Volume 4, Issue 5, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING NIPAH VIRUS AMONG HEALTHCARE STUDENTS IN PAKISTAN

Ayesha Zafar[1], Muhammad Bilal Chuhan[2], Khansa Kaleem [3], Muskan Ali[4], Rehan Nadeem[5], Hamna Khalid[*6]

[1]*Lecturer at Department of Pharmaceutical Sciences, Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, Haripur*

[2,4,5]*Pharm D. Student at Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, Haripur*

[3,*6]*MBBS Student at Wah Medical College, Wah Cantt*

[1]ayesh.zafar@paf-iast.edu.pk, [2]b25f0135phd085@paf-iast.edu.pk, [3]khansakaleem293@gmail.com, [4]b25f0324phd003@paf-iast.edu.pk, [5]b25f0517phd024@paf-iast.edu.pk, [6]hamnakhalid2412@gmail.com

[*6]ORCID: 0009-0005-5414-1356

DOI:https://doi.org/10.5281/zenodo.20230495

Keywords

Nipah virus; zoonotic infections; healthcare students; knowledge attitude practice; outbreak preparedness

Article History

Received: 19 March 2026
Accepted: 28 April 2026
Published: 16 May 2026

Corresponding Author: *
Hamna Khalid

Abstract

Background: *The nipah virus is a likely cause of serious fatalities with great potential to spread in South and Southeast Asia as an emerging, zoonotic infection. Poor awareness and readiness of students in health care could interfere with early identification and prompt response of future outbreaks.*

Objective: *To establish the knowledge, attitudes and practices (KAP) on Nipah virus among healthcare students.*

Methodology: *The study was cross-sectional carried out between January and March 2026 at the Pak-Austria Fachhochschule Institute (PAF-IAST), Pakistan. Convenience sampling was used to recruit a total of 312 healthcare students (Pharm D, MBBS and others). A validated questionnaire consisting of a structured, self-administered questionnaire was used to collect the data to address socio-demographics and KAP domains. A Likert scale was used to measure the responses. The SPSS version 26 was used in the analysis of data and descriptive statistics and chi-square test were used; a p-value of or less was viewed as significant.*

Results: *Among 312 participants, 47.1% were aged 17–19 years, 57.7% were females, and 55.8% were Pharm D students. In general, moderate knowledge was most prevalent among domains: 32.7% in animal to human transmission, 35.6% in respiratory symptoms, and 33.7% in severity of disease. Knowledge on the availability of vaccines was, however, low with 30.8% reporting negligible and 29.8% low knowledge. Attitude measurement revealed that 43.3% were moderately confident in community coping strength and 35.6% were moderately confident in authorities and 33.7% reported a moderately threatening risk of the disease. Prevention practices were changing: 33.7% demonstrated moderate levels of consideration to report suspected cases, 31.7% moderate, and 28.8% very high compliance with hand hygiene, and 32.7% low compliance with mask use on animals handling. There was minimal educational outreach practice, with 32.7% ending up practicing moderately. There was no significant association between*

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

knowledge (p = 0.198), attitude (p = 0.449), or practice levels (p = 0.810) based on the field of study.

Conclusion: *Moderate KAP on Nipah virus with significant knowledge gap on preventive practice and knowledge area among healthcare students are observed. Precise education-related interventions, interdisciplinary education, and elevated infection control awareness should be needed to advance preparedness to potential zoonotic outbreak reactions.*

