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A SURVEY OF AWARENESS ON NIPAH VIRUS AMONG MEDICAL FRATERNITY OF TERTIARY CARE CENTERS- A NORTH INDIAN STUDY

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Abstract

Background: Nipah virus (NiV) is a highly lethal zoonotic pathogen causing recurrent outbreaks in South and Southeast Asia. The medical fraternity plays a crucial role in early detection, infection control, and outbreak containment, yet knowledge gaps may increase the risk of nosocomial transmission.

Methods: This descriptive cross-sectional study assessed Nipah virus knowledge among 658 healthcare professionals using purposive sampling over 6 months in North Indian tertiary care hospitals. A pre-tested structured questionnaire, validated by experts and piloted for reliability, covered sociodemographics, knowledge (etiology, transmission, diagnosis), attitudes, and practices. Data were analyzed descriptively as frequencies and percentages.

Results: Most participants correctly identified Nipah virus as the causative agent (87%) and fruit bats as the natural reservoir (68%). However, awareness of the zoonotic nature, Indian outbreak history, and diagnostic methods was only moderate. Many respondents incorrectly identified Kerala instead of Siliguri as the site of the first Indian outbreak, and social media/internet was the main information source.

Conclusion: Although overall awareness was satisfactory, important gaps remained in outbreak history, transmission, and diagnostic knowledge. Targeted educational interventions and structured infection-control training are needed to improve preparedness among future and current healthcare professionals.

Keywords: Nipah virus; Zoonotic disease; Healthcare professionals; Knowledge assessment; India

Introduction-

The Nipah virus (NiV) is a newly emerging zoonosis that belongs to the family Paramyxoviridae and is classified under the genus Henipavirus. This virus is fatal in nature and poses a great threat to public health, especially in the Southeast Asian and South Asian regions. The disease was first discovered in a timeline of 1998-1999 due to an outbreak in Malaysia. During the outbreak, NiV

caused encephalitis in pig farms and in humans. The case fatality ratio of the disease is approximately 40 to 75 per cent. Furthermore, it has been causing a lot of repeated outbreaks in Bangladesh and India. India has seen an outbreak in Kozhikode, Kerala (2018, 17 deaths) and isolated cases in Siliguri (2001) and Nadia (2007) indicating the virus's potential to become endemic.

The medical community is the first line of defence in detection, containment and response of NiV. Knowledge gap can lead to missed diagnosis and nosocomial transmission. Examples of early Malaysian and Bangladeshi outbreaks showed that HCWs were disproportionally affected because of lack of PPE and infection control knowledge. Before 2023, studies show low knowledge levels among HCWs. For example, a survey was carried out on 261 providers from south India in 2022. Of these, 77.8% were aware of NiV symptoms and natural hosts in bats. However, only 38.7% were aware of risk date palm sap. Meanwhile, 90.7% of them demanded more information on prevention. Likewise, a study conducted in Bangladesh during 2020-2021 among 211 physicians found that 19% had good knowledge, 50% fair and 31% poor; the chief cause of which was low awareness (83%). In Mysuru, India (2019), 43.5% medical students had good epidemiological knowledge, but only 31.4% knew the incubation period of 5-14 days, with senior students being more aware.[3,5].

The findings point to the need to assess the awareness of NiV among the Indian medical fraternity, as any outbreak will overwhelm the healthcare system and there are currently no vaccines or antivirals available; management will therefore only be supportive care and isolation. Surveys conducted cross-sectionally like this survey are necessary to quantify knowledge, attitudes, practices (KAP) and training needs so that further targeted measures such as workshops and protocol can be integrated into the curriculum. In states like MP, which are near previous hotspots, outbreaks could be aggravated owing to low preparedness. Moreover, this necessitates a One Health approach in combination with veterinary, human and environmental surveillance.2,5 The current study aims to assess levels of NiV awareness, gaps identified, and suggest measures to strengthen the preparedness of the medical fraternity against the level-4 threat.

Material & Methods-

This study was a descriptive cross-sectional design to capture a snapshot of current knowledge regarding the Nipah virus. The recruitment of participants for this study was accomplished from Jan 2019 to May 2019.

