

A source hunting investigation in one health approach on Nipah outbreak in the northern region of Bangladesh: The first survivor case in 2023

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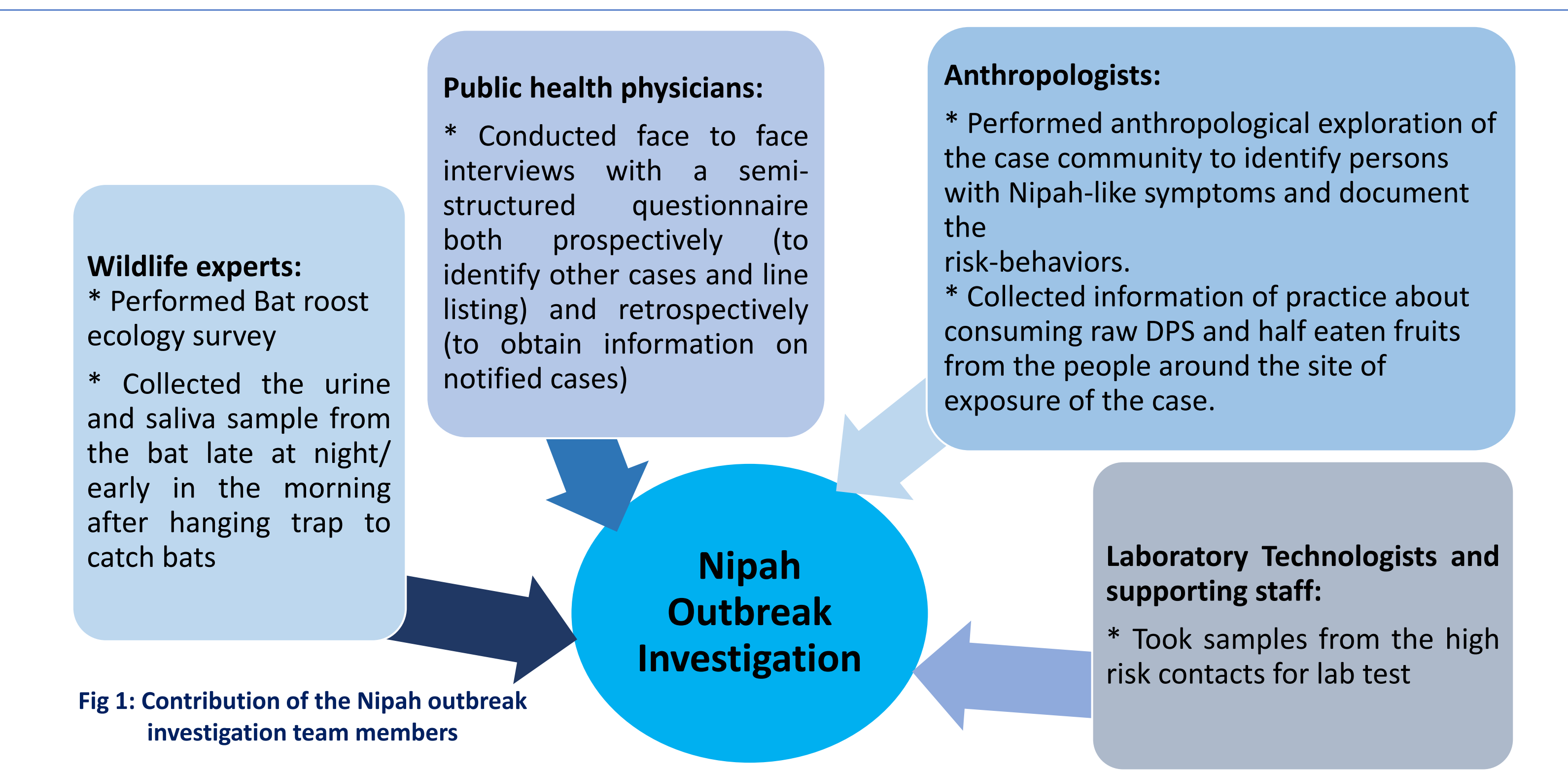
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Background

- Nipah virus (NiV) is a zoonotic virus (one of the nine infectious diseases with pandemic potential).
- On 13 January, 2023 a confirmed case of Nipah Virus Disease was reported through Nipah Enhanced Surveillance. In Bangladesh, every Nipah case notified is to be investigated because of its high case fatality rate and reporting of new cases every year.
- A team was formed in one health approach consisting of public health physicians, veterinarians and anthropologists.
- We investigated this outbreak to determine the magnitude, to identify the source of infection and also to explore the contributing perception and cultural patterns in order to control and prevent further spread.