INTRODUCTION

Nipah virus (NiV) is an extremely dangerous zoonotic virus of the genus of Henipavirus and the family of Paramyxoviridae, directly posing a serious threat to the global health of the population.[1] The reservoir in this case is the fruit bats of genus Pteropus or the flying fox. The infection is known to be transmitted to humans through direct contact with infected bats or indirectly through the intermediary animal, e.g, pigs.[2] The human infection can also take place by way of ingesting of contaminated food items, especially raw date palm sap or bat secretion exposed fruits. The first case of Nipah virus was reported in 1998 to 1999 in Malaysia where the disease spread because of the infection of pigs that then cause disease after the infection in human beings. Since its discovery, a series of outbreaks has been reported in some countries in South and Southeast Asia especially in Bangladesh and India where it is claimed that humans interact with animals creating conditions that support the spread of the virus.[3] Nipah virus presents as a very varied disease with elevated rates of morbidity starting with some indiscriminate effects like fever, headache, myalgia and fatigue. Nevertheless, the disease may easily evolve into serious neurological problems and encephalitis, seizures, and coma. Infected individuals also rarely have respiratory issues.[4] The incubation period is usually between 4 to 14 days though, in some instances it has lasted longer. Nipah virus infection is among the deadliest emerging infections since a range between 40% to 75% is the case fatality rate based on outbreak and capacity of health service providers to respond to the outbreak. Today, the main way of diagnosis is based on laboratory tools including polymerase chain reaction (PCR) and antigen detection procedures. Although diagnostic technology has improved, the treatment is currently focused on supportive care as there have been no particular antiviral drugs or popularly available vaccines.[5]

The fact that most outbreaks have been reported in Bangladesh and India notwithstanding, there is a tendency towards the risk of Nipah virus spreading to other countries given that the countries have similar ecological features, the migration habits of the fruit bats and the inter-country movement of animals and/or people.[6] Since populations of fruit bat can be found in the rural and peri-urban areas of Pakistan, and there is human-animal human contact, then there are chances that there might be a spillover.[7] Healthcare professionals and students are ready and aware in such a situation and this are important in the early detection, reporting and handling of suspected cases.[8] Earlier research has shown inconsistency in the level of knowledge, attitude and practices associated with Nipah virus among health care providers and students. Although there are positive responses amongst those who regard infection control, knowledge gaps and inconsistent preventive measures are also prevalent especially in people who have not gone through formal training when it comes to dealing with emerging infectious diseases or those whose knowledge has not been subjected to a booster of emerging infectious disease education.[9,10]

Knowledge, Attitude, and Practice (KAP) research are popular instruments in evaluation of the extent of awareness, perception and practice of behavior about infectious diseases. This type of study can be used to establish the gaps in knowledge and readiness, which will allow the creation of the necessary educational interventions and training. In the light of the growing danger of new outbreaks of zoonotic diseases and a very low level of awareness of the

Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

social issue of Nipah virus in most areas, it is vital to consider the extent of knowledge, attitudes and preventive behaviors of health care students. Hence, the current study is intended to evaluate the knowledge, attitudes, and practices of Nipah virus among healthcare students to identify any gaps and supportive measures required to increase preparedness to recurrent outbreaks and prevent the disease.

METHODOLOGY

The study is a cross-sectional study conducted between January and March 2026 at Wah Medical College and Pak-Austria Fachhochschule Institute of Applied Sciences and Technology (PAF-IAST) in Pakistan. Sample size included 312 participants and the OpenEpi sample size calculator was used to calculate the sample size. Convenience sampling technique was used. Inclusion criteria were healthcare students of Pharm D, MBBS and other healthcare students present within the study duration and willing to participate. Exclusion criteria included students who do not provide consent for the participation, filled an incomplete questionnaire, or were not registered to healthcare related programs and were not part of the research. Data collection was done by using the structured, self-administered, previously validated questionnaire; it was based on the pre-existing studies on the topic of knowledge, attitudes, and practices related to Nipah virus. The questionnaire will have four distinct sections, contain socio-demographic variables, awareness about Nipah virus, attitude about Nipah virus prevention and practices for Nipah virus prevention. The level of knowledge, attitudes, and practices of the respondents were obtained by assessing their responses on a Likert scale with the ratings being negligible, moderate, and high. Before collection of data, ethical approval was obtained from the respective institutions and informed consent of all individuals was obtained. Confidentiality and anonymity of the participants were maintained. Data analysis was performed using the SPSS version 2. Frequencies and percentages were used to obtain descriptive statistics of categorical variables. The chi-square test was used to ascertain the association between demographic factors and the knowledge, attitudes and practices. A p-value of or less than 0.05 was taken as significant.

