Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Khoso et al - 2026

DOI: http://doi.org/10.5281/zenodo.20488052

KNOWLEDGE ABOUT NIPAH VIRUS AND IT'S PREVENTION AMONG UNDERGRADUATE STUDENTS OF PEOPLE'S NURSING SCHOOL LUMHS JAMSHORO

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Keywords:

Nipah, Virus, Knowledge, vaccine, healthcare workers.

Received on 03 Apr 2026

Accepted on 04 May 2026

Published on 30 May 2026

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Abstract

Background:

Nipah virus (NIV) is a highly infectious zoonotic disease associated with significant morbidity and mortality worldwide. Adequate knowledge regarding its transmission and prevention is essential, particularly among healthcare students who play a vital role in disease control and public awareness.

Objective: This study aimed to assess the level of knowledge regarding Nipah virus and its prevention among undergraduate students of Peoples Nursing School, LUMHS Jamshoro.

Methods: A descriptive cross-sectional study design was conducted, Data were collected from undergraduate nursing students using a structured questionnaire after consent from participants.

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Online ISSN 3007-2387

Print ISSN 3007-2379

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Sample size taken by using Rao software, with 5% margin of error and 95% confidence interval. The collected data were analyzed using SPSS, and results were presented in the form of frequencies and percentages. Appropriate statistical tests were applied to determine the association between variables.

Results: The results revealed that the overall level of knowledge regarding Nipah virus among undergraduate students was moderate. Approximately 42–54% of the participants demonstrated correct knowledge on certain aspects, such as transmission and prevention. However, a considerable proportion of students showed misconceptions, for instance, 44.6% incorrectly believed that Nipah virus is transmitted through sexual intercourse, while 23.8% wrongly associated it with HIV/AIDS. Additionally, a significant percentage of respondents (around 30–34%) selected "don't know" for several questions, indicating gaps in knowledge.

Conclusion: The study indicates that undergraduate nursing students possess a moderate level of knowledge regarding Nipah virus and its prevention, with notable gaps and misconceptions in key areas. These findings highlight the need for targeted educational interventions, awareness programs, and strengthened academic training to improve students' understanding. Enhancing knowledge at the undergraduate level is essential for effective disease prevention, early recognition, and better preparedness in managing emerging infectious diseases.

CHAPTER 1

INTRODUCTION

1.1 Background

The Nipah virus is a severely virulent and emerging zoonotic RNA virus that poses a severe threat to global public health. It belongs to the genus Henipavirus within the family Paramyxoviridae and is closely related to the Hendra virus, another lethal agent that jumped from horses to humans in the 1990s(1). As an enveloped, non-segmented, single-stranded virus, NiV is classified globally as a

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Online ISSN 3007-2387

Print ISSN 3007-2379

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Biosafety Level 4 (BSL-4) pathogen because of its high mortality rate, the potential for human-to-human transmission, and the current absence of effective vaccines or targeted therapies.

The virus was first identified in 1998 during a massive outbreak in Malaysia and Singapore, which primarily affected pig farmers. This initial event resulted in nearly 300 human cases and over 100 deaths, while also devastating the local economy as more than one million pigs were culled to control the spread. The virus was named after the Malaysian village of Kampung Sungai Nipah, where the first human isolation occurred. Since then, NiV has caused recurring seasonal outbreaks in South and Southeast Asia, particularly in Bangladesh and India, where it has become an endemic health threat.

According to Silvia Angeletti, Massimo Ciccozzi conducted a study in the year of 2016. In their study a phylogenetic and also an evolutionary analysis is carried out which has been used to help in in understanding the starting, origin and epidemiology of the virus. According to D.D. Kulkarni, C. Tosh in the year 2013 done a study regarding the present situation of Nipah virus infection. In their study they explained about the outbreak, historical background, etiology, host ranges, regarding the cases and the death records, route of transmission of disease, the clinical signs which are presented in animals, disease in human being and diagnostic test and their facilities. Same like this all studies other so much researches are going on in the name of Nipah virus. Those who are infected with Nipah virus infection are should be isolated and precautions must be taken by using the protective equipment like face shields, masks, double gloves, surgical gowns and aprons should be used to prevent nosocomial transmission. No any antiviral medications are available for the treatment. The only management is the

Intensive supportive care. Still there is no any medication, vaccinations or any other particular treatment is available for the curing of the infection. An intensive supportive care is only available now for treating and preventing the further complications. Still itself it is one

of the untreatable disease, the only way is to avoid crowded areas, not eating infected fruit and polluted water. This can prevent the further complication. The natural biological reservoir for the

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Nipah virus is frugivorous fruit bats of the Pteropus genus, commonly known as "flying foxes". These bats harbor the virus in their systems without showing any clinical symptoms of disease. However, they intermittently shed the virus through saliva, urine, faeces, and blood, which can then contaminate the environment or food sources. Intermediate hosts play a pivotal role in the transmission cycle by amplifying the virus before it reaches humans. While pigs were the primary bridge in Malaysia, horses were implicated in a 2014 outbreak in the Philippines, and other animals like dogs, cats, and goats have shown susceptibility to the infection.

Transmission dynamics vary significantly across different geographical regions due to diverse cultural practices and ecological conditions(2). In Bangladesh and parts of India, the most common route of infection is the consumption of raw date palm sap. This culturally valued beverage is often harvested during winter months, matching the period when infected bats frequently visit the trees and contaminate the sap with their excretions. Additionally, human-to-human transmission has emerged as a significant pathway, especially in hospital settings (nosocomial infection) and during traditional funeral rituals involving close contact with the deceased(3). In these regions, the virus is often spread through droplets or direct contact with the respiratory secretions and saliva of infected individuals.