Study Population and Sampling

The target population consists of medical professionals (doctors, surgeons, and students) who are actively engaged in clinical care. Using a prevalence value (77.8%) taken from published literature, the sample size was estimated at a 95% confidence interval and 5% margin of error . A purposive sampling technique was used to include healthcare professionals actively involved in patient care and available at the time of the study. Notably, certain representatives were specifically chosen. As participants of the present study, were included faculty, resident doctors, physicians, surgeons and nursing staff. These were from the tertiary care teaching hospitals of North India.

The formula was used to calculate the sample size.

n = (Z2*p*(1-p))/(d2) where: n = sample size Z = z-value d = precision p = estimated proportion of the population

where

- The sample size that is required is n.
- Z value at 95 percent confidence level is 1.96
- Probability value is equal to O.778.
- The margin of error can be 3.5 per cent.

n equals to the expression stated above.

n ≈ 542 after considering 20% non-response.

Final sample size = 542 + (20 percent of 542).

The final sample size was ≈ 542 + 108 = 650. The sample size was calculated using 77.8% prevalence, 95% confidence level and 3.5% margin of error. This calculation yielded a minimum sample size of 542. After adding a 20% non-response rate, the final sample size was 650.
Participants who were already studying or working at the selected institutions were included. Those who did not consent were excluded. The Institutional Ethics Committee granted ethical approval, while written informed consent was secured from all participants before the data gathering took place.

Data Collection & Analysis
A structured questionnaire was prepared on reference of WHO and CDC and was pre-tested before data collection. The questionnaire encompassed sections for collecting sociodemographic details and for assessing knowledge about the Nipah virus aetiology, transmission, clinical features including diagnosis. Each correct response was given a score of one mark and a total knowledge score was computed. According to the scores obtained, the participants were classified as possessing poor (<50%), moderate (50–75%) or good (>75%) knowledge. Before beginning the study, subject experts reviewed the questionnaire to test its content validity and performed a pilot test on it.
The relevant statistical software was used to analyze data. Categorical variables were reported by count and percentage. The research (experiment) was done at the S.R. College of Pharmaceutical Sciences. A significance of p-value less than 0.05

Results-The total number of study participants were (N=658), out of which 556 undergraduate, 86 postgraduates, and 16 faculty members. The overall male-to-female ratio was 61% to 39% [Table 1]. An overwhelming majority (87%) of the entire informants have knowledge on the agency causing Nipah virus, indicating a high level of awareness on the aetiology of Nipah virus. However, only 31% of the respondents were aware that Nipah virus has zoonotic origin. Furthermore, only 59% of the participants were aware that it originated from Malaysia as shown in Table 2. While 68% of the total cohort correctly identified fruit bats as the natural reservoir, there were significant discrepancies in knowledge regarding the first outbreak in India, with many erroneously attributing this event to Kerala instead of Siliguri [Table 3]. Eventually, knowledge of diagnostics and clinics has moderately 52.3% correct views on laboratory methods of participants. Majority responded social media or internet as the main source of information [Table 4].

Table 1: Socio-Demographic Profile of Participants

Characteristics	Undergraduates (n=556)	Postgraduates (n=86)	Faculty (n=16)	Total (N=658)
Sex				
Male	348 (63%)	42 (49%)	10 (62.5%)	400 (61%)
Female	208 (37%)	44 (51%)	6 (37.5%)	258 (39%)
Total	**556 (100%)**	**86 (100%)**	**16 (100%)**	**658 (100%)**

Table 2: Knowledge Regarding Nipah Virus Etiology and Origin.

