include patients treated for snakebites during a defined period. This ensures that the data are recent and relevant to current treatment practices at Bheri Hospital. Exclusion Criteria: 1. Non-snakebite Envenomations: Patients who have been diagnosed with envenomations from sources other than snakes (e.g., insect bites, marine animal stings) will be excluded to maintain focus on snakebite envenomations. 2. Incomplete Medical Records: Patients with incomplete or missing medical records (e.g., lack of documentation on treatment, clinical features, or outcomes) will be excluded, as these cases would not provide enough data for analysis. 3. Patients Treated Elsewhere: Patients who received initial treatment at another healthcare facility and were later referred to Bheri Hospital will be excluded unless their complete treatment history is available for review. Only those who were initially treated at Bheri Hospital will be included in the study. 4. Data Missing for Key Variables: Patients with missing key information related to clinical features, treatment protocols, or outcomes will be excluded from the analysis, as this data is critical for the study's objectives.

**Data Collection Technique:** The data for this study will be collected after patient consent and patients' charts will be reviewed, utilizing patient medical records from Bheri Hospital. This approach allows the research team to gather comprehensive data on the clinical features, treatment outcomes, and demographic information of patients diagnosed with snakebite envenomation who were treated at the hospital during the study period. Detailed Steps for Data Collection: 1. Review of Patient Medical Records: o Patient Selection: Based on the inclusion and exclusion criteria, the medical records of all patients diagnosed with snakebite envenomation during the study period. o Data Extraction: A trained research team will access the patient records stored in the hospital's electronic or paper-based medical system. Data will be extracted from these records for each eligible patient. The information to be collected includes: □ Demographic information: Age, gender, occupation, and geographic location of the patient. □ Clinical features: Initial symptoms (local and systemic), type of envenomation (e.g., hemotoxic, neurotoxic), and any complications (e.g., renal

failure, respiratory issues). Time to treatment: The duration between the snakebite and the administration of medical treatment, including antivenom. Treatment details: Type of antivenom (if administered), other interventions (e.g., wound care, supportive therapies), and any additional treatments provided (e.g., ventilatory support, dialysis). Outcome information: Recovery status, complications during recovery, length of hospital stay, and mortality rate (if applicable). □ Follow-up data: Information on the patient's post-discharge condition, if available, such as any long-term complications (e.g., limb amputation, chronic renal impairment). 2. Standardized Data Collection Forms: o To ensure consistency and accuracy in data extraction, a standardized data collection form will be designed. The form will include predefined fields for all relevant variables, allowing for a systematic and organized approach to recording patient data. o These forms will be filled out by the research team based on the information available in the patient records. Each patient's data will be entered into the form individually to maintain clarity and minimize errors. 3. Data Entry and Verification: o Once the data is collected, it will be entered into a digital database (e.g., Excel or a statistical software program like SPSS or R) for analysis. o Verification of the data will be carried out to ensure accuracy. A second researcher or supervisor will cross-check a subset of records to minimize human error during data entry. 4. Ethical Considerations: o The study will adhere to ethical guidelines related to confidentiality and data protection. Patient identifiers will be removed or anonymized before the data is used for analysis to ensure patient privacy. o Permission for the use of medical records will be obtained from the hospital administration. 5. Handling Missing Data: o In cases where certain data is missing or incomplete, efforts will be made to obtain this information from alternative sources, such as follow-up visits, consultations, or direct communication with attending medical staff. o If data remains incomplete, it will be handled according to standard statistical methods, such as exclusion of missing data during analysis or imputation methods if applicable.

#### Data collection tools

- Patient Data Collection Form • Data Entry Spreadsheet • Data Verification Checklist • Consent Form • Statistical Analysis Software

**Pretesting:** Pretesting is an important step to ensure the data collection tools and processes are well-designed and function smoothly. The pretesting phase will involve testing the Patient Data Collection Form on a small sample of 5–10 cases of snakebite envenomation treated at Bheri Hospital. This process will help identify issues related to the clarity, completeness, and efficiency of the form, and provide an opportunity to refine the tools before

the main data collection. Pretesting will ultimately enhance the quality, consistency, and reliability of the data collected during the study.