The clinical presentation of Nipah virus in humans is exceptionally severe, often beginning with non-specific symptoms such as fever, headache, myalgia, and vomiting. After an incubation period that typically ranges from 4 to 14 days, the disease can rapidly progress to acute respiratory distress and neurological complications. Patients frequently suffer from severe encephalitis (brain inflammation), which can manifest as disorientation, mental confusion, and seizures, eventually leading to a coma within 24 to 48 hours(**4**). Long-term survivors may also experience neurological sequelae, including personality changes and recurring seizures. The case-fatality rate for NiV is among the highest for infectious diseases, typically ranging from 40% to 75%, though some recent outbreaks in the "Nipah belt" of Bangladesh have reported fatality rates as high as 92% to 100%.

Given its high mortality and the potential to trigger a pandemic, the **World Health Organization (WHO)** has listed NiV as a priority disease for research and development. Despite the recognized

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danger, there is still a limited understanding of the virus's genetic diversity and its transmission patterns within wildlife populations(5). Current management of the disease is restricted to intensive supportive care, as there are no standardized antiviral treatments or human vaccines available. Consequently, the global response emphasizes biosecurity and public awareness. Various studies have highlighted that emerging infectious diseases such as Nipah virus pose a serious threat to public health, particularly in developing countries. Undergraduate nursing students, being future healthcare providers, are expected to have adequate knowledge regarding the transmission, symptoms, and preventive measures of such infections. However, previous research indicates that the level of awareness regarding Nipah virus among students is often inadequate, especially in terms of its modes of transmission and infection control practices. Studies conducted in different regions have shown that while some students possess basic knowledge, there are still significant gaps in understanding preventive strategies such as proper use of personal protective equipment, isolation techniques, and early identification of symptoms.

Furthermore, educational exposure and clinical training play a vital role in enhancing students' knowledge and preparedness. It has been observed that students who receive proper guidance, supervision, and updated information during their clinical practice demonstrate better awareness and preventive behaviors. In the context of Pakistan, limited research is available focusing specifically on Nipah virus awareness among nursing students, particularly in institutions like Peoples Nursing School Jamshoro. Therefore, assessing the level of knowledge regarding Nipah virus and its prevention among undergraduate nursing students is essential to identify existing gaps and to improve educational strategies. This will ultimately help in strengthening infection control practices and ensuring better preparedness for potential outbreaks.

A major challenge in controlling the virus is the gap in knowledge and preventive practices among both health care providers and the general population. Studies in high-risk areas have shown that many people continue to engage in risky behaviors, such as drinking raw sap, despite being aware of the associated dangers. Addressing these gaps requires a "One Health" approach that integrates

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human, animal, and environmental monitoring. Effective control and future prevention will depend on strengthening surveillance systems, enhancing public health literacy, and developing culturally sensitive interventions to mitigate the risk of viral spillover from nature to humanity.

1.2: Problem statement:

The Nipah Virus Infection is a highly fatal zoonotic disease that poses a significant public health threat in many parts of South and Southeast Asia. Due to its high mortality rate, lack of specific treatment, and potential for human-to-human transmission, awareness and preventive practices are critical in controlling its spread. Undergraduate nursing students, as future healthcare providers, play a vital role in early detection, patient education, and infection control. Despite the importance of this knowledge, there is limited evidence regarding the level of understanding of Nipah virus and its prevention among students enrolled in institutions such as Peoples Nursing School. Insufficient knowledge may lead to inadequate preparedness, poor infection control practices, and increased risk of disease transmission in healthcare and community settings. Therefore, it is essential to assess the level of knowledge regarding Nipah virus and its preventive measures among undergraduate students of Peoples Nursing School. Identifying knowledge gaps will help in designing targeted educational interventions, strengthening curriculum content, and improving students' competence in managing emerging infectious diseases.

1.3: AIM: Assess the level of knowledge regarding Nipah Virus Infection and its prevention among undergraduate students of Peoples Nursing School.

1.4: Objectives: To assess students' knowledge about the causes and transmission of Nipah virus.
To evaluate awareness regarding signs and symptoms of Nipah virus infection.
To identify sources of information related to Nipah virus among students.

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Significance of the study:

This study on the level of knowledge regarding Nipah virus infection and its prevention among undergraduate students of Peoples Nursing School is highly significant for nursing practicum and clinical training.

Firstly, it enhances the practical competencies of nursing students by emphasizing the importance of infection prevention and control measures in clinical settings. Understanding Nipah virus equips students with essential skills such as proper use of personal protective equipment (PPE), patient isolation techniques, and safe handling of infectious materials during their practicum. Secondly, the study bridges the gap between theoretical knowledge and clinical practice. By assessing students' awareness, it ensures that nursing trainees are not only academically prepared but also clinically competent to manage emerging infectious diseases effectively during hospital postings.

Thirdly, it promotes patient and community safety during clinical practice. Well-informed nursing students can actively participate in educating patients, attendants, and the community about preventive strategies, thereby reducing the risk of disease transmission within healthcare facilities and surrounding areas. Furthermore, this study supports the development of critical thinking and decision-making skills among nursing students. In practicum settings, students may encounter suspected infectious cases, and adequate knowledge enables them to respond promptly and appropriately. Lastly, the findings of this study can assist clinical instructors and hospital administrators in designing targeted training sessions, drills, and infection control protocols, thereby strengthening the overall quality of nursing practicum and healthcare delivery.

