



Knowledge and attitude on Nipah at Hatibandha upazilla of Lalmonirhat district in Bangladesh

Md. Samiul Haque¹, Md. Shahadat Hossain^{2*}, Md. Muklesur Rahman³, G.U. Ahsan¹

¹Department of Public Health, North South University, Dhaka, Bangladesh

²Department of Pathology and Parasitology, Jhenaidah Government Veterinary College, Jhenaidah, Bangladesh

³Department of Microbiology and Hygiene, Bangladesh Agricultural University, Mymensingh, Bangladesh

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*Corresponding Author

Md. Shahadat Hossain

✉ shahadatvet@gmail.com

ABSTRACT

A cross sectional study was done to assess the level of knowledge on Nipah (virus) among the community people of Hatibandha upazilla at Lalmonirhat district in Bangladesh. A total of 215 samples from 3 villages (Borokhada, Shingmari, Dolapara) were selected randomly from Hatibandha upazilla in which household were selected by random sampling from each village. Among the respondents 96% people heard about Nipah, 4% have no proper knowledge. The socio-demographic profile of the survey participants were gachhi (date palm sap collector), tree owner and the community people. Gachhi covers 40% of total responded group. The study observed that among 215 respondents most of them (82.3% gachhi) used skirt (a protective covering frame made by bamboo and other materials) and 17.7% did not use skirt during sap collection. 46% people drank raw sap from protective source and 27.4% people did not drink sap from protective source. 39.5% people have the perception that not taking raw sap prevents Nipah. Respondents heard about Nipah but they don't have proper knowledge about mode of transmission, risk group of disease, symptom, treatment and prevention of the disease. This is because health worker, physicians did not provide the information correctly and low media coverage of the selected areas. Therefore, the study suggests increasing awareness through media communication and proper support from government health sector.

INTRODUCTION

Nipah virus (NiV) is an emerging infectious disease (EID) and belongs to the genus Henipavirus (family Paramyxoviridae) First identified and isolated in the village of Sungai Nipah, Malaysia in 1999 during a severe disease outbreak in humans and pigs, NiV was initially diagnosed as a Hendra-like virus and named 'Nipah' (Mahmudur Rahman, 2012). NiV has a notable case fatality rate, 75–100 percent depending on the strain. In Bangladesh, primary transmission to humans is believed to be because of consumption of bat-contaminated date palm sap (DPS) (Dhillon and Banerjee, 2015). Outbreak investigations have repeatedly identified drinking fresh date palm sap as a risk factor for NiV transmission. Bats are the reservoir of NiV and infected bats can shed virus through both saliva and urine and can contaminate the raw sap. The

virus can transmit to humans through ingestion of contaminated sap. We already know that skirts can interrupt bats' access and as an indirect effect of the skirt promotion some people stopped drinking raw sap. When trees have skirts, bats cannot access the sap and when people do not drink sap, they are at much lower risk of contracting Nipah virus but we do not know how we can influence people to practice these behaviours regularly. Nipah outbreak has been occurring every year in Bangladesh. This intervention might interrupt the disease transmission from bats to humans. Several human Nipah virus (NiV) outbreaks have occurred in Bangladesh since 2001 with 71% case fatality (Khan et al., 2012; ICDDR.B., 2010, 2011) The ICDDR.B has collaborated closely with the Government of Bangladesh through the Institute of Epidemiology, Disease Control and Research (IEDCR) on outbreak investigations and have repeatedly identified drinking fresh date palm sap

as a risk factor for NiV transmission. (Luby et al., 2006; Luby et al., 2009). Raw date palm sap is only collected during cold season (October-November to February-March) because without cold weather sap becomes spoiled (smelly and sour) for human consumption. In rural communities drinking raw date palm sap is a common practice in the cold season that coincides temporally with the NiV outbreak season in Bangladesh. When people drink raw date palm sap, apparently contaminated with infected bats' saliva and urine, they may get NiV infection (Khan et al., 2012).