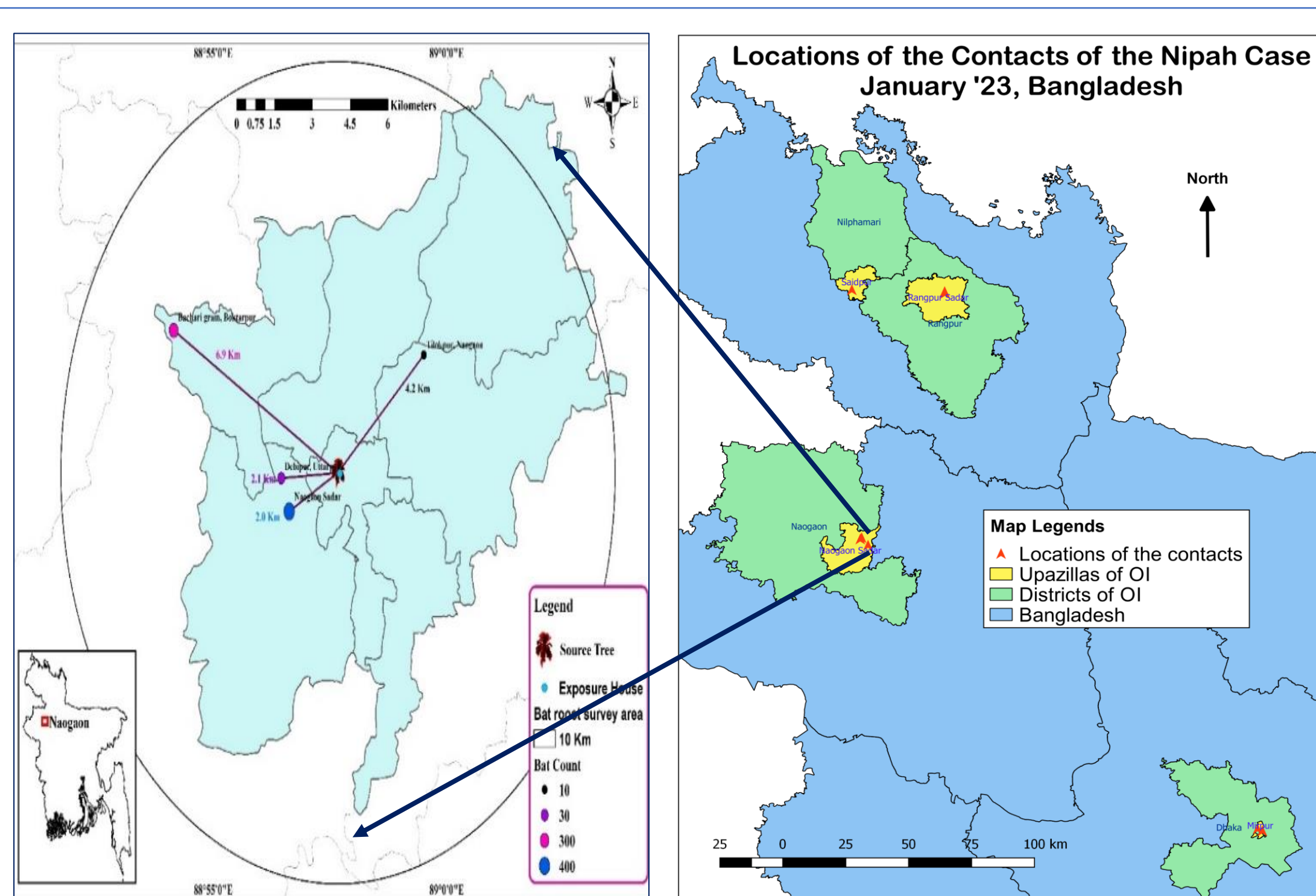
Methods

- An operational case definition was prepared for identifying suspected, probable and confirmed cases and contacts.
- The investigation at hospital and community level contacts were performed between 14 to 28 January 2023 which included contact tracing from 4 districts of Bangladesh- as the cases travelled those area after onset of symptoms.
- Throat swabs and blood were collected from high-risk and symptomatic contacts for laboratory investigation of NiV infection by detection of NiV-RNA by real time one step RT-PCR and detection of antibodies against NiV by ELISA .