### Validity and reliability of tool

1. Validity Validity ensures the tool measures what it is intended to measure. The following types of validity will be addressed: • Content Validity: The tool will be reviewed by clinical experts (doctors, toxicologists) to ensure it captures all relevant aspects of snakebite envenomation, including clinical features, treatments, and outcomes. • Criterion Validity: The tool's data will be compared with existing records or studies to ensure it aligns with established measures. • Construct Validity: The tool will be tested during pretesting to ensure it accurately captures the key concepts of snakebite management. 2. Reliability Reliability refers to the consistency of the tool in collecting data. It will be ensured through: • Inter-rater Reliability: Data collectors will receive guidance to ensure consistent use of the form. Regular monitoring and feedback will help maintain consistency across different researchers. • Intra-rater Reliability: Data collectors will repeat the data collection process for a subset of cases to ensure consistency over time. • Test-Retest Reliability: The tool will be tested again after a short period to assess its stability over time. 3. Steps to Ensure Validity and Reliability • Expert Review and Pretesting: Ensuring comprehensive coverage of variables and refining the tool based on feedback. • Monitoring: Regular supervision of data collectors to ensure consistency. • Data Verification: Periodic audits of collected data to ensure accuracy and reliability.

**Potential Biases:** Biases such as selection bias, information bias, recall bias, observer bias, reporting bias, and confounding bias may influence the study's results. However, through strategies like standardized data collection, quality control, and statistical adjustments, these biases can be minimized, leading to more reliable and valid results.

**Limitation of the study:** This study on snakebite envenomation at Bheri Hospital has several limitations, including limited generalizability, retrospective data collection, the potential for information bias, a small sample size, the possibility of confounding variables, and the risk of recall and observer biases. Additionally, the lack of long-term follow-up may result in incomplete assessment of long-term outcomes. While these limitations must be acknowledged, efforts to minimize bias and ensure rigorous data collection will help mitigate their impact on the study's findings.

**Plan for supervision and monitoring:** To ensure the quality, accuracy, and consistency of the data collection process, a robust plan for supervision and

monitoring will be implemented throughout the study on snakebite envenomation patients at Bheri Hospital. This plan will help identify and address any issues that arise during the study and ensure that the research is conducted ethically and according to protocol. 1. Supervision of Data Collectors • Standardized Procedures: Data collectors will be instructed to follow standardized procedures for data extraction and documentation to minimize inter-rater variability. • Supervisory Role: A senior researcher or project coordinator will be assigned as the primary supervisor to oversee the data collection process.

The supervisor will ensure that data collectors adhere to the protocol and provide guidance when needed.

- Routine Check-ins: The supervisor will conduct routine check-ins with data collectors to assess their progress, answer any questions, and address any challenges encountered during data collection. This will help identify any issues early and ensure that data collection remains on track. 2. Monitoring of Data Collection Process • Regular Audits: A system of regular audits will be implemented to ensure that the data being collected is accurate and complete. This could involve reviewing a subset of the forms completed by each data collector to check for consistency and accuracy. • Spot Checks: The research team will conduct spot checks on a random sample of cases during data collection to ensure data collectors are following the proper procedures and filling out the forms correctly. • Double Data Entry: To enhance data reliability, double data entry will be used. Two independent data collectors will enter the same data into the study database, and any discrepancies will be resolved by cross-checking with the original medical records. • Inter-rater Reliability: Periodic inter-rater reliability checks will be conducted by having multiple data collectors review and complete the same case. This will help identify any inconsistencies in data interpretation or entry. 3. Monitoring of Ethical Standards • Patient Consent: While this is a retrospective study, informed consent for the use of medical records will be obtained from patients (or their families) if required by the institutional ethics board. • Confidentiality Assurance: All patient data will be anonymized to protect patient confidentiality. Data will be stored in a secure database with limited access to authorized personnel only. 4. Data Quality Control • Data Validation: As part of the monitoring process, the collected data will be regularly validated to ensure it meets quality standards. This will include checking for missing values, outliers, or inconsistencies that may indicate errors during data collection. • Feedback and Troubleshooting: Any issues or challenges identified during the data collection process (e.g., missing data, unclear documentation)

will be addressed through feedback and additional Trai clarification. This will ensure that the data collection process remains efficient and accurate throughout the study.

5. Statistical Monitoring

- Interim Analysis: During the study, interim analysis will be conducted to assess the progress of data collection and identify any emerging trends. If necessary, adjustments can be made to the methodology or data collection forms based on these interim findings.
- Data Analysis Monitoring: Statistical experts will monitor the data analysis process to ensure that appropriate methods are being used to account for any biases or confounding factors in the data.

6. Communication and Reporting

- Regular Team Meetings: The research team will hold regular meetings to discuss progress, share findings, address any issues, and ensure the study is proceeding according to plan. These meetings will also provide an opportunity for the supervisor to offer guidance and address any concerns raised by the data collectors.
- Progress Reports: The project coordinator will prepare progress reports for stakeholders, including the ethics committee, hospital administrators, and funding agencies. These reports will document the status of data collection, any challenges faced, and the steps taken to address them.