RESULTS

Table 1

Socio-Demographic Characteristics of Participants (n = 312)

Variables	Categories	f (%)
Age (years)	17–19 years	147 (47.1%)
	20–22 years	114 (36.5%)
	22–25 years	51 (16.3%)
Gender	Male	132 (42.3%)
	Female	180 (57.7%)
Field of Study	Pharm D	174 (55.8%)
	MBBS	33 (10.6%)
	Other	105 (33.7%)
Place of Residence	Urban	204 (65.4%)
	Rural	108 (34.6%)
Socioeconomic Status	Lower	45 (14.4%)
	Middle	225 (72.1%)
	Upper	42 (13.5%)

Table 1 presents the socio-demographic characteristics of the study participants (n = 312). The variables included age, gender, field of study, place of residence, and socioeconomic status. Regarding age distribution the majority participants are young with age 17-19 years 147

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

(47.1%). In terms of gender distribution there is high representation of females 180 (57.7%) as compared to males 132 (42.3%). With respect to field of study Pharm D shows more than half of participant 174 (55.8%) whereas MBBS students compromises of 33 (10.6%), and students of other fields accounted for 105 (33.7%). Place of residence shows 204 (65.4%) were from urban areas and 108 (34.6%) were from rural areas. Socioeconomic status shows the majority participants are from middle class 225 (72.1%) followed by the lower class 45 (14.4%) and upper class 42(13.5%) respectively.

Table 2
Knowledge Regarding Nipah Virus Among Healthcare Students (n = 312)

Variables	Categories	f (%)
Direct contact with animals as main source of Nipah virus spread	Negligible	42 (13.5%)
	Low	60 (19.2%)
	Moderate	102 (32.7%)
	High	84 (26.9%)
	Very High	24 (7.7%)
Respiratory signs observed in Nipah virus infection	Negligible	60 (19.2%)
	Low	81 (26.0%)
	Moderate	111 (35.6%)
	High	45 (14.4%)
	Very High	15 (4.8%)
Media involvement in dissemination of Nipah virus information	Negligible	51 (16.3%)
	Low	111 (35.6%)
	Moderate	99 (31.7%)
	High	42 (13.5%)
	Very High	9 (2.9%)
Knowledge regarding vaccine against Nipah virus	Negligible	96 (30.8%)
	Low	93 (29.8%)
	Moderate	66 (21.2%)
	High	42 (13.5%)
	Very High	15 (4.8%)
Perceived severity of Nipah virus infection	Negligible	39 (12.5%)
	Low	39 (12.5%)
	Moderate	105 (33.7%)
	High	96 (30.8%)
	Very High	33 (10.6%)

The information about direct contact with animals as primary source of transmission of Nipah virus is represented in table 2. Most of them possess moderate knowledge 102 (32.7%) and there was a smaller percentage who have very high knowledge 24(7.7%) respectively. In terms of respiratory signs that have been experienced in Nipah virus infection majority has moderate knowledge 111(35.6%). Reporting outcomes of knowledge on Media involvement in sharing of information about the Nipah virus indicate that most people have low knowledge 111(35.6%) and then moderate knowledge 99(31.7%). Reporting results of knowledge regarding vaccine against Nipah Virus majority have negligible knowledge 96(30.8%) or low knowledge 93(29.8%). Results of knowledge about perceived severity Nipah virus infection reveals that most people have moderate knowledge and some of them had very high knowledge; 39(12.5%) is negligible, and

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

105(33.7%) is moderate and 96(30.8%) is high and very high respectively.

Table 3
Attitude Toward Nipah Virus Among Healthcare Students (n = 312)