1.5: Research Question: What is the level of knowledge regarding Nipah Virus and its prevention among nursing students at people's Nursing School Jamshoro.

1.6: Hypothesis:

- Null Hypothesis (H_0): There is no significance level of knowledge regarding Nipah Virus and it's prevention among undergraduate nursing students.

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Online ISSN 3007-2387 Print ISSN 3007-2379

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DOI: http://doi.org/10.5281/zenodo.20488052

- Alternative hypothesis: there is significant level of knowledge regarding nipah virus and its prevention among undergraduate nursing students.

1.7: Operational definition:

The level of knowledge regarding Nipah virus and its prevention refers to the extent of understanding among undergraduate nursing students about the cause, transmission, signs and symptoms, risk factors, and preventive measures of Nipah virus, as measured by a structured questionnaire.

CHAPTER 2

LITERATURE REVIEW

Nipah virus (NiV) is a highly pathogenic zoonotic virus that poses a serious global public health threat, particularly in South and Southeast Asia. It is primarily transmitted from fruit bats (*Pteropus* species) to humans, either directly or through contaminated food sources such as raw date Nipah palm sap. Human-to-human transmission has also been documented, especially in healthcare settings. NiV infection can lead to severe encephalitis and respiratory illness, with a high case fatality rate (40–75%)(6). Several studies have assessed public awareness and knowledge levels regarding Nipah virus, particularly in endemic regions like Bangladesh.

A recent nationwide cross-sectional study (2024–2025) found that only 29.2% of respondents had good knowledge of Nipah virus, despite 94.1% showing positive attitudes toward prevention. Additionally, only 33% demonstrated correct preventive practices, indicating a significant gap between knowledge and behavior(7).

Similarly, another large-scale study involving 2,121 participants reported that 69.38% of individuals were aware of Nipah virus, while 62% had adequate knowledge. The study highlighted that mass media and social platforms were the primary sources of information. These findings suggest that although awareness may be moderate, comprehensive and accurate knowledge remains insufficient,

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particularly regarding transmission routes, fatality, and prevention. Healthcare professionals generally demonstrate higher levels of knowledge compared to the general population; however, gaps still exist in infection prevention and control practices.

According to study conducted among healthcare workers in Bangladesh (2022–2023) found that although participants had a reasonable understanding of NiV, there were deficiencies in preparedness, infection control measures, and clinical management knowledge.

This indicates the need for continuous training and capacity building among healthcare providers to effectively manage outbreaks(7).

2.2: Summary

Overall, the literature indicates that while awareness of Nipah virus exists, comprehensive knowledge and effective preventive practices remain inadequate. There is a consistent gap between knowledge, attitudes, and actual behavior, especially in high-risk communities.

Furthermore, there is limited research focusing on specific populations or regions, particularly outside endemic zones, which justifies the need for further studies assessing knowledge levels and preventive practices.

CHAPTER 3

MATERIAL AND METHOD

3.1: Study Design and setting:

A descriptive cross-sectional study design was used to assess the level of knowledge regarding Nipah virus and its prevention among undergraduate students. The study was conducted at People's Nursing School, Liquat University of Medical and Health Sciences, data were collected from undergraduate nursing students.

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3.2: Study duration:

The study was carried out over a period of January 2026 to April 2026.

3.3: Study population:

The study population included undergraduate nursing students from all academic years (1st to 4th year) of People's Nursing School, Liaquat University of Medical and Health Sciences, including both morning and evening shift students.

3.4: Sample size:

A sample size 458 was selected from population by using sample sized calculator raosoft, with

- The Margin of error ± 5%
- The confidence level 95%
- Total population 458
- The sample size 210

Initially calculated sample size was 458 participants. After adding a 10% attrition rate to account for non-response or incomplete data, the final sample size was increased to 231 participants.

3.5: Sampling technique:

A non-probability convenience sampling technique was used to select participants based on their availability and willingness to participate.

- Inclusion Criteria:
- Undergraduate nursing students (1st to 4th year) .
- Students enrolled at People's Nursing School, LUMHS Jamshoro
- Students willing to participate Students who completed the questionnaire (online or physical)
- Exclusion Criteria
- Postgraduate students

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- Students absent during data collection
- Incomplete questionnaires

3.6: Data Collection Tool

A structured questionnaire was adopted to assess level of knowledge regarding nipah virus and its prevention by undergraduate nursing students. Questionnaire permission was taken by author, and his study was conducted at Najran region Saudi Arabia. The questionnaire consisted of three sections:

(1) Consent form

(2)Demographic Information (age, gender, academic year)

(3)Knowledge-related questions about Nipah virus (cause, transmission, symptoms, prevention, etc.)

Data Collection Procedure:

Data collected through online google forms with consent, sent through what's up groups. However, for participants who had limited internet access, the questionnaire was also administered in printed (hardcopy) forms to ensure maximum participation. All data were collected and stored in a secure manner. Participant's confidentiality and privacy were strictly maintained, and the collected information was used solely for academic research purposes. Access to the data was limited to the researcher only.

3.7: Data Analysis:

The data were analyzed and entered using SPSS version 27. The study variables included demographic characteristics (age, gender, academic year) and knowledge related variables about nipah virus and its prevention. Descriptive statistics were applied, and the results were presented in the form of frequencies and percentages, no inferential statistical tests were applied, as the study focused on descriptive analysis.

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3.8: Ethical consideration:

Ethical approval for this study was obtained from the Director of People's Nursing School LUMHS Jamshoro prior to data collection. Participation was entirely voluntary, and informed consent was obtained from all participants before their inclusion in the study. Participants were assured that their responses would remain confidential and anonymous. No personal identifiers were recorded, and the collected data were used solely for academic research purposes. Furthermore, all data were stored securely, and access was restricted to the researcher only.

