

Monkey Pox an Emerging Zoonosis: Awareness among the University Faculty Members, Rawalpindi



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Abstract

Background: Rapid spread of monkey pox across countries has raised serious concerns and WHO has announced it a Public Health emergency of international concern. It is essential to promote educational campaigns to bridge gaps in understanding this emerging zoonosis. The objective was to evaluate knowledge and awareness level regarding monkey pox among faculty members of Public Sector University.

Methodology Cross-sectional study was conducted on 70 faculty members in Dec 2022-Aug 2023. Close-ended questionnaire was used by convenience sampling, socio-demographics were recorded along with evaluation of awareness regarding monkey pox epidemiology, prevention and control. Twenty questions were asked, based on correct answer counts, overall knowledge and awareness level was evaluated placing in categories; poor, moderate and good. Chi-square test was used to determine association between awareness level and variables; age, education, gender, marital status using SPSS-26.

Results: Out of 70 participants; 29 (41.42%) male, 41(58.57%) females, age group 25-60 years, average 38 years, married 53 (75.71%), majority 61 (87.14%) from University surroundings. Average of overall correct answers was calculated, 45.6% answered correctly indicating “moderate” level of knowledge and awareness. No relationship was found between awareness level and age, education, gender, marital status of respondents.

Conclusion: Knowledge and awareness level of faculty members regarding monkeypox epidemiology, infection, prevention, and control was moderate and no relationship was found between awareness level and age, education, gender, marital status of respondents. Collaborative efforts by all stakeholders can play significant role in enhancing monkeypox awareness, leading to a decreased risk of disease transmission.

Keywords: Monkeypox; emerging zoonosis; awareness; university

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Introduction

Monkeypox disease has a global significance in Public Health due to its impact on west and central African countries along with the remainder of the world, as reported by the WHO in May 2022. The identification of monkeypox disease in multiple non-endemic countries has sparked concerns among Public Health authorities worldwide (1). According to reports (2), the rise in the median ages of monkeypox cases and the reappearance of monkeypox occurrences in various countries after an interval of nearly forty years, has become a topic of global concern. Ongoing studies are being conducted to gain deeper insights into the disease epidemiology, sources of infection, and transmission patterns.

Human monkeypox is a resurfacing “zoonotic infectious disease” triggered by a “double-stranded DNA” virus that belong to the

“Orthopox virus genus” of “Poxviridae” family. This virus is closely related to vaccinia (cowpox) and variola (smallpox) viruses and leads to smallpox-like symptoms in humans, though its clinical severity is comparatively lower (2). Since the smallpox eradication in 1980 and the discontinuation of smallpox vaccination thereafter, monkeypox has appeared as the primary Orthopox virus of utmost significance for Public Health.

Monkeypox predominantly manifested in central and west Africa, frequently near tropical rainforests, but there has been a growing occurrence in urban settings. The disease is transmitted through various animal hosts, encompassing rodents and non-human primates. Initially, the monkeypox virus was isolated from the monkeys, yet, its natural hosts encompass tree and rope squirrels, Gambian pouched rats, and rodents-dormice (3). Human monkeypox was initially detected in humans in 1970,

specifically in a 9-month-old baby boy from the Democratic Republic of the Congo, in that area from where smallpox was eradicated in 1968.

The virus of human monkeypox became a concern for the Public Health after an outbreak that occurred in May-June 2022, affecting the world already dealing with the COVID-19 pandemic (2). In July 2022, the WHO declared the Monkeypox virus in humans as a “public health emergency” of international concern. In November 2022, WHO stressed the use of the term “Mpox” as a synonym for monkeypox (4). Between January and July 2022, over 14,500 cases were documented across 72 countries in all WHO regions, with a significant number of cases observed in the European region. Notably, many of these cases showed transmission without any links to disease-endemic countries. Recently, on April 17, 2023 in Rawalpindi Pakistan; recorded its first laboratory-confirmed case of monkeypox (5). This marks a significant development in the spread of the disease to new regions. The re-emergence of monkeypox outbreaks in certain countries has been linked to weakening immunity caused by the suspension of smallpox vaccination. The absence of smallpox vaccination has potentially left populations more susceptible to monkeypox, leading to its resurgence in these regions (6). According to Jairoun et al (1), antibodies produced from prior smallpox vaccinations can offer up to 85% cross-protection against monkeypox. Consequently, individuals who have not received the smallpox vaccine may experience a higher incidence of monkeypox viral infection due to the lack of this cross-protection (6).