Variables	Categories	f (%)
Confidence in community's ability to cope with Nipah virus outbreak	Negligible	51 (16.3%)
	Low	48 (15.4%)
	Moderate	135 (43.3%)
	High	60 (19.2%)
	Very High	18 (5.8%)
Confidence in authorities to handle Nipah virus outbreak	Negligible	33 (10.6%)
	Low	81 (26.0%)
	Moderate	111 (35.6%)
	High	63 (20.2%)
	Very High	24 (7.7%)
Perception of Nipah virus as a serious health threat	Negligible	24 (7.7%)
	Low	33 (10.6%)
	Moderate	105 (33.7%)
	High	96 (30.8%)
	Very High	54 (17.3%)
Frequency of wearing mask while handling animals	Negligible	90 (28.8%)
	Low	102 (32.7%)
	Moderate	54 (17.3%)
	High	42 (13.5%)
	Very High	24 (7.7%)
Practice of sanitization protocols at workplace	Negligible	57 (18.3%)
	Low	48 (15.4%)
	Moderate	120 (38.5%)
	High	57 (18.3%)
	Very High	30 (9.6%)

Table 3 shows that the confidence in community's ability to cope with Nipah Virus outbreak shows majority of the students have moderate attitude 135 (43.3%) followed by very high attitude 60 (19.2%). Regarding the confidence in authorities to handle Nipah virus outbreak shows majority have moderate attitude 111 (35.6%) followed by33 (10.6%) shows negligible attitude. Reporting the attitude of students towards perception of Nipah virus as a serious health threat shows majority of students have moderate attitude 105 (33.7%). The results regarding attitude of students wearing masks while handling animals is majority have lowest attitude and few of them have very high attitudes; Finally reporting the attitude towards practice of sanitization protocols at workplace shows majority have moderate attitude and few of them have very high attitude.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Table 4

Practices Regarding Nipah Virus Prevention Among Healthcare Students (n = 312)

Variables	Categories	f (%)
Consideration in reporting cases with signs similar to Nipah virus	Negligible	51 (16.3%)
	Low	69 (22.1%)
	Moderate	105 (33.7%)
	High	48 (15.4%)
	Very High	39 (12.5%)
Frequency of hand washing after dealing with animals	Negligible	15 (4.8%)
	Low	51 (16.3%)
	Moderate	99 (31.7%)
	High	57 (18.3%)
	Very High	90 (28.8%)
Education of family and peers about preventive measures of Nipah virus infection	Negligible	81 (26.0%)
	Low	63 (20.2%)
	Moderate	102 (32.7%)
	High	45 (14.4%)
	Very High	21 (6.7%)

Table 4 shows regarding consideration in reporting cases with signs similar to Nipah virus shows majority have moderate 105 (33.7%) and few of them shows very high. Regarding the results of washing hands after dealing with animals 15 (4.8%) is negligible, 51 (16.3%) is low, 99 (31.7%) is moderate, 57 (18.3%) is high and 90 (28.8%).Finally regarding the practices of family and peers about preventive measures of Nipah Virus infection majority have moderate practices and few of them have very high practices.