CHAPTER-4

Results:

TABLE NO 1: CLASSIFICATION OF AGE

Catagories	Frequency	Percentage
18-22	143	57.7%
26-30	56	22.6%
31-35	20	8.1%
35-40	11	4.4%
Total:	231	93.1%

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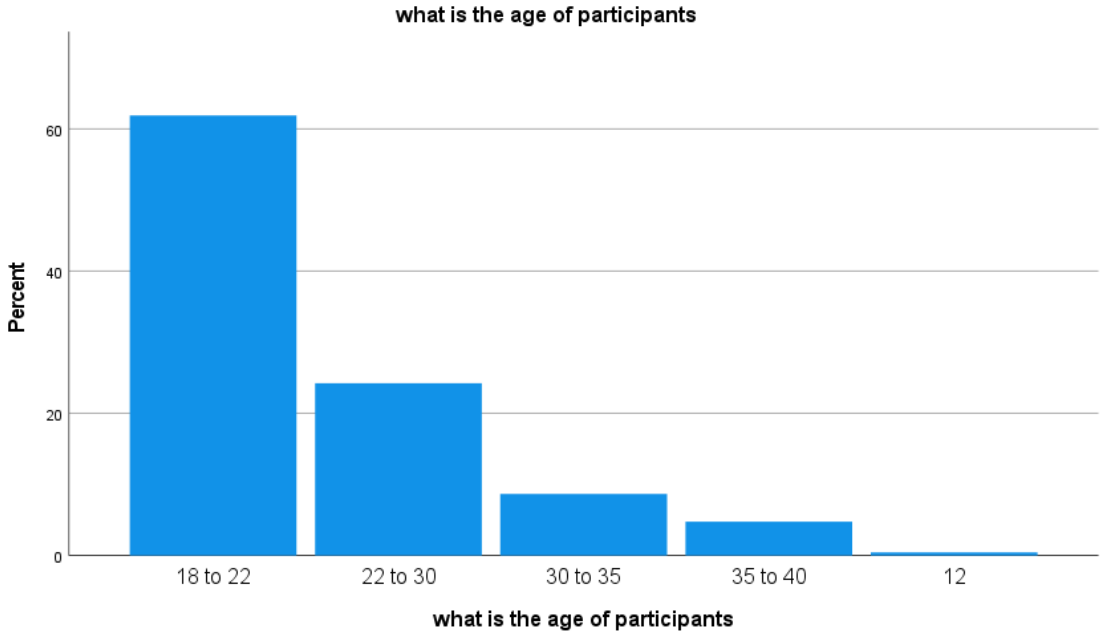

Figure:1

The results show that the majority of participants were in the age group of 18–24 years (57.7%). This was followed by the age group of 26–30 years (22.6%). A smaller proportion of participants belonged to the age group of 31–35 years (8.1%), while the least number of participants were in the age group of 35–40 years (4.4%). This indicates that most of the study participants were young adults in the 18–24 years age group.

Table 2: classification of gender

Categories	Frequency	Percentage
Male	105	45.5%
Female	126	54.5%
Total:	248	100.0

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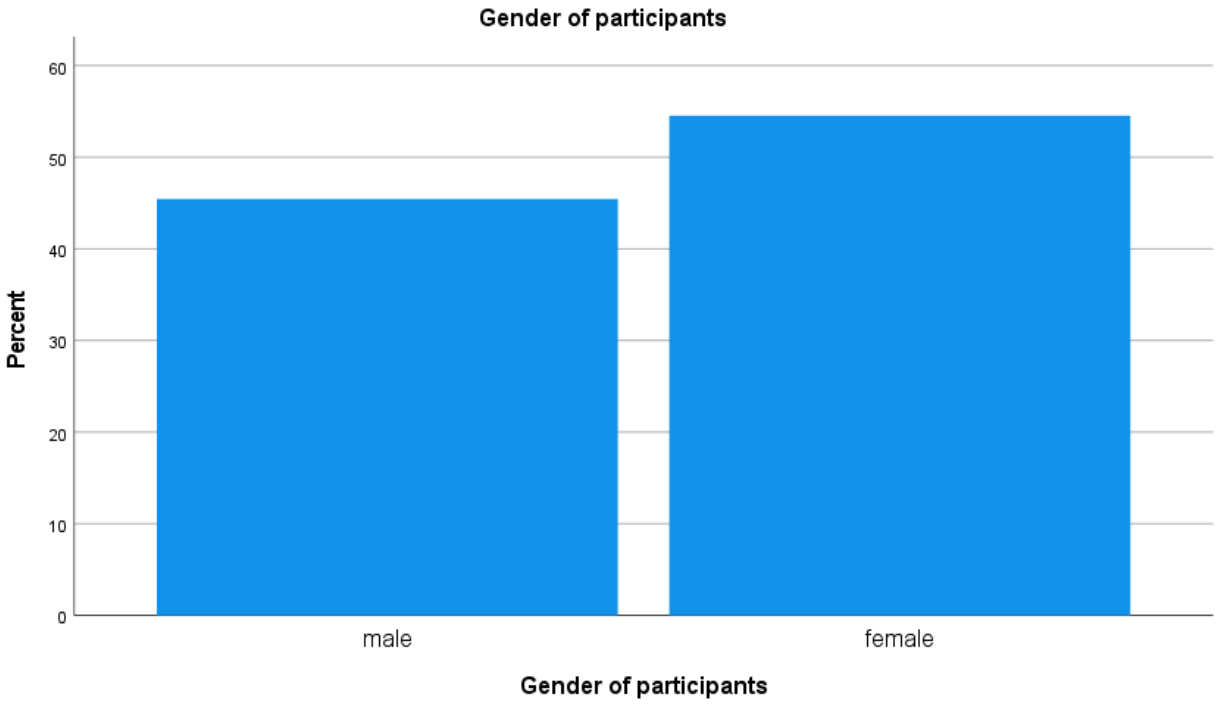

Figure 2

The results show that the majority of participants were female (54.5%), while 45.5% were male. This indicates that female participants were slightly more in number compared to male participants in the study population.