In Bangladesh, Nipah was first reported from Meherpur district in April-May 2001 with 13 cases and 9 fatalities (69% mortality). Subsequently this was followed in chronological order in January 2003 in Naogaon district with 12 cases with 8 fatalities (67% mortality), January-February 2004 in Manikganj and Rajbari districts 42 cases with 14 fatalities (33% mortality), February –April 2004 in Faridpur district 36 cases with 27 fatalities (75% mortality), January 2005 in Tangail district 12 cases with 11 fatalities (92% mortality), January and February 2005 an outbreak in Thakurgaon affecting 7 people and 3 deaths (42% mortalities) February -May 2007 in Kustia district with 8 cases and 5 fatalities (55% mortality), February-March 2008 in Manikganj and Rajbari districts with 9 cases and 8 fatalities (88% mortalities). February-May 2007 in Nadia district of India 50 suspected cases were reported with 3-5 fatalities (10-17% mortalities). In February of 2011 an outbreak occurred in Hatibandha, Lalmonirhat, Dinajpur with 46 cases and 26 fatalities (56.5% mortality) with 21 children died in one day on 4th February 2011. Most of these districts are near border of India (www.thedailystar.net Feb 11, 2011; ICDDR, 2004a; 2004b). These were due to person to person contact.

In the 10 years following the Nipah outbreak in Malaysia (Gurley, et al., 2007) no further human cases of NiV infection have been reported from Malaysia, but 8 human outbreaks of NiV infection in Bangladesh were reported from 2001 through 2008, all occurring between December and May (Nahar et al., 2013). A total of 135 human cases of Nipah infection in Bangladesh were recognized; 98 (73%) died. One outbreak of NiV occurred in

Siliguri, India, 15 kilometers north of the Bangladesh border in January and February 2001 and a second NiV outbreak was reported by newspapers in Nadia District, India also close to the border with Bangladesh, in 2007 (Nahar et al., 2013). In addition to the outbreaks, between 2001 and 2007, (Ministry of Health and Family Welfare; 2007) other NiV transmission events, ranging from single sporadic human cases to clusters of 2–4 human cases were recognized in Bangladesh (Nahar et al., 2013). Thus, in contrast to the Malaysia-Singapore outbreak, which could be coherently explained by a single or perhaps a few transmissions of NiV from an infected bat to pigs, leading to a porcine epidemic which in turn led to a human epidemic in Bangladesh NiV transmission from bats to human is repeated and ongoing. The diversity of NiV strains recovered from Bangladesh also supports multiple introductions of the virus from bats into human populations even within a single year. Among 4 NiV isolates from human NiV cases in 2004, the sequences of the nucleoprotein open reading frames of the isolates differed by 0.9% in nucleotide homology, in contrast to the sequences obtained from all of the human cases in Malaysia which were nearly identical to each other (ICDDR, 2007).

The clinical presentation of NiV infection in Bangladesh differed from Malaysia. In Bangladesh, severe respiratory disease is more common, with 62% of cases having cough, 69% developing respiratory difficulty, and available chest radiographs showing diffuse bilateral opacities covering the majority of the lung fields. By contrast, in Malaysia, 14% of patients had a non-productive cough on presentation; only 6% of chest radiographs were abnormal and these abnormalities were mild and focal. The case fatality rate was higher in Bangladesh at 73%, compared with 39% from Malaysia, but much of this difference results from the more sophisticated clinical care provided in Malaysia. One-half of Malaysian Nipah patients received mechanical ventilatory support compared to a single patient (1%) in Bangladesh (Chua, 2003). One third of Nipah survivors in Bangladesh have moderate to severe objective neurological dysfunction 7-30 months after infection (Chua, 2003; Nahar et al., 2013). Epidemiological investigations in

Bangladesh have identified three pathways of transmission of NiV from bats to people. The most frequently implicated route is ingestion of fresh date palm sap. Date palm sap is harvested from December through March, particularly in west central Bangladesh. A tap is cut into the tree trunk and sap flows slowly overnight into an open clay pot. Infrared camera studies confirm that *P. giganteus* bats frequently visit date palm sap trees and lick the sap during collection (Nahar et al., 2013). NiV can survive for days on sugar-rich solutions such as fruit pulp (ICDDR, 2010). The presumed wildlife reservoir of Nipah virus, bats of the genus *Pteropus*, is widely distributed across Bangladesh, the rest of the Indian subcontinent, and Southeast Asia.