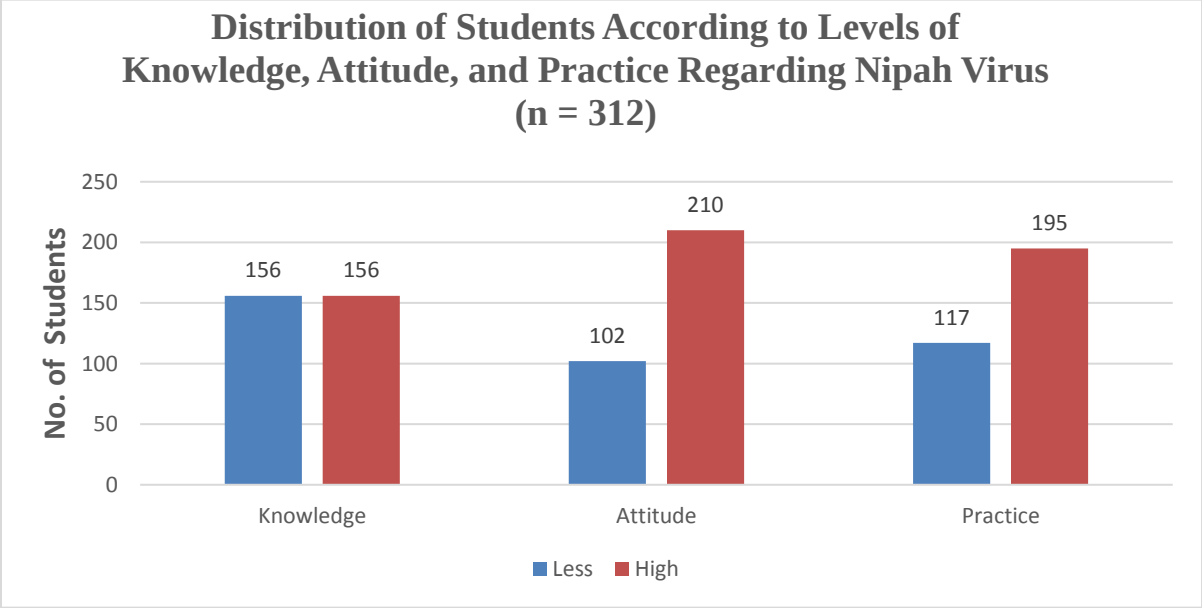

Figure 1: Distribution of Students According to Levels of Knowledge, Attitude, and Practice Regarding Nipah Virus (n = 312)

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Table 5

Association of Field of Study with Knowledge, Attitude, and Practice Levels Regarding Nipah Virus (n = 312)

Variable	Categories	Pharm D n (%)	MBBS n (%)	Other n (%)	Chi-square (χ^2)	p-value
Knowledge Level	Low	81 (46.6%)	15 (45.5%)	60 (57.1%)	3.243	0.198
	High	93 (53.4%)	18 (54.5%)	45 (42.9%)		
Attitude Level	Low	54 (31.0%)	9 (27.3%)	39 (37.1%)	1.603	0.449
	High	120 (69.0%)	24 (72.7%)	66 (62.9%)		
Practice Level	Less Practice	63 (36.2%)	12 (36.4%)	42 (40.0%)	0.422	0.810
	High Practice	111 (63.8%)	21 (63.6%)	63 (60.0%)		

Table 5 provides the relationship that determines the field of study with the level of knowledge, attitude, and practice (KAP) of Nipah virus among healthcare students. The students of Pharm D had high level of knowledge (53.4%) than MBBS students (54.5%) and other healthcare students (42.9%); however, there is not significant association between field of study and level of knowledge (χ^2 = 3.243, p = 0.198). Likewise, the 69.0% students of Pharm D and 72.7% students of MBBS students had high levels, which did not have a statistically significant association with field of study (χ^2 = 1.603, p = 0.449). Regarding practices, students of Pharm D (63.8%) and MBBS (63.6%) and other disciplines (60.0%) reported the highest practice levels, and the association was not statistically significant (χ^2= 0.422, p = 0.810). Comprehensively, knowledge, attitude, and practice level of Nipah virus were not significantly associated with field of study in a group of healthcare students.

DISCUSSION

In the current study, the knowledge, attitude and practice (KAP) of Nipah Virus Infection were evaluated among the students of the healthcare and the awareness about the disease showed moderate level with considerable differences in certain areas. The percentage of participants with moderate knowledge about routes of transmission and clinical manifestations, especially respiratory symptoms, was large.[11] The result is corroborated with the past researches carried out in South Asia, in which the healthcare students were found to be having an adequate level of knowledge but not profound about emerging zoonotic infections. Indicatively, outbreaks post-outbreak research on studies in Bangladesh and India reported comparable median awareness scores due to the low curriculum coverage on rare yet highly fatal illnesses.[12] Nevertheless, the comparatively low awareness of vaccine availability, though in the context of ongoing research and with no commonly accepted vaccine, emphasizes knowledge gap, which have already been reported in previous KAP studies of emerging infectious diseases.