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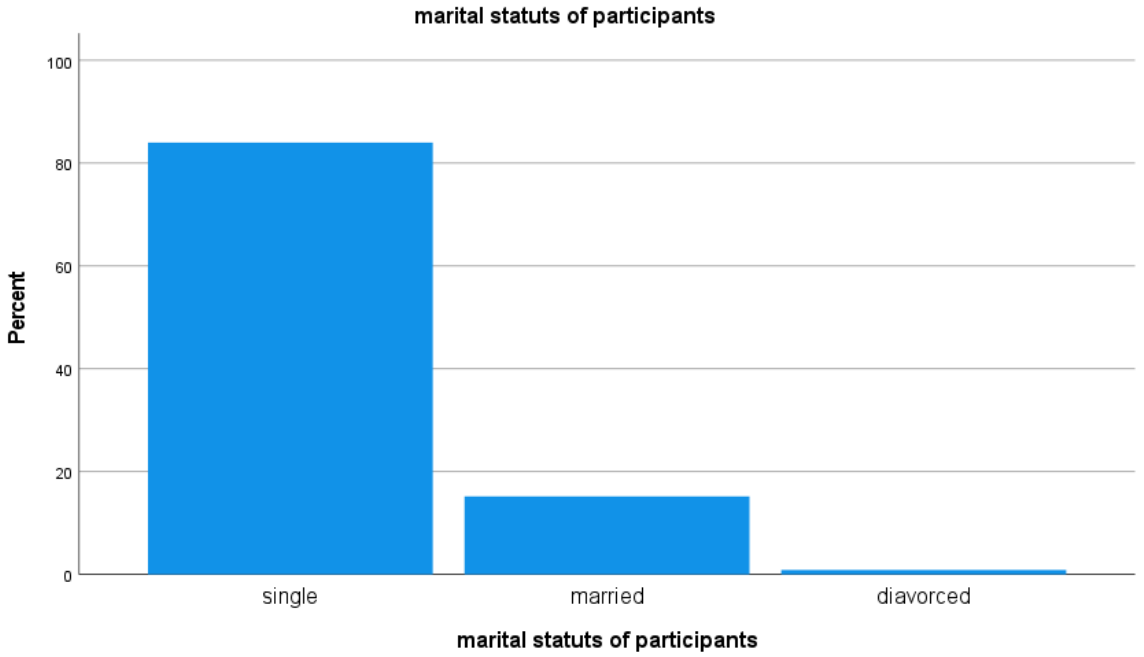

Figure 3

Table No 03: classification of marital status

Categories	Frequency	Percentage
Single	194	84.0%
Married	35	15.2%%
Divorces	2	0.9%%
Total:	248	100.0

The results show that the majority of participants were single (84.0%), while 15.2% were married and only 2.0% were divorced. This indicates that most of the study participants were unmarried students in the study population.

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https://pakjmcr.com/index.php/1/about

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Table No 04: classification of year of study

Categories	Frequency	Percentage
First year	90	39.0%
Second year	71	30.7%
Third year	49	21.2%
Fourth year	21	9.1%
Total:	231	100.0