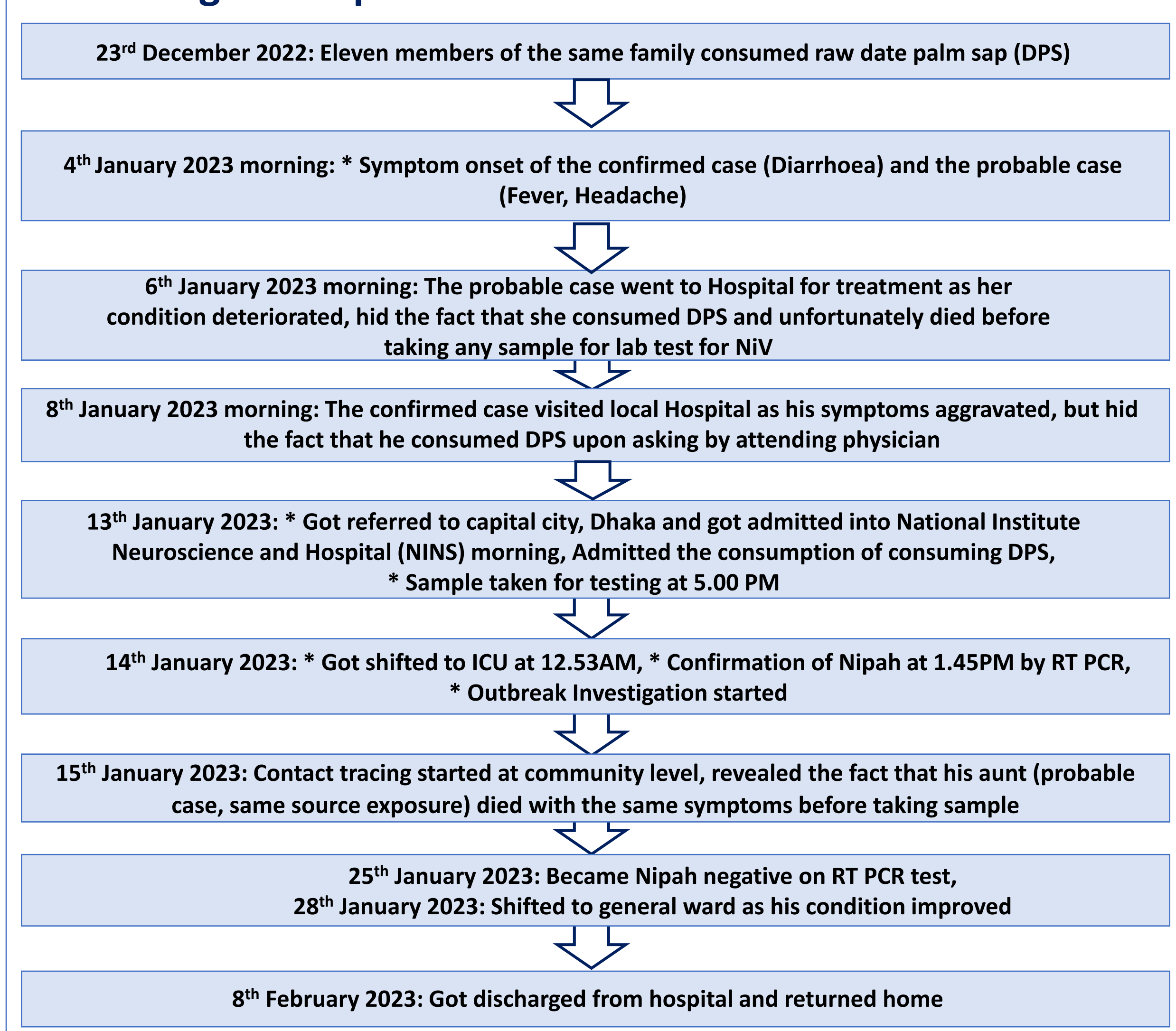


Operational definitions

- Suspected case:** Any person, Fever with- New onset of altered mental status or seizure and/or headache and/or Vomiting and/or Cough or shortness of breath- with/without history of contact and common exposure with notified Nipah patient prior to 21 days of onset of symptoms (4th January, 2023) in the areas where raw DPS was consumed is suspected case of encephalitis till to date.
- Probable case:** Any patient with history of possible Nipah encephalitis, who has died before sample collection but, has an epidemiological link with at least one confirmed Nipah patient prior to his/her symptom onset.
- Confirmed case:** A suspected encephalitis case with laboratory confirmation of Nipah virus infection either by- IgM antibody against Nipah virus by ELISA in serum or Nipah virus RNA identified by PCR from respiratory secretions (throat swab).
- Contact:** For this investigation, any person who come in direct contact (touching patient, stay with patient within 1 meter distance more than 15 minutes or more, sleep together, using common towel, caregiver) and indirect contact (not touching, stay within 1 meter distance less than 15 minutes) with notified confirmed Nipah patient after onset of his symptom.
- High risk contact:** Following symptom onset of the confirmed Nipah patient, any person who reports direct exposure to bodily fluid with a confirmed Nipah patient or close proximity that may lead to exposure with cough or sneeze of the Nipah patient, is a high-risk contact.
- Exposure:** Any person who had a history of taking raw date palm sap from the common source of notified and confirmed Nipah patient on 23rd December, 2022 will be considered as exposed.