Regarding the attitudes, most of the participants were of moderate perception of risk and trust in community and governmental response. This is in line with the earlier studies in the past as the outbreak of zoonotic illnesses like Ebola Virus Disease and COVID-19 recorded that healthcare students expressed unwarranted optimism but not high confidence in systemic preparedness.[13] It is important to note that, even though a significant percentage of students have known about Nipah virus as a serious health risk, there was a comparatively less degree of trust on authorities, and this may indicate the general issues about the adequacy of healthcare infrastructure and outbreak readiness in emerging environments.[14] Similar tendency has been noted in the Pakistani and regional studies, which argues that perceived institutional preparedness is a major factor in the formation of intentions in case of a developing infectious threat. The evaluation of the preventive measures showed inconsistent results. Although the level of hand hygiene was relatively good, especially after exposure to the animals, other preventive habits, including wearing a mask during animal handling and peer education were

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

not good enough.[15,16] These results are consistent with other past KAP studies, where lack of consistency between knowledge and practice has always been observed. Indeed, even though sufficient information was available at the moment of the COVID-19 Pandemic, compliance with preventive measures among students and healthcare professionals differed considerably. The reasons that might explain this gap can be behavioral, cultural, and resource-based factors, such as perceived vulnerability, access to protective measures, and inadequate practical training on infection prevention measures.[17,18]

Lastly, the research observed no significant difference in the research field (Pharm D, MBBS and others) and the level of KAP, meaning that the distribution of awareness and behaviours diffuses across disciplines. This is unlike in some of the previous researches in which medical students were found to exhibit a better level of knowledge compared to their non-medical counterparts. Nonetheless, the same results have been also described in multidisciplinary healthcare environments, which also indicates that exposure to the knowledge of infectious diseases is possibly more subject to external input, including media as opposed to schooling.[19,20] The findings highlight the importance of combined, interdisciplinary educational intervention and specific awareness strategies to enhance the readiness to similar zoonotic infections such as Nipah virus.

CONCLUSION

To sum up, the level of knowledge, attitude, and practices in relation to Nipah virus among healthcare students were moderate, with obvious gaps in such key aspects as vaccine knowledge, preventive measures, and belief in outbreak preparedness. Despite the overall knowledge on transmission and severity of the disease, discrepancies between knowledge and actual behavior point out to the necessity of more effective translation of awareness into action. The fact that there are no noteworthy distinctions between the disciplines also shows that the gaps are not discipline-specific. Thus, structured education on the emergent zoonotic infections, reinforced training of the practical infection control, and awareness campaigns across the disciplines are crucial to increase the preparedness and response capacity of future healthcare professionals.

REFERENCES

Riaz F, Ashraf M, Usman M, Bashir M, Ahmed W, Suleman M, Mughal MA, Maroof S, Shah M, Fatima QT. KAP survey to assess preparedness and knowledge regarding Nipah virus among veterinary students and practitioners. Agrobiological Records 19: 100-107 [Internet]. 2025 Apr

Islam T, Hasan M, Mutsuddi A, Shifat AA, Goutam A, Bari MR, Eva FN, Rozars MF, Sultana S, Sarker NE, Nabi MH. Knowledge and attitude among Bangladeshi healthcare workers regarding the management and infection prevention and control of Nipah virus. Journal of Virus Eradication. 2024 Sep 1;10(3):100389.

Ali N, Iqbal A, Rehman FU, Osama M, Khalid M, Jamal M. Knowledge, attitude, and practice (KAP) study on dengue fever among medical students in Dera Ismail Khan, Pakistan: knowledge, attitude, and practice study on dengue fever among medical students. Pakistan Journal of Health Sciences. 2024 Aug 31:186-91

Hossain H, Sakib MA, Sayeed SS, Rahman M, Brishty KA, Pal SK, Rahman T, Marma CS, Rafi MK, Islam S, Shahriar F. Community knowledge and response to Nipah virus infection and its transmission, prevention and control measures: Insights from a cross-sectional survey in Bangladesh. PLOS Neglected Tropical Diseases. 2025 Dec 17;19(12):e0013855.

Al Sulayyim H, Alsaleem M, Sherjab A, Aldoghman S, Alyami H, Al Yami A, Almeshal M, Altheban M, Alsinan D, Altheban O, Al-Mansour F. Knowledge of Healthcare Workers Towards Nipah Virus: A Cross-Sectional Study. Research in Community & Public Health Nursing (RCPHN). 2024 Sep 1;35(3).