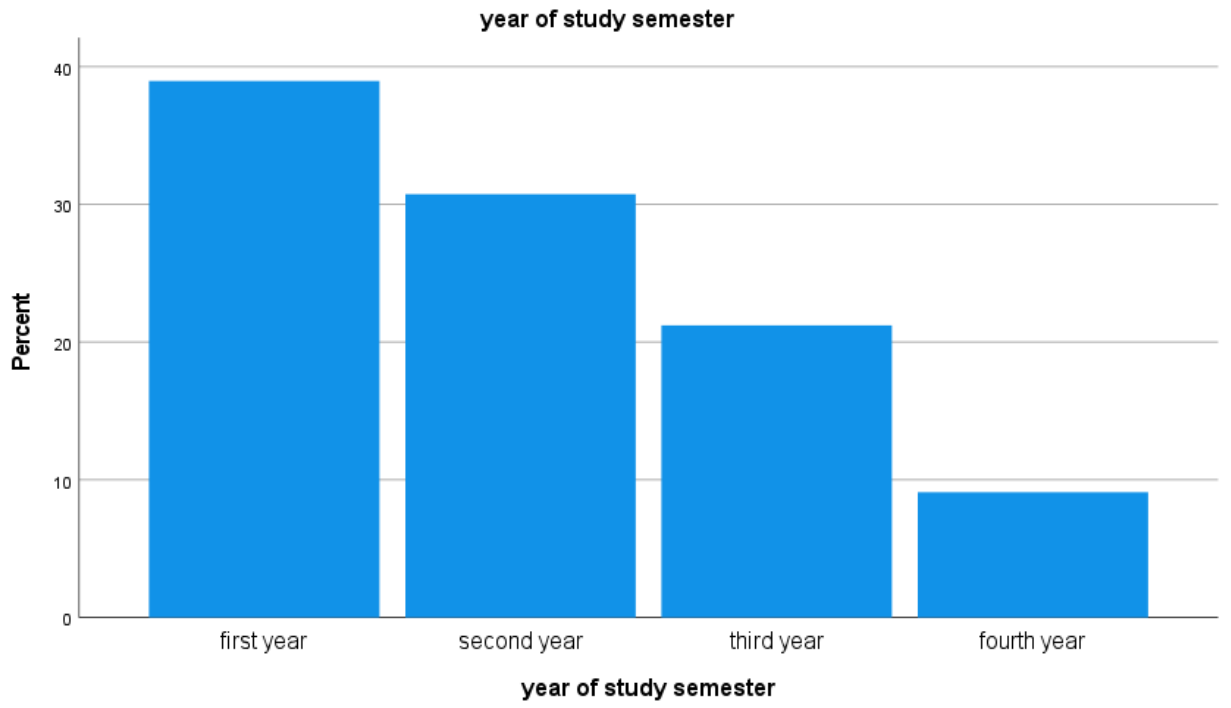

Figure 4

The results show that the majority of participants were from 1st year (39.0%), followed by 2nd year (30.7%). A smaller proportion of participants were from 3rd year (21.2%), while the least number

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Online ISSN 3007-2387

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of participants were from 4th year (9.1%). This indicates that most of the participants were from the earlier years of study, particularly 1st year students.

Table No 05: classification of Residency

Categories	Frequency	Percentage
Urban	95	42.8%
Rural	127	57.2%
Total	222	100.0

The participants residency table show that the majority of participants belonged to rural areas (57.2%), while 42.8% were from urban areas. This indicates that most of the study participants were residing in rural areas.

Table No 06 symptoms of (NIV)

Question 01	Yes n (%)	No n (%)	Don't know n (%)
Symptoms of nipah virus infection may be distress convulsion and coma	126 (54.5)%	37(16.0)%	68(29.4)%

The results show that the majority of participants responded "Yes" (54.5%), while 16.0% responded "No" and 29.4% reported "Don't know".

This indicates that more than half of the participants had knowledge regarding the asked question, although a considerable proportion still lacked awareness.

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Table No 07 Vaccine availability

Question 02	Yes n (%)	No n (%)	Don't know
A vaccine is currently available to prevent Nipah virus disease The 2018 nipah virus outbreak in kerela state	98 (42.4)%	63 (27.3)%	70 (30.3)%

The result for vaccine availability show that 42.4% of participants responded "Yes" that a vaccine is currently available for Nipah virus prevention, while 27.3% responded "No" and 30.3% reported "Don't know". This indicates that less than half of the participants had correct knowledge regarding vaccine availability, while a considerable proportion lacked awareness.

Table No 08 reservoir

Question 03	Yes n (%)	No n (%)	Don't know n (%)
Fruit bats are the main reservoir of the Nipah virus	109 (47.2)%	49(21.2)%	73 (31.6)%

"Regarding the reservoir of Nipah virus, 47.2% of the respondents correctly identified pads as the main reservoir, whereas 21.2% gave incorrect responses and 31.6% reported that they did not know."

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Table NO. 09 report of Bangladesh and India

Question 04	Yes n (%)	No n (%)	Don't know (%)
Human to human transmission of the nipah virus has been reported in Bangladesh and India	120 (52.2)%	41 (17.8)%	69 (30.0)%

With respect to human-to-human transmission of Nipah virus being reported in Bangladesh and India, 52.2% of respondents responded 'Yes', 17.8% respondents 'No', while 13.0% were not aware.

Table No 10 transmission through droplet

Question	Yes n (%)	No n (%)	Don't know n(%)
The nipah virus can be transmitted from human to human via droplet infection	121 (52.4)%	39 (16.9)%	71 (30.7)%

Regarding the transmission of nipah virus through droplet infection from human to human, 52.4% of respondents reported 'Yes', 16.9% reported 'No', while 30.7% indicated that they did not know.

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https://pakjmcr.com/index.php/1/about

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Table No 11 treatment

Question	Yes n (%)	No n (%)	Don't know n (%)
Currently there is no treatment for the nipah virus	84 (36.4)%	74(32.0)%	73(31.6)%

In relation to the availability of current treatment for Nipah virus, 36.4% of respondents reported 'Yes', 32.0% reported 'No', while 31.6% were not aware.

Table No 12 strains

Question	Yes n (%)	No n (%)	Don't know n (%)
There are many strains of nipah virus	96 (41.6)%	61(26.4)%	74 (32.0)%

In response to the statement that there are multiple strains of Nipah virus, 41.6% of respondents agreed, 26.4% disagreed, while 32.0% were not aware.

Table No 13 NiV IN Bangladesh and Malaysia

Question	Yes n (%)	No n (%)	Don't know n (%)
Outbreak of nipah virus infection has occurred in Bangladesh and Malaysia	93(40.4)%	59(25.7)%	78(33.9)%

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Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

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DOI: http://doi.org/10.5281/zenodo.20488052

Regarding whether Nipah virus infection has occurred in Bangladesh and Malaysia, 40.4% of respondents answered 'Yes', 25.7% answered 'No', and 33.9% reported that they did not know.

Table No 14 drinking date Pam Sap

Question	Yes n (%)	No n (%)	Don't know (%)
Drinking date pam sap is a common risk factor for human to human virus infection	103(44.6)%	50(21.6)%	78(33.8)%

In relation to drinking date pam sap risk factor for human-to-human viral infection, 44.6% of respondents agreed, 21.6% disagreed, while 33.8% were not aware.