**Plan for data management and analysis:** The data management and analysis plan for this study will ensure the integrity and accuracy of the data collected on snakebite envenomation at Bheri Hospital. Data will be carefully managed, stored securely, and cleaned for quality assurance. Descriptive and inferential analyses will be conducted to summarize findings and identify factors associated with outcomes. Statistical techniques like Chi-square tests, logistic regression, and multiple imputation will be employed to analyze the data effectively. The study aims to provide valid and reliable conclusions on the clinical features, treatments, and outcomes of snakebite envenomation. Statistical software like SPSS v 16 or Microsoft office excel 2019 will be used for analysis, ensuring rigorous, reliable, and ethical management of the data throughout the study.

**Expected outcome of the research results:** The expected results of the study will provide comprehensive data on the clinical features, treatment protocols, and outcomes associated with snakebite envenomation in a Nepalese context. The study will also identify demographic patterns, highlight gender and age-related differences, and analyze treatment efficacy and complication rates. Ultimately, these findings will contribute to a better understanding of the problem, guide improvements in clinical care, and inform public health policies aimed at reducing snakebite mortality and morbidity in Nepal.

**Plan for utilization of research findings:** The utilization plan for this research on snakebite envenomation at Bheri Hospital involves the dissemination of findings to academic communities, healthcare institutions, and policymakers. It aims to inform public health interventions, improve snakebite management protocols, and promote prevention strategies in high-risk communities. Findings will be used for advocacy to enhance treatment access and antivenom availability, as well as to develop training programs for both healthcare workers and the general public. By leveraging the research results, the study will contribute to improving clinical care, reducing snakebite-related mortality and morbidity, and guiding future research on snakebite envenomation in Nepal.

### Ethical Consideration

**Are human participants required in this research?**

Yes

**How many participants are required for the research?**

40

**What is the frequency of the participant's involvement in the research?**

few times

**Responsibility of the research participants:**

Principal investigator and Co-Investigator Are vulnerable participants involved? Few

**Are there any risks involved for the participants?**

No

**How informed consent is obtained from the research participants?**

verbal

**Please specify:** Verbal informed consent is obtained by first introducing the researcher and explaining the study's purpose, methods, and participant involvement. The researcher provides a clear explanation of the potential risks and benefits, ensuring the participant understands the study, their role, and that participation is voluntary and can be withdrawn at any time without consequence. Participants are given an opportunity to ask questions and clarify any doubts, ensuring comprehension. Once the participant affirms their willingness to participate, they give a clear verbal consent, which is documented in the study records, either through a voice recording or by noting the date, time, and details of the consent process. Special care is taken to use language appropriate to the participant's literacy level and cultural context, and if necessary, a translator or witness is involved. This process ensures ethical standards are

maintained while respecting the participant’s autonomy and rights.

**Who is responsible for obtaining informed consent?**

Principal Investigator

**Is there anything being withheld from the research participants at the time the informed consent is being sought?**

No

**Is the research sensitive to the Nepali culture and the social values?**

No

**Is health insurance (if applicable) being made available to the research participants?**

No

**Is Investigation going to be conducted in Nepal?**

No

**Is there going to be a transfer of any biological materials from the country?**

No

**Does the study involve transfer of DNA sample?**

No

Document		
S. N	Name	Document
1.	Acceptance letter from related hospital/ Organization /Institution	Yes
2.	Conceptual framework	Yes
3.	References	Yes
4.	Flow diagram	Yes
5.	Data collection tools	Yes
6.	Work Plan	Yes
7.	Informed consent form	Yes
8.	Conflict of Interest sanket	Yes
9.	Conflict of Interest urmila	Yes
10.	Conflict of Interest Dinesh	Yes
11.	Conflict of Interest parash	Yes
12.	Role and responsibility	Yes
13.	Cover letter	Yes
14.	ethical training of all	Yes
15.	questionnaire Nepali	Yes
16.	work Plan	Yes
17.	consent form	Yes

Study Timeline	
Start date	End Date
2025-03-01	2025-10-31
2025-03-01	2025-10-31
2025-03-01	2025-10-31
2025-03-01	2025-10-31

Status History				
S. N.	Date	Status	Description	Document
1.	November 30,			
	-0001			
	Draft		Proposal is saved as a draft	
	N/A			
2.	December 8, 2024		Under administrative consideration	
	Proposal from researcher is			
	N/A			
3.	February 22, 2025		Ethical Review Board	
	accepted by NHRC.			

N/A			
4.	May 15, 2025	Approved	Meeting Date 11
May 2025			

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