Knowledge Variable	Undergraduates (n=556)	Postgraduates (n=86)	Faculty (n=16)	Total (N=658)
Causative Agent				
Nipah Virus	484 (87%)	76 (88%)	13 (81%)	573 (87%)
Others (H1N1/Flu)	72 (13%)	10 (12%)	3 (19%)	85 (13%)
Nature of Disease				
Zoonotic	344 (62%)	41 (48%)	11 (68%)	396 (60%)
Others/Combined	212 (38%)	45 (52%)	5 (32%)	262 (40%)
Geographic Origin				
Malaysian Peninsula	314 (56.5%)	58 (67.4%)	6 (37.5%)	378 (57.4%)
Others	242 (43.5%)	28 (32.6%)	10 (62.5%)	280 (42.6%)
First Outbreak				

Group				
Pig Farmers	390 (70%)	60 (70%)	6 (37.5%)	456 (69%)
Others	166 (30%)	26 (30%)	10 (62.5%)	202 (31%)

Table 3: Knowledge of Transmission and Clinical Features

Characteristics	**Undergraduates (n=556)**	**Postgraduates (n=86)**	**Faculty (n=16)**	**Total (N=658)**
Natural Host				
Fruit Bat	378 (68%)	59 (69%)	6 (37.5%)	443 (68%)
Others (Pig/Fly)	178 (32%)	27 (31%)	10 (62.5%)	215 (32%)
Risk Factors				
Pig farming (True)	472 (85%)	70 (81%)	11 (68.75%)	558 (85%)
First Outbreak (India)				
Siliguri*	170 (30.6%)	34 (39.5%)	10 (62.5%)	214 (32.5%)
Kerala	386 (69.4%)	52 (60.5%)	6 (37.5%)	444 (67.5%)
Systems Affected				
Brain & Respiratory	322 (58%)	58 (67.4%)	6 (38%)	386 (59%)

Table 4: Diagnosis, Treatment, and Information Sources

Characteristics	**Undergraduates (n=556)**	**Postgraduates (n=86)**	**Faculty (n=16)**	**Total (N=658)**
Diagnosis (RT-PCR/Isolation)				
Both methods correct	288 (51.8%)	50 (58%)	6 (38%)	344 (52.3%)
Incubation Period				
5 to 14 days	344 (61.8%)	50 (58.1%)	6 (38%)	400 (61%)
Primary Info Source				
Social Media/Internet	3	217	1	521
Newspaper/TV	110	40	16	78
Friends/Colleagues	30	22	5	40
Awareness programs	5	9	5	19

Discussion-

According to present study, students and faculty possessed moderate to high awareness about Nipah virus as 87% identified Nipah Virus as its causative agent. In a study done by Thomas et al. [6] in medical students from Kerala, India, an almost similar finding was obtained. Herein, 43.5% had good knowledge and most of the participants were aware of the disease. Furthermore, the Himes L et al. [7] study showed that Nipah virus awareness by healthcare providers of South India had a substantial knowledge gap as well. According to the present study the knowledge regarding the zoonotic nature was only 60%. This shows that though people were aware of the disease, its zoonotic nature were not known to everyone. This is important because according to Singh et al. [1] Nipah virus is a zoonotic infection which is primarily spread with fruit bats but also through pigs and human-to-human transfer.

In the current research, 68% of respondents correctly identified fruit bats as the natural reservoir. This is similar to earlier studies where it was found that the raters were moderately aware of bat-related transmission, although, the exact percentages varied by population as well as professional category. The first outbreak in India was misunderstood by participants who incorrectly responded that the outbreak was in Kerala instead of Siliguri. This mistake is understandable as noted by Singh et al.1 and Alam et al.8. Both writers declare that the first Indian outbreak was in Siliguri in 2001, while the later outbreaks, including in 2018 and 2021, were in Kerala. The history of the outbreak seems to be less clearly retained than the concepts of reservoir and causation.

In the current study diagnostic knowledge was only moderate with 52.3% being correctly identified as RT-PCR/isolation. This finding mimics the South India healthcare-provider study by Himes et al.,[7] wherein many respondents still required more information on prevention, treatment and preparedness. The present study showed that the incubation period was 4 to 14 days which was fairly recognized by the present study as described by Alam et al. [8] and WHO. In the end, Thomas et al.,[6] also reported that social media and the internet were the main sources of information, indicating that although Nipah disease awareness is predominantly achieved by digital media, a level of half-knowledge or misinformation may persist.

Conclusion

The study showed satisfactory awareness of Nipah virus causation but notable gaps in outbreak history, transmission, and diagnosis among participants. Focused training, curriculum-based teaching, and regular infection-control updates are needed to strengthen preparedness and reduce the risk of nosocomial spread.

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