Chronological Sequence of Events



Results

- The confirmed case (a 13 year old boy) was admitted into ICU later and survived.
- We identified the probable case by retrospective investigation, the aunt of the confirmed case- a 50-year-old female (same source exposure, but died earlier as she hid the DPS history while seeking treatment).
- Total 107 contacts were identified from the community and healthcare facilities from four sub-divisional areas: 16 in Naogaon, 25 in Nilphamari, 33 in Rangpur and 33 in Dhaka, the capital city of Bangladesh.
- We tested 55 high-risk and symptomatic contacts and all were negative for NiV by RT-PCR and ELISA.
- Four bat roosts were found within a 10km radius (including the nearest roost which was within 2 km) from the source tree where the relative of the cases collected DPS.
- We maintained regular follow-up up to 42 days according to protocol and no contacts developed any sign-symptoms at that time period.
- Our anthropologist team members saw a few date palm trees being harvested within a 500-meter radius area around the source of exposure and also came to know that, the local collectors sold the raw DPS without boiling due to reduced demand of boiled sap.

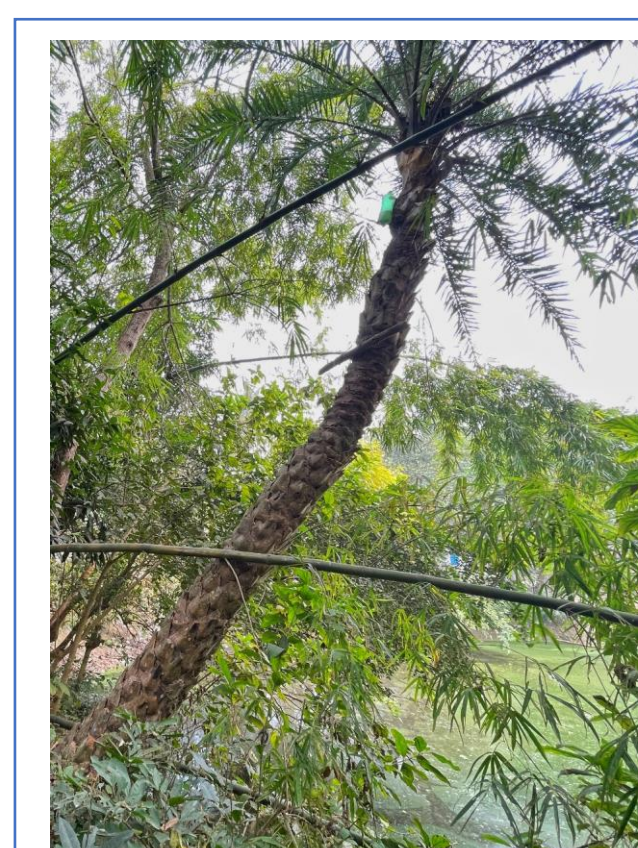


Table 1 : Characteristics of Nipah contacts (N= 107)

Variable	Number and percentage
Male	47 (43.9%)
Female	60 (56.1%)
Household contacts	33 (30.1%)
Hospital contacts	76 (71.03%)
History of Taking DPS (same source)	11 (10.3%)
History of symptoms developed	9 (8.4%)
Sample Collected (among contacts)	55 (51.4%)
Missing Case	0 (0%)

Conclusion

We identified one confirmed and one probable case of NiV infections having history of consuming contaminated DPS. The outbreak was contained since there were no cases among the contacts. By our timely investigation in one health approach and clinical intervention, the confirmed case survived successfully.

Recommendations

- Strengthen community-focused One Health surveillance to prevent disease spillover drawing from outbreak lessons and fostering interdisciplinary collaboration among health, wildlife and anthropology sectors for effective preparedness to tackle future epidemic and pandemic threats.
- Community based awareness program about Nipah virus and social stigma regarding DPS consumption need to be conducted in a large scale to combat Nipah. It may include the local people, the DPS collectors, the local influential or media persons etc. The authority should make this program sustainable to raise awareness every year.
- As Nipah has a very case fatality rate, physicians should consider taking DPS history rigorously. Regular upgradation of treatment protocol with periodic arrangement of Continuing Medical Education program in health facilities of the area can be organized.