Table No 15 mode of transmission through sexual contact

Question	Yes n (%)	No n (%)	Don't know n (%)
The nipah virus can be passed on during sexual intercourse	103 (44.6)%	50(21.6)%	78(33.8)%

According to mode of transmission through sexual contact results are, 44.6% of respondents answered Yes, 21.6% answered No, and 33.8% reported that they did not know.

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Table No 16 outbreak of Nipah virus

Question	Yes n (%)	No n (%)	Don't know n (%)
Outbreak of NIV occur most often during the summer months	76 (32.9)%	76(32.9)%	79(34.2)%

In relation to the seasonal occurrence of Nipah virus outbreaks during summer months, 32.9% of respondents agreed, 32.9% disagreed, while 34.2% were not aware.

Table No 17 transmission route through mosquito

Question	Yes n (%)	No n (%)	Don't know (%)
The nipah virus can be spread through mosquitos	72 (31.2)%	96(41.6)%	63(27.3)%

A higher proportion of participants (41.6%) correctly identified that Nipah virus is not transmitted by mosquitoes; however, a considerable number of respondents (31.2%) incorrectly believed mosquito transmission is possible, while 27.3% were unaware of the transmission route.

Table 18 recovery and survival rate from nipah virus

Question	Yes n (%)	No n (%)	Don't know n (%)
It is possible to survive and recover from nipah virus infection	115 (50.0)%	54(23.5)%	60(26.1)%

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Half of the participants (50.0%) reported that recovery from Nipah virus infection is possible, whereas 23.5% believed it is not possible to survive, and 26.1% had no knowledge about the outcome of infection.

Table No 19 causative agent in animal

Question	Yes n (%)	No n (%)	Don't know n (%)
The nipah virus does not cause disease in animals	70 (30.4)%	94(40.9)%	66(28.7)%

A higher proportion of participants (40.9%) correctly recognized that Nipah virus can cause disease in animals, whereas 30.4% incorrectly believed it does not affect animals, and 28.7% had no knowledge regarding this statement.

Table 20: out break in kerela and its high mortality rate

Question	Yes n(%)	No n(%)	Don't know n(%)
The 2018 nipah virus outbreak in kerela had a high mortality rate	108(47.0)%	58(25.2)%	64(27.8)%

Half of the participants (50.0%) reported that recovery from Nipah virus infection is possible, whereas 23.5% believed it is not possible to survive, and 26.1% had no knowledge about the outcome of infection.

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DOI: http://doi.org/10.5281/zenodo.20488052

Table No 21 NIV lead to HIV AIDS

Question	Yes n (%)	No n (%)	Don't know n (%)
The nipah virus can cause HIV/AIDS	55(23.8)%	103(44.6)%	73(31.6)%

Most respondents (44.6%) correctly stated that Nipah virus does not cause HIV/AIDS, while 23.8% incorrectly believed that it can cause HIV/AIDS, and 31.6% were unaware of this fact

Table No 22 disease agent in animal

Question	Yes n (%)	No n(%)	Don't know n (%)
nipah virus does not cause the disease in animals	80(34.6)%	77(33.3)%	73(31.6)%

Participants showed nearly equal distribution of responses; 33.3% correctly recognized that Nipah virus can cause disease in animals, whereas 34.6% held an incorrect belief, and 31.6% had no knowledge regarding this statement.

Table No 23 asymptomatic nipah virus

Question	Yes n (%)	No n(%)	Don't know n(%)
Nipah virus infection can be asymptomatic	86(37.6)%	72(31.4)%	71(31.0)%

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DOI: http://doi.org/10.5281/zenodo.20488052

More than one-third of participants (37.6%) correctly identified that Nipah virus infection can be asymptomatic; however, 31.4% responded incorrectly, and 31.0% had no knowledge regarding this statement.

Knowledge By year of study:

Gender	Yes	No	Don't know	Total
First year	39	12	39	90
Second year	38	15	18	71
Third year	41	5	3	23
Fourth year	8	5	8	49
Total	126	37	68	231

Chi Square test:

	Value	Df	p-value
Pearson's Chi Square	30.033	6	<.001
a.1 cells (8.3%) have expected count less than 5. The minimum expected count is 3.36			

A Chi-square test of independence showed a significant association between year of study and knowledge regarding the topic (Pearson's $\chi^2 = 30.033$, $df = 6$, $p < 0.001$). This indicates that students' responses (Yes, No, Don't know) differed significantly across different years of study.

Result description: Total 230 sample size respondents were included from which, the majority of respondents (57.7%) were in the age group of 18–22 years, indicating that most participants were young undergraduate students. The second largest group (22.6%) belonged to 26–30 years, followed by 31–35 years (8.1%) and 35–40 years (4.4%), showing a gradual decline in frequency with increasing age.

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The mean age of the participants was approximately 24–25 years (calculated using grouped data midpoints), suggesting that the sample is predominantly composed of young adults.

Regarding distribution, the data appears to be positively skewed (right-skewed), as a higher concentration of participants falls in the younger age group, while fewer participants are present in the older age categories. Participants according to their year of study, the majority of respondents were from the first year (39.0%), followed by second year students (30.7%). A smaller proportion belonged to the third year (21.2%), while the least number of participants were from the fourth year (9.1%). This indicates that most respondents were in the early years of their academic program. The mean value of 2.0 indicates that, on average, participants were around the second year of study.

The analysis of participant's responses regarding knowledge of nipah virus demonstrates a moderate level of awareness with notable gap and inconsistencies. More than half of the respondents correctly identified certain aspects such as symptoms of infection (54.5%) and human-to-human transmission (52.2%–52.4%). However, knowledge regarding other important areas remained limited. Less than half of the participants were aware of the natural reservoir (47.2%), the existence of multiple strains (41.6%), and the occurrence of outbreaks in affected countries (40.4%).