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Mokbul MI, Saha S, Tuli SN, Nur FB, Islam AM, Islam T, Shreyan S, Bhadra AB, Prince GD, Eva IS, Tabassum MN. Assessment of Public Knowledge Regarding the Emergence of Nipah Virus Outbreak in Bangladesh: A Nationwide Cross-Sectional Study.

Rehman S, Ullah S, Effendi MH, Shah MK, Aziz D, Budiastuti B, Ullah S, Khan A, Malik MI, Rehman WU, Anwar MI. Knowledge, attitudes, and practices toward monkeypox among university students in Khyber Pakhtunkhwa, Pakistan: A cross-sectional study from Gomal University. Int. J. One Health.;11(2):271-84.

Mokbul MI, Saha S, Tuli SN, Nur FB, Islam AK, Islam T, Shreyan S, Bhadra AB, Prince GD, Eva IS, Tabassum MN. Assessment of the general population knowledge about the emergence of Nipah virus outbreak in bangladesh: a nationwide cross-sectional study. Journal of Virus Eradication. 2025 Mar 1;11(1):100585.

Yang Y, Liang R, Luo Y, Zhu D, Liu Y, Guo Y, Zhang J, Niu Q. Investigation on the knowledge-attitude-practice of medical students in controlling emerging infectious diseases: A case study of COVID-19. PLoS One. 2025 Dec 10;20(12):e0338708.

Aslam F, Bibi R, Din IL, Anwar S, Mehboob DY, Habib U, Fatima A. Effect of educational interventions on awareness of dengue fever and its preventive measures among high school students: educational interventions on awareness of dengue fever. NURSEARCHER (Journal of Nursing & Midwifery Sciences). 2024 Sep 30:24-9.

Ahmed T, Amjad OB, Ahmed H, Ahmed S, Ansari JA, Ricketson R, Tahir MF. A cross-sectional survey on fruit bat-human interaction in Pakistan; one health perspective. One Health Outlook. 2023 Feb 28;5(1):3.

Das P, Mannan MA, Chowdhury S. Knowledge, attitudes, and practices on occupational hazards among veterinary students in Bangladesh: A cross-sectional study. Journal of Public Health Research. 2025 Oct;14(4):22799036251388585.

Elsersawy N. Assessing Knowledge, Attitudes, and Practices (KAP) Towards the One Health Approach in Governmental Officers in Egypt.

Azlan NZ, Shahirah Razaly NN, Wan Abas WN, Othman N, Md Isa ML. Knowledge, Attitudes, and Practices Towards Wild Animal Trade and Consumption in Preventing Zoonotic Disease Among the Community of Sungai Lembing, Pahang. Malaysian Journal of Medicine & Health Sciences. 2024 Sep 1;20(5).

Bakhtiar R, Duma K, Hilda H, Hendra R, Mallongi A. Gender differences associated with knowledge, attitude, and behavior about cough etiquette in primary health care. Pharmacia. 2024 Apr 4;71:1-6.

Mcleod C. The knowledge, attitudes and perceptions towards needle stick protocol of chiropractic students at a South African university. University of Johannesburg (South Africa); 2024.

Ali I, Hassan Z, Ullah AR, Wazir MN, Fida N, Khan MI, Masood A, Shah SZ, Ali W, Ullah I, Ashraf A. Healthcare workers' knowledge and risk perception regarding the first wave of COVID-19 in Khyber Pakhtunkhwa, Pakistan: An online cross-sectional survey. Annals of Medicine and Surgery. 2024 May 1;86(5):2562-71.

Bose B, Kumar S. Zoonotic diseases and the plight of public health awareness: a study on human perception. Journal of Zoonotic Diseases. 2024 Feb 1;8(1):460-7.

Gonzalez RG. Using Random Forest feature importance results to predict zoonosis. medRxiv. 2023 May 5:2023-05.

Ninsiima LR, Nyakarahuka L, Kisaka S, Atuheire CG, Mugisha L, Odoch T, Romano JS, Klein J, Mor SM, Kankya C. Knowledge, perceptions, and exposure to bats in communities living around bat roosts in Bundibugyo district, Uganda: implications for viral haemorrhagic fever prevention and control. BMC infectious diseases. 2024 Mar 14;24(1):311.