The incubation period of monkeypox ranges from 5 to 21 days, during which clinical symptoms manifest similarly to smallpox but with less severity. Patients typically experience a prodrome lasting from 4 to 17 days after the disease which is characterized by symptoms such as headache, fever, back pain, myalgia, and lymphadenopathy, commonly affecting the cervical and maxillary regions (7). Following the prodrome, a maculopapular rash with a centrifugal distribution emerges, and as time passes, the distinct lesions develop into scabs. This specific pattern of rash progression is a notable feature of monkeypox infection (7,8). Complications may arise after the disease including encephalitis, pneumonitis, keratitis, and susceptibility to other bacterial infections. Despite these potential complications, the mortality rate remains relatively low, ranging from 1% to 10%.(8).

Monkeypox can be transmitted to humans through two main routes: from animals, primarily from rodents & primates, to humans (animals-to-humans), or from infected humans to others (human-to-human) (7). The virus can be transmitted through various means that includes hunting or consuming animals infected with the disease, exposure to aerosol droplets of large size, directly contacting infectious

scabs, sores, body secretions, or through sharing of bedding or clothing that is contaminated (7).

Key elements of monkeypox prevention include isolating the infected patients, maintaining hand hygiene with hand sanitizers, ensuring vaccination, and wearing face mask once encountering an infected animal or person. Implementing these measures is essential for controlling the spread of the disease and safeguarding Public Health (7).

Prevention and prompt management of monkeypox are of paramount importance, particularly for the general population and healthcare workers. Raising awareness through effective strategies can significantly aid in disease prevention. There is a necessity for a public sensitization campaign to advocate for proper prevention measures and to address the stigma associated with the affected community (9). Elimination of monkeypox virus can be achieved through public education, conducting risk assessments, and adopting the One Health Approach (10).

Fresh cases of monkeypox in Pakistan are distressing and call for urgent prevention and control to curtail its spread. In Pakistan and other low-middle-income countries, the scarcity of resources in healthcare settings necessitates the implementation of proper measures to tackle the emerging and re-emerging viruses while considering the epidemiological, economic and social constraints (11). Pakistan encounters numerous challenges in fighting the intricate dynamics of monkeypox transmission. Practical measures, health education, and awareness promotion are vital to educate the public and prevent outbreaks.

Effective control of global outbreak of monkeypox demands meticulous coordination among various stakeholders, which includes the community, clinicians, public health officials, and future healthcare professionals. It involves evidence based information dissemination, conducting suitable diagnostic testing, implementing contact tracing, and ensuring accessible healthcare for individuals and their contacts that have been affected (11).

The objective of this study is to evaluate the awareness among the University faculty members regarding monkey pox epidemiology, prevention, and control. The participants can impart wakefulness to the students, peer group, families and community regarding the seriousness of disease, emerging trends, its control, and implementation of evidence-based strategies. The findings of this study will be used to inform appropriate faculty support strategies and such improvements are likely to have long-lasting and valuable benefits. Due to the growing cases of monkey pox, this study will serve as an instrument to generate innovative strategies for the university stakeholders and will also facilitate in formulation of pragmatic recommendations that can impart awareness among the masses about monkeypox prevention and control.

Methodology

A cross-sectional descriptive study was conducted from December 2022 to August 2023 at a Public Sector University, National University of Medical Sciences Rawalpindi. The study protocol was approved by the Institutional Review Board & Ethical Committee of NUMS (IRB No: O6/IRB&EC/NUMS/13 dated 29 August 2022) and the Informed consent was confirmed by the IRB. Consent was taken from the study participants and their confidentiality was also assured.

Total 76 Faculty members of all the departments; faculty of Multidisciplinary studies and Social Sciences and Humanities from NUMS PWD Campus participated in the study. Willing members were included in the study and the non-consenting ones were excluded. A close-ended, semi-structured, pre-tested, self-administered questionnaire was used, by nonprobability convenience method of sampling. Before the data collection a workshop was also organized at the University for understanding of Monkey pox and its Epidemiology. The questionnaire was developed through literature search, and specific items were designed for this study(4,12). A pilot study was conducted on 15 participants to pre-test the questionnaire in our study setting.

In part A of the questionnaire faculty members' biodata included the socio-demographic information; age, gender, residential status, residential city, marital status, educational status, faculty members of departments from Multidisciplinary studies and faculty of social sciences and Humanities.