Most date palm sap is processed at high temperature to make molasses, but some is enjoyed as a fresh juice, drunk raw within a few hours of collection. In the 2005 Nipah outbreak in Tangail District, Bangladesh, the only exposure significantly associated with illness was drinking raw date palm sap. A second route of transmission for NiV from bats to people in Bangladesh is via domestic animals. Fruit bats commonly drop partially eaten saliva-laden fruit. Domestic animals in Bangladesh forage for such food. Date palm sap that is contaminated with bat feces and so is unfit for human consumption is also occasionally fed to domestic animals. The domestic animals may become infected with NiV, and shed the virus to other animals, including humans. Contact with a sick cow in Meherpur, Bangladesh in 2001 was strongly associated with Nipah infection (ICDDR, 2007). Pig and goat may associate with Nipah outbreak in Naogaon in 2003, 2004 (Ministry of Health and Family Welfare; 2007). The epidemiology of NiV transmission in Bangladesh suggests two avenues to prevent human disease. The first is limiting exposure of Bangladeshi villagers to NiV contaminated fresh date palm sap. Steps to make the date palm sap consumption safer include diverting more of the production to molasses where the sap is cooked at temperatures above the level that NiV cannot survive and limiting bat access to date palm trees where the sap will be consumed fresh. A number

of methods have been occasionally employed by date palm sap collectors to restrict bat access to date palm trees (Ministry of Health and Family Welfare; 2007). The study was done to observe behavior change interventions to prevent human consumption of NiV contaminated sap through reducing raw sap consumption from unprotected trees in a district of the Nipah affected regions.

MATERIALS AND METHOD

The study was conducted among gacchi (date palm sap collector) and date palm tree owner living in 3 selected villages (Borokhada, Shingmari, Dolapara) Hatibandha upazilla at Lalmonirhat district of Bangladesh. Interview was taken to collect data from the respondents during the October 2012 to March 2013. The sample size was 215, calculated using the formula $4 pq/d^2$. A pre structured questionnaire was used to assess knowledge and attitude related to Nipah among the respondents. Then the data was collected, analysed and entered into Excel. The frequency of sociodemographic variables, knowledge and attitude among respondents were expressed in proportions.

RESULTS AND DISCUSSION

Table-1 shows that among 215 respondent 96.3% people hear about Nipah disease and 3.7% are not hear about Nipah disease.

Table 1: Distribution of the respondent based on knowledge about Nipah Disease

		Frequency	Percent
Have you heard about Nipah disease?	Yes	207	96.3
	No	8	3.7
	Total	215	100.0

Source of information about Nipah

Table 2 shows that among 215 respondent 8% people have seen one time, 39.1% seen two times and 53% seen poster multiple time about Nipah disease.

Table 2: Distribution of the respondent based on how many times have seen poster about Nipah

How many times have seen poster about Nipah?	Frequency	Percent
One time	17	7.9
Two times	84	39.1
Multiple times	114	53.0
Total	215	100.0

Table 3: Sources of information on Nipah disease

Sources	Responses		Percent of Cases
	N	Percent	
NGO	211	15.9%	98.6%
Community	169	12.7%	79.0%
Doctor	180	13.6%	84.1%
Imam	171	12.9%	79.9%
Neighbour	164	12.4%	76.6%
Leader	156	11.8%	72.9%
Family	145	10.9%	67.8%
Doctor from dhaka	130	9.8%	60.7%

People were getting information about nipah disease from different community services (Table 3). 98.6% respondent got information from NGO followed by doctors or physicians (84.1%), imam (79.9%), community (79.0%). Less number of people get information from family (67.8%) and Doctor from Dhaka (60.7%).

Table 4: Distribution of the respondent based on using skirts during sap collection

Use of skirts	Frequency	Percent
Yes	177	82.3
No	38	17.7
Total	215	100.0

Table 4 shows that among 215 respondent 82.3% people use skirt during sap collection and 17.7% do not use skirt during sap collection.

Table 5: Distribution of the respondents according to materials used in skirts

Materials used in skrits	Frequency	Percent
Bamboo	150	69.8
Dhoincha	59	27.4
Jute stalk	6	2.8
Total	215	100.0

It is observed that among 215 respondents than 69.8% gacchi used bamboo during skirt preparation, 27.4% used dhoincha and 2.8% used jute stalk during skirts preparation (Table 5).

Table 6: Percent respondents drink raw sap from protective source

Drinking raw sap	Frequency	Percent
Multiple times a day	99	46.0
Once a day	59	27.4
2-3 times per week	47	21.9
Once or twice a season	9	4.2
	1	0.5
Total	215	100.0

The study shows that among 215 respondent 46% people drank raw sap from protective source multiple times a day, 27.4% people drank raw sap from protective sap once daily, 21.9% drank raw sap from protective source 2-3 times per week and 4.2 % drank raw sap from protective source once or twice a season (Table 6).