Furthermore, understanding of preventive and clinical aspects was particularly inadequate. Only 42.4% of respondents believed that a vaccine is available, while responses regarding treatment were almost equally distributed, indicating confusion (36.4% "Yes", 32.0% "No", 31.6% "Don't know"). Similarly, awareness of specific risk factors such as consumption of contaminated date palm sap was reported by 44.6% of participants. In addition, misconceptions and uncertainty were observed regarding transmission routes, including droplet infection and sexual contact, where a substantial proportion of participants either provided incorrect responses or selected "Don't know" (ranging from approximately 30% to 34% across multiple items). Overall, the findings reveal that although some participants possess basic knowledge about Nipah virus, there is a significant lack of comprehensive understanding, with consistently high proportions of uncertainty across multiple

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domains. This highlights the need for improved educational interventions to enhance awareness and accurate knowledge among undergraduate students.

Discussion:

The present study aimed to assess the level of knowledge regarding Nipah virus and its prevention among undergraduate students. The findings indicate that participants had a moderate level of knowledge, with noticeable gaps and misconceptions in several important areas. This finding is consistent with the study discovered that the knowledge of HCWs in Najran, KSA was poor although the Saudi MOH has sent circulation to all the healthcare facilities demonstrating the key points of the disease. Such points included epidemiology of the disease, agent, seasonality, mode of transmission, incubation period, clinical features, treatment, case definition, infection control in Healthcare facilities, diagnosis, and public health response. The findings indicated a lack of proper knowledge and the need for an improvement(8).

Furthermore, misconceptions were evident in relation to transmission routes, including droplet infection and sexual contact, where many participants either responded incorrectly or selected "Don't know". The consistently high percentage of uncertain responses across multiple questions highlights a lack of clear and reliable knowledge among students, however another study found that describes that The staffs of reception and pharmacy had misconceptions on prevention of Nipah infection. The study also expressed that by conducted study has helped in finding level of awareness among health care professional at the time of outbreak which can help in updating their knowledge by many educational intervention for providing quality services to the public(4).

The study highlights the need for targeted educational interventions to improve students' understanding of Nipah virus. Enhancing awareness through academic curricula, seminars, and public health campaigns is essential to reduce misconceptions and promote accurate knowledge, which is crucial for disease prevention and control. Similar results were reported by M.I. Mokbul et al. the observed higher odds of poor knowledge among participants who acquired information from

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sources like social media and television compared to those relying on educational institutions are particularly concerning. However, this result contradicts another study that compared a broader Nepalese sample, showing that respondents who learnt about the monkey pox virus and its epidemic via social media had considerably greater knowledge(5). During the AI era, in comparison to other forms of media, newspapers, local governments, and healthcare practitioners tend to be less common providers of disease information. This highlights the potential drawbacks of relying solely on social media for public health education and awareness campaigns(9).

These findings are consistent with previous studies conducted on emerging infectious diseases, which report that although general awareness may be present, detailed and accurate knowledge is often lacking, particularly in developing countries where public health education is limited.

Although some level of awareness regarding Nipah virus exists among undergraduate students, the overall knowledge remains insufficient. Addressing these gaps through continuous health education, seminars, and curriculum integration is crucial for improving disease awareness and prevention(10).

Conclusion:

The present study assessed the level of knowledge regarding Nipah virus and its prevention among undergraduate students. Overall, the findings indicate that participants had moderate but insufficient knowledge about the virus. While more than half of the respondents were aware of certain aspects such as symptoms and human-to-human transmission, knowledge regarding critical areas—such as vaccine availability, treatment options, reservoirs, and specific risk factors—remained limited.

A considerable proportion of participants consistently selected “Don’t know” across multiple questions, highlighting gaps in awareness and uncertainty. Misconceptions were also observed in areas such as transmission routes and treatment availability. These findings suggest that although some basic awareness exists, comprehensive and accurate understanding of Nipah virus is lacking among undergraduate students.

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Limitations:

This study has several limitations that should be considered:

- The study was conducted in a single institution, which limits the generalizability of the findings to other populations.
- The sample size was relatively limited, which may affect the statistical power of the results.
- Data was collected using a self-administered questionnaire, which may introduce response bias or misunderstanding of questions.
- The study assessed knowledge only, and did not evaluate attitudes or practices related to Nipah virus prevention.
- Lack of advanced statistical analysis (e.g., inferential tests) may limit deeper interpretation of associations between variables.

Strengths:

Despite limitations, the study has several strengths:

- It addresses an important and emerging public health issue (Nipah virus awareness).
- Use of a structured questionnaire ensured uniform data collection.
- Inclusion of multiple knowledge domains (symptoms, transmission, prevention, outbreaks) provides a comprehensive overview.
- The study highlights specific gaps in knowledge, which can guide future interventions.
- It provides baseline data for future research in similar populations.

Recommendations:

Based on the findings, the following recommendations are suggested:

Awareness programs should be conducted among students to improve knowledge about Nipah virus, especially regarding transmission, prevention, and treatment.

Educational institutions should include infectious disease education in their curriculum or seminars.

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Public health authorities should utilize media campaigns and workshops to spread accurate information.

Further studies should be conducted with larger and more diverse samples to improve generalizability.

Future research should include analytical tests (e.g., chi-square) to explore associations between knowledge and demographic variables.

Studies should also assess attitudes and preventive practices to provide a more complete understanding.

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