In part B of questionnaire (table 2), the questions were related to knowledge and awareness of monkey pox regarding the Epidemiology, Infection, prevention, and control. There were 20 questions based on correct and incorrect statements; including monkey pox epidemiological aspects, mode of transmission, environmental and social factors, reservoir, genus family, incubation period, clinical signs, lab investigations, vaccines, precautions, infection prevention and control. The preventive measures include using personal protective equipment, hand hygiene, isolating patients, addressing endemicity, adopting the One Health approach, and implementing surveillance. Based on their responses (the correct answers count), against all the 20 questions, the overall knowledge and awareness level was evaluated by placing in different categories like poor, moderate and good.

The scale used to evaluate the level of knowledge and awareness according to their correct answers was; poor

(between score 0-33), moderate (between score 34-67) and good (between score 68-100). Their frequencies and percentages were calculated accordingly. To determine the association between the faculty awareness level and variables like; age, education, gender and marital status the chi-square test was used. The p-value less than 0.05 was considered statistically significant. Data was analyzed using SPSS version 26.

Results

In this study the questionnaire was distributed to 76 faculty members however, six members did not fill the form. Remaining 70 faculty members participated in the study out of which 29 (41.42%) male and 41(58.57%) females were between the age of 25-60 years with average age group of 38 years. Married participants were 53 (75.71%), unmarried 17 (24.28%) and majority 61 (87.14%) belonged to surrounding area of University Islamabad, Rawalpindi, Taxila and Wah. Out of the total participants 50 (71.42%) were from faculty of Multidisciplinary studies and 20 (28.57%) from faculty of Social Sciences and Humanities.

The analysis utilized chi-square test to determine the association between participants' awareness of monkeypox and the age, education, gender and their marital status of the respondents (table 1). The overall knowledge and awareness level about monkeypox was evaluated and calculated based on the correct answers against the total 20 questions. The percentage scores of the answers are given in (Table 2). Average of the overall correct answers was recorded, and it was found that 45.6% of the respondents answered the questions correctly which indicated "moderate" level of knowledge and awareness (according to the scale defined in the methodology section). To determine the association between faculty awareness level and different variables the chi-square test was used and no relationship was found between awareness and age, education, gender and marital status of the respondents ($p>0.05$).

Table 1. Association of sociodemographic variables with awareness level among faculty members regarding Monkey Pox.

Variables	Chi-Square Value	p-value
Awareness * Age	249.422	0.445
Awareness * Education	17.295	0.570
Awareness * Gender	26.363	0.120
Awareness * Marital Status	36.289	0.549

Table 2: Knowledge and Awareness among Faculty members regarding Monkey Pox Epidemiology, Prevention and Control.

Q#	Questions	Correct	%	Incorrect	%
1.	Monkeypox in humans is an infection with a virus circulating in wildlife in Central and West Africa.	11	15.7%	59	84.3%
2.	Monkeypox was first identified in humans in the Democratic Republic of the Congo in 1970	10	14.3%	60	85.7%
3.	Monkeypox is a zoonosis, which means a disease which can spread from Animals to human	45	64.3%	25	35.7%
4.	The incubation period of monkeypox infection ranges from 5-21 days	12	17.1%	58	82.9%
5.	Main environmental and social factors for monkeypox emergence are Deforestation, climate change, civil unrest and poverty, and cessation of smallpox vaccination.	14	20.0%	56	80.0%
6.	Disease that belongs to the Genus Ortho poxvirus in the family Poxviridae (apart from Monkeypox) include smallpox	15	21.4%	55	78.6%
7.	The best diagnostic specimen to collect for laboratory testing is Skin lesion	36	51.4%	34	48.6%
8.	The most useful laboratory test to rapidly confirm monkeypox is Polymerase Chain Reaction (PCR)	34	48.6%	36	51.4%
9.	A person with monkeypox is infectious until Crusts fall off and new skin has formed.	30	42.9%	40	57.1%
10.	A vaccine against monkeypox is approved for persons at risk and available.	18	25.7%	52	74.3%
11.	Monkeypox can be transmitted person-to-person by respiratory droplets, skin lesions, contaminated materials and surfaces, and body fluids	60	85.7%	10	14.3%
12.	Animals that were reported to transmit monkeypox to humans include rodents and monkeys	12	17.1%	58	82.9%
13.	Monkeypox is characterized by, rash, swollen lymph nodes and fever	34	48.6%	36	51.4%
14.	Infection prevention and control precautions for monkeypox include use of personal protective equipment (PPE) when caring for patients, isolation of patients and hand hygiene practices	48	68.6%	22	31.4%
15.	Key moments when health workers or family attendant must perform hand hygiene include before and after touching a patient, before carrying out a clean or aseptic procedure, before and after exposure to body fluids and after touching patient surroundings	57	81.4%	13	18.6%
16.	Identification and follow-up of persons who may have come into contact with a person infected with a specific pathogen is known as routine surveillance	8	11.4%	62	88.6%
17.	Safe and dignified burial of persons who have died of or with monkeypox should align with local cultural practices and safety regulations	55	78.6%	15	21.4%
18.	Case finding involves health and community personnel systematically looking for recent or new monkeypox cases	53	75.7%	17	24.3%
19.	'One Health' is an approach to developing policies, programs, legislation, and research for the human-animal-environment interface in which different sectors work together to achieve better public health outcomes.	48	68.6%	22	31.4%
20.	Pakistan is endemic in Monkeypox.	38	54.3%	32	45.7%
	Average	31.9	45.6%	38.1	54.4%