Table 7: Percent respondent based on sap collection in different times

Bengali Months	Frequency	Percent
Arshin	18	8.4
Kartik	77	35.8
Agrahayan	80	37.2
Poush	26	12.1
Magh	8	3.7
Falgun	6	2.8
Total	215	100.0

It is found that 8.4% gacchi start collecting sap in Arshin month (September–October), 35.8% start collecting sap from Kartik month (October–November), 37.2% from Agrahayan month (November–December, 12.1% from Poush (December–January), 3.7% from Magh (January–February) and 2.8 % from Flgun month (February–March).

Table 9: Percent respondent saw bats in locality

Seeing bats	Frequency	Percent
Daily	143	66.5
Once or twice a week	47	21.9
Only occasionally	22	10.2
Never	2	0.9
Dont know	1	0.5
Total	215	100.0

Table 9 shows that among 215 respondent 66.5% people saw bats daily, 21.9% saw one or twice a day 10.2% saw occasionally and .9% never saw bats in their locality.

Table 10: Percent respondents followed way of prevention of Nipah disease

Ways of prevention	Responses		Percent of Cases
	N	Percent	
Stop drinking raw sap	150	39.5%	69.8%
Stop drinking any form of date palm sap	72	18.9%	33.5%
Use skirts	110	28.9%	51.2%
Drink boiled sap	27	7.1%	12.6%
Nothing done to prevent Nipah	21	5.5%	9.8%
Total	380	100.0%	176.7%

It was observed that 39.5% respondents believed that Nipah will prevent if people stop to drink raw sap, 18.9% believed stop drinking of any form of sap, 28.9% believed using skirt is one of prevention of Nipah disease and 7.1% believed drinking boil sap can be the way to prevent Nipah

Table 11: Education status of respondents

Education	Satisfactory	Non-satisfactory	Total	Percent
Illiterate	47	52	99	46%
Primary to Graduate	77	39	116	53.9%

Table 11 shows that among 215 respondents 46% people Illiterate and 53.9% people Primary to Graduate.

Table 12: Main Occupation of the respondents

Occupation	Satisfactory	Non satisfactory	Total	Percent
Farmer	61	55	116	53.9%
Employee	57	42	99	46%

It was observed that 53.9% respondents are farmer and 46% respondents are employee.

DISCUSSION

Nipah virus is zoonotic and causes severe disease in swine and humans. Symptoms range from

asymptomatic to acute respiratory syndrome with fatal encephalitis. The study described the knowledge and attitude of respondents towards Nipah disease in their locality.

Due to the lack of knowledge and awareness, community people cannot take advantage of methods to mitigate Nipah infection as detailed above, resulting in periodic outbreaks of NiV infections among community people in some areas of Bangladesh (Lo et al., 2012).

Since people continue drinking raw sap and Nipah outbreaks have been recurring almost every year in Bangladesh, including a date palm sap associated outbreak in 2012 after the change in government policy to discourage drinking the date palm sap, more effective interventions are needed. The study suggests taking collaborative effect with NGOs and other community services in order to prevent Nipah disease. People should be aware of avoiding drinking raw date palm sap and to use skirts to protect the raw sap if they want to continue to drink raw sap.

Most of the gachhi now take sap from the protective source than that of previous result done by another organization. Most of the people start to collect sap from Kartik (October–November) and stop to collect sap Magh month (January–February).

Information from the poster, newspaper community health worker, imam, local leader etc is a very important intervention for the spread of Nipah disease through sap.

For preventive measures of NiV spillover, awareness programs should be implemented, including for mitigation strategies, such as the use of bamboo skirts during the collection of date palm sap as well as the avoidance of drinking raw date palm sap and eating half-eaten fruits. Moreover, community-based educational campaigns should be organized in high-risk bat–human interface areas targeted at bat hunters and consumers and Gacchi as well as the households neighboring bat roosts in order to avoid future outbreaks of NiV in Bangladesh.

CONCLUSION

This study on knowledge and attitude towards Nipah disease among community people was being conducted at hatibandha of Lalmonirhat district in Bangladesh. It provides an opportunity to explore the extent of understanding of and compliance with Nipah virus prevention and control guidelines among community people in the epidemiological context of low incidence. As it relates to the public health implications locally, the findings support the need to specifically include health care workers in order to improve capacity to manage Nipah Disease. Considering the results, this study strongly recommends designing an appropriate intervention program targeting community people in order to build strong awareness and motivation to stop drinking raw sap, using of skirts during collection of date palm sap from tree and hygienic processing of the sap through designing and implementing educational intervention.

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