Knowledge and awareness level (Based on Correct Answers) Poor 0-33%, Moderate 34-67%, Good 68-100%

Discussion

Achieving control of this worldwide monkeypox occurrence demands meticulous coordination among all stakeholders, which encompasses present and future healthcare professionals, public health officials, clinicians, and the community. The recent monkeypox cases reported in Pakistan are worrisome and necessitate speedy prevention and control measures to contain the disease but Pakistan is facing numerous challenges while dealing with the complicated dynamics of monkeypox transmission.

In this study, the participants demonstrated a moderate level of knowledge with score of 31.9 (45.6%), indicating that slightly less than half of them were aware of the mode of transmission and symptoms of monkeypox. Moreover, no relationship was found between monkeypox prevention awareness with the age, education, gender and their marital status of the respondents ($p > 0.05$).

Various studies(13–15) have evaluated the

knowledge about monkeypox in the general population, including in the Kurdistan-region of Iraq, Lebanon, and Czech Republic. The findings revealed that participants in these studies had insufficient knowledge. On the other hand, studies (16–18) conducted in Saudi Arabia and Jordan showed that the participants had satisfactory knowledge about monkeypox.

Out of the total respondents of our study, 32 (45.7%) incorrectly reported that monkeypox is endemic in Pakistan when asked about its endemicity. They were also unaware of the fact that monkey pox is a viral infection more pronounced in central and west Africa, as only 11 (15.75%) gave the correct answer, and the majority of them had an idea that it is present all around the world.

"One Health" is linked to improved outcomes in Public Health, promoting the development of policies, legislation, programs, and research focused on the interconnectedness of human, animal, and environmental

health. This approach encourages different sectors to collaborate, striving to achieve better Public Health results through a holistic perspective. In this study, the participants were asked regarding their knowledge of "One Health", and 48 (68.6%) were aware of it. Additionally, the majority of participants, 53 (75.7%), correctly understood that "Case Finding" includes active participation of community health workers, searching for new or recent cases.

According to a recent study (19) conducted in Saudi Arabia, 61.3% of the public conveyed interest in acquiring knowledge about monkeypox, and this interest indicated a positive correlation with their level of concern and awareness about the disease. The study also revealed that only half of health workers accurately identified the transmission mode of monkeypox from animal-to-human. However, a majority of the respondents (64.8%) acknowledged that skin contact as a source of transmission from human to other human. In this study, 45 (64.3%) of participants believed that monkey pox is a "zoonotic disease" that is spread from animals to humans and 60 (85.7%) said that skin contact is a significant mode of transmission. Regarding the best laboratory diagnostic specimen to collect for testing, the skin lesion were agreed by 36 (51.4%) in our study.

In Italy, a study (20) demonstrated that a significant majority of participants (78.5%) were aware of the transmission modes of monkeypox, which include respiratory droplets, direct contact, and body fluids. In our study 60 (85.7%) correctly responded that monkeypox can be transmitted by respiratory droplets, contaminated materials, and body fluids.

Among participants of our study, 48 (68.6%) acknowledged the importance of employing preventive measures to manage this outbreak, which includes promptly reporting symptoms to health authorities and utilizing the vaccine. Jamil et al (21) covered similar aspects in their discussion, and emphasized on the significance of having sufficient diagnostic facilities, reinstating routine vaccination practices, monitoring transmission rates through travel, and implementing robust surveillance efforts to mitigate the spread of monkeypox. Moreover, the increasing awareness and knowledge about monkeypox will serve as a primary preventive measure against the spread of the disease (22,23).

While documenting the knowledge, attitudes and practices of Italian Physicians, Riccò et al(20) found that a significant number of healthcare professionals (74.8%), recognized that prevention protocols can effectively prevent infection. However, only 44.4% had an accurate understanding that monkeypox is a pathogen that circulates among numerous hosts and is not limited to primates. Out of the total respondents, 42.3% were aware that the virus prolongedly survives on surfaces that are contaminated. In our study, only 48 (68.6%) participants correctly recognized

that infection prevention and control measures for this disease encompass using "personal protective equipment" while taking care for patients, isolation of the patients, and practicing hand hygiene.

The authors of the Italian study (20) highlighted the pivotal role of Public Health in managing incident cases, emphasizing the importance of contact tracing so as to apply the preventive methods within the community and workplace, including conduct of campaigns on the vaccination.

In a Jordanian study (16), it was found that below 40% of participants were aware that the monkeypox virus is transmitted easily from human to other human. Similarly, medical professionals in Italy reported knowledge gaps in monkeypox(20). Furthermore, studies conducted in Indonesia(24,25) revealed that healthcare professionals had low knowledge about other rare outbreaks, while their understanding of Indonesia's endemic outbreaks was relatively high. In our study, 60 (85.7%) respondents had the knowledge that skin lesions, respiratory droplets, contaminated surfaces and body fluids have a big role in transmission of disease (24). The rapid dissemination of information about monkeypox may occur through social media platforms, enabling swift communication and sharing of relevant updates. Enhanced accessibility to monkeypox information within the public can significantly contribute to knowledge acquisition, aid in containing rising cases, and help check the virus spread in developing world (24).

In another study conducted in Saudi Arabia(17), 46.5% of the public was aware of monkeypox transmission through sexual contact and body fluids. It was also indicated through scientific evidence that the fresh epidemic may align with sexually transmitted infection. In our study, 60 (85.7%) respondents had the knowledge that body fluids are an important source of transmission. The dynamics of monkeypox transmission necessitates the inclusion of a sexual health framework as a response strategy.

In the same Saudi Arabian study (17), 77% of the general population respondents did consider monkeypox as an "infectious disease" and did not associate it with bioterrorism. However, a study (16) carried out in a health school in Jordan revealed that 50% of participants linked monkeypox to bioterrorism. In this study, 59 (80%) % responded that the social factors responsible for monkey pox emergence are deforestation, climate change, civil unrest, and poverty.

Limitations include firstly, the study was limited by a small sample size. Secondly, it has been carried out on the faculty members at a single public sector university, the results would be more generalizable if faculty, students, and staff from multiple Institutes would have been involved along with the comparison among private with public universities.

Conclusion

Knowledge and awareness level of faculty members regarding monkeypox epidemiology, infection, prevention, and control was found to be moderate and no relationship was found between awareness level and age, education, gender and marital status of the respondents. Collaborative efforts by all stakeholders can play a significant role in enhancing monkeypox awareness among faculty members, leading to a decreased risk of disease transmission.

Recommendations

Addressing the challenges posed by monkeypox requires a comprehensive and coordinated approach involving global health organizations, governments, healthcare professionals, and the public. By working together, we can effectively mitigate the impact of monkeypox and safeguard public health. Promoting conspiracy ideas about viral emergence can be potentially harmful, but offering sufficient knowledge can help mitigate this risk. This is especially crucial for social media platforms, which are often used to report emerging viral infections. Therefore, it is essential to promote educational campaigns about human monkeypox to bridge the gaps in knowledge and awareness regarding this infection. This will play a critical role in enhancing the capacity to respond effectively to the disease. In the future work, more variables can be included to check the awareness of the respondents.

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Ethical Approval:

This study was approved by Institutional Review Board (IRB) & Ethical Committee of National University of Medical Sciences.

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Authors' Contribution:

UH: Conception of the study, data collection, data analysis, and drafting

TNJ: Design of the study, data analysis and interpretation

HS & RA: Data collection, data analysis, data interpretation

RZ & NJ: Data collection and drafting